B700
MTR
MANUAL

Burroughs

FIELD ENGINEERING

TECHNICAL MANUAL

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AA418977

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INTRODUCTION

This technical manual contains the basic documentation needed to operate and apply the Burroughs B 700-Series Maintenance Test Routines (MTR's).MTR's are used in testing and maintaining B 700 systems, subsystems, and units. All released MTR's are documented in this issue, except for:

Reader Sorter MTR (RSMTR)
Universal Cartridge Disk Drive MTR (UCDDMTR)
Communications Processor MTR (PMLCMTR)

MTR's that are not released will be issued in the near future as needed.

Because each B 700 system varies in configuration and may be upgraded or reconfigured, the MTR documentation is packaged in looseleaf form and provided with a set of preprinted index tabs to allow each user to tailor the MTR documentation to his particular site application.

The individual MTR documents may be assembled in the desired sequence (refer to Application and Use Section), and the index tabs may be affixed either to the cardboard dividers provided with the MTR's or to other forms of separators purchased locally to identify each MTR.

The MTR INDEX is provided as an aid in configuring the site MTR documentation and maintaining the documentation as it is changed. This index lists the MTR's by type and application and identifies the MTR name and part number and the current revision level and release date. Three blank columns in the MTR INDEX are provided for the user to configure and maintain his documentation. These columns are:

a. The Site Appl. (application) column, in which the user may enter an X or ✓ to indicate those MTR's that apply to his site.

b. The Vol. (volume) column, in which the user enters the number of the binder or volume (1 or 2) in which each applicable MTR is to be filed. The user may wish to put the MTR's in volumes by category and application (i.e., Volume I for system processor, system memory, and system console tests, and Volume II for peripheral device tests). A title page is provided for each volume.

c. The Change No. column, which will be used during subsequent publications to indicate the latest publication change number (PCN) suffix (-001, -002, etc.) applicable to changed MTR's. All applicable PCN's should be ordered to keep the MTR documentation up-to-date. Order only those MTR PCN's that apply to your site. Use the complete PCN number, form 1066115-nnn (1066115-001, 1066115-002, etc.) when ordering the changes.

Each branch library will be provided with a PCN cover sheet and a new MTR INDEX for each MTR PCN. Thus, each branch can maintain a complete up-to-date index of all MTR's without maintaining all of the detailed documentation.

Districts will be provided with both the MTR INDEX and detailed documentation for each PCN.

MTR INDEX

Application		Mnemonic	Name	Part No.	Site Appl.(1)	Vol.(2)	Latest Rev.	Rel. Date	Change No.(3)
Function	**Equipment**								
System processor and memory	All B 700-series processors.	FEMTMTR	Field Engineering Memory Test	1448 6906			H	10/1/74	
		PROCMTR	Processor	1448 6948			H	10/1/74	
		BSWMTR	Barrel Switch	1448 6955			C	10/1/74	
		DPMMTR	Data/Program Memory	1448 6981			C	10/1/74	
	B 711, B 771 Processors	MCUMTR	Memory Control Unit	1448 6963			F	5/31/74	
	B 720 Processor	SMCUMTR	Semiconductor Memory	2602 9694			A	10/1/74	
System console tests	B 9343 Console (64 char.) and IOC (B 705/B 711)	CONSMTR	Console (B 705/B 711)	1448 6997			C	9/28/73	
	B 9343 Console (96 char.) and IOC (B 705/B 711)	CON96MTR	Console 96-character	1449 0940			C	9/28/73	
	B 9343-x Console (64/94 char.) and B 346/B 346-1 IOC (B 720)	ECONMTR	Electronic Console	2602 9751			A	10/1/74	
	B 9344 SPO and B 44 IOC (B 771)	SPOMTR	Supervisory Printer	1449 0908			B	10/1/74	
System memory loader tests	B 705/B 711 Systems	MEMLDR MTR	Memory Loader	1448 8506 1448 8514 (diag.)			C	10/1/74	
	B 720 Systems	ELDRMTR	Electronic Memory Loader	2602 1964 2602 1972 (diag.)			A	10/1/74	
	B 771 Systems	CMLDRMTR	Card Memory Loader	2601 4043 (deck)			D	3/15/74	
	B 705/B 711, B 711-1, and B 720 Systems	MTRL	MTR Loader	2604 2610			A	10/1/74	
Card device tests	9114 Card Reader (80 col) and B 111 IOC	CR80MTR	Card Reader (80 col.)	1448 7011 1448 7524 (deck)			C	10/1/74	
	9115 Card Reader (80 col.) and B 115 IOC	CR91MTR	Card Reader 9115 (80 col.)	2601 4274 2601 7608 (deck)			D	10/1/74	
	9119-1, 9419-2/6, and 9418-2 Card Peripherals; B 311 IOC	RP96MTR	Recorder-Punch (80/96 col.)	1448 7003 1448 7961 (deck)			D	10/1/74	

(1) Enter "X" if applicable to this site.
(2) Enter volume number to be filed in.
(3) Latest publication change available (original issue unless otherwise indicated)

MTR INDEX (cont)

Application		Mnemonic	Name	Part No.	Site Appl.(1)	Vol. (2)	Latest Rev.	Rel. Date	Change No.(3)
Function	Equipment								
Disk device tests	9480-11/12, 9481-1/2 Disk Drive Units; B 489 IOC	DISKMTR	Disk	1448 6989			F	10/1/74	
	9480-11/12, 9481 Disk Drive Units; B 489-2 (Direct Memory access)	UCDDMTR	Universal Cartridge Disk Drive	2602 9710			-	Not Rel.	
Printer device tests	988, 9247, 9249 Line Printers; B 243, B 244, and B 245 IOC's	PMTR	Printer	2602 9678			C	10/1/74	
Magnetic tape device tests	9490-21/25 Magnetic Tape Cassette Drive; B 392 IOC	TCMTR	Tape Cassette	1449 0916			D	10/1/74	
	9491-2 Magnetic Tape Drive; B 391 IOC	TMMTR	Magnetic Tape Unit	1449 0874			D	10/1/74	
Paper tape device tests	9122 and 9222 Paper Tape Units; B 121 and B 221 IOC's	PTAPMTR	Paper Tape	1448 7037			A	10/1/74	
Data Communications device tests	B 352 Communications Processor (B 720 System)	PMLCMTR	Programmable Multiline Control	2602 9736			-	Not Rel.	
	B 351 and B 351-1 Single Line Controls	SLCMTR	Single Line Control	2601 4068			D	10/1/74	
Miscellaneous device tests	9134, 9135 Reader Sorter; B 131 IOC	RSMTR	Reader Sorter	2603 3027			-	Not Rel.	

(1) Enter "X" if applicable to this site.
(2) Enter volume number to be filed in.
(3) Latest publication change available (original issue unless otherwise indicated)

APPLICATION AND USE

GENERAL

The documentation in this technical manual consists of the following information, as applicable, for each Maintenance Test Routine:

a. Operating instructions, which provide the setup procedures and program steps used in implementing and operating the MTR.

b. Program listing, which is a detailed listing of the MTR and provides information concerning steps required when an error occurs.

c. Manual procedures, which are diagnostic procedures that must be followed when an error is detected by the MTR.

d. Failure dictionary, which is a list of probable defective components related to the MTR-detected error.

e. Illustrations, which are provided for some MTR's in the form of waveforms, card formats, or test patterns monitored during tests or used in implementing tests.

f. Notes, which provide additional special reference data or application/test notes.

The documentation in this manual is used with the appropriate MTR program medium to implement and use the MTR's. The program medium may be punched paper tape or 80-column cards; the type used depends on the method used by the system processor to load memory.

The MTR program exists on a magnetic tape which is distributed to each district office. Each branch must order from the district, on the required medium, the MTR's that apply to the support of the branch's respective systems.

SEQUENCE OF MTR APPLICATION

The MTR's may be divided into two major functional catagories:

a. System processor and memory MTR's.

b. I/O (peripheral) devices and associated I/O controls.

Figure 1 shows the sequence in which the MTR's should be implemented. This sequence is required because each MTR uses logic tested by a previously executed MTR. Thus, it is obvious that system console or SPO MTR must be the first I/O device test, because all I/O MTR's require the use of keyboard entries. Table 1 is a tabulation of MTR applications by system.

In addition to testing an I/O device and its I/O control, an I/O MTR provides various tests used to perform adjustments that require processor intervention. Also, tests are provided to aid in troubleshooting the I/O device.

TROUBLESHOOTING NOTES

It is important to remember that the MTR's are written to diagnose a normal failure involving one component. The MTR's do not diagnose a catastrophic failure involving many faulty components, a backplane failure, or a defective cable/connector. These failures must be diagnosed by the field engineer using the MTR's as an aid. This can be done by analyzing the program listing at the area of the failure and, if possible, single-stepping through the program, analyzing the diagnosis of the MTR, and inspecting for failures (such as backplane failure) that could cause the symptoms.

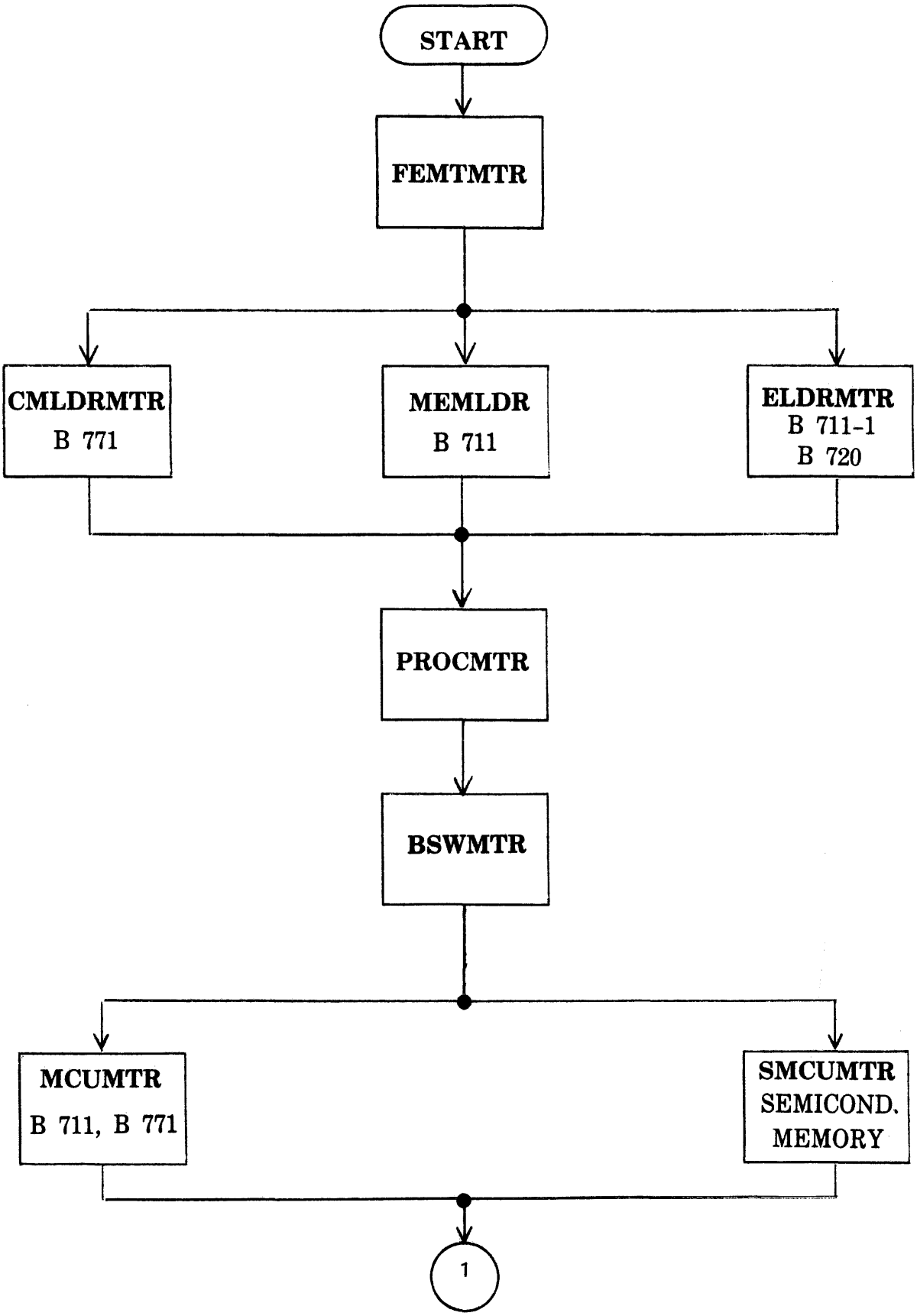


Fig. 1 MTR Implementation Sequence (Sheet 1 of 2)

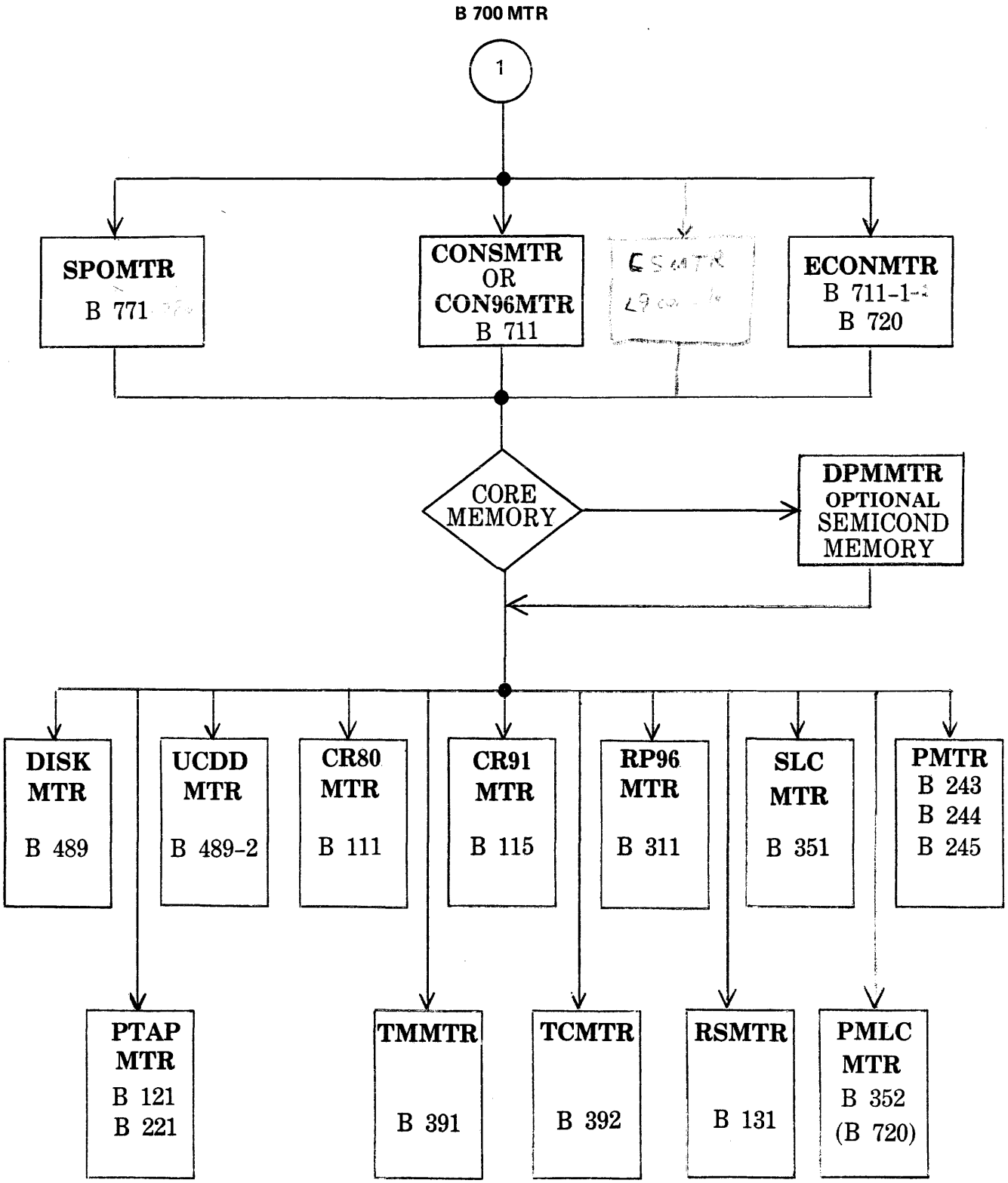


Fig. 1 MTR Implementation Sequence (Sheet 2 of 2)

Table 1. MTR Application Table

SEE MTRLDR (2604 2028) FOR OPTIONAL MTR LOADING VIA 80-COL CARDS

DEVICE	B711 MTR	PART NO		B771 MTR	PART NO	
MEMORY	FEMT	1448	6906	FEMT	1448	6906F
MEMORY LOADER	MEMLDR	1448	8498	CMLDR	2601	4035
PROCESSOR	PROC	1448	6815	PROC	1448	6815C
BARREL SWITCH	BSW	1448	6823	BSW	1448	6823C
MEM CONTROL	MCU	1448	6831	MCU	1448	6831D
CONSOLE	CONS	1448	6864			
CONSOLE, 96 CHAR	CON96	1449	0866			
SPO				SPO	1449	0825
MEM,DATA	DPM	1448	6849	DPM	1448	6849B

NOTE THE ABOVE MTRS MUST BE RUN IN THE ORDER LISTED FOR FAULT DIAGNOSIS
THE FOLLOWING MAY BE RUN IN ANY ORDER

DISK,9480&9481	DISK	1448	6856	DISK	1448	6856C
PRINTER, A9249	PMTR	2602	9660	PMTR	2602	9660
PRINTER, A9247	PMTR	2602	9660	PMTR	2602	9660
PRINTER, A 988	PMTR	2602	9660	PMTR	2602	9660
CARD RDR,9114	CR80	1448	6898			
CARD RDR,9115				CR91	2601	4266
TAPE,CASS	TC	1449	0833	TC	1449	0833B
TAPE,MAG	TM	1449	0791	TM	1449	0791B
PAPER TAPE PUNCH	PTAP	2603	5402			
PAPER TAPE READER	PTAP	2603	5402			
CARD RDR/PUNCH	RP96	1448	6880	RP96	1448	6880B
DATA COM(B351/B253)	SLC	2601	4050C	SLC	2601	4050

NOTE REVISION LETTERS,WHEN LISTED INDICATE THE MINIMUM REVISION LEVEL REQUIRED

DEVICE	B711-1 MTR	PART NO		B721 MTR	PART NO	
MEMORY	FEMT	1448	6906H	FEMT	1448	6906H
MEMORY LOADER	ELDR	2602	1956	ELDR	2602	1956
PROCESSOR	PROC	1448	6815H	PROC	1448	6815H
BARREL SWITCH	BSW	1448	6823C	BSW	1448	6823C
MEM CONTROL	MCU	1448	6831F	SMCU	2602	9686
CONSOLE (B264,B264-1)	ECON	2602	9744	ECON	2602	9744
MEM,DATA	DPM	1448	6849B			

NOTE THE ABOVE MTRS MUST BE RUN IN THE ORDER LISTED FOR FAULT DIAGNOSIS
THE FOLLOWING MAY BE RUN IN ANY ORDER

DPM MTR MAY BE RUN ON B721 HOWEVER IT IS NOT NECESSARY FOR FAULT DIAGNOSIS

MEM,DATA				DPM	1448	6849B
DISK,9480&9481(B489)	DISK	1448	6856E	DISK	1448	6856E
DISK,9480&9481(B489-2)				UCDD	2602	9702
PRINTER, A9249	PMTR	2602	9660B	PMTR	2602	9660B
PRINTER, A9247	PMTR	2602	9660B	PMTR	2602	9660B
PRINTER, A 988	PMTR	2602	9660B	PMTR	2602	9660B
CARD RDR,9114	CR80	1448	6898B	CR80	1448	6898B
CARD RDR,9115	CR91	2601	4266C	CR91	2601	4266C
TAPE,CASS	TC	1449	0833C	TC	1449	0833D
TAPE,MAG	TM	1449	0791C	TM	1449	0791C
PAPERTAPE PUNCH & READER	PTAP	2603	5402	PTAP	2603	5402
CARD RDR/PUNCH	RP96	1448	6880C	RP96	1448	6880C
DATA COM (B351)	SLC	2601	4050D	SLC	2601	4050D
DATA COM (B352)				PMLC	2602	9728
READER-SORTER (9135)				RS	2603	3019

NOTE REVISION LETTERS, WHEN LISTED, INDICATE THE MINIMUM REVISION LEVEL REQUIRED

MTR PROGRAM REFERENCE DATA

The following reference data includes instructions for extracting MTR programs, listings, and test media from the MTR program tape distributed.

1. TAPE LABELED 'MTRLST' CONTAINS THE MTR CONFIGURATION DOCUMENT FILE 'CONDOC'AND ALL FILES PREFIXED WITH 'OI' EXCEPT 'OIPMLC' AND 'OIUCDD' . THESE FILES AND THE 'FD' FILES ASSOCIATED WITH THEM ARE LOCATED ON 'MTRLSP' . RECOVERY OF THESE FILES IS VIA A LINE PRINTER AND THE SAME PROCEDURE IS FOLLOWED AS EXPLAINED BELOW WITH ONLY A TAPE LABEL DIFFERENCE.

2. TAPE LABELED 'MTRPUN' CONTAINS ALL FILES TO BE PUNCHED ON 80 COLUMN CARDS OR PAPER TAPE AND ARE PREFIXED WITH 'CD', 'TD', OR 'PT'.

FILE NAMES CONSIST OF 6 CHARACTERS, THE FIRST TWO INDICATING THE TYPE OF FILE.

OI	FOR OPERATOR INSTRUCTIONS
FD	FOR FAILURE DATA
CD	FOR CARD DECK OF PROGRAM (B771)
TD	FOR TEST DECKS
PT	FOR PAPER TAPE OF PROGRAM (B711)

THE LAST 4 CHARACTERS ARE THE FIRST 4 OF THE PROGRAM ID(MTR NAME)

EXAMPLE: OPER INST FOR BSWMTR IS OIBSWM, CARD DECK IS CDBSWM

****** NOTE SOME MTR'S CONSIST OF 2 PRINTER FILES
PMLCMTR REQUIRES OIPMLC & FDPMLC
UCDDMTR REQUIRES OIUCDD & FDUCDD

****** NOTE PROGRAM DECKS (CDXXXX) WILL BEGIN WITH A LABEL CARD CONTAINING IN COLUMNS 18 THRU 23 PROGRAM ID INFORMATION CONSISTING OF THE FIRST 4 CHARACTERS OF THE PROGRAM ID AND, WHEN APPLICABLE R FOR REVISION & THE REVISION LETTER.

EXAMPLE: PROCRC IS PROCMTR REVISION C
SLCMP1 IS SLCMTR PROVISIONAL RELEASE 1
TPNC IS TPNCHMTR WITH NO REVISIONS

A LABEL CARD IS ALSO AT THE END OF EACH DECK. WHEN LOADING B771 THE LABEL CARD TERMINATES LOADING RE-INITIATING THE LOAD WILL THEN COMPLETE LOADING.

TEST DECK (TDXXXX) LABEL CARDS ARE BLANK.
TEST DECKS ARE DESCRIBED IN RESPECTIVE OPER. INST.

THE PROCEDURE FOR EXTRACTING LINE PRINTER FILES IS:

1. MOUNT 'MTRLST' & LOAD ALL FILES.
(MCP INST - 'LOAD MTRLST/')

2. CHANGE DESIRED FILE NAME TO PRINTER BACKUP NO.
(MCP INST - 'CC CH XXXXXX @')

3 PRINT THE BACKUP FILE.
(MCP INST - 'PBD X SAVE N') X = BACKUP #,N = # OF COPIES

THE PROCEDURE FOR EXTRACTING CARD PUNCH FILES IS:

1. MOUNT 'MTRPUN' & LOAD ALL FILES.
(MCP INST - 'LOAD MTRPUN/')

2. CHANGE DESIRED FILE NAME TO PUNCH BACKUP NO.
(MCP INST - 'CC CH XXXXXX *')

3 PUNCH THE BACKUP FILE.
(MCP INST - 'PC X SAVE N') X = BACKUP #,N = # OF DECKS

B 700 MTR

THE PROCEDURE FOR PRODUCING PAPER TAPES FROM MAG TAPE IS:

1. MOUNT 'MTRPUN' & LOAD ALL FILES.
   (MCP INST - 'LOAD MTRPUN/')
2. PLACE EXECUTE CARD DECK IN CARD READER - CONTAINS:
   ? EX PAPERD CG XXXXX
   ? FILE MTRTAP = PT---- (FILE NAME TO BE PUNCHED)
   ? END
3. SPO WILL RETURN MESSAGE - ENTER 2 DIGIT TAPE COUNT
   ENTER MAXNN AT SPO

   M = MIX NUMBER
   AX = CONSTANT
   NN = NUMBER OF TAPE COPIES

THE PROCEDURE FOR PRODUCING TEST DECKS FROM MAG TAPE IS:

1. MOUNT 'MTRPUN' & LOAD ALL FILES.
   (MCP INST - 'LOAD MTRPUN/')
2. ENTER AT SPO: 'CC PER DSKBIN TD---- CG XXXXX'
   (FILE NAME TO BE PUNCHED)

MTR	FILE NAMES				
BSWMTR	OIBSWM	CDBSWM	PTBSWM		
CMLDRMTR	OICMLD			TDCMLD	
CONSMTR	OICONS	CDCONS	PTCONS		
CON96MTR	OICON9	CDCON9	PTCON9		
CR80MTR	OICR80	CDCR80	PTCR80	TDCR80	
CR91MTR	OICR91	CDCR91	PTCR91	TDCR91	
DISKMTR	OIDISK	CDDISK	PTDISK		
DPMMTR	OIDPMM	CDDPMM	PTDPMM		
ECONMTR	OIECON	CDECON	PTECON		
ELDRMTR	OIELDR				
FEMTMTR	OIFEMT				
MCUMTR	OIMCUM	CDMCUM	PTMCUM		
MEMLDRMTR	OIMEML				
MTRLDR	OIMTRL		PTMTRL		
PMLCMTR	OIPMLC	CDPMLC	PTPMLC		FDPMLC
PMTR	OIPMTR	CDPMTR	PTPMTR		
PROCMTR	OIPROC	CDPROC	PTPROC		
PTAPMTR	OIPTAP	CDPTAP	PTPTAP		
RP96MTR	OIRP96	CDRP96	PTRP96	TDRP96	
RSMTR	OIRSMT	CDRSMT	PTRSMT		
SLCMTR	OISLCM	CDSLCM	PTSLCM		
SMCUMTR	OISMCU	CDSMCU	PTSMCU		
SPOMTR	OISPOM	CDSPOM	PTSPOM		
TCMTR	OITCMT	CDTCMT	PTTCMT		
TMMTR	OITMMT	CDTMMT	PTTMMT		
UCDDMTR	OIUCDD	CDUCDD	PTUCDD		FDUCDD

FEMTMTR FIELD ENGINEERING MEMORY TEST IC
B 711, B 711-1, AND B 720
(8 K-WORDS OF MEMORY)

TEST STEP	OPERATOR ACTION	RESPONSE	YES	NO

NOTE UNLESS OTHERWISE NOTED 721 VS 711 MEANS 721 VS 711/711-1 OR 771

TERMINALS SPECIFIED BY CARD NAME ARE 721.
THOSE SPECIFIED BY LOCATION CODE ARE 711,
ARE ENCLOSED IN # ! AND APPLY TO PA BACKPLANE

S1 INSTALL FE CARDS (WITH POWER OFF)

if 711-3 use 721
always use systems books

CARDS	LOCATIONS 711	IC LOCATIONS 721
FE1	DQ9	DH5
FE2	DR2	DH2
FE3	DR5	DG9
FE4	DR8	DG6

* *

* NOTE: FOR CORE MEMORY SYSTEMS ONLY

* IF THE FIRST MEMORY MODULE (0-8K)HAS BEEN TESTED AND AN UPPER MODULE IS TO BE TESTED - PERFORM STEPS A & B BEFORE GOING TO STEP 4

* A SET 4K/8K SWITCH PER SIZE OF UPPER MEMORY MODULE

* B CONNECT A JUMPER TO GND FROM THE TERMINAL CORRESPONDING TO THE STARTING ADDRESS OF THE UPPER MODULE

ADDRESS	TERMINAL	
8K	PADI5P	(SMADR03/)
16K	PADI5H	(SMADR02/)

* *

S2 SET SWITCHES

711	721
SGL TO NORM	SGL TO NORM
REP TO NORM	REP TO NORM
EOR TO SOE	EOR TO SOE
IRQ TO IRQ	IRQ TO IRQ
4/8 TO 8K	4/8 TO 8K
	ERS TO ERS
	INH TO NORM

S3 POWER ON — SYSTEM POWERS UP — S4 — M0
NOTE IF LOAD IND IS ON PRESS LOAD SWITCH THEN PRESS CLEAR get out of load

VERIFY ALL SYSTEM FUSES BEFORE PROCEEDING

S4 SET MTR SWITCH TO MEM — SC8 & STOP IND ON; ERR IND OFF; HALT IND OFF (721) — S7 — S5

S5 OBSERVE SC INDICATORS FOR NEXT STEP

	711	721
SC = 0	M12	M21 *
SC = 1	S6	M32 *
SC = 2	S9 *	M32 *
* (SEE NOTE 1)		
SC = 3	M6	M27
SC = 4	M6	M27
SC = 5	M6	M32
SC = 6	S8	M32
SC = 7	F110	F110
SC = 8	M11	M11
SC = 9	F111	F111

STEP	OPERATOR ACTION	RESPONSE	YES	NO
S6	OBSERVE ERR IND ON FE4	ERR ON	S6A	S6C
	A. SET SWITCHES EOR TO EOR, IRQ TO CENTER, PRESS RER & PRO PUSHBUTTONS	ERR IND OFF	S7	S6B
	B. OBSERVE CONSOLE D OR SPO ERROR INDICATORS FOR NEXT STEP	IND = 0: M1; IND = 1: M6 (SEE NOTE 1); IND = 3: M13		
	C. METER PAFQOS (CGCLEARA)	0%	M17	M1
S7	WITH IRQ SWITCH SET TO IRQ OBSERVE FEAC (se11=0 se10=0)	FEAC = 0106 (Parity bits in Main memory)	S7A	S7F
	A. SET IRQ SWITCH TO CENTER & PRESS PRO PUSHBUTTON	TEST LOOPS	S7B	F143
	B. OBSERVE INCR	INCR = 1FFF * * (SEE NOTE 2)	S10	M2
	C. IS SYSTEM 721		S7E	S7D
	D. METER PADQ4Q (EOWRITE/)	100%	F112	F138
	E. METER EO2-1R (EOWRITE)	0%	F201	F202
	F. SET REP SWITCH TO REP. SET MTR SWITCH TO MTR THEN TO MEM. OBSERVE INCR	INCR = 1FFF * * (SEE NOTE 2)	S7G	M2
	G. SET REP SWITCH TO NORM. GO TO S7C			
S8	OBSERVE INCR	INCR = 0000 OR 0001	M2	8A
	A. SET IRQ SWITCH TO CENTER, SET EOR SWITCH TO EOR, PRESS PRO PUSHBUTTON	INCR = 1FFF * * (SEE NOTE 2)	M6	M2
S9	IS CONFIDENCE ESTABLISHED IN FE CARDS		M6	M10
S10	IS SYSTEM 721		S14	S10A
	A.(IF UPPER MOD BEING TESTED GO TO S20) CONNECT A JUMPER FROM PADI7Y (MPM17) TO GRD	ERR & STOP IND ON	S11	M14
S11	REMOVE JUMPER. REMOVE NM4 CARD THEN PRESS RER & PRO PUSHBUTTONS	ERR & STOP IND ON	S12	M15
S12	INSERT NM4 CARD. REMOVE NM7 CARD THEN PRESS RER & PRO PUSHBUTTONS	ERR & STOP IND ON	S13	F115
S13	INSERT NM7 CARD. CONNECT A JUMPER FROM PABJ3C (SMDTM16) TO PABJ4C (LI3DTM17)			

SET MTR SWITCH TO MTR
THEN BACK TO MEM ERR & STOP IND ON S20 S20

* *

* THIS STEP WRITES INCORRECT PARITY INTO MEMORY TO VERIFY THAT
* LOADER LOGIC WILL OVER-WRITE BAD PARITY IN ADDRESS ZERO
*
* A NORMAL CYCLE OF FEMTMTR MUST BE REPEATED AFTER LDRMTR TO
* PURGE MEMORY OF PARITY ERROR BEFORE LOADING MTRS OR FIRMWARE
*

* *

S14 THIS STEP VERIFIES MEMORY RETAINS
DATA IN A STATIC (CLOCKS OFF) MODE.

A.SET REP SWITCH TO REP
SET EOR SWITCH TO EOR

B.PRESSING PRO PB ADVANCE SC IND TO 2

C.SET SGL SWITCH TO SGL
WAIT SEVERAL SECONDS THEN
SET SGL SWITCH TO NORM TEST RESUMES
WITHOUT ERROR S14D M30
(EO2 IND OFF)

D.REPEAT STEPS B & C WITH SC IND AT 4
THEN SET REP SWITCH TO NORM
AND GO TO S15.

S15. REMOVE MPA-1 CARD HALT IND ON
EO2 IND = 6 S16 M33

S16. INSERT MPA-1 CARD
REMOVE NM14 CARD,CYCLE MTR HALT IND ON
SWITCH TO MTR/BACK TO MEM EO2 IND = 4 S17 M34

S17. INSERT NM14 CARD
REMOVE NM7 CARD,CYCLE MTR
SWITCH TO MTR/BACK TO MEM HALT IND ON
EO2 IND = 4 S18 F203

S18. SET INH SW TO INH EO2 IND4 OFF
PRESS PRO PB ERR IND ON S20 F2

S20. END OF FE MEMORY TEST (SEE NOTE 3)
REMOVE JUMPERS(711) INSERT CARD(721)
SET SWITCHES

FE- MTR TO MTR EO2- ERS TO NORM (721)
IRQ TO CENTER INH TO NORM (721)

THEN GO TO APPROPRIATE MEMORY LOADER MTR

* B

NOTES

NOTE 1

IF CONFIDENCE IS NOT ESTABLISHED
IN THE PROCESSOR GO TO M1

NOTE 2

DIM OR CYCLING INDICATOR IS CONSIDERED ON
IF 4K/8K SWITCH IS IN 4K INCR SHOULD BE 0FFF
IF 4K/8K SWITCH IS IN 8K INCR SHOULD BE 1FFF

NOTE 3

TEST MAY BE REPEATED BY PRESSING PRO PUSHBUTTON

NOTE 4

IF ERROR IS NOT CORRECTED BY THE FAILURE NO. IND
BY MANUAL PROCEDURES, M16 CAN BE USED TO CHECK FOR
MARGINAL SIGNAL LEVELS AT THE MEMORY INTERFACE.

NOTE 5 (B721 ONLY)

IF AN ERROR OCCURS THE PRO PB CAN BE USED TO
RESUME THE TEST UNTIL THE NEXT ERROR IS DETECTED.
IF THE ERROR IS A DATA COMPARISON ERROR (FE4 ERROR
IND. ON, EO2 HALT IND ON) THE INCR DISPLAY WILL BE
THE FAILING ADDR.+ 1. THE MPM WILL ALSO BE THE
FAILING ADDR.+ 1.

IF THE ERROR IS PARITY ERROR (EO2 IND'S ON) THE
INCR AND MPM DISPLAYS ARE THE ADDRESS AND DATA OF
THE FAILING ADDRESS. WHEN USING THE PRO PB ON
PARITY ERRORS SET THE EOR SWITCH TO EOR TO PREVENT
AMBIGUOUS INDICATIONS.

NOTE 6

TO INSURE THAT LOW DUTY CYCLE STEALS ARE NOT
OCCURRING ONE OF THE FOLLOWING SHOULD BE DONE

1 SCOPE SIGNAL STSTEAL/ OR RQSTL(N)/ FOR
CONTINUOUS HIGH (NO NEG TRANSITIONS)

2 DISABLE STEALS BY REMOVING CARDS THEN
RE-RUNNING FEMT MTR

DISK REMOVE DMC & DDC
PMLC REMOVE CLB & CLC

TABLE 1 MPM TEST DATA

OBSERVE INCR & FIND VALUE IN INCR COLUMN
VALUE OF MPM DATA WILL BE FOUND UNDER
DISPLAYED SC VALUE

FOR 8K MODE (4/8 SWITCH IN 8K) TEST SEQUENCE COUNT INCR (ADDRS)		SC1/2	SC3/4	SC5/6
0000-0FFE	(EVEN)	DATA 0'S	1'S	ADDRS + 1
0001-0FFF	(ODD)	DATA 1'S	0'S	ADDRS + 1
1000-1FFE	(EVEN)	DATA 1'S	0'S	ADDRS + 1
1001-1FFF	(ODD)	DATA 0'S	1'S	ADDRS + 1

FOR 4K MODE (4/8 SWITCH IN 4K) TEST SEQUENCE COUNT

	INCR (ADDRS)		SC1/2	SC3/4	SC5/6
0000-07FE	(EVEN	DATA	0'S	1'S	ADDRS + 1
0001-07FF	(ODD)	DATA	1'S	0'S	ADDRS + 1
0800-0FFE	(EVEN)	DATA	1'S	0'S	ADDRS + 1
0801-0FFF	(ODD)	DATA	0'S	1'S	ADDRS + 1

* * * * * * * * * * * * * * * * * * B

PROGRAM LISTING

NANO GROUP 1

NANO BIT	TERMINAL	
1	NM4-1Q	#FK5Q!
2	NM4-2E	#FK6E!
3	NM4-2F	#FK6F!
4	NM4-2D	#FK6D!
9	NM4-1G	#FK5G!
10	NM4-1H	#FK5H!
11	NM4-2H	#FK6H!
12	NM4-1F	#FK5F!
17	NM4-1M	#FK5M!
18	NM4-2M	#FK6M!
19	NM4-1N	#FK5N!
20	NM4-2N	#FK6N!
25	NM4-2P	#FK6P!
26	NM4-2Q	#FK6Q!
27	NM4-1R	#FK5R!
28	NM4-2R	#FK6R!
33	NM4-2V	#FK6V!
34	NM4-1W	#FK5W!
35	NM4-2W	#FK6W!
36	NM4-1V	#FK5V!
41	NM4-1Y	#FK5Y!
42	NM4-2Y	#FK6Y!
43	NM4-2S	#FK6S!
44	NM4-1X	#FK5X!
49	NM4-1P	#FK5P!
50	NM4-1L	#FK5L!
51	NM4-2X	#FK6X!
52	NM4-1S	#FK5S!

NANO GROUP 2

NANO BIT	TERMINAL	
5	NM5-1Q	#FK2Q!
6	NM5-2E	#FK3E!
7	NM5-2F	#FK3F!
8	NM5-2D	#FK3D!
13	NM5-1G	#FK2G!
14	NM5-1H	#FK2H!
15	NM5-2H	#FK3H!
16	NM5-1F	#FK2F!
21	NM5-1M	#FK2M!
22	NM5-2M	#FK3M!
23	NM5-1N	#FK2N!
24	NM5-2N	#FK3N!
29	NM5-2P	#FK3P!
30	NM5-2Q	#FK3Q!
31	NM5-1R	#FK2R!
32	NM5-2R	#FK3R!
37	NM5-2V	#FK3V!
38	NM5-1W	#FK2W!
39	NM5-2W	#FK3W!
40	NM5-1V	#FK2V!
45	NM5-1Y	#FK2Y!
46	NM5-2Y	#FK3Y!
47	NM5-2S	#FK3S!
48	NM5-1X	#FK2X!
53	NM5-1P	#FK2P!
54	NM5-1L	#FK2L!
55	NM5-2X	#FK3X!
56	NM5-1S	#FK2S!

F
F
F
F
F
F

ADDRS	DIGITS/DATA 0123	4567	89AB	CD
0000	FFFF	0000	0000	0100
0001	FFF6	A000	0000	0100
0002	F7F4	0000	0000	0100
0003	FFF6	AC52	0000	0000
0004	FFF6	A012	0000	0100
0005	F7F0	0000	0000	0000
0006	FE76	0000	0000	0100
0007	FFF6	0640	4000	0100
0008	F7E6	0000	0000	0100
0009	FFF6	A156	4000	0100
000A	FFF6	A15E	4000	0000
000B	FFF6	A001	4000	0100
000C	FEB6	0000	0000	0100
000D	FFF6	A000	C000	0100
000E	FFDE	0000	0000	0100
000F	FFF6	A0DE	4000	0000
0010	FFF6	AC40	4000	0100
0011	FFF6	A140	4000	0000
0012	FFF6	A0C0	4000	0000
0013	FFF6	C000	4000	0000
0014	D7E6	0000	0000	0000
0015	C7E6	0000	0000	0100

ADDRS	DIGITS/DATA 0123	4567	89AB	CD
0100	FFF6	A640	0040	0100
0101	FFF6	E000	0040	0100
0102	FFF6	C000	0040	0000
0103	FFF6	C640	0040	0100
0104	FFF6	E640	0040	0000
0105	FFF6	0646	0040	0100
0106	FFF6	2C40	0040	0000
0107	FFD2	0C40	0D20	2400
0108	FFF6	0000	0C00	2000
0109	FFF6	A158	0000	0100
010A	FFF6	2C52	4000	0000
010B	FFF6	A001	C000	0000
010C	FFF6	AC4E	4000	0000
010D	FFF6	AC5C	4000	0000
010E	FFF6	0C46	4000	0100
010F	FFF6	0000	4000	0000
0110	FFF6	001A	C000	0000
0111	FFF6	A152	0000	0100
0112	FFF6	AD52	0000	0100
0113	FFF6	2C5E	4000	0000
0114	77E6	A012	0000	0000
0115	FFF6	8000	4000	0100

0016	FFF6	E000	4000	0100
0017	FFF6	0C40	4000	0100
0018	FE36	0000	0000	0000
0019	FFB6	0000	0000	0000
001A	FEF6	0000	0000	0000
001B	FFF6	0C41	4000	0000
001C	FFF6	0F40	4000	0100
001D	FFF6	2000	4000	0100
001E	27E6	0000	0000	0000
001F	FF36	0000	0000	0100
0020	FFF6	2C40	4000	0000
0021	FFF6	C000	0000	0100
0022	FFF6	C012	0000	0100
0023	FFF6	0640	2000	0100
0024	FFF6	A000	2000	0000
0025	FFF6	C001	A000	0000
0026	FFF6	C001	2000	0100
0027	FFF6	C000	A000	0100
0028	FFF6	CC5C	2000	0000
0029	FFF6	C140	2000	0000
002A	FFF6	C0C0	2000	0000
002B	FFF6	C0DE	2000	0000
002C	FFF6	C148	0000	0000
002D	FFF6	C156	2000	0100

ADDRS	DIGITS/DATA 0123	4567	89AB	CD
002E	77E6	0000	0000	0000
002F	FFF6	C15C	2000	0100
0030	FFF6	0000	0002	0000
0031	FFF6	CC40	2000	0100
0032	FFF6	E000	2000	0100
0033	FFF6	0C40	2000	0100
0034	FFF6	0000	2000	0000
0035	FFF6	0F40	2000	0100
0036	FFF6	0C41	2000	0000
0037	FFF6	0C40	A000	0000
0038	FFF6	2000	2000	0100
0039	FFF6	2001	2000	0000
003A	FFF6	2C40	2000	0000
003B	FFF6	E000	0000	0000
003C	FFF6	EC52	0000	0100
003D	FFF6	E012	0000	0000
003E	FFF6	E152	0000	0000
003F	FFF6	ED52	0000	0000
0040	FFF6	EC5E	0000	0100
0041	FFF6	0640	1000	0100
0042	FFF6	A000	1000	0000
0043	FFF6	C000	1000	0000
0044	FFF6	E001	9000	0100
0045	FFF6	E001	1000	0000
0046	FFF6	E000	9000	0000
0047	FFF6	E156	1000	0000
0048	FFF6	EC5C	1000	0100
0049	FFF6	EC4C	1000	0000
004A	FFF6	E15C	1000	0000
004B	FFF6	E0DE	1000	0100
004C	FFF6	E0C0	1000	0100
004D	FFF6	EC40	1000	0000
004E	FFF6	E140	1000	0100
004F	FFF6	E15E	1000	0100
0050	9436	0000	0000	0000
0051	FFF6	0C40	1000	0100
0052	FFF6	0C41	1000	0000
0053	FFF6	0C40	9000	0000
0054	FFF6	0000	1000	0000
0055	FFF6	00C0	1000	0000
0056	FFF6	0F40	1000	0100
0057	FFF6	2001	1000	0000
0058	FFF6	2000	1000	0100
0059	FFF6	2C56	1000	0100

0116	FFF6	CC52	0000	0000
0117	FFF6	C152	0000	0100
0118	C5A6	C012	0000	0100
0119	FFF6	CC5E	0000	0000
011A	FFF6	CC58	0000	0000
011B	FFF6	C15E	0000	0100
011C	FFF6	C15A	0000	0000
011D	FFF6	C640	2000	0100
011E	FFF6	CC5E	2000	0100
011F	FFF6	C15E	2000	0000
0120	FFF6	C14C	2000	0000
0121	FFF6	C012	2000	0000
0122	FFF6	E001	2000	0000
0123	FFF6	0C41	A000	0100
0124	FFF6	CD52	0000	0100
0125	FFF6	2001	A000	0100
0126	FFF6	2C56	2000	0100
0127	FFF6	2C5E	2000	0000
0128	FFF6	8000	2000	0100
0129	FFF6	EC40	2100	0100
012A	FFF6	EC48	0000	0000
012B	FFF6	EC58	0000	0100
012C	FFF6	E15E	0000	0000
012D	FFF6	C001	9000	0000

ADDRS	DIGITS/DATA 0123	4567	89AB	CD
012E	FFF6	C001	1000	0100
012F	FFF6	C000	9000	0100
0130	FFF6	EC56	1000	0100
0131	FFF6	EC5E	1000	0000
0132	FFF6	EC4E	1000	0100
0133	FFF6	E0CE	1000	0000
0134	8C12	EC5F	9000	0100
0135	8412	EC5F	9000	0000
0136	FFF6	E14C	1000	0100
0137	FFF6	00DA	1000	0100
0138	FFF6	001B	1000	0000
0139	FFF6	001A	9000	0000
013A	FFF6	0C46	1000	0100
013B	FFF6	2C44	1000	0100
013C	FFF6	2C40	1000	0000
013D	FFF6	0140	1000	0000
013E	FFF6	C001	1000	0200
013F	FFF6	C000	9000	0200
0140	FFF6	2C40	1000	0300
0141	FFF6	AC56	0B00	0000
0142	FFF6	AC4C	0B00	0100
0143	FFF6	CC56	0B00	0000
0144	FFF6	CC4E	0B00	0000
0145	FFF6	CC4C	0B00	0100
0146	FFF6	C15E	0B00	0000
0147	FFF6	C001	8B00	0000
0148	FFF6	E0DE	0B00	0100
0149	FFF6	E0C0	0B00	0100
014A	FFF6	EC56	0B00	0100
014B	FFF6	E001	8B00	0100
014C	FFF6	EC44	0B00	0100
014D	FFF6	EC45	8B00	0100
014E	FFF6	EC4C	8B00	0100
014F	97E6	E000	8B00	0000
0150	FFD2	0000	0B00	0000
0151	FFD2	00C0	0B00	0000
0152	FFD2	1800	0B00	0000
0153	FFF6	18C0	0B00	0000
0154	FFF6	001A	8B00	0000
0155	FFF6	189A	0B00	0000
0156	FFF6	0800	0B00	0100
0157	FFF6	0840	0B00	0000
0158	FFF6	0CC0	0B00	0000
0159	FFF6	1480	0B00	0100

005A	FFF6	8000	1000	0100
005B	FFF6	0C40	0040	0100

ADDRS	DIGITS/DATA 0123	4567	89AB	CD
005C	FFF6	A000	0040	0000
005D	FFF6	0000	0000	2500
005E	FFF6	0000	0000	2000
005F	FFF6	0C40	0000	0000
0060	FFF6	0640	0800	0100
0061	FFF6	A001	0B00	0100
0062	FFF6	A156	0B00	0100
0063	FFF6	AC40	0B00	0100
0064	FFF6	AC5E	0B00	0100
0065	FFF6	AC5C	0B00	0000
0066	FFF6	A000	0B00	0000
0067	FFF6	A000	8B00	0100
0068	FFF6	C000	0B00	0000
0069	FFF6	C000	8B00	0100
006A	FFF6	C001	0B00	0100
006B	FFF6	CC40	0B00	0100
006C	FFF6	CC5C	0B00	0000
006D	FFF6	C156	0B00	0100
006E	FFF6	EC40	0B00	0000
006F	FFF6	EC5C	0B00	0100
0070	FFF6	EC5C	0B00	0000
0071	FFF6	E000	0B00	0100
0072	FFF6	E000	8B00	0000
0073	FFF6	E001	0B00	0000
0074	FFF6	E156	0B00	0000
0075	FFF6	0C00	0B00	0000
0076	FFF6	001A	0B00	0100
0077	FFF6	00C0	0B00	0000
0078	FFF6	0440	0B00	0000
0079	FFF6	1800	0B00	0000
007A	FFF6	1C40	0B00	0000
007B	FFF6	0000	0B00	0000
007C	FFF6	0C41	0B00	0000
007D	FFF6	0C41	8B00	0100
007E	FFF6	0C46	0B00	0100
007F	FFF6	0C40	8B00	0000
0080	FFF6	0F40	0B00	0100
0081	FFF6	6010	8B00	0000
0082	FFF6	2001	0B00	0000
0083	FFF6	2C40	0B00	0000
0084	FFF6	2C44	0B00	0100
0085	FFF6	2C4C	0B00	0000
0086	FFF6	2C56	0B00	0100
0087	FFF6	2C5C	0B00	0100
0088	FFF6	2C5E	0B00	0000
0089	FFF6	2000	0B00	0100

ADDRS	DIGITS/DATA 0123	4567	89AB	CD
008A	FFF6	8000	0B00	0100
008B	FFF6	0C40	0F00	0000
008C	FFF6	0C40	0D80	0000
008D	FFF6	0000	0D00	0000
008E	FFF6	D81C	0010	0100
008F	FFF6	2001	0010	0000
0090	FFF6	C000	0010	0000
0091	FFC9	0000	0000	0100
0092	FFF6	0000	0000	4000
0093	FFF6	0C41	0B00	4100
0094	FFF6	00C6	0005	0100
0095	FFF6	0C40	0005	0000
0096	FFF6	0000	0C00	2900
0097	FFF6	0000	0C00	2C00
0098	FFF6	0000	0000	3D00
0099	FFF6	0000	0000	3800
009A	FFDB	0000	0000	0100

015A	FFF6	6000	0B00	0000
015B	FFF6	20DE	0B00	0100

ADDRS	DIGITS/DATA 0123	4567	89AB	CD
015C	FFF6	2C45	8B00	0100
015D	FFF6	2C4D	0B00	0100
015E	FFF6	8C54	0B00	0000
015F	FFF6	8C50	0B00	0100
0160	FFF6	8C48	0B00	0100
0161	FFF6	8C42	0B00	0100
0162	FFF6	0C5E	0B00	0100
0163	FFF6	0C58	0B00	0100
0164	FFF6	015E	0B00	0000
0165	FFF6	0158	0B00	0000
0166	FFF6	EC40	1800	0100
0167	FFF6	0C40	8F00	0100
0168	FFF6	0000	0100	0000
0169	FFF6	EC5F	8100	4000
016A	FFF6	00C0	0100	8100
016B	FFF6	0000	0900	0100
016C	FFF6	2001	0020	0000
016D	FFF6	E001	0010	0000
016E	FFF6	0C40	0010	0100
016F	FFF6	1C40	0010	0000
0170	FFF6	E001	4000	4100
0171	FFF6	0C40	9000	4100
0172	FFF6	0C41	8B00	4000
0173	FFF6	EC41	9100	4000
0174	FFF6	0000	0080	4100
0175	FFF6	A000	0005	0100
0176	97E6	A000	0005	0100
0177	FFF6	C000	8005	0000
0178	FFF6	E000	0005	0000
0179	FFF6	0F46	0005	0000
017A	FFF6	6146	0005	0100
017B	FFF6	6012	0000	0100
017C	FFF6	2B00	0005	0100
017D	FFF6	0000	0000	1000
017E	FFF6	0C40	0C10	2C00
017F	93F4	0000	0000	0000
0180	94B6	0000	0000	0100
0181	9536	0000	0000	0100
0182	95B6	0000	0000	0000
0183	87D6	0000	0000	0000
0184	F426	0000	0000	0100
0185	F5A6	0000	0000	0100
0186	F7F3	0000	0000	0000
0187	F7F2	0000	0000	0100
0188	F7F5	0000	0000	0000
0189	F7F7	0000	0000	0100

ADDRS	DIGITS/DATA 0123	4567	89AB	CD
018A	F7C6	0000	0000	0000
018B	F7EE	0000	0000	0000
018C	F7FE	0000	0000	0100
018D	41D6	0000	0C00	2100
018E	47E6	0000	0000	0000
018F	D3F6	C0C0	2000	0100
0190	D3F6	0000	0002	0100
0191	D432	0000	0000	0000
0192	C5B2	0000	0000	0100
0193	C596	0000	0000	0100
0194	24F2	0000	0000	0000
0195	A7CE	0000	0000	0100
0196	A476	0000	0000	0100
0197	A5B6	0000	0000	0000
0198	A5A6	0000	0000	0100
0199	9CB6	0000	0000	0000
019A	9C76	0000	0000	0000

009B	93D6	0000	0000	0000		019B	9C36	0000	0000	0100
009C	97D6	0000	0000	0100		019C	FFD6	0000	0000	0000
009D	97E6	0000	0000	0100		019D	FC56	0000	0000	0100
009E	87E6	0000	0000	0000		019E	FFF4	0000	0000	0000
009F	77D6	0000	0000	0000		019F	EFD6	0000	0000	0100
00A0	37E6	0000	0000	0100		01A0	EBE6	0000	0000	0000
00A1	F7D6	0000	0000	0100		01A1	ED56	0000	0000	0100
00A2	E7E6	0000	0000	0000		01A2	DC36	0000	0000	0000
00A3	47DE	0000	0000	0100		01A3	DC34	0000	0000	0100
00A4	47D6	0000	0000	0000		01A4	DC26	0000	0000	0100
00A5	D7F6	0000	0000	0100		01A5	DC16	0000	0000	0100
00A6	D7F6	0000	0000	0000		01A6	CD96	0000	0000	0000
00A7	D434	0000	0000	0000		01A7	2FD6	0000	0000	0100
00A8	D426	0000	0000	0000		01A8	2CD6	0000	0000	0100
00A9	C7F6	0000	0000	0000		01A9	2CE6	0000	0000	0100
00AA	C7D6	0000	0000	0100		01AA	AD56	0000	0000	0000
00AB	C5B4	0000	0000	0100		01AB	BFD6	0000	0000	0100
00AC	C5A6	0000	0000	0100		01AC	4FD6	0000	0000	0100
00AD	27F6	0000	0000	0100		01AD	1FE6	0000	0000	0100
00AE	27E6	0000	0000	0000		01AE	0FE6	0000	0000	0000
00AF	27F7	0000	0000	0000		01AF	B7D6	0000	0000	0000
00B0	A436	0000	0000	0000		01B0	B436	0000	0000	0100
00B1	A7D6	0000	0000	0100		01B1	15D6	0000	0000	3D00
00B2	A7E6	0000	0000	0100		01B2	0472	0000	0000	0000
00B3	B7E6	0000	0000	0000		01B3	0572	0000	0000	0100
00B4	9FD6	0000	0000	0000		01B4	05B6	0000	0000	0000
00B5	9FE6	0000	0000	0000		01B5	07E6	0000	0000	0100
00B6	8FD6	0000	0000	0100		01B6	FFF6	0F40	0B02	0000
00B7	8FE6	0000	0000	0100		01B7	77D6	0000	0002	0100

ADDRS	DIGITS/DATA 0123	4567	89AB	CD		ADDRS	DIGITS/DATA 0123	4567	89AB	CD
00B8	7FE6	0000	0000	0100		01B8	7FE6	0000	0002	0000
00B9	7FD6	0000	0000	0100		01B9	FFED	0000	0002	0000
00BA	3FE6	0000	0000	0000		01BA	FFF6	2012	0000	0000
00BB	FFE6	0000	0000	0000		01BB	FFF6	2C50	0000	0000
00BC	EFE6	0000	0000	0100		01BC	FFF6	A140	002C	0000
00BD	4FE6	0000	0000	0100		01BD	FFF6	C0C0	002C	0000
00BE	DFD6	0000	0000	0100		01BE	FFF6	CC40	002C	0100
00BF	DFE6	0000	0000	0100		01BF	FFF6	C140	002C	0000
00C0	CFE6	0000	0000	0000		01C0	FFF6	E640	002C	0000
00C1	2FE6	0000	0000	0100		01C1	FFF6	EC5E	002C	0000
00C2	AFD6	0000	0000	0000	B711	01C2	FFF6	0C40	802C	0000
					B705	01C2	FFE4	0C40	802C	0000
00C3	AFE6	0000	0000	0000		01C3	FFF6	00C0	002C	0000
00C4	BFE6	0000	0000	0100		01C4	FFF6	00C6	002C	0000
00C5	11E6	0000	0C00	2D00		01C5	7FD5	0F46	002C	0100
00C6	15E6	0000	0000	3D00		01C6	FFF6	2F4C	002C	0000
00C7	05B2	0000	0000	0100		01C7	FFF6	0646	0080	0100
00C8	77E6	0000	0002	0100		01C8	FFF6	A001	0080	0100
00C9	FFD2	0000	0000	0100		01C9	FFF6	C001	0080	0100
00CA	FFF6	0000	0001	0000		01CA	FFF6	CC40	0080	0100
00CB	FFF6	2C52	0000	0100		01CB	FFF6	CC5C	0080	0000
00CC	FFF6	2C5E	0000	0100		01CC	FFF6	C15C	0080	0100
00CD	FFF6	2C48	0000	0000		01CD	FFF6	E001	0080	0000
00CE	FFF6	0000	0008	0000		01CE	FFF6	E000	8080	0000
00CF	FFF6	0640	002C	0100		01CF	FFF6	EC56	0080	0100
00D0	FFF6	A000	002C	0000		01D0	FFF6	E156	0080	0000
00D1	FFF6	C000	002C	0000		01D1	FFF6	E157	0080	0100
00D2	FFF6	E000	002C	0100		01D2	FFF6	EC40	0080	0000
00D3	FFF6	E140	002C	0100		01D3	FFF6	EC5E	0080	0000
00D4	FFF6	E0C0	002C	0100		01D4	FFED	0C40	0080	0100
00D5	FFF6	0C40	002C	0100		01D5	FFF6	00C6	0080	0000
00D6	FFF6	0C46	002C	0100		00D6	FFF6	6010	8080	0000
00D7	FFF6	0F46	002C	0100		01D7	FFF6	80C0	0080	0100
00D8	FFF6	2000	002C	0100		01D8	FFF6	0D54	0080	0000
00D9	FFF6	2C40	002C	0000		01D9	FFF6	000A	0080	0000
00DA	FFF6	0640	0080	0100		01DA	FFF6	0D4A	0080	0000
00DB	FFF6	A000	0080	0000		01DB	FFF6	0D40	0080	0000
00DC	FFF6	AC40	0080	0100		01DC	FFF6	0D5E	0080	0000
00DD	FFF6	C000	0080	0000		01DD	FFF6	0D58	0080	0000

00DE	FFF6	E000	0080	0100		01DE	FFF6	AC60	0980	0000
00DF	FFF6	EC5C	0080	0100		01DF	FFF6	0C40	9000	0900
00E0	FFF6	E15C	0080	0000		01E0	FFF6	0C40	0005	0900
00E1	FFF6	0C40	0080	0100		01E1	D7E6	0000	0000	0800
00E2	FFF6	0C41	8080	0100		01E2	FFF6	0000	0002	0900
00E3	FFF6	0C46	0080	0100		01E3	FFF6	0C40	0080	0800
00E4	FFF6	0C41	0080	0000		01E4	FFF6	C0C0	2000	1800

ADDRS	DIGITS/DATA 0123	4567	89AB	CD		ADDRS	DIGITS/DATA 0123	4567	89AB	CD	
00E5	FFF6	0C40	8080	0000		01E5	FFF6	EC4C	1002	1900	
00E6	FFF6	0000	0080	0000		01E6	FEAD	0000	0000	0100	
00E7	FFF6	00C0	0080	0000		01E7	FFC0	0000	0000	0100	
00E8	FFF6	001A	0080	0100		01E8	FFF6	C000	8000	8100	
00E9	FFF6	0F40	0080	0100		01E9	FFF6	E000	8000	8000	
00EA	FFF6	2000	0080	0100		01EA	FFF6	0C41	0000	8000	
00EB	FFF6	2C56	0080	0100		01EB	FE52	0000	0000	0100	
00EC	FFF6	2C5C	0080	0100		01EC	53D7	0000	0C00	0100	
00ED	FFF6	2C40	0080	0000		01ED	53D7	A0C0	4C00	0000	
00EE	FFF6	2001	0080	0000		01EE	53D7	C0C0	2C00	0000	
00EF	FFF6	8000	0080	0100		01EF	53F7	0C40	1C00	0000	
00F0	FFF6	0D46	0080	0000		01F0	53F7	0C40	0C05	0100	
00F1	FFF6	0000	0000	0800		01F1	53F7	A000	0C2C	0100	
00F2	FFF6	A0C0	4000	0900		01F2	53D7	0C40	0C2C	0100	
00F3	FFF6	0000	0000	1900		01F3	53D7	0F46	0C2C	0100	
00F4	FFF6	0C40	0000	8100		01F4	63D7	A0C0	4000	0000	
00F5	FFED	0000	0000	0100		01F5	63D7	C0C0	2000	0000	
00F6	FF76	0000	0000	0000		01F6	63D7	0F46	002C	0100	
00F7	FFE4	0000	0000	0100		01F7	63F7	2000	002C	0000	
00F8	47F7	0000	0000	0000		01F8	FFF6	0000	0000	0100	
00F9	53F7	0000	0C00	0000		01F9	FFF6	0000	0000	0100	
00FA	53F7	0F46	0C2C	0000		01FA	FFF6	0000	0000	0100	E
00FB	63F7	0F46	002C	0000		01FB	FFF6	0000	0000	0100	
00FC	17F7	0000	0000	0000		01FC	FFF6	0000	0000	0100	
00FD	07F7	0000	0000	0100		01FD	FFF6	0000	0000	0100	
00FE	FFF6	8C52	0000	0100		01FE	FFF6	0000	0000	0100	
00FF	FFF6	0C52	0000	0000		01FF	FFF6	0000	0000	0100	
						0200	FFFF	0000	0000	0100	

MANUAL PROCEDURES

M0	OPERATOR 721	711	SIGNAL	RESPONSE		YES	NO
	ACTION TERM	TERM	NAME				
	NOTE	10%	TOLERENCE	ON ALL VOLT METER READINGS			
1.	CONNECT JUMPER FROM AC3-1P #DK2P! TO GRD THEN PRESS POWER ON P.B.			POWER UP		2	F200
2.	METER AC3-2W		#DK0L!(CCPWRO)	100%		3	F107
3.	METER AC3-2A		#DK0B!(+5V)	+5 VDC		4	F101
4.	METER AC3-2C		#DK0V!(+24)	+24 VDC		5	F102
5.	METER AC3-2Y		#DK0P!(+12)	+12.3 VDC		6	F103
6.	METER AC3-2B		#DK0H!(-12)	-12.4 VDC		7	F104
7.	IS SYS 721					F100	8
8.	METER		#DK0K!(-24)	-24.8 VDC		F106	F105
M1	OPERATOR 721	711	SIGNAL	RESPONSE		YES	NO
	ACTION TERM	TERM	NAME				
1.	HOLDING CLEAR P.B.			INCR = 0		2	M3
2.	HOLDING CLEAR P.B. PRESS PRO P.B.			FEAC = 0		3	F29
3.	RELEASE CLEAR METER CG2-1I		#FQ1I!(CGCLEARB)	0%		7	4
4.	METER FE4-2I		#DR9I!(FE4CLR/)	100%		6	5
4.	METER FE4-2I		#DR9I!(FE4CLR/)	100%		6	5
5.	METER FE3-1J		#DR5J!(FE3PCLR/)	100%		F30	F82
6.	METER CG2-1H		#FQ1B!(CGCLRARC)	0%		12	8
7.	METER CG2-1H		#FQ1B!(CGCLEARC)	0%		9	F28
8.	METER CG2-2V		#FQOE!(ACPONCL/)	100%		F27	F100
9.	METER CG2-2K		#FQ0S!(CGCLEARA)	0%		10	F189
10.	HOLDING CLEAR P.B.METER						
	(721) CG2-2K,1I,1H		(CGCLEAR'N')	ALL = 100%		11	F27
	(711) FQ-0S,1I,1B		(CGCLEAR'N')	ALL = 100%		11	F27
11.	CYCLE CLEAR P.B. & METER CG2-1N		#FQ1R!(CGCLEAR/)	PRESSED = 0% RELEASED = 100%		M2	F207
12.	METER EO2-2E		#DQ4S!(EOERRST/)	100%		F31	F49
M2	OPERATOR 721	711.	SIGNAL	RESPONSE		YES	NO
	ACTION TERM	TERM	NAME				
	SET 4/8 SWITCH TO 8K						
	SET EOR SWITCH TO EOR						
	SET IRQ SWITCH TO CENTER						
	SET REP SWITCH TO NORM						
	SET INH SWITCH TO INH (721)						
	CYCLE MTR SWITCH TO MTR,THEN BACK TO MEM						

1.A.	METER	CD1-2C	#DQ1C!	(CDSCLKA)	3-5%	2	1B
B.	METER	CG2-1B	#FQ0B!	(CGSCLK1)	3-5%	F1	1C
C.	METER	CG2-1C	#FQ0C!	(CGSCLK2)	3-5%	F205	1D
D.	IS SYSTEM 721					1E	1N
E.	METER	CG2-2C		(CGHALT)	0%	1F	1S
F.	METER	CG2-2X		(CG10CLK1)	45-55%	1G	F208
G.	METER	CG2-2L		(CGFECLK)	6-10%	1J	1H
H.	METER	CG2-2M		(CGFECLK/)	90-94%	F209	F213
J.	METER	CG2-2N		(CGTIME1/)	55-65%	1K	F210
K.	METER	CG2-2W		(CGTIME2)	35-45%	1L	F211
L.	METER	CG2-1S		(CGSCLKR)	3-5%	F214	1M
M.	METER	CG2-1L		(BTSTOP/)	100%	F212	F215
N.	METER		#FQ1L!	(EOESTOP/)	100%	1P	F4
P.	METER		#FQ1C!	(CGFECLK)	6-10%	F3	1Q
Q	METER		#FQ1S!	(CGFECLK/)	90-94%	F145	1R
R.	METER		#FQ1K!	(CG100)	15-25%	F146	F117
S.	METER	EO2-2M		(EOANYER)	0%	F206	F204
2.A.	METER	CG2-2M	#FQ1S!	(CGFECLK/)	90-94%	2B	F230

B. METER THE FOLLOWING PINS ON CD1 #DQ0! FOR 3-5% (CDSCLKN)
IF ALL ARE CORRECT CONTINUE TO STEP 3
IF NOT REPLACE INDICATED CD1 CHIPS

PIN(S)	CHIP(S)	PIN(S)	CHIP(S)
1C	A7	1B,2D	A5 C3
2F,2G	B7	2E,2H	B5
2K,2J	C3 C7 D3	2I,2L	C3 C5
2Q,2N	D7	2M,2R	D5
2U,2T	C3 D3 E7	2S,2V	C3 E5
1Y,1X	F7	2W,2Y	F5

3.A.	IS SYSTEM 721					4	3B
B.	METER		#BJ4I!(LI3SMC)	87-90%		3D	3C
C.	METER		#FQ0D!(CGCSB)	10-13%		3F	F5
D.	METER		#FQ0W!(CGMDAF)	8-12%		3K	3E
E.	METER		#FQ1V!(LIMRC/)	48-52%		F129	3H
F.	METER		#DQ3R!(EOMEW)	100%		F109	3G
G.	METER		#DQ3K!(LIFORT2/)	100%		F6	F10
H.	METER		#DQ4Q!(EOWRITE/)	48-52%		F130	7J
J.	METER		#DQ4M!(EODATCY)	0%		3P	F138
K.	METER		#FQ1K!(CG100)	48-52%		3L	F144
L.	METER		#BJ3J!(LIMDOS/)	0%		3M	F125
M.	METER		#DQ4Q!(EOWRITE)	48-52%		3N	3P
N.	METER		#DJ3C!(EOMDSB)	0%		5	F65
P.	METER		#DR5E!(LIMEW/)	48-52%		F58	3Q
Q.	SCOPE	FE4-2S	#DR9S!(FE4MPTIM)	SEE WAVEFORMS		3R	F56
R.	METER	FE3-2U	#DR6U!(FE4SCOB)	40-55%		F59	3S
S.	METER	FE3-2D	#DR6D!(FESCLK/)	95-97%		F57	F81
4.	METER	EO2-2B		(STSTEAL/)	100%	4A	M21
A.	METER	CG2-2E		(CGWRITE)	12-18%	4F	4B
B.	METER	EO2-1R		(EOWRITE)	48-52%	F218	4C
C.	METER	EO2-1U		(BTMEW/)	48-52%	F219	4D
D.	REMOVE DM3 CARD THEN METER	EO2-1U		(BTMEW/)	48-52%	F220	4E
E.	REMOVE CLB CARD THEN METER	EO2-1U		(BTMEW/)	48-52%	F221	3Q

NOTE IF SYSTEM HAS MORE THAN ONE PMLC REPEAT STEP 4E UNTIL ALL CLB CARDS ARE REMOVED THEN GO TO M2 STEP 3Q

F.	METER	LI8-1D	(LIFORT2/)		100%	4G	F228
G.	METER	STC-2I	2H 1I 1B (STLG'N')		ALL 0%	4H	F242
H.	METER	CG2-1U		(FEPROC/)	100%	4J	F256
J.	METER	EO2-2Q		(EOMDSB)	0%	4K	F259
K.	METER	CG2-2D		(CGERCLK)	3-5%	5	F261

5.	METER CG2-2L	#FQ1C!(CGFECLK)	8-14%	5A	F260
A.	METER CU1-1Y	#FP4Y!(CUSC)	0%	5E	5B
B.	METER MU2-2F	#FP2F!(MUTYPE2)	100%	F7	5C
C.	METER FE3-2F	#DR6F!(FESS/)	0%	F8	5D
D.	METER FE4-1J	#DR9D!(FETEST)	100%	F9	F12
E.	METER CU1-2V	#FP5V!(CUSC/)	0%	5F	F11
F.	METER MU2-2D	#FP2D!(MUBORC)	0%	7	F13
7.	METER MU4-1J	#FN5J!(MUMPLS1)	100%	8	F17
8.	METER MU6-3-1E	#FM3E!(MUINCR12)	48-52%	9	8A
A.	METER MU4-1E	#FN5E!(MUINCREN)	48-52%	8B	8D
B.	METER MU4-1B	#FN5B!(MUMPCREN)	48-52%	8C	8D
C.	METER CG2-2I	#FQ0J!(LI5VREF)	3 TO 5 VDC	F99	F14
D.	METER EO2-1T	#DQ3Q!(EOINHSTP)	48-52%	F21	8E
E.	METER EO2-2S	#DR8R!(LINHSTP/)	48-52%	8F	8J
F.	IS SYSTEM 721			8G	F15
G.	METER EO2-2B	(STSTEAL/)	100%	8H	M21
H.	METER EO2-2V	(EODATCY)	0%	F216	F217
J.	SCOPE FE4-1U	#DR8U!(FE4LADRF)	SEE W2	F16	8K
K.	SCOPE FE3-2S	#DR6S!(FE3LADDR)	SEE W3	F83	8L
L.	IS 4K/8U SWITCH IN 8K			8M	8Q
M.	SCOPE FE4-2N	#DR9N!(FE2AC3)	3 US/16MS PER	F84	8N
N.	SCOPE FE4-2F	#DQ9F!(FE1UPCNT)	1 US/0.5 MS PER	F85	8P
P.	SCOPE FE4-2P	#DQ9P!(FE4STAC)	1 US SQUARE WAVE	F86	F87
Q.	SCOPE FE3-2P	#DR6P!(FE2AC4)	3 US/8 MS PER	F84	8N
9.	METER MU4-2E	#FN6E!(MUAPL51)	0%	10	F18
10.	METER MU4-2J	#FN6J!(MUMPLS2)	0%	11	F19
11.	METER MU4-2H	#FN6H!(MUAPLS2)	0%	12	F20
12.	METER SM5-2T	#DI8T!(SMADR16/)	48-52%	13	12A
A.	METER EO2-2V	#DQ4M!(EODATCY)	0%	12B	F47
B.	IS SYSTEM 721			12E	12C
C.	METER	#DI8W!(SMDATCY)	0%	12D	F22
D.	METER	#DQ4S!(EOERRST/)	100%	F46	F49
E.	METER EO2-2E	(EOERRST/)	100%	M23	F148
13.	METER SM5-1U	#DI7U!(SMADR15/)	48-52%	14	13A
A.	METER SM5-1R	#DI7Q!(MUINCR11)	48-52%	F48	F33
14.	METER SM5-1V	#DI7V!(SMADR14/)	48-52%	15	14A
A.	METER SM5-2N	#DI8N!(MUINCR10)	48-52%	F48	F34
15.	METER SM5-2U	#DI8U!(SMADR13/)	48-52%	16	15A
A.	METER SM5-2P	#DI8P!(MUINCR09)	48-52%	F48	F35
16.	METER SM5-1E	#DI7E!(SMADR12/)	48-52%	17	16A
A.	METER SM5-2L	#DI8L!(MUINCR08)	48-52%	F50	F36
17.	METER SM5-2E	#DI8E!(SMADR11/)	48-52%	18	17A
A.	METER SM5-2K	#KI8K!(MUINCR07)	48-52%	F50	F37
18.	METER SM5-2D	#DI8D!(SMADR10/)	48-52%	19	18A
A.	METER SM5-1J	#KI7J!(MUINCR06)	48-52%	F50	F38
19.	METER SM5-2F	#DI8F!(SMADR09)	48-52%	20	19A
A.	METER SM5-1K	#DI8K!(MUINCR05)	48-52%	F50	F39
20.	METER SM4-2V	#DI5V!(SMADR08/)	48-52%	21	20A
A.	METER SM4-2L	#DI5L!(MUINCR04)	48-52%	F51	F40
21.	METER SM4-1W	#DI4W!(SMADR07/)	48-52%	22	21A
A.	METER SM4-1J	#DI4J!(MUINCR03)	48-52%	F52	F41
22.	METER SM4-2R	#DI5R!(SMADR06/)	48-52%	23	22A
A.	METER SM4-1U	#KI4U!(MUINCR02)	48-52%	F52	F42
23.	METER SM4-2Q	#DI5Q!(SMADR05/)	48-52%	24	23A
A.	METER SM4-2J	#DI5J!(MUINCR01)	48-52%	F52	F43
24.	METER SM4-1Q	#DI4Q!(SMADR04/)	48-52%	25	24A
A.	METER SM4-1P	#DI4P!(MUINCR00)	48-52%	F53	F44
25.	METER SM4-2P	#DI5P!(SMADR03/)	100%	26	25A
A.	METER SM4-1I	#DI4P!(MUINCRX)	0%	F53	F45
26.	METER SM4-2H	#DI5H!(SMADR02/)	100%	27	F53
27.	METER SM4-1H	#DI4H!(SMADR01/)	100%	28	F54
28.	METER SM4-1N	#DI4N!(SMADR01)	0%	29	F55
29.	METER FE3-1F	#DR5F!(FE3DSELC)	30-35%	30	29A
A.	METER FE3-1K	#DR5K!(FE4SEL)	30-35%	29B	F68
B.	METER FE4-2U	#DR9U!(FE4SC1+2)	30-35%	F63	F70
30.	METER FE3-2H	#DR6H!(FE3DSELB)	30-35%	31	F96
31.	METER SM6-2L	#DJ4L!(SMDTM16)	23-28%	32	31A
A.	METER SM6-2F	#DJ4F!(EXT16/)	48-53%	F60	M4
32.	METER SM6-2N	#DJ4N!(SMDTM15)	23-28%	33	32A
A.	METER SM6-2C	#DJ4C!(EXT15/)	48-53%	F61	M4
33.	METER SM6-1N	#DJ4M!(SMDTM14)	23-28%	34	33A
A.	METER SM6-1F	#DJ3F!(EXT14/)	48-53%	F61	M4
34.	METER SM6-2M	#DJ4M!(SMDTM13)	23-28%	35	34A
A.	METER SM6-1D	#DJ3D!(EXT13/)	48-53%	F61	M4
35.	METER SM6-2G	#DJ4G!(SMDTM12)	23-28%	36	35A
A.	METER SM6-2K	#DJ4K!(EXT12/)	48-53%	F71	M4
36.	METER SM6-1H	#DJ3H!(SMDTM11)	23-28%	37	36A
A.	METER SM6-1L	#DJ3L!(EXT11/)	48-53%	F71	M4
37.	METER SM6-1G	#DJ3G!(SMDTM10)	23-28%	38	37A
A.	METER SM6-1Q	#DJ3Q!(EXT10/)	48-53%	F71	M4
38.	METER SM6-1I	#DJ3I!(SMDTM09)	23-28%	39	38A
A.	METER SM6-2P	#DJ4P!(EXT09/)	48-53%	F150	M4
39.	METER SM7-2L	#DJ1L!(SMDTM08)	23-28%	40	39A
A.	METER SM7-2F	#DJ1F!(EXT08/)	48-53%	F72	M4
40.	METER SM7-2N	#DJ1N!(SMDTM07)	23-28%	41	40A
A.	METER SM7-2C	#DJ1C!(EXT07/)	48-53%	F73	M4
41.	METER SM7-1N	#DJON!(SMDTM06)	23-28%	42	41A
A.	METER SM7-1F	#DJOF!(EXT06/)	48-53%	F73	M4
42.	METER SM7-2M	#DJ1M!(SMDTM05)	23-28%	43	42A
A.	METER SM7-1D	#DJ0D!(EXT05/)	48-53%	F73	M4
43.	METER SM7-2G	#DJ1G!(SMDTM04)	23-28%	44	43A
A.	METER SM7-2K	#DJ1K!(EXT04/)	48-53%	F74	M4
44.	METER SM7-1H	#DJ0H!(SMDTM03)	15-20%	45	44A
A.	METER SM7-1L	#DJ1L!(EXT03/)	65-70%	F147	M4
45.	METER SM7-1G	#DJ0G!(SMDTM02)	15-20%	46	45A
A.	METER SM7-1Q	#DJ0Q!(EXT02/)	65-70%	F147	M4
46.	METER SM7-1I	#DJ0I!(SMDTM01)	15-20%	47	46A
A.	METER SM7-2P	#DJIP!(EXT01/)	65-70%	F147	M4

47. SET IRQ SWITCH TO IRQ
SET REP SWITCH TO REP
PRESSING PRO PUSHBUTTON
ADVANCE SC INDICATORS TO 5
METER LI8-1R #BJ4C!(LI'N'DTM17) 48-53% 48 47A

A.METER SM5-1X #DI7X!(SMPG12) 48-53% F90 47B

B. METER SM5-1W #DI7W!(SMPGEN1) 48-53% 47C F75

C.METER SM5-2V #DI8V!(SMPGEN2) 48-53% F77 F76

48. PRESSING PRO PUSHBUTTON
ADVANCE SC INDICATORS TO 1.
SET SGL SWITCH TO SGL THEN PRESS
SGL PUSHBUTTON SEVERAL TIMES
OBSERVING THE ALTERNATE ONES
ZEROS PATTERN IN MPM. CORRECT 49 48A

A.IS SYSTEM 721 M27 48B

B.IS ERROR DROPPED BIT M7 M9

49. SET SGL SWITCH TO NORM
PRESSING PRO PUSHBUTTON
ADVANCE SC INDICATORS TO 2.
SET SGL SWITCH TO SGL THEN PRESS
SGL PUSHBUTTON SEVERAL TIMES
OBSERVING THE ALTERNATE ONES &
ZEROS PATTERN IN MPM. CORRECT 50 49A

A.MEMORY FAULT (IF B721 GO TO M27)

50. IS SYSTEM 721 53 52

52. PERFORM M16 SECTIONS A & B. IF NO ERROR FOUND GO TO M10

53. CONFIDENCE IS NOW ESTABLISHED IN THE PROCESSOR
RE-START AT S2

M3	OPERATOR ACTION	721 TERM	711 TERM	SIGNAL NAME	RESPONSE	YES	NO
	1.HOLDING CLEAR PUSHBUTTON PRESS PRO PUSHBUTTON OBSERVE FEAC				FEAC = 0	2	3
	2.HOLDING CLEAR PUSHBUTTON OBSERVE INCR FOR ONES				ONES IN ANY 2 DIGITS	F28	
					ONES IN DIGIT A	F23	
					ONES IN DIGIT B	F24	
					ONES IN DIGIT C	F25	
					ONES IN DIGIT D	F26	
	3.METER CG2-1S			#FQ1S!(CGFECLK/)	90-96%	F27	4
	4.IS SYSTEM B721					5	6
	5.METER CG2-2X			(CG10CLK1)	45-55%	F213	F208
	6.METER			#FQIK!(CG100)	15-25%	F146	F117

M4	OPERATOR ACTION (711/721 EXT BUS FAULT)	RESPONSE	YES	NO
	1.WAS EXT BIT OF PREVIOUS TEST 0%.		M5	2
	2.FIND FAILURE # PER EXT #	EXT BIT 1-4	F62	
		EXT BIT 5-8	F64	
		EXT BIT 9-12	F66	
		EXT BIT 13-16	F67	

NOTE IF PROBLEM IS NOT CORRECTED BY
STEP 2 USE M5 TO ISOLATE

M5	OPERATOR ACTION (711/721 EXT BUS GRD FAULT)	RESPONSE	YES	NO
	SET IRQ SWITCH TO IRQ TO STOP LOOPING. NOTE EXT BIT NO. FOUND BAD IN PREVIOUS METERING & CONNECT MTR METER TO IT.			
	1.REMOVE A PSI CARD	EXT BIT = 100%	3	2
	2.ALL PSI CARDS REMOVED		4	1
	3.INSERT LAST PSI CARD REMOVED THEN METER ON SAME CARD PINS 1W, 2W, 1V, 2V (PSREAD'N'/)	ALL = 100%	3A	F132
	A.ON SAME CARD METER PINS 2B,1K,1J,2J (PSENST'N'/)	ALL = 100%	F134	F133
	4.METER CON1-2K #DK6K!(ENCON-TEST PT) 0% (IF NO CON1 CARD USED IN SYSTEM GO TO 5)		4A	F141
	A.REMOVE CON1 CARD-METER EXT BIT	EXT BIT = 100%	F135	5
	5.REMOVE A DDP- METER EXT BIT	EXT BIT = 100%	7	6
	6.ALL DDPS REMOVED		8	5
	7.GO TO M1 (OR E1) OF MTR FOR LAST DDP REMOVED & FIND FAILURE PER EXT BIT NO.			
	8.REMOVE CARDS LISTED IN EXT FAULT TABLE - NEXT PAGE PER EXT BIT NO. ONE AT A TIME UNTIL EXT BIT READS 100% THEN REPLACE CHIPS ON THAT CARD.			

EXT FAULT TABLE

SECTION A (711/771)

EXT BIT	CARD/CHIPS	771
1	FS1 C7 D3 DJ0 E7 D7 DR2 B1 B3 FL7 A3 A5(A5 D3)	
2	FS1 C7 D3 DM0 E7 D7 DR2 B1 B3 FL7 B3 B5(A5 D3)	
3	FS1 C3 C7 DJ0 E7 D7 DR2 B1 B3 FL7 C3 C5(A5 D3)	
4	FS1 C3 C7 DM0 E7 D7 DR2 B1 B3 FL7 D3 D5(A5 D3)	
5	FS4 C7 D3 DM0 F7 B5 DR2 B5 B7 FL7 A3 A5(F3 F5)	
6	FS4 C7 D3 DJ0 F7 D5 DR2 B5 B7 FL7 B3 B5(F3 F5)	
7	FS4 C3 C7 DJ0 F7 B5 DR2 B5 B7 FL7 C3 C5(F3 F5)	
8	FS4 C3 C7 DJ0 F7 B5 DR2 B5 B7 FL7 D3 D5(F3 F5)	
9	FS7 C7 D3 DJ3 E7 D7 DQ9 B1 B3 FL7 A3 A5(A7 C3)	
10	FS7 C7 D3 DJ3 E7 D7 DQ9 B1 B3 FL7 B3 B5(A7 C3)	
11	FS7 C3 C7 DJ3 E7 D7 DQ9 B1 B3 FL7 C3 C5(A7 C3)	
12	FS7 C3 C7 DJ3 E7 D7 DQ9 B1 B3 FL7 D3 D5(A7 C3)	
13	FT0 C7 D6 DJ3 F7 B5 DQ9 B5 B7 FL7 A3 A5(E3 F7)	
14	FT0 C7 D3 DJ3 F7 B5 DQ9 B5 B7 FL7 B3 B5(E3 F7) DQ3 E7	
15	FT0 C3 C7 DJ3 F7 B5 DQ9 B5 B7 FL7 C3 C5(E3 F7) DQ3 E7	
16	FT0 C3 C7 DJ3 F7 B5 DQ9 B5 B7 FL7 D3 D5(E3 F7) DQ3 D7	

NOTE - CHIPS FOR FL7 CARD DIFFER FOR 771 AND ARE SHOWN IN ( )
FOR 711-1 THE 'FL7' COLUMN DOES NOT APPLY - USE THE
'LI7' COLUMN OF SECTION B INSTEAD.

SECTION B (721)

EXT BIT	CARD/CHIPS	THIS COLUMN ALSO 711-1
1	LU6-1 C7 D3 SM7 D7 E7 FE2 B1 B3 LI7 A7 A7 E02 G7	
2	LU6-1 C7 D3 SM7 D7 E7 FE2 B1 B3 LI7 A5 C7	
3	LU6-1 C3 C7 SM7 D7 E7 FE2 B1 B3 LI7 D7 F5	

```
 4   LU6-1   C3  C7    SM7  D7  E7     FE2  B1  B3     LI7  E7  F7
 5   LU6-2   C7  D3    SM7  B5  F7     FE2  B5  B7     LI7  A7  B7
 6   LU6-2   C7  D3    SM7  B5  F7     FE2  B5  B7     LI7  A5  C7
 7   LU6-2   C3  C7    SM7  B5  F7     FE2  B5  B7     LI7  D7  F5
 8   LU6-2   C3  C7    SM7  B5  F7     FE2  B5  B7     LI7  E7  F7
 9   LU7-1   C3  C7    SM6  D7  E7     FE1  B1  B3     LI7  A7  B7
10   LU7-1   C3  C7    SM6  D7  E7     FE1  B1  B3     LI7  A5  C7
11   LU7-1   C7  D3    SM6  D7  E7     FE1  B1  B3     LI7  D7  F5
12   LU7-1   C7  D3    SM6  D7  E7     FE1  B1  B3     LI7  E7  F7
13   LU7-2   C3  C7    SM6  B5  F7     FE1  B5  B7     LI7  A7  B7   E02  G9
14   LU7-2   C3  C7    SM6  B5  F7     FE1  B5  B7     LI7  A5  C7   E02  G9
15   LU7-2   C7  D3    SM6  B5  F7     FE1  B5  B7     LI7  D7  F5   E02  G9
16   LU7-2   C7  D3    SM6  B5  F7     FE1  B5  B7     LI7  E7  F7   E02  G9

M6  OPERATOR ACTION                          RESPONSE          YES   NO
    (711  MPM PARITY  OR DATA ERROR)                                    B

                                                                        B
    THIS  ERROR  COULD  BE  CAUSED  BY                                  B
    A  MARGINAL  SIGNAL  LEVEL.  IF                                     B
    THE  FAILURE  INDICATED  BY  M6                                     B
    DOES  NOT  CORRECT  PROBLEM,  ON                                    B
    2ND  ENTRY  INTO  M6  GO  TO  M16
    SECTIONS  A  &  B.                                                  B

 1  SET  REP  SWITCH  TO  REP
    SET  EOR  SWITCH  TO  EOR
    PRESSING  PRO  PUSHBUTTON
    ADVANCE  SC  INDICATORS  TO  1
    SET  SGL  SWITCH  TO  SGL
    PRESSING  SGL  PB  SEVERAL  TIMES
    LOOK  FOR  AN  ERROR  IN  THE
    ALTERNATE  ONES  &  ZEROS
    PATTERN  IN  MPM              ERROR  OBSERVED          2     3

 2  MEMORY  ERROR
    MPM  DISPLAY  IN  THIS  MODE  IS
    THE  CONTENTS  OF  MEM  I/O  REG

 3  IS  CONSOLE  D  IND  1  OR  SPO  ERROR  IND  ON          4     7

 4            NOTE
    IF  CONFIDENCE  IS  ESTABLISHED
    IN  THE  PROCESSOR  GO  TO  M6  STEP  7

    SET  SGL  SWITCH  TO  NORM
    PRESSING  PRO  PUSHBUTTON
    ADVANCE  SC  INDICATORS  TO  6
    METER  PADI7Y  (MPM17)        62-64%                    5     E9

 6  METER  PADI8Y  (SMPCHK2)      62-64%                    F80   F79
                                                                        B
                                                                        B
 7  SET  EOR  SWITCH  TO  SOE                                           B
                                                                        B
                                                                        B
 5  METER  PADI8G  (SMPCHK1)      62-64%                    6     F78   B
    SET  SGL  SWITCH  TO  NORM
    SET  REP  SWITCH  TO  NORM
    SET  MTR  SWITCH  TO  MTR
    THEN  BACK  TO  MEM           ERR  &  STOP  IND  ON     9     8

 8  ERROR  IS  INTERMITTENT
    SET  IRQ  SWITCH  TO  CENTER
    PRESS  PRO  PUSHBUTTON
    TEST  WILL  REPEAT  UNTIL
    ERROR  IS  DETECTED           ERR  &  STOP  IND  ON     9     8

 9  MEMORY  FAULT
    OBSERVE  &  NOTE  INCREMENT  FOR
    ADDRESS  OF  ERROR  (SUBTRACT  1
    FROM  INCR  VALUE  TO  OBTAIN
    ADDRESS)  AND  MPM  FOR  DATA
    (SEE  TABLE  1  FOR  EXPECTED
    DATA  PATTERN)

            NOTE
        IF  MPM  DATA  MATCHES
        EXPECTED  DATA  MPM  BIT  17
        IS  AT  FAULT
        THE  PRO  PUSHBUTTON  WILL
        ADVANCE  THE  TEST  TO  THE
        ADDRESS  OF  THE  NEXT  ERROR
        IF  MORE  THAN  ONE  ERROR  IS
        PRESENT

M7  OPERATOR  ACTION                         RESPONSE          YES   NO
    (711  MPM  BIT  =  0)                                               B

 1  SET  SGL  SWITCH  TO  NORM                                          B
    PRESSING  PRO  PUSHBUTTON                                           B
    ADVANCE  SC  INDICATORS  TO  2.                                     B
    SET  SGL  SWITCH  TO  SGL
    PRESS  SGL  PUSHBUTTON  UNTIL                                       B
    MPM  IS  NOT  ZEROS
    MPM  BIT  NOT  ON  IS  ERROR                                        B

 2  REMOVE  FOLLOWING  CARDS
    ACCORDING  TO  MPM  BIT  NO.
    1  CARD  AT  A  TIME          MPM  IND  LIGHTS          4     3     E
                                                                        B
                                                                        B

*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  B
*                                                                       *
*  MPM BIT     CARD   CHIPS        CHIPS              CARD   CHIPS      B
*                                                                       B
*    1  OR  2  PADR2  C3  C5       PADJ0  C5  C7                        B
*    3  OR  4  PADR2  D3  D5       PADJ0  C5  C7      PADI4  F7         B
*    5  OR  6  PADR2  D5  D7       PADJ0  A5  B7      PAFP7  E7         B
*    6  OR  8  PAFL4  B7  C7  D7                                        B
*    7  OR  8  PADR2  C5  C7       PADJ0  A5  B7      PAFP7  D7  F7
*    9  OR  10 PADQ9  C3  C5       PADJ3  C5  C7                        B
*   11  OR  12 PADQ9  D3  D5       PADJ3  C5  C7                        B
*   13  OR  14 PADQ9  D5  D7       PADJ3  A5  B7                        B
*   15  OR  16 PADQ9  C5  C7       PADJ3  A5  B7                        B
*    9  TO  16 PAFK5  C7  E7       PAFK2  C7  E7                        B
*    9  TO  16 PAFJ9  C7  E7       PAFJ6  C7  E7                        B
*                                                                       B
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  B

 3  ALL  CARDS  FOR  MISSING  BIT
    REMOVED                                                 M9    2
                                                                        E
                                                                        E
 4  REPLACE  CHIPS  ON  CARD  JUST                                      E
    REMOVED,RE-INSERT  ALL  CARDS                                       E
M8  OPERATOR  721  711  SIGNAL               RESPONSE          YES   NO
    ACTION  TERM  TERM  NAME
    (NPM  ERROR)                                                        B
                                                                        B
                                                                        B
    THIS  ERROR  COULD  BE  CAUSED  BY                                  B
    A  MARGINAL  SIGNAL  LEVEL.  IF                                     B
    THE  FAILURE  INDICATED  BY  M8
    DOES  NOT  CORRECT  PROBLEM,  ON                                    B
    2ND  ENTRY  INTO  M8  GO  TO  M16
    SECTIONS  B  &  C.                                                  B

 1  OBSERVE  MPM  BIT  8  (IND  B1)          ON                2     4

 2  METER  NM14-1T  #FK5T!(LINGP0)           0%                3     F112

 3  METER  NM6-1T  #FK9T!(LINGP1)            100%              6     F112
```

```
4    METER  NM14-1T   #FK5T!(LINGP0)          100%                    5    F112
5    METER  NM6-1T    #FK9T!(LINGP1)           0%                     6    F112

6    OBSERVE & NOTE MPM (NANO ADD)
     USING 'NANO LIST' (SECTION 4)
     FIND THE MPM VALUE IN THE
     'ADDRS' COLUMN AND NOTE THE
     DATA VALUE FOR THE 14 NANO
     DIGITS                                                          7    7

7    USING DATA VALUE OBTAINED IN
     STEP 6 CALCULATE THE CORRECT
     LEVEL FOR NMNPAR1.
     (NMNPAR1 = 1
          IF NANO GROUP 1 IS ODD)

     METER  LI8-2D    #FK6I!(NMNPAR1)    CORRECT LEVEL                8    9

*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*                              NOTE
*
*        NANO GROUP 1 IS DIGITS    0-2-4-6-8-A-C
*
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

8    USING DATA VALUE OBTAINED IN
     STEP 6 CALCULATE THE CORRECT
     LEVEL FOR NMNPAR2.
     (NMNPAR2 = 1
          IF NANO GROUP 2 IS ODD)

     METER  LI8-1C    #FK3I!(NMNPAR2)    CORRECT LEVEL      F115      10

*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*                              NOTE
*
$        NANO GROUP 2 IS DIGITS    1-3-5-7-9-B-D
*
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

9    USING 'NANO TERMINAL LIST'
     (SECTION 3) AND DATA VALUE
     FROM STEP 6, METER 28 NANO
     BITS OF GROUP 1
                                  INCORRECT BIT FOUND      11    F113

10   USING 'NANO TERMINAL LIST'
     (SECTION 3) AND DATA VALUE
     FROM STEP 6, METER 28 NANO
     BITS OF GROUP 2
                                  INCORRECT BIT FOUND      11    F114

11   WITH POWER ON REMOVE CARD
     PER FOLLOWING TABLE

        MPM BIT 8      NANO GROUP 1      NANO GROUP 2

     711
          0            PAFK5             PAFK2
          1            PAFJ9             PAFJ6

     721
          0            NM14              NM15
          1            MM6               NM7

     METER NAN0 BIT FOUND
     INCORRECT IN STEP 9 OR 10     CORRECT LEVEL      12    13
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*    NANO GROUP 1 IS BITS  1-4,  9-12,17-20,25-28,33-36,41-44,49-52
*    NANO GROUP 2 IS BITS  5-8,13-16,21-24,29-32,37-40,45-48,533-56
*
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *

12   CARD REMOVED IS AT FAULT
     FIND CHIP NO,S IN TABLE 2

13   CORRECT LEVEL FOR NANO BIT IS HIGH                          14    12

14   CARD IN OPPOSITE MPM LEVEL
     (SAME NANO GROUP) IS AT FAULT
     FIND CHIP NO,S IN TABLE 2

     TABLE 2
      NANO BIT      CHIPS

        1  -  8     A3  B5  C7  D5  E5  E7
        9  -  16    B3  B5  C7  E7
       17  -  24    C3  C7  D5  E7
       25  -  32    C7  D3  D5  E5  E7
       33  -  40    C7  E3  E5  E7
       41  -  48    C7  E5  E7  F3
       49  -  56    C7  D5  D7  E7
                NOTE
       FOR NM6,NM7 DISREGARD UNUSED
       CHIP LOCATIONS IN TABLE 2

M9   OPERATOR ACTION                          RESPONSE      YES    NO
     (711 MPM BIT FAULT)

     FAULT IS EITHER MEMORY OR CARD
     CONTAINING MPM TERMINATOR

        MPM BIT NO,  CARD/CHIPS

            1-2      PAD14  C5  F7
            3-4      PAFM0  B5  C3  C7  F7
            5-6      PAFM9  B3  B5  C7  F7
            7-8      PAFM9  B5  C3  C7  F7
            9-10     PAFM6  B3  B5  C7  F7
            11-12    PAFM6  B5  C3  C7  F7
            13-14    PAFM3  B3  B5  C7  F7
            15-16    PAFM3  B5  C3  C7  F7
            17       PADI7  A5  F5

M10  OPERATOR ACTION                          RESPONSE      YES    NO
     (711 FE COMPARATOR CHECK)
      SET REP SWITCH TO NORM
      SET SGL SWITCH TO NORM
      SET IRQ SWITCH TO IRQ
      SET EOR SWITCH TO SOE
      SET MTR SWITCH TO MTR
      THEN BACK TO MEM          SC = 2, 4, OR 6      1     4

1    OBSERVE & NOTE INCR & FEAC   INCR = FEAC        2     4
     (DISPLAY IS ERROR ADDRESS +1)

2    OBSERVE MPM & COMPARE
     WITH EXPECTED DATA VALUE
     FROM TABLE 1                 ERROR OBSERVED     3     4
```

3	PRESSING PRO PUSHBUTTON ADVANCE TEST TO NEXT ERROR NOTING DATA VALUE & ADDRESS OF EACH ERROR	ALL ADDRESSES BAD	4	MEM		
4	SET IRQ SWITCH TO CENTER SET EOR SWITCH TO EOR SET MTR SWITCH TO MTR THEN BACK TO MEM CONSOLE D OR SPO ERROR IND ON		E6	5	F	
5	SCOPE PADR8U (FE4LADRF)	SEE W2	MEM	6		
6	SCOPE PADR9S (FE3LADDR)	SEE W3	F83	7		
7	SCOPE PADR8N (FE4P2)	1 US SQUARE WAVE	8	F88		
8	SCOPE PADR8S (FE4CLR)	SEE W4	F84	F89		
M11.	OPERATOR ACTION (711/721)	RESPONSE	YES	NO		
	1.IS SYSTEM 721		2	M8		
	2.METER L18-2H (LINPE/)	100%	F152	M8		
M12	OPERATOR ACTION (711 SC = 0) VERIFY FUSES F2,F3,F4,F6 IF NO FUSE FAILURE CONTINUE	RESPONSE	YES	NO		
1	METER PADI7D (SMPERR)	0%	2	10	F	
2	METER PADQ3Y (LINPE/)	100%	5	3	F F F F	
3	METER PADR9Y (FE0LTST/)	100%	4	F131	F F F	
4	METER PAFP2F (MUTYPE2)	100%	F108	M2	F F	
5	OBSERVE FEAC	FEAC = 0106	F97	6		
6	OBSERVE STOP IND	STOP IND ON	F116	7		
7	METER PADR9E (FE3PCLR/)	100%	8	F82		
8	METER PADR8B (CDSCLKJ)	3-5%	9	M2		
9	METER PADR8N (FE4P2)	48-52%	F96	F88		
10	RETURN TO TEST STEP S6 A					
M13	OPERATOR ACTION (711) (NPE = SC1)	RESPONSE	YES	NO	B F F	
1	METER PAFP2F (MUTYPE2)	100%	3	2	F	
2	METER PADR6F (FESS/)		F8	M2		
3	METER PADR9Y (FEOLTST/)	100%	F108	F94		
M14	OPERATOR ACTION (711 P.E. NOT DETECTED) SET EOR SWITCH TO EOR PRESS PRO PUSHBUTTON	RESPONSE	YES	NO		
1	METER PADI7D (SMPERR)	70-75%	10	2	F	
2	METER PAD17G (CGMDAF)	8-12%	5	4	F F	
4	METER PAFQ1V (LIMRC/)	46-50%	F129	F130		
5	METER PAD17S (CG100D)	46-52%	6	F117	F F F	
6	METER PADI8B (LIPECLR/)	100%	7	8		
7	METER PAD18R (MMDOS/)	100%	F119	F125	B B B	
8	METER PAFL8D (LIPCLRA/)	100%	F126	9	F F F	
9	METER PAFQ1J (CGPCLR/)	100%	F128	F127	F F F	
10	METER PADR5R (FE3PERR/)	25-30%	11	F122		
11	METER PADR5Y (FE3MPAR)	70-75%	12	F122		
12	IS ERR INDICATOR ON		F121	F123		
M15	OPERATOR ACTION (711 NPM PARITY ERR NOT DETECTED) SET EOR SWITCH TO EOR SET IRQ SWITCH TO IRQ PRESS PRO PUSHBUTTON	RESPONSE	YES	NO		
1	METER PADQ3Y (LINPE/)	0%	3	2	F F F F	
2	METER PADR9Y (FE0LTST/)	0%	F95	F94	F F	
3	OBSERVE ERR IND	ERR IND ON	F122	F92		
M16	OPERATOR ACTION (711/721 MARGINAL SIGNAL LEVEL TEST)	RESPONSE	YES	NO		

1 SET EOR SWITCH TO EOR
SET IRQ SWITCH TO CENTER
SET INH SWITCH TO INH (721)
PRESS PRO PUSHBUTTON

2 SCOPE THE FOLLOWING POINTS FOR SWITCHING LOGIC LEVELS
VERIFY
LOGIC HIGHS 2.5 V MIN
LOGIC LOWS 0.3 V MAX
REPLACE CHIP IF NOT

SECTION A
(STEPS 1 & 2 MUST PRECEED A)

SIGNAL	721	711	PINS	CHIP
EXT01/-04/	LU6-1	#FS1!	2Q 2P 2G 2L	C7
EXT05/-08/	LUL-2	#FS4!	2Q 2P 2G 2L	C7
EXT09/-12/	LU7-1	#FS7!	2Q 2P 2G 2L	C7
EXT13/-16/	LU7-2	#FT0!	2Q 2P 2G 2L	C7

SECTION B

MPM01-02	SM2	#DI4!	1K 1K	C5
MPM03-04	MU6-4	#FM0!	1R 1K	B5
MPM05-08	MU6-1	#FM9!	1I 2J 1R 1K	B5

MPM09-12	MU6-2	#FM6!	1I	2J	1R	1K		B5	
MPM13-16	MU6-3	#FM3!	1I	2J	1R	1K		B5	
MPM17	SM5	#DI7!	1Y					A5	

THE FOLLOWING PORTION OF SECTION B APPLIES TO 721 ONLY

SMADR01/	MADD1	1S			MADD1	D7	MADD2	D5
SMADR02/-04/	MADD1	2S	1T	2T	MADD1	D7	MADD2	D7
SMADR05/07/09/	MADD2	1P	2P	1L			MADD2	D5
SMADR06/12/14/	MADD1	1P	2P	1L	MADD1	D5		
SMADR08/10/11/	MADD2	2N	1N	2I			MADD2	C5
SMADR13/15/16/	MADD1	2N	1N	2I	MADD1	C5		
MD0N/	M0B	1Q	1F	2H	2F	2D	1E	M0B	B5
	M0B	1N	2N	2E	2X	2M	1P	M0B	C5
	M0B	1Y	2Y	1X	2W	2P		M0B	F3

SECTION C B

(STEPS 1 & 2 MUST PRECEED C)
NMN01 THRU NMN56
(SEE NAN0 TERMINAL LIST-PAGE 3-001)
(NOTE-FIRST CHIP LISTED IS MOST SUSPECT)

SIGNAL	721	711	CHIPS		SIGNAL	721	711		
NM01	NM14	#FX5!	E5	A3	NMN25	NMN14	#FK5!	B5	D3
NM02	NM14	#FK5!	B5	D5 A3	NMM26-28	NMN14	#FK5!	D5	D3
NMN03,04	NM14	#FK5!	B5	A3	NMN29	NMN15	#FK2!	B5	D3
NMN05	NM15	#FK2!	E5	A3	NMN30-32	NMN15	#FK2!	D5	D3
NMN06	NM15	#FK2!	B5	D5 A3	NMN33-36	NMN14	#FK5!	E5	E3
NMN07,08	NM15	#FK2!	B5	A3	NMN37-40	NMN15	#FK2!	E5	E3
NMN09-12	NM14	#FK5!	B5	B3	NMN41-44	NMN14	#FK5!	E5	F3
NMN13-16	NM15	#FK2!	B5	B3	NMN45-48	NMN15	#FK2!	E5	F3
NMN17-20	NM14	#FK5!	D5	C3	NMN49-52	NMN14	#FK5!	D5	D7
NMN21-24	NM15	#FK2!	D5	C3	NMN53-56	NMN15	#FK2!	D5	D7

M17 OPERATOR ACTION — RESPONSE — YES — NO
(711 CLOCK FAULT)
(VERIFY FUSES F2 F3 F4 F6) D

1	METER PAFQ0B (CGSCLK1)	3-5%	3	2	D
2	METER PAFQ1L (EOESTOP/)	100%	F3	F4	D
3	METER PADQ1N (CDSCLKH)	3-5%	4	F139	D
4	METER PADQ1T (CDSCLKJ)	3-5%	F98	F140	D

M21 OPERATOR ACTION — RESPONSE — YES — NO
(721 STEAL FAULT)
SEE NOTE 6

1.METER THE FOLLOWING STEAL REQUEST SIGNALS FOR 100%
CHNL 1 STC-1J (RQSTL1/)
CHNL 2 STC-2N (RQSTL2/)
CHNL 3 STC-2K (RQSTL3/)
CHNL 4 STC-1N (RQSTL4/) — ALL = 100% — F243 — 2

2.GO TO M1 OF MTR FOR DDP IN STEAL CHANNEL FOUND BAD
NOTE IF READING ON RQSTLN/ WAS 0% (GRD) FAULT IS EITHER IN DDP (USE M1 OF MTR FOR THAT DDP) OR ON STC CARD (USE F241)

M23 OPERATOR ACTION — RESPONSE — YES — NO
(721 SMADR FAULT)

1.REMOVE DMC CARD THEN METER SMADR SIGNAL FOUND BAD IN M2. — 48-52% — 2 — 3

2.FIND FAILURE PER SMADR NO.

1 TO 4	F236	
5 TO 8	F237	
9 TO 12	F238	
13 TO 16	F239	

3.REMOVE CLB & CLC CARDS THEN METER SMADR SIGNAL FOUND BAD IN M2 — 48-52% — 5 — 4

4.GO TO F240 DASH NO. THAT CORRESPONDS WITH SMADR NO. (SMADR01/ = F240-1)

5.NOTE FAILING SMADR NO.& GO TO M1 OF PMLC MTR

NOTE IF SYSTEM HAS MORE THAN ONE PMLC DDP REPEAT STEP 3 ON EACH.

M24 OPERATOR ACTION — RESPONSE — YES — NO
NOT USED

M25 OPERATOR ACTION — RESPONSE — YES — NO
NOT USED

M26 OPERATOR ACTION — RESPONSE — YES — NO
(721 MPM BIT = 0)

1.SET INH SWITCH TO 1NH
SET REP SWITCH TO REP
SET EOR SW TO EOR
CYCLE MTR SWITCH TO MTR
THEN BACK TO MEM.

2.SET SGL SWITCH TO SGL.
PRESS SGL PB TO OBTAIN AN MPM DISPLAY OF ALL 1'S (MINUS FAILING BIT/S).

3.REMOVE THE FOLLOWING CARDS PER FAILING MPM BIT NO. 1 AT A TIME — MPM IND LITES — 5 — 4

STC (ALL BITS) SM6 (MPM 9-16) SM7 (MPM 1-8)
CU2 (MPM 5-8) FE1 (MPM 9-16) FE2 (MPM 1-8)
ALL NM CARDS (MPM 9- 16)

4.ALL CARDS REMOVED — 6 — 3

5.USING LOGIC DIAGRAM OF CARD JUST REMOVED REPLACE CHIPS CONNECTED TO FAILING MPM BIT.

6.FIND FAILURE NO. PER FAILING MPM BIT NO.

MPM BIT		MPM BIT	
1 OR 2	F231	9 TO 12	F234
3 OR 4	F232	13 TO 16	F235
5 TO 8	F233		

M27 OPERATOR ACTION — RESPONSE — YES — NO
(721 MEMORY INPUT CHECK)

SET SWITCHES; INH TO INH REP TO REP
4/8 TO 8K EOR TO EOR
CYCLE MTR SWITCH TO MTR THEN TO MEM

NOTE ANY INCORRECT METER READING OF 0% (CRD) ON AN MADD CARD OUTPUT (M27 1,2 OR3) COULD BE DUE TO A SHORTED CHIP ON AN MPA OR MPB CARD. ALL MPA/MPB CARDS CAN BE REMOVED WHILE METERING MADD. IF THIS CORRECTS READING RE-INSERT CARDS

ONE AT A TIME TO ISOLATE THE CARD THEN USING LOGIC DIAGRAM TRACE SIGNAL BEING METERED FOR SUSPECT CHIPS.

1.METER THE FOLLOWING MADR(N) & MACS(N) SIGNALS					
A.MADD-1 1I 2H 2L 1M	ALL	45-55%	1B	F154
B.MADD-2 1I 2H 2L 1M	ALL	45-55%	1C	F155
C.MADD-1 1W 2W 1X 2V	ALL	0%	1D	F156
D.MADD-1 1V 2U	ALL	0%	1E	F157
E.MADD-2 1U 1V 2U 2X	ALL	0%	1G	F158
G.MADD-1 1U 2X	ALL	45-55%	1H	F157
H.MADD-1 2R 1R 2Q	ALL	45-55%	1J	F160
J.MADD-2 2R 1R 2Q	ALL	45-55%	2	F153
2.METER THE FOLLOWING MADI(N) SIGNALS				
A.MADD-1 1D 2D 1C	ALL	45-55%	2B	F161
B.MADD-1 1G 2G 1F	ALL	45-55%	2C	F162
C.MADD-1 2J 2K 2M	ALL	45-55%	2D	F163
D.MADD-2 1C 1D 2D	ALL	45-55%	2E	F167
E.MADD-2 1F 1G 2G	ALL	45-55%	2F	F165
F.MADD-2 2K		45-55%	2G	F166
G.PRESSING PRO PB ADVANCE SC TO 5 METER MADD-2 2M		45-55%	3	F166
3.PRESSING PRO PB ADVANCE SC TO 1				
A.METER MOB 2K (MOBSBI)	0%		3B	F167
B.METER MADD-1 2Y (MAWRT/-1)	70-80%		3C	F168
C.METER MADD-2 2Y (MAWRT/-2)	70-80%		3D	F169
D.METER MPA-1 B3 (WRT/)	82-90%		3E	F170
E.METER MPB-1 B3 (WRT/)	82-90%		4	F171
4.METER THE FOLLOWING ADR/ SIGNALS				
A.MPA-1 C4 D4 F4 H4 Q4	ALL	45-55%	4B	F172
B.MPB-1 C4 D4 F4 H4 Q4	ALL	45-55%	4C	F173
C.MPA-1 I4 J4 K4 M4 P4	ALL	45-55%	4D	F174
D.MPB-1 I4 J4 K4 M4 P4	ALL	45-55%	4E	F175
E.MPA-1 L4 U4 V4 W4	ALL	70-80%	4F	F176
F.MPB-1 L4 U4 V4 W4	ALL	70-80%	M28	F177

M28 OPERATOR ACTION (721 MEMORY OUTPUT CHECK)	RESPONSE	YES	NO
1.SET INH SWITCH TO NORM SET 4/8 SWITCH TO 4K SET EOR SWITCH TO SOE SET REP SWITCH TO NORM CYCLE MTR SWITCH TO MTR THEN BACK TO MEM	SAME ERROR RECURS (SEE STEP 24)	2	S4
2.NOTE VALUE OF MPM & INCR THEN USING TABLE 1 EXPECTED VALUES DETERMINE MPM BITS IN ERROR	BIT IS PICKED	3	5
NOTE * IF MPM CONTAINS THE CORRECT VALUE BIT 17 IS AT FAULT-GO TO 5			
3.STARTING WITH MPA-2 & MPB-2 REMOVE A 4K MOD OF MEM THEN CYCLE MTR SWITCH	ERROR RECURS	3A	4
NOTE * A 4K MOD IS 1 MPA & 1 MPB WITH SAME DASH NO.			
A.REPEAT STEP 3 ON NEXT HIGHER MEM MOD. WHEN ONLY MPA/MPB-1 REMAIN GO TO 5.			

4.FAULT IS IN LAST MEM MOD REMOVED
FIND CHIPS PER MPM BIT NO NOTED IN STEP 2.

MPM BIT	
1 THRU 4	MPA A9
5 THRU 8	MPA E9
9	MPA I9
10 THRU 13	MPB A9
14 THRU 16	MPB E9

5.SET INH SWITCH TO INH & REP TO REP PRESSING PRO PB ADV SC IND TO 1 (SEE STEP 23 BEFORE PROCEEDING)				
METER MOB-1L (MPM01)	45-55%	6	5A
A.METER MOB-1Q (MPD001/)	45-55%	F178	22
6.METER MOB-2I (MPM02)	45-55%	7	6A
A.METER MOB-1F (MPD0020)	45-55%	F178	22
7.METER MOB-1K (MPM03)	45-55%	8	7A
A.METER MOB-1N (MPD0031)	45-55%	F179	22
8.METER MOB-2J (MPM04)	45-55%	9	8A
A.METER MOB-2N (MPD004/)	45-55%	F179	22
9.METER MOB-1I (MPM05)	45-55%	10	9A
A.METER MOB-2H (MPD005/)	45-55%	F180	22
10.METER MOB-2G (MPM06)	45-55%	11	10A
A.METER MOB-2F (MPD006/)	45-55%	F180	22
11.METER MOB-1D (MPM07)	45-55%	12	11A
A.METER MOB-2D (MPD007/)	45-55%	F181	22
12.METER MOB-2B (MPM08)	45-55%	13	12A
A.METER MOB-1E (MPD008/)	45-55%	F181	22
13.METER MOB-1J (MPM09)	45-55%	14	13A
A.METER MOB-2E (MPD009/)	45-55%	F182	22
14.METER MOB-1S (MPM10)	45-55%	1K	14A
A.METER MOB-2X (MPD010/)	45-55%	F185	22
15.METER MOB-2U (MPM11)	45-55%	16	1KA
A.METER MOB-1Y (MPD011/)	45-55%	F183	22
16.METER MOB-1U (MPM12)	45-55%	17	16A
A.METER MOB-2Y (MPD012/)	45-55%	F183	22
17.METER MOB-2T (MPM13)	45-55%	18	17A
A.METER MOB-1X (MPD013/)	45-55%	F184	22
18.METER MOB-2S (MPM14)	45-55%	19	18A
A.METER MOB-2W (MPD014/)	45-55%	F186	22
19.METER MOB-2L (MPM15)	45-55%	20	19A
A.METER MOB-2M (MPD015/)	45-55%	F187	21
20.METER MOB-2Q (MPM16)	45-55%	21	20A
A.METER MOB-1P (MPD016/)	45-55%	F187	22
21.PRESSING PRO PB ADV SC IND TO 5			
METER MOB-1R (MPM17)	45-55%	M30	21A
A.METER MOB-2P (MPD017/)	45-55%	F188	22

22.IF INCORRECT READING ON MPDO(N) WAS 0% (GRD) FAULT IS EITHER MEM CHIP (USE M30) OR ON MOB CARD (USE FAILURE FOR MPDO(N) READING CORRECT). IF READING WAS NOT 0% GO TO M30.

23.IF 0% (GRD) READING ON ANY MPM BIT IS OBSERVED FAULT MAY BE A SHORTED CHIP ON ANY CARD WIRED TO MPM BIT. IF ERROR IS NOT CORRECTED BY CHIP REPLACEMENT IN MEMORY GO TO M26

24.IF TEST NOW RUNS WITHOUT ERROR FAULT IS IN MPA-2 OR MPB-2. EXCHANGE MPA/B-1 WITH -2 THEN GO TO M28 STEP 5.

M29	OPERATOR ACTION	RESPONSE	YES	NO
	NOT USED			

M30 MEMORY ADDRESS OR DATA FAILURE TABLE

THE MEMORY IS ORGANIZED IN 4K MODULES. EACH MODULE CONSISTS OF 1 MPA & 1 MPB CARD. THE FIRST MODULE (ADDR 0000 THRU 0FFF) IS MPA-1 & MPB-1. THE 2ND MODULE (ADDR 1000 THRU 1FFF) IS MPA/B-2 ETC. THE MOST SIGNIFICANT DIGIT CORRESPONDS TO THE DASH NO. OF THE MODULE (0XXX IS -1, 1XXX IS -2 ETC).

THE MPA CARD CONTAINS MPM BITS 1 THRU 9,MPB CONTAINS BITS 10 THRU 17 AND DIFFERS FROM MPA ONLY IN THAT CHIPS I1, I3, I5 & I7 ARE REMOVED.
THE MPA/B CARD IS ORGANIZED INTO 4 1K BY 1 GROUPS. THE GROUP SELECT IS A DECODE OF THE 1K & 2K A&DRESS BITS (SMADR5 & 6). DURING FE MEMORY TEST THESE EQUAL INCR BITS 1 & 2. SMCU & DPM MTRS WILL DISPLAY DPM ADDRESS IN MIR IN EITHER CASE DIGIT B BITS 4 & 8 OF THE FE DISPLAY INDICATE THE GROUP WHILE DIGIT A INDICATES THE MODULE.

DIGIT B 8421		DIGIT B 8421	
00XX	GROUP 1	10XX	GROUP 3
01XX	GROUP 2	11XX	GROUP 4

THE PROCEDURE FOR ISOLATING MEMORY CHIP IS;

1.DETERMINE FAILING MODULE FROM MOST SIG. DIGIT OF ADDRESS

2.DETERMINE GROUP NO. OF FAILURE FROM DIGIT B BITS 4 & 8.

3.DETERMINE MPM BIT NO. IN ERROR.(TABLE 1 IF FEMT)

4.FIND SUSPECT CHIP IN FOLLOWING CHART.

NOTE IF FAILURE IS PICKED BIT,ONLY THE CHIP IN THE FAILING GROUP IS SUSPECT.
IF FAILURE IS DROPPED BIT CHIPS OF ALL 4 GROUPS ARE SUSPECT,BUT CHIP IN FAILING GROUP IS PROBABLE FAULT. DRIVER (DR) CHIP IS SUSPECT WHEN 10 LEAST ADDRESS BITS = 000 OR 001.

	MPM BITS (MPA CARD)									MPM BITS (MPB CARD)							
GROUP	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
1	A1	B1	C1	D1	E1	F1	G1	H1	I1	A1	B1	C1	D1	E1	F1	G1	H1
2	A3	B3	C3	D3	E3	F3	G3	H3	I3	A3	B3	C3	D3	E3	F3	G3	H3
3	A5	B5	C5	D5	E5	F5	G5	H5	I5	A5	B5	C5	D5	E5	F5	G5	H5
4	A7	B7	C7	D7	E7	F7	G7	H7	I7	A7	B7	C7	D7	E7	F7	G7	H7
DR	A9	A9	A9	A9	E9	E9	E9	E9	I9	A9	A9	A9	A9	E9	E9	E9	E9

M32	OPERATOR ACTION	RESPONSE	YES	NO
	NOTE IF CONFIDENCE IS NOT ESTABLISHED IN THE PROCESSOR GO TO M1 ALSO SEE NOTE 4			
1.OBSERVE	HALT IND	ON	1A	5
A.OBSERVE	HEX VALUE OF 4 E02 ERROR INDICATORS FOR NEXT STEP	IND / STEP		
		0 / 4G		
		1,2 OR 3 / 2		
		4 OR 5 / 3		
		6 / 4		
		7 / F229		
2. LOADER ERROR				
A.METER	LI7-2P (LILTB/)	100%	2B	F222
B.METER	LI8-2F (LIERR/)	100%	F223	F224
3. NANO ERROR				
A.METER	LI8-1V (FEOLIST/)	100%	F225	F226
4. MPM ERROR				
	NOTE INSURE CON1 CARD PROVIDES CONTINUITY FROM PINS 1T TO 2T (MPM17 TO CONMPM17).			
A.SET	INH SWITCH TO INH THEN CYCLE MTR SWITCH TO MTR & BACK TO MEM		4B	4B
B.SET	INH SWITCH TO NORM THEN CYCLE MTR SWITCH AGAIN	SAME ERROR	4C	S4
	NOTE IF TEST NOW RUNS,PARITY ERROR WAS CLEARED BY WRITE. GO TO S7			
C.OBSERVE	MPM FOR NO. OF BITS ON	EVEN	4D	4E
D.METER	SM5-1Y (MPM17)	100%	4F	M27
E.METER	SM5-1Y (MPM17)	0%	4F	M27
F.METER	SM5-1D (SMPERR/)	100%	4G	4H
G.ERROR	CONDITION HAS CLEARED. COULD BE A SLOW MEMORY CHIP. EXCHANGE MPA/B-1 WITH A HIGHER MODULE. FAILING BIT CAN THEN BE IDENTIFIED BY SMCU MTR.			
H.OBSERVE	MPM BITS 1 TO 8 (DIGITS A&B) FOR NO. OF BITS ON	EVEN	4I	4J
I.METER	SM7-2H (SMPCHK1)	0%	4L	F78
J.METER	SM7-2H (SMPCHK1)	100%	4L	F78
L.OBSERVE	MPM BITS 9 TO 1L	EVEN	4M	4N
M.METER	SM6-2H (SMPCHK2)	0%	F227	F79
5.HAS	M1 BEEN RUN		M27	M1

M33	OPERATOR ACTION (NO MPM ERROR)	RESPONSE	YES	NO
1.METER	SM5-1D (SMPERR/)	0% OR PULSES(NOT 100%)	6	2
2.METER	SM5-2B (LIPECLR/)	100%	5	3
3.METER	LI7-2H (LIPCLRA/)	100%	F244	4
4.METER	LI7-1H (CGPCLR/)	100%	F245	F246
5.METER	SM5-1S (EOIDPE/)	100%	F248	F247
6.METER	E02-2M (EOANYER)	100% OR PULSES(NOT 0%)	7	F249
7.METER	E02-1M (EOASPRST)	0%	8	F251
8.METER	E02-1P (CGHALT)	100%	9	10
9.OBSERVE	HALT IND	ON	F252	F253
10.METER	E02-2N (CGERRCLK)	3-5%	F254	F255

M34	OPERATOR ACTION (NO NPM ERROR)	RESPONSE	YES	NO
1.METER	EO2-2K (LINPE/)	0% OR PULSES(NOT 100%)	3	2
2.METER	FE4-2Y (FEOLTST/)	0%	F256	F257
3.OBSERVE	HALT IND	ON	F258	F249

M36	OPERATOR ACTION	RESPONSE	YES	NO
1.OBSERVE	INCR	0000 OR 0001	M2	2
2.OBSERVE	ERR IND (FE4)	OFF	3	M2

3.SET INH SWITCH TO INH
SET IRQ SWITCH TO CENTER
PRESS PRO PB-OBSERVE INCR 0FFF (SEE NOTE 2) 4 M2

4.SET INH SWITCH TO NORM
SET IRQ SWITCH TO IRQ
CYCLE MTR SWITCH TO MTR
THEN BACK TO MEM.
AND GO TO M32
ASSUME CONFIDENCE IN PROCESSOR

FAILURE DICTIONARY

F1 CD1 C3 C7 D3

F2 NOT USED

F3 CG1 A1 A7 B5 C5 C7 D1 D3 D5

F4 E01 E7 CG1 B5 C7 E1 FE3 A7 B3 B5 D3 FE4 A3 A7 B1 E5

F5 CG1 A5 B5 C5 D1 D3

F6 EO1 A7 C7 E3

F7 CU1 A1 F7

F8 MU2 B1

F9 FE3 B5

F10 B711 LI3 A7 A5 A3 B1 D3 EO1 A7 LOAD SWITCH
B771 LI5 A5 B1 B7 C5 B7 EO1 A7 LOAD SWITCH
B711-1 LI7 B1 B7 D5 E5 F3 F5 E01 A7 LOAD SWITCH

F11 CU1 A1 E7

F12 FE4 MTR SWITCH

F13 MU2 A1 F1

F14 B711 LI3 B1 B771 LI5 B1 B721/711-1 LI8 F3

F15 EO1 A3 B3 B7 C7 D7

F16 B711 LI3 D3 EO1 A7 FE4 E7 F7
B771 LI5 F7 EO1 A7 FE4 E7 F7
B711-1 LI8 A7 EO1 A7 FE4 E7 F7

F17 MU4 C5 D5

F18 MU4 A5 B7

F19 MU4 B5 C7

F20 MU4 A5 A7 C7

F21 MU4 A1 A3 D5

F22 SM2 B5 C5 SM3 C5 F7

F23 MU1-4 (721 MU6-4) B1 D3 E1 F1 F3 F5

F24 MU1-1 (721 MU6-1) A1 B1 C5 D3 D5 E1 F1 F3 F5

F25 MU1-2 (721 MU6-2) A1 B1 C5 D3 D5 E1 F1 F3 F5

F26 MU1-3 (721 MU6-3) A1 B1 C5 D3 D5 E1 F1 F3 F5

F27 B711 CG1 A3 A5 B3 C1 D1 D5 LU5 E5 CLEAR SWITCH
B721 CG2 B1 C1 C3 C7 D1 E7 LU5 E5 CLEAR SWITCH

F28 B711 CG1 A3 B721 CG2 C3

F29 CG1 C1 (IF B721 CG2 C3 CD2 A5)
FE1 AND FE2 A3 A7 FE3 A7

F30 FE3 A5 B5 C3 C5 E3 E7 F5 AND IF 721 EO2 B9

F31 B711 CG1 C1 B721 CG2 C7

F32 NOT USED

F33 MU1-3 (721 MU6-3) B1 D3 E1 E5 E7

F34 MU1-3 (721 MU6-3) A1 A5 D1 D3 F7

F35 MU1-3 (721 MU6-3) A1 C1 C5 D3 F7

F36 MU1-2 (721 MU6-2) B1 B7 D3 F1 F5 F7 MU1-3 (MU6-3) D3

F37 MU1-2 (721 MU6-2) B1 D3 E1 F1 F7

F38 MU1-2 (721 MU6-2) A1 D1 D3 D7

F39 MU1-2 (721 MU6-2) A1 C1 C5 D3 F7

F40 MU1-1 (721 MU6-1) B1 B7 D3 F1 F5 F7 MU1-2 (MU6-2) D3

F41 MU1-1 (721 MU6-1) B1 D3 E1 E5 E7

F42 MU1-1 (721 MU6-1) A1 D1 D3 D5 F7

F43 MU1-1 (721 MU6-1) A1 C1 C5 D3 F7

F44 MU1-1 (721 MU6-1) B1 B7 D3 F1 F5 F7 MU1-1 (MU6-1) D3

F45 MU1-1 (721 MU6-1) B1 D3 E1 E5 F7

F46 SM3 A5 A7 C5 D7 E7 F7 OR MEMORY

F47 B711 EO1 A3 B3 B7 C7 B721 EO2 A7 B3 B5

F48 B711 SM3 D7 E7 OR MEMORY B721 GO TO M23

F49 B711 EO1 A3 B3 B7 C7 CG1 C1 SM2 F3 SM3 FM
B721 EO2 B9 G5 CG2 C3 C7 SM4 F3 SM5 F7

F50 B711 SM3 B7 C7 OR MEMORY B721 GO TO M23

F51 B711 SM2 A5 B5 C5 E5 E7 F3 OR MEMROY B721 GO TO M23

F52 B711 SM2 E5 E7 OR MEMORY B721 GO TO M23

F53 B711 SM2 D5 D7 OR MEMORY B721 GO TO M23

F54 B711 SM2 D1 D5 D7 OR MEMORY B721 GO TO M23

F55 SM2 D1 D7 F3

F56 FE4 A5 D3 D5 F3

F57 FE4 B5 C7

F58 EO1 D3 D5

F59 B711 EO1 A7 D3 E3 FE3 A7 LI3. A7 C3 D3
B771 EO1 A7 D3 E3 FE3 A7 LI5 B3 B5 C1 D7 A3 F7
B711-1 EO1 A7 D3 E3 FE3 A7 LI8 A7 C5 E5
B721 EO2 F5 G3 FE3 A7 LI8 A7 C5 E5 STC C5

F60 B711 SM1-2 (SM1 IF 711-1/771) A3 F5 F7 OR MEMORY
B721 SM6 A3 F5 F7 MADD-2 B5 C7

F61 B711 SM1-2 (SM1 IF 711-1/771) F5 F7 OR MEMORY
B721 SM6 F5 F7 MADD-2 C3 C5 D5

F62 FE2 B1 B3 F5

F63 FE3 A1 A5 B7 C7 D5 D7

F64 FE2 B5 B7 F5

F65 EO1 C1 D3

F66 FE1 B1 B3 F5

F67 FE1 B5 B7 F5
F68 FE4 C3 D3 F3

F69 FE3 B1 B5 B7 C7 D5 D7

F70 FE4 B3 C3

F71 B711 SM1-2 (SM1 IF 711-1/771) E5 E7 OR MEMORY
B721 SM6 E5 E7 MADD-2 A5 A7

F72 B711 SM1-1 (SMD1 IF 711-1/771) A3 F5 F7 OR MEMORY
B721 SM7 A3 F5 F7 MADD-1 C5 C7

F73 B711 SM1-1 (SMD1 IF 711-1/771) F5 F7 OR MEMORY
B721 SM7 F5 F7 MADD-1 A5 A7 B5 B7

F74 B711 SM1-1 (SMD1 IF 711-1/771) E5 E7 OR MEMORY
B721 SM7 E5 E7 MADD-1 B5 B7

F75 B711 SM1-1 D5 F3 B711-1/771 SMD1 D5 F3 B721 SM7 D5 F3

F76 B711 SM1-2 D5 F3 B721 SM6 D5 F3
B711-1/771 SM1 D5 F3

F77 B711 SM3 F5 B721 SM5 F5

F78 B711 SM1-1 A5 C5 B711-1/771 SMD1 A5 C5 B721 SM7 A5 C5

F79 B711 SM1-2 A5 C5 B711-1/771 SM1 A5 C5 B721 SM6 A5 C5

F80 SM3 B5 F5

F81 FE3 A5

F82 FE3 A5 B3 C3

F83 FE4 A5

F84 FE3 D3 D5 E7

F85 FE2 A3 A5 A7

F86 FE1 A3 A5 A7

F87 FE4 A5 D5 D7

F88 FE4 A5 D3 C5

F89 FE4 E3 E5 F5

F90 B711 LI3 F5 B771 LI5 C1 B711-1 LI8 E7
B721 LI8 E7 MADD-2 C5 C7

F91 NOT USED

F92 FE4 A3

F93 NOT USED

F94 FE4 E7

F95 B711 LI3 E7 F1 F7 B771 LI5 B1 E5 E7
B711-1 LI8 A5 C1 F7

F96 FE4 C3 C5 C7 E5 F5

F97 FE4 C1

F98 FE4 F5 F7 REP SWITCH

F99 MU1-3 (721 MU6-3) B1 B7 D3 F1 F5 F7

F100 B711 AC2 CARD B721 AC3 CARD

F101 CHECK +5 V FUSE OR SUPPLY

F102 CHECK +24 V FUSE OR SUPPLY

F103 CHECK +12 V FUSE OR SUPPLY

F104 CHECK -12 V FUSE OR SUPPLY

F105 CHECK -24 V FUSE OR SUPPLY

F106 PROBLEM ON AC1 BOARD

F107 CC6 OR CC6E D1 E3 CC6K OR CC6EK D3 E3
CC7 (ALL VERSIONS) C7 E5

F108 B711 LI3 F1 F7 B771 LI5 B1 E5 E7 B711-1 LI8 C1 F7

F109 B711 LI3 F5 B771 LI5 E5 B711-1 LI8 E7

F110 FE4 C3 C5 E3 F5

F111 FE4 D5 E5

F112 B711 LI3 B7 C7 D7 B771/B711-1 SMD1 A3 A7 B3
B721 SM7 A3 A7 B3

F113 NM4 (721 NM14) A1 B1 C1 D1 E1 F1 F5

F114 NM5 (721 NM15) A1 B1 C1 D1 E1 F1 F5

F115 B711 LI3 E7 F7 EO1 F1 F3
B711-1 LI8 A5 C1 EO1 F1 F3
B771 LI5 B1 E5 E7 EO1 F1 F3
B721 LI8 A5 C1 EO2 A3 F9

F116 FE3 E7 FE4 A1 A3 A7 B1 E5

F117 CG1 B5 C3 C5 D3 XSISTORS Q1 Q2 Q3 CRYSTAL Y1
CAPS C25 C26 C27 C28 C29

F118 CG1 E1 F1

F119 SM3 A7 B5 C5 E5 F5

F120 NOT USED

F121 FE4 A1 B1 F7 EOR SWITCH

F122 FE3 E7

F123 FE4 A1 A3 A7

F124 NOT USED

F125 B711 LI3 B1 F5 B771 LI5 B1 F5 B711-1 LI8 E7 F3

F126 B711 LI3 A7 E1 E5 B711-1 LI8 D5 D7 E5 F5
B771 LI5 A5 B7 D7

F127 CG1 C3

F128 B711 LI4 C1 D1 B711-1 LI7 B1 C1 B771 LI6 B1 B7

F129 CG1 C3 F1

F130 B711 LI3 F1 B711-' LI8 F7 B771 LI5 A7

F131 FE4 C7 E7

F132 PS1 E7 F7 (LAST PS1 CARD REMOVED)

F133 PS1 A5 C7 (LAST PS1 CARD REMOVED)
F134 PS1 B3 B5 B7 (LASTPS1 CARD REMOVED)

F135 CON1 A5 A7 D5 F5 F7

F136 NOT USED

F137 NOT USED

F138 EO1 A7

F139 CD1 C3 C7 D3

F140 CD1 C3 D3 E7

F141 CON1 C5 C7 D3 D7

F142 NOT USED

F143 IRQ IS SET, RUN MTR FOR SYSTEM CONTROLLER DEVICE

F144 CG1 B1

F145 CG1 B5 C3 C5 D3 D5

F146 CG1 D3 D5

F147 B711 SM1-1 E5 E7 B711-1/771 SMD1 E5 E7
B721 SM7 E5 E7 MADD-1 A5 A7

F148 EO2 B9 G5 CG2 C3 C7 SM4 F3 SM5 F7

F149 NOT USED

F150 B711 SM1-2 (SM1 IF 711-1/771) E5 E7 OR MEMORY

B721 SM6 E5 E7 MADD-1 B5 C7

F151 CG2 C5 D3

F152 EO2 A3 A9 C3 C7 G3

F153 MADD-2 D3

F154 MADD-1 C3 E5

F155 MADD-2 C3 E5

F156 MADD-1 E7 F7
F157 MADD-1 F5 E7

F158 MADD-2 F5 E7

F159 NOT USED

F160 MADD-1 D3

F161 MADD-1 A7 E5

F162 MADD-1 B7

F163 MADD-1 C7

F164 MADD-2 A7 E5

F165 MADD-2 B7

F166 MADD-2 C7

F167 MOB D5

F168 MADD-1 E5

F169 MADD-2 E5

F170 MPA-1 C9 G9 I9

F171 MPB-1 C9 G9 I9

F172 MPA-1 B9

F173 MPB-1 B9

F174 MPA-1 H9

F175 MPB-1 H9

F176 MPA-1 B9 C9 D9 H9

F177 MPB-1 B9 C9 D9 H9

F178 MOB A5 B5 D5

F179 MOB C5 C7 D5

F180 MOB B5 B7

F181 MOB A7 B5

F182 MOB C5 D5 E5

F183 MOB F3 F7

F184 MOB E5 F3

F185 MOB C5 E7

F186 MOB E7 F3

F187 MOB C5 D7

F188 MOB F3 F5

F189 B711 CG1 C1 B721 CG2 C3

F190 NOT USED

F191 NOT USED

F192 NOT USED

F193 NOT USED

F194 NOT USED

F195 NOT USED

F196 NOT USED

F197 NOT USED

F198 NOT USED

F199 NOT USED

F200 AC3 CARD OR POWER CONTROLS

F201 SM7 A3 A7 B3

F202 EO2 G3

F203 LI8 C1

F204 EO2 INH SWITCH

F205 B711 CG1 A7 B721 CG2 A7
F206 CG2 A1 A5 B5 D5 EO2 INH SWITCH

F207 B711 CG1 D5 B721 CG2 B1
F208 CG2 D7 F7 XSISTORS Q1 Q2 Q3 CRYSTAL Y1 CAPS C25 THRU C31

F209 CG2 C7

F210 CG2 A3 B5 D3

F211 CG2 D3 D5

F212 CG2 A1 B1 B3 B5 D3 D5

F213 CG2 B1 B5 D3

F214 CG2 B7 E7

F215 CG2 B3 B7 F7 FE3 A7 B5 D3

F216 EO2 A3 B5 G5

F217 EO2 A3 A7 B3 B5 C3
F218 CG2 A3 B3 B5 C5 D7 F7

F219 EO2 F5 G5

F220 SIGNAL 'BTMEW/' ACTIVE FROM DISK
GO TO M1 OF UCDD MTR

F221 SIGNAL 'BTMEW/' ACTIVE FROM PMLC

GO TO M1 OF PMLC MTR
F222 LI7 D3 D5 LI8 B1

F223 EO2 C7 E5 LI8 B1 B7 F5

F224 EO2 A9 C3 C7 E3 E5

F225 EO2 A3 F9 LI8 C1 F7

F226 LI8 F3 F7 FE4 E7

F227 EO2 C7 E5 F9 SM5 B5 D5 E5 F5

F228 EO2 G3 G5 LI8 A7 B7 E5 F3 F5 LOAD SWITCH
F229 SM4 A5 C5 C7 F3 EO2 C7 E5

F230 B711 CG1 A3 D5 B721 CG2 B1 C7 D3

F231 SM4 C5 F7
F232 MU6-4 B3 C3 C7 F7

F233 MU6-1 B3 B5 C3 C7 F7

F234 MU6-2 B3 B5 C3 C7 F7

F235 MU6-3 B3 B5 C3 C7 F7

F236 DMC A5

F237 DMC A7

F238 DMC F5

F239 DMC F7

F240 USE DASH NO. EQUAL TO SMADR BIT NO.

-1	SM4 C7 D1 D5 D7	MADD-1 D7 E7	MADD-2 D5 E7
-2	SM4 C7 D5 D7	MADD-1 D7 E7	MADD-2 D7 E7
-3	SM4 C7 D5 D7	MADD-1 D7 E7	MADD-2 D7 E7
-4	SM4 C7 D5 D7	MADD-1 D7 E7	MADD-2 D7 E7
-5	SM4 D1 E5 E7		MADD-2 D3 D5
-6	SM4 E5 E7	MADD-1 D3 D5	
-7	SM4-E5 E7		MADD-2 D3 D5
-8	SM4 A5 E5 E7 F3		MADD-2 C3 C5
-9	SM5 B7 C7		MADD-2 C3 D5
-10	SM5 B7 C7		MADD-2 C3 C5
-11	SM5 B7 C7		MADD-2 C3 C5
-12	SM5 B7 C7	MADD-1 D3 D5	
-13	SM5 D7 E7	MADD-1 C3 C5	
-14	SM5 D7 E7	MADD-1 C3 D5	
-15	SM5 D7 E7	MADD-1 C3 C5	
-16	SM5 A5 D7 E7	MADD-1 C3 C5	

F241 STC A5 B3 B7 C5 D5 D7
F242 STC A5 B3 B7 C3 C5 D3 D5

F243 STC A5 D5

F244 LI8 D5 D7 F5

F245 LI7 C1 D3 F1 LI8 D5 D7 E5

F246 CG2 D7

F247 EO2 C7 F5 ERS SWITCH

F248 SM5 B5 D5 E5 F5

F249 EO2 F9

F250 EO2 INH SWITCH

F251 EO2 C5 D3 ERS SWITCH

F252 EO2 A9 C3 C7 E5 E9 F3 F9 G7 INDICATOR5

F253 EO2 A3 HALT INDICATOR

F254 CG2 A1 A5 A7 B5 D5

F255 CG2 A5 A7 B7 EO2 D7

F256 LI8 A5 C1 F7

F257 LI8 F3 F7 FE4 E7

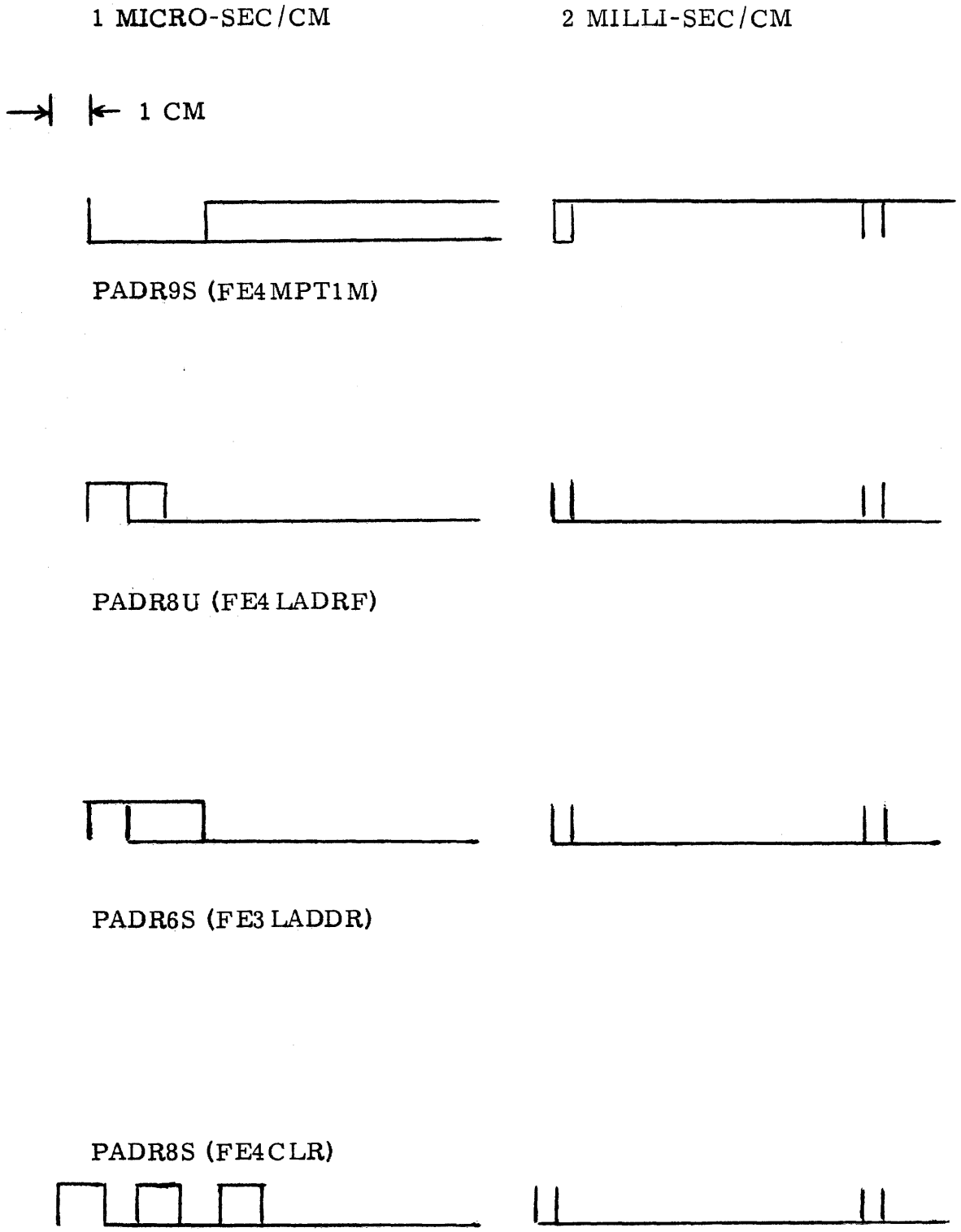
F258 EO2 A3 A9 C3 D9 E3 E5 E9 INDICATORS

F259 EO2 D9 G7

F260 B711 CG1 A3 B721 CG2 C7

F261 CG2 A5 A7 B7

ILLUSTRATIONS



MTRLDR
MAINTENANCE TEST ROUTINE
LOADER

```
PROGRAM-ID  MTRLDR.
*************************************************************
*
*   MTR LOADER  OPERATOR  INSTRUCTIONS      2604   2028
*
*   THIS  PROGRAM LOADS B721,  B711,  B711-1  MTR,S  IN  CARD
*   FORM VIA  9114   OR 9115   CARD  READER.
*
*   ALL  THE  FOLLOWING  MTR'S  MUST BE LOADED  VIA  PAPER
*   TAPE  TO INSURE  CORRECT  FAULT  DIAGNOSIS.
*
*        B711              B711-1            B721
*
*        PROC              PROC              PROC
*        BSW               BSW               BSW
*        MCU               MCU               SMCU
*        CON/CON96         ECON              ECON
*        DPM               DPM               CR80/CR91
*        CR80              CR80
*
*
*   LOADING  ANY  OF  THE  ABOVE  MTR'S  VIA  CARDS  MAY  RESULT
*   IN  ERRONEOUS  FAULT  DIAGNOSIS.
*
*   IF  THE  FEMT  OR  CON/ECON  MTR'S  INDICATE  A  DDP  IS
*   CAUSING  UNEXPECTED  DATA  OR  STATUS  INTERRUPTS  CARD
*   LOADING  CANNOT  BE  ACCOMPLISHED.
*
*************************************************************
*
*   CARD  LOADING  PROCEDURE
*   1  READY  THE  CARD  READER
*
*   2  SET  LOAD  SWITCH  TO  NORM-PRESS  CLEAR
*
*        NOTE   ON  711/711-1      D8  IND  WILL  LITE-DISREGARD
*
*   3  SET  LOAD  SWITCH  TO  LOAD
*      LOAD  PROGRAM  TAPE  2604   2010
*
*           NOTE   LABEL  CARD  CONTAINS  NAME & REVISION  LEVEL
*                  OF  PROGRAM  AND  SHOULD  BE  KEPT  WITH  DECK.
*                  LOADER  WILL  IGNORE  LABEL  CARD.
*
*   4  PRESS  CONSOLE  READY/SPO  INPUT  REQ
*
*   5  SELECT  PORT  NO.  OF  CARD  READER  WITH  A  SINGLE
*      KEY  DEPRESSION  (1THRU  9,A  OR  B  ON  ALPHA  OR  NUM)
*
*   6   B721   WHEN  STOP  CARD  IS  READ  CONTROL  IS  TRANSFERED
*              TO  NEW  PROGRAM  WHICH  BEGINS  EXECUTION.
*
*          B711   B711-1      WHEN  STOP  CARD  IS  READ  MTRLDR  GOES
*                             TO  A  WAIT  CONDITION.   SYSTEM  CLEAR
*                             MUST  BE  USED  TO  EXECUTE  NEW  PROGRAM.
*
*
*   FAULT  INDICATIONS                        CAUSE
*
*   CON   D  IND  =  4F  (CF  ON  711)        CARD  PARITY  ERROR
*   SPO   A  'P'  IS  PRINTED                 (SEE  NOTE)
*
*   CON   D  IND  =  50  (D0  ON  711)        PROGRAM  BEING  LOADED
*   SPO   AN  '0'  IS  PRINTED                ATTEMPTED  TO  OVERWRITE
*                                             THE  LOADER
*
*   CON   D  IND  =  43  (C3  ON  711)        CARD  COUNT  INCORRECT
*   SPO   A  'C'  IS  PRINTED                 #MISSING  CARD(S)!
*
*   ANY  OTHER  D  IND  VALUES  INDICATE  A  HARDWARE  ERROR
*
*        NOTE    TO  RETRY  AFTER  CARD  PARITY  PLACE  LAST  CARD
*                FED  INTO  OUTPUT  HOPPER  BACK  TO  THE  INPUT
*                HOPPER  #AT  END  OF  DECK  IS  OK  BUT  BELOW
*                STOP  CARD!  (STOP  =  COLUMN  13  NON  BLANK)
*                THEN  PRESS  CON  RDY/SPO  INPUT  REQ  (OR  FST)
*
*                CARD  DECK  NEED  NOT  BE  IN  ORDER
*
*        NOTE   LOADER  WRITES  0002  INTO  ALL  MEMORY
*               ADDRESSES  BEFORE  LOADING  CARDS  TO  FIND  MEM
*               LIMIT  AND  TO  CLEAR  MEM  OF  PARITY  ERRORS.
*************************************************************
```

PROGRAM LISTING

```
0000  803F        CPCR = PARERR - 1.
0001  F0CF        MAR1 = AMPCR.                    WRITE 0002 TO ALL MEM
0002  00EA        AMPCR = FINISH - 1.              TO ELIMINATE PARITY ERR
0003  F1D5        MIR = B001 + 1.                  SAVE MEM LIMIT VALUE
                WRITEMEM.                          WHEN ADDRESS ERROR
0004  F0FB        WHEN RMI MAR1 = BMAR + 1.        OCCURS, THEN GO TO
0005  F0F3        MW1.                             'RELOCATE'.
0006  4003        MPCR = WRITEMEM - 1.
0007  F01A        SET LC3.          SET 721 FLAG
                WAITFORIRQ.
0008  F0F8        WHEN IRQ STEP.  WAIT FOR READY PB OR SPO INPUT REQ
0009  F108        ASR BEX.          GET CONTROLLER PORT ADDRESS
000A  F078        B = B0TT.
000B  F16F        BR2 = B1TT.
000C  F172        CSAR B = B C.
000D  C109        LIT = 9 SAR = 1. IF INPUT REQ=1 SET SPO FLAG (LC2)
                * LIT IS FOR ALPHA/NUM IND OR IF SPO FOR ENABLE KYBRD
000E  F123        A2 = B C.
000F  F198        IF LST SET LC2 SKIP.
0010  F090        BR2 = A2.
0011  80CE        CPCR = CONSOLEIND - 1. TURN ON ALPHA/NUM IND
                RELOCATE.      MOVE ALL CODE FROM 'READER' TO 'FINISH'
                *                TO JUST BELOW MEM LIMIT.
0012  F023        A2 = AMPCR.          A2 = READ ADDRESS
0013  004E        AMPCR = READER.
0014  F041        A3 = AMPCR.
0015  00EB        AMPCR = FINISH.
0016  F068        B = A2.              SUBTRACT LABEL 'READER' FROM
0017  F070        B = A3 - B.          LABEL 'FINISH' TO GET SIZE OF
                *                      CODE TO BE RELOCATED.
0018  F05E        ASR.
0019  F056        A3 = BMAR.           GET MEM LIMIT
001A  F046        A3 = A3 R.
001B  C840        LIT = @40@ SAR = 8.      TEST MEM LIMIT FOR GRTR
001C  F12C        A3 - LIT.                THAN 16K
001D  F0B7        IF NOT AOV SKIP.         IF YES CHG TO 16K VALUE
001E  F058        A3 = LIT.
001F  F045        A3 = A3 L.
0020  F131        A3 = A3 - B.         SUBTRACT SIZE FROM MEM LIMIT TO
                *                      GET NEW LOCATION OF 'READER'.
                *                      A3 IS WRITE ADDRESS
0021  F068        B = A2.   PUT 'READER' IN B
0022  F070        B = A3 - B.  SUBTRACT 'READER' FROM 'NEW READER'
                *              TO GET DISPLACEMENT VALUE
0023  F017        A1 = B.      STORE DISPLACEMENT VALUE IN A1
                * FOR 14KW MEM OR GRTR VALUE IS 3F15
                MOVER.
0024  F0D1        MAR1 = A2.
0025  F0F1        MR1.                 READ UNTIL ALL 1'S CODE
0026  F0F9        WHEN RDC BEX.
0027  F0E1        MIR = B.
0028  F0B5        IF NOT ABT SKIP.
0029  402E        MPCR = GETREADERPORT - 1.
002A  F0D2        MAR1 = A3.
002B  F0F3        MW1.
002C  F02A        A2 = A2 + 1.
002D  F04C        A3 = A3 + 1.
002E  4023        MPCR = MOVER - 1.
                GETREADERPORT.
002F  F018        SET LC1.
0030  804D        CPCR = READER - 1.GET PORT OF CARD READER
0031  F126        A2 = LIT AND B.
0032  C80F        LIT = @0F@ SAR = 8.
0033  F02B        A2 = A2 - 1.
0034  F026        A2 = A2 L.
0035  E000        LIT = 0.
0036  F0CE        LMAR.      CLEAR FOR CARD COUNTER
0037  80CE        CPCR = CONSOLEIND - 1. TURN OFF ALPHA/NUM IND
0038  F080        B = BMAR.
0039  F16F        BR2 = B1TT.
003A  F098        DW2.       DISABLE SPO OR CONSOLE
003B  F090        BR2 = A2.        SET READER ADDRESS INTO BR2
003C  005B        AMPCR = LOADER - 1.
003D  F100        AMPCR = A1 + AMPCR.   SET NEW LOADER ADDRESS
                *                       A2 DIGITS A,C, & D IS CARD COUNTER
003E  F033        A2 = B.
003F  F0C9        JUMP.      GO TO LOADER
                PARERR.
0040  F060        B = AMPCR.
0041  F0FF        0 EQV B.
0042  F09C        IF ABT JUMP.
0043  F0F9        WHEN RDC BEX.        GET ERROR CODE
0044  F078        B = B0TT.
0045  0007        AMPCR = WAITFORIRQ - 1.
0046  F0CB        LIT EQV B.
0047  E004        LIT = 4.             TEST FOR ADDRESS ERROR CODE
0048  F09B        IF ABT LUOP JUMP.    JUMP TO A1 IF YES
0049  0006        AMPCR = WAITFORIRQ - 2.
004A  E009        LIT = 9.             4 IF 711   9 IF 721
004B  F09B        IF ABT LUOP JUMP.
004C  F0E1        MIR = B.
004D  F000        WAIT.      HARD ERROR-MIR = CODE
                READER.        ALL CODE FROM HERE ON GETS MOVED
                *      FOR 14KW MEM OR GRTR 'READER' IS AT 3F63
004E  F05D        ASE.
004F  F080        B = BMAR.
0050  F078        B = B0TT.
0051  F16E        BR2 = B.
0052  F0FC        WHEN SRQ STEP.
0053  F097        DR2 BEX.             READ ODD CHAR
0054  F0A6        IF LC1 JUMP.   LC1 = 1 CHAR MODE FOR KYBRD ENTRY
0055  F049        A3 = A3 XOR B.       UPDATE LRC
0056  F0E2        MIR = B C.           SHIFT TO UPPER BYTE
0057  F0FC        WHEN SRQ STEP.
0058  F097        DR2 BEX.             READ EVEN CHAR
0059  F049        A3 = A3 XOR B.       UPDATE LRC
005A  F08B        BBI B.               OR WITH UPPER BYTE
005B  F1B3        IF URQ SET GC2 ELSE JUMP.    START OVER IF STINT
                *                              GC2 IS DON,T CARE
                LOADER.
005C  F05D        ASE.
005D  F080        B = BMAR.
005E  F16F        BR2 = B1TT.
005F  F097        DR2 BEX.       RESET ANY URQ
0060  F0E7        MIR = B001.          SEND TERM IN CASE OF LABEL CARD
0061  F098        DW2.
0062  F0EA        MIR = LIT.
0063  C812        LIT = @12@ SAR = 8.
0064  F098        DW2.           SEND PICK COMMAND
0065  F0CA        LCTR.
0066  E002        LIT = 2.             DISCARD FIRST 8 COLUMNS
                COLUMN1-8.
0067  005B        AMPCR = LOADER - 1.
0068  F0CB        LIT EQV B.
0069  E043        LIT = @43@.      DISCARD ENTIRE CARD IF IT IS A
006A  F09D        IF ABT SKIP.     'LABEL' CARD (BLANK L IN COL 1-2)
006B  004D        AMPCR = READER - 1.    SET ADDRESS OF RELOCATED
006C  F100        AMPCR = A1 + AMPCR.    READER INTO AMPCR
006D  F05E        ASR. RESET CONTROLLER STINT IF ERR OVER-RIDE USED
006E  F091        CALL.                  CALL READER
006F  0066        AMPCR = COLUMN1-8 - 1.
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0070  F100        AMPCR = A1 + AMPCR.      ADD RELOCATION VALUE
0071  F0C8        INC IF COV SKIP.
0072  F0C9        JUMP.
0073  F054        A3 = 0.          CLEAR LRC REG
0074  F0CA        LCTR.
0075  E001        LIT = 1.
            COLUMN9-14.
0076  004D        AMPCR = READER - 1.      SET ADDRESS OF RELOCATED
0077  F100        AMPCR = A1 + AMPCR.      READER INTO AMPCR
0078  F01F        RESET GC2.      IN CASE OF URQ
0079  F091      CALL.                CALL READER
007A  0075      AMPCR = COLUMN9-14 - 1.
007B  F100      AMPCR = A1 + AMPCR.
007C  F0C8      INC IF COV SKIP.
007D  F0C9      JUMP.
007E  00A3      AMPCR = STOPCODE - 1.
007F  F07F      B = B R.
0080  F0FF       0 EQV B.      TEST FOR STOP CODE (NON ZERO = STOP)
0081  F0B5       IF NOT ABT SKIP.
0082  004D       AMPCR = READER - 1.      SET ADDRESS OF RELOCATED
0083  F100       AMPCR = A1 + AMPCR.      READER INTO AMPCR
0084  F05F      B.
0085  F091       CALL.      READ COLUMNS 15 & 16 (ADDRESS WORD)
0086  F0CA       LCTR.
0087  E01E       LIT = 30.
0088  00BC      AMPCR = ERROR - 1.
0089  F0D5      MAR1 = B.
            *                              TEST ADDRESS READ FROM CARD IS
008A  F064        B = A1 - B.            LESS THAN THAT OF THIS PROGRAM
008B  E04F        LIT = @4F@.          ASCII '0' FOR OVERFLOW INDICATION
008C  F0B7        IF NOT AOV SKIP.
            COLUMN17-80.
008D  004D        AMPCR = READER - 1.      SET ADDRESS OF RELOCATED
008E  F100        AMPCR = A1 + AMPCR.      READER INTO AMPCR
008F  F05F        B.
0090  F091        CALL.
0091  F0E1        MIR = B.
0092  F0F3        MW1.
0093  F0FB        WHEN RMI MAR1 = BMAR + 1.
0094  008C        AMPCR = COLUMN17-80 - 1.
0095  F100        AMPCR = A1 + AMPCR.
0096  F0C8        INC IF COV SKIP.
0097  F0C9        JUMP.
0098  00BC        AMPCR = ERROR - 1.
0099  F100        AMPCR = A1 + AMPCR.
009A  F03D        A3 EQV 0.                TEST FOR PARITY ERROR
009B  CC50        LIT = @50@ SAR = 12.  'P' FOR PARITY
009C  F0B4        IF NOT ABT JUMP.
009D  005B        AMPCR = LOADER - 1.
009E  F100        AMPCR = A1 + AMPCR.
009F  F147        B = A2 C.            INCR CARD COUNT
00A0  F07E        B = B + 1.
00A1  F123        A2 = B C.
00A2  D400        SAR = 4.
00A3  F0C9        JUMP.
            STOPCODE.
00A4  F0CA        LCTR.
00A5  E003        LIT = 3.
            STOPREADER.
00A6  004D        AMPCR = READER - 1.
00A7  F100        AMPCR = A1 + AMPCR.
00A8  F00C        RESET GC1.  RESET ERR FLAG IN CASE OF ERR OVER-RIDE
00A9  F091        CALL.
00AA  00A5        AMPCR = STOPREADER - 1.
00AB  F100        AMPCR = A1 + AMPCR.
00AC  F0C8        INC IF COV SKIP.
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```
00AD  F0C9        JUMP.
00AE  F025        A2 = A2 C.
00AF  F12F        A3 = A2 R.      GET CARD COUNT
00B0  C443        LIT = @43@ SAR = 4.  'C' FOR CARD COUNT ERROR
00B1  F026        A2 = A2 L.      CLEAR CARD COUNTER
00B2  00BC        AMPCR = ERROR - 1.
00B3  F03C        A3 EQV B.
00B4  F0B5        IF NOT ABT SKIP.
00B5  00E0        AMPCR = TERMINATE - 1.
00B6  F055        A3 = B001.
00B7  F03C        A3 EQV B.
00B8  F0B5        IF NOT ABT SKIP.
00B9  00E0        AMPCR = TERMINATE - 1.
00BA  F100        AMPCR = A1 + AMPCR.
00BB  F027        A2 = A2 R.      RESTORE CONTROLLER ADDRESS
00BC  F0C9        JUMP.
            ERROR.                              LIT HAS ERROR CODE
00BD  00CE        AMPCR = CONSOLEIND - 1.
00BE  F100        AMPCR = A1 + AMPCR.
00BF  F05D        ASE.
00C0  F056        A3 = BMAR.      SAVE READER ADDRESS
00C1  F006        SET GC1.        ERROR FLAG
00C2  F068        B = A2.         GET CONTROLLER PORT ADDRESS
00C3  F078        B = B0TT.
00C4  F16E        BR2 = B.
00C5  F192        IF LC2 SET LC2 ELSE JUMP.
00C6  F16F        BR2 = B1TT.
00C7  F1D5        MIR = B001 + 1.
00C8  F098        DW2.                ENABLE SPO PRINTER
00C9  F16E        BR2 = B.
00CA  F0FC        WHEN SRQ STEP.
00CB  F0EA        MIR = LIT.          LIT HAS ERROR CODE
00CC  F098        DW2.
00CD  F16F        BR2 = B1TT.
00CE  E000        LIT = 0.        DISABLE SPO
            CONSOLEIND.
00CF  F0EA        MIR = LIT.          GET DATA PATTERN FROM LIT
00D0  F05F        B.
00D1  C881        LIT = @81@ SAR = 8.    S IND WORD
00D2  F0BB        IF NOT GC1 SKIP.    TEST ERROR FLAG
00D3  E082        LIT = @82@.            D IND WORD
00D4  F082        B = LIT L.
00D5  F08B        BBI B.
00D6  F0E1        MIR = B.
00D7  F098        DW2.
00D8  F187        IF GC1 STEP ELSE JUMP.
00D9  F0FD        WHEN URQ STEP.    ERROR - FST OR RDY TO OVER-RIDE
00DA  F0EE        MIR = LIT L.
00DB  F098        DW2.
00DC  F100        AMPCR = A1 + AMPCR.
00DD  005D        AMPCR = LOADER + 1.
00DE  F071        B = A3.
00DF  F16E        BR2 = B.        RESTORE READER ADDRESS
00E0  F0C9        JUMP.
            TERMINATE.
00E1  F080        B = BMAR.
00E2  F16F        BR2 = B1TT.
00E3  F0E7        MIR = B001.
00E4  F098        DW2.
00E5  F01E        IF LC3 SKIP.
00E6  F000        WAIT.           END OF 711 LOAD - PRESS SYSTEM CLEAR
00E7  F17D        DLD.            RESET ADDRESS ERROR ON 721
00E8  F0F9        WHEN RDC BEX.
00E9  F0C0        IF NOT LC2 SKIP.
00EA  FFFF        CNST = @FFFF@.
            FINISH.
```

MEMLDR MEMORY LOADER
B 711 MEMORY LOADER

```
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*                                                              *
*  THIS TEST UTILIZES  A 3 SECTION TEST TAPE 1448  8506        *
*  AND A DIAGNOSTIC  TAPE 1448  8514                           *
*                                                              *
*  TEST TAPE                                                   *
*    SECTION 1      A START CODE (66)                          *
*                   16 DATA WORDS                              *
*                   A STOP CODE (4000)                         *
*                                                              *
*                   USED TO VERIFY START & STOP                *
*                   DECODING AND LOADING CONTROL               *
*                   CIRCUITS                                   *
*                                                              *
*    SECTION 2      A START CODE (66)                          *
*                   A SEQUENTIAL DATA PATTERN                  *
*                                                              *
*                   USED TO VERIFY DATA LOADING                *
*                                                              *
*    SECTION 3      8 BLOCKS - EACH CONSISTING OF              *
*                   A START CODE (66)                          *
*                   A SINGLE DATA BIT                          *
*                   AN INCORRECT LRC CHARACTER (BLANK)         *
*                                                              *
*                   USED TO VERIFY ERROR DETECTION             *
*                   CIRCUITS                                   *
*                                                              *
*  DIAGNOSTIC TAPE                                            *
*                   A START CODE                               *
*                   ALTERNATING 1,S AND 0,S                    *
*                   A STOP CODE                                *
*                                                              *
*                   USED TO EXERCISE LOGIC FOR                 *
*                   METERING OR SCOPING SIGNALS                *
*                                                              *
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
```

1	SET LOAD SWITCH TO ON KEYBOARD SHIFT LOCK OFF (SOME CONSOLES) SET SGL SWITCH TO NORM SET MTR SWITCH TO MTR PRESS CLEAR PUSHBUTTON		A E1	D 2	
2	OBSERVE INCR	INCR = 0	3	E11	
3	START TAPE READER	CONS ERROR IND ON	E9	4	
	NOTE FUSE F1 IF NO TAPE READER MOTION				
4	LOAD TEST TAPE - SECTION 1 OBSERVE INCR	STEPS OFF 0	5	E2	
	NOTE IF CONSOLE ERROR INDICATOR IS ON GO TO E9 IF D INDICATOR 1, 2, OR3 IS ON GO TO E10				B B B
5	VERIFY INCR STOPS AS END OF SECT 1 DATA PASSES THROUGH READER (STOP READER)		6	13	
	NOTE IF CONSOLE ERROR INDICATOR IS ON GO TO E9 IF INCR STOPS BEFORE END OF SECT 1 - STOP READER & GO TO STEP 6				
6	OBSERVE INCR	INCR = 0022	7	14	
7	STOP LOADER & LOAD TEST TAPE SECTION 2 - PRESS CLEAR START LOADER OBSERVE MPM FOR DATA PATTERN PER TABLE 1	DATA CORRECT	8	E10	
	NOTE IF CONSOLE ERROR INDICATOR LIGHTS READER OR TAPE IS FAULTY				
8	STOP READER				
	NOTE IN STEPS 8 & 9 IF CONSOLE ERROR INDICATOR DOES NOT LIGHT, STOP READER BEFORE NEXT DATA BLOCK IS READ THEN GO TO APPROPRIATE E#				
	ADVANCE TAPE TO SECTION 3 PRESS CLEAR,START READER WHEN FIRST DATA BLOCK IS READ	CON ERROR IND ON	9	E4	
9	PRESS CLEAR (CLEAR MUST PRECEDE NEXT DATA BLOCK)	CON ERROR IND ON	10	E5	
10	REPEAT STEP 9 UNTIL EACH OF THE 8 LRC ERRORS OF SECTION 3 HAVE BEEN DETECTED		11	9	
	NOTE DO NOT PRESS CLEAR AFTER 8 TH LRC ERROR IS DETECTED				
11	STOP READER METER PADQ0B (CGSCLK1)	0%	12	E6	
12	CONNECT A JUMPER FROM PADI7Y (MPM17) TO GRD LOAD TEST TAPE SECT 1 PRESS CLEAR,START READER	CON ERROR IND ON	12A	F49	
12A	REMOVE JUMPER SET LOAD SWITCH TO OFF PRESS CLEAR SET REP/NORM SWITCH TO REP SET MTR SWITCH TO MEM THEN BACK TO MTR	CON ERROR IND ON	12B	E12	
	NOTE THIS STEP VERIFIES NANO PARITY ERROR DETECTION ON A TYPE I INSTRUCTION AND PURGES MPM OF PARITY ERRORS				
12B	END OF MEMORY LOADER TEST GO TO PROC MTR				

****

13 PERFORM SECTION E3
IF NO ERROR IS DETECTED — F12 / F13

14 OBSERVE INCR
INCR 0001 — 16
INCR = 0008 — F41
INCR = 0009 — F46
INCR = OTHER — 15

15 PERFORM SECTION E3
IF NO ERROR IS DETECTED — 16

16 LOAD DIAGNOSTIC TAPE
PRESS CLEAR,START READER
METER PAFL7R (LISTP/) 100% — F67 F13 B

TABLE 1 (MPM DATA PATTERN)

ADDRESS (INCR)	DATA	ADDRESS (INCR)	DATA	
0-3	C000	5C-5F	0100	
4-7	6000	60-63	0200	
8-B	3000	64-67	0400	
C-F	1800	68-6B	0800	
10-13	0C00	6C-6F	1000	
14-17	0600	70-73	2000	
18-1B	0300	74-77	8000	
1C-1F	0180	78	0001	
20-23	00C0	79	0002	
24-27	0060	7A	0004	
28-2B	0030	7B	0008	
2C-2F	0018	7C	0010	
30-33	000C	7D	0020	
34-37	0006	7E	0040	
38-3B	0003	7F	0080	
3C-3F	0001	80	0100	
40-43	0002	81	0200	
44-47	0004	82	0400	
48-4B	0008	83	0800	
4C-4F	0010	84	1000	
50-53	0020	85	2000	
54-57	0040	86	8000	
58-5B	0080	87	4000	(STOP CODE)

(CONTINUED COL 2)

NOTE 1
TAPE MUST BE RUNNING TO TRACE SIGNALS
READER MAY BE STOPPED AND RESTARTED
IF CONSOLE ERROR INDICATOR LITES

PRESS CLEAR BEFORE DOING SIGNAL TRACE
IF CONSOLE ERROR INDICATOR LITES
PRESS CLEAR BEFORE METERING
IF END OF DATA (STOP CODE) IS READ
RELOAD TAPE & PRESS CLEAR

NOTE 2
OBSERVE THE KEYBOARD CODE BAILS AS
A BLANK SECTION OF TAPE IS READ,
ANY BAIL MOVEMENT INDICATES KEYBOARD
MECHANISM FAILURE

MANUAL PROCEDURES

E1	OPERATOR ACTION (INITIAL ERROR)	MACHINE ACTION	A	D	
1	METER PAFL8T (SMPERR)	0%	2	F2	
2	METER PAFL7S (LILRCER/)	100%	3	F4	
3	METER PAFL8R (LIERR/)	100%	4	F3	
4	METER PADQ3W (EOERRIND)	0%	5	F25	
5	METER PADK9T (CCI32/)	100%	F27	F26	
E2	OPERATOR ACTION (INCR NOT COUNTING)	MACHINE ACTION	A	D	
1	STOP TAPE READER METER PAFL4P (LILOAD)	100%	6	2	
2	HOLDING CLEAR PUSHBUTTON METER PAFL5D (LIPCLRA/)	0%	4	3	
3	HOLDING CLEAR PUSHBUTTON METER PAFL7H (CGPCLEAR/)	0%	F5	F6	
4	HOLDING CLEAR PUSHBUTTON METER PAFL5C (CGCLEARC)	100%	5	F7	
5	METER PAFL4C (LDSE/)	0%	F9	F8	
6	METER PAFL4N (LIFORTYP2/)	0%	7	F21	B
7	METER PADQ3P (EOFORT2/)	0%	7A	F66	B B B B B
7A	METER PADQ3V (EOESTOP/)	100%	7B	F24A	B
7B	PERFORM SECTION E3 IF NO ERROR IS DETECTED		8		B
8	LOAD DIAGNOSTIC TAPE PRESS CLEAR,START READER. AS START CODE (FIRST DATA) PASSES THROUGH READER METER PAFL5U (LICCE66/)	METER DEFLECTS	9	F11	
	NOTE USE INVERT & X10 AND WATCH FOR MOMENTARY METER DEFLECTION REPEAT STEP 8 AS REQUIRED				
9	WITH DIAG TAPE LOADING SCOPE PAFL4U (LILCCS1)	1 US, 64 MS PER	10	F45	
10	SCOPE PAFL4R (LIMEW/)	NEG 1 US, 128 MS PER	F24	F23	
E3	OPERATOR ACTION (KEYBOARD - LOGIC INTERFACE) VERIFY FUSES F9, F10, F12 LOAD DIAGNOSTIC TAPE, PRESS CLEAR,START READER	MACHINE ACTION	A	D	

SEE NOTES 1 & 2

1	SCOPE PAFL4Q (CCKST)	SEE WAVEFORM	2	E7	
2	SCOPE PAFL8W (CCKB8)	SEE WAVEFORM	3	E8-1	
3	SCOPE PAFL7V (CCKB7)	SEE WAVEFORM	4	E8-2B	
4	SCOPE PAFL7Y (CCKB6)	SEE WAVEFORM	5	E8-2C	
5	SCOPE PAFL8X (CCKB5)	SEE WAVEFORM	6	E8-2D	
6	SCOPE PAFL8V (CCKB4)	SEE WAVEFORM	7	E8-2E	
7	SCOPE PAFL8U (CCKB3)	SEE WAVEFORM	8	E8-2F	
8	SCOPE PAFL8Y (CCKB2)	SEE WAVEFORM	9	E8-2G	
9	SCOPE PAFL7X (CCKB1)	SEE WAVEFORM	10	E8-2H	
10	NO ERROR DETECTED				

E4	OPERATOR ACTION (1 ST LRC NOT DETECTED)	MACHINE ACTION	A	D
1	METER PAFL8H (LILRCNZ/)	100%	2	F28
2	METER PAFL4D (LILRCER/)	0%	3	F4
3	METER PAFL8R (LIERR/)	0%	4	F3
4	METER PADQ3W (EOERRIND)	100%	5	F25
5	METER PADQ9T (CCI32/)	0%	F27	F26

E5 OPERATOR ACTION
(2 ND THRU 8 TH LRC NOT DETECTED)

DATA BLOCK	FAILURE
2	F29
3-4	F30
5-6	F31
7-8	F32

NOTE
SECTION 3 OF TEST TAPE IS 8 SETS OF 2 CHARACTERS EACH SEPERATED BY SEVERAL INCHES OF BLANKS.DATA BLOCK 1 IS FIRST SET READ DATA BLOCK 2 IS THE SECOND SET READ ECT.

E6	OPERATOR ACTION (CLOCK NOT INHIBITED BY ERROR)	MACHINE ACTION	A	D
1	METER PADQ3V (EOESTOP/)	0%	F40	F33

E7	OPERATOR ACTION (KEYBOARD STROBE)	MACHINE ACTION	A	D
1	STOP READER SCOPE PADK9G (CCCS/)	PULSE PERIOD NEG 10 US 250-300 US	6	2
2	SCOPE PADK8H (CCCS)	10 US 250-300 US	F18	3
3	SCOPE PADL2C (CCCLR/)	100%	5	4
4	SCOPE PADL2E (CGCLEAR)	0%	F15	F14
5	SCOPE PADL1B (CDSCLKC)	3-5%	F17	F16
6	START READER (NO TAPE) SCOPE PADK8G (CCKBST)	PULSE PERIOD NEG 10 US 250-300 US	F19	F20

E8	OPERATOR ACTION (KEYBOARD DATA)	MACHINE ACTION	A	D
1	STOP READER SCOPE PADM0T (CCSKDI/)	PULSE PERIOD NEG 10 US 250-300 US	2	F22
2	LOAD DIAGNOSTIC TAPE PRESS CLEAR,START READER SEE NOTES 1 & 2			
2A	SCOPE PADM0R (CCKBU8)	SEE WAVEFORM	F34	F38
2B	SCOPE PADM1R (CCKBU4)	SEE WAVEFORM	F34	F38
2C	SCOPE PADM1U (CCKBU2)	SEE WAVEFORM	F35	F38
2D	SCOPE PADM0U (CCKBU1)	SEE WAVEFORM	F35	F38
2E	SCOPE PADM1Q (CCKBL8)	SEE WAVEFORM	F36	F39
2F	SCOPE PADM1T (CCKBL4)	SEE WAVEFORM	F36	F39
2G	SCOPE PADM1S (CCKBL2)	SEE WAVEFORM	F37	F39
2H	SCOPE PADM0S (CCKBL1)	SEE WAVEFORM	F37	F39

E9	OPERATOR ACTION (ERROR INDICATOR ON)	MACHINE ACTION	A	D
	NOTE IF D IND 1, 2, OR3 IS ON GO TO E10			
1	STOP READER METER PAFL8H (LILRCNZ/)	100%	2	F4
2	PERFORM SECTION E3 IF NO ERROR DETECTED		F48	

E10	OPERATOR ACTION (DATA ERROR)	MACHINE ACTION	A	D
1	IS CONS D IND 1, 2, OR 3 ON		1A	1B
1A	OBSERVE D INDICATORS	D = 1 D = 2 D = 3 D = 4 D = 5	F59 F60 F61 23 F63	C
1B	PERFORM SECTION E3 IF NO ERROR DETECTED		2	
2	STOP READER,REMOVE TAPE PRESS CLEAR,START READER METER PAFL4E (LISB/)	43-47%	3	F42
3	SCOPE PAFL5P (LIENSHF)	2 US,64 MS PER	4	F43
4	LOAD DIAGNOSTIC TAPE SEE NOTE 1 SCOPE PAFL4U (LILCCS1)	1 US, 64 MS PER	4A	F45
4A	SCOPE PAFL5T (LILCCS2)	1 US, 64 MS PER	5	F1
5	SCOPE PAFL4R (LIMEW/)	1 US, 128 MS PER	6	F23
6	SCOPE PAFL4J (LIMEMCY/)	2 US, 128 MS PER	7	F49

7	METER PAFL8B (EXT01/)	OSCIL 50-63%	8	F50	
8	METER PAFL7J (EXT02/)	OSCIL 50-63%	9	F51	
9	METER PAFL7L (EXT03/)	OSCIL 50-63%	10	F52	
10	METER PAFL8M (EXT04/)	OSCIL 50-63%	11	F53	
11	METER PAFL7D (EXT05/)	OSCIL 50-63%	12	F54	
12	METER PAFL7K (EXT06/)	OSCIL 50-63%	13	F55	
13	METER PAFL8N (EXT07/)	OSCIL 50-63%	14	F56	
14	METER PAFL7Q (EXT08/)	OSCIL 50-63%	15	F57	
15	METER PAFL8C (EXT09/)	OSCIL 50-63%	16	F54	
16	METER PAFL8I (EXT10/)	OSCIL 50-63%	17	F55	
17	METER PAFL7P (EXT11/)	OSCIL 50-63%	18	F56	
18	METER PAFL8P (EXT12/)	OSCIL 50-63%	19	F57	
19	METER PAFL7C (EXT13/)	OSCIL 50-63%	20	F54	
20	METER PAFL8J (EXT14/)	OSCIL 50-63%	21	F55	
21	METER PAFL8K (EXT15/)	OSCIL 50-63%	22	F56	
22	METER PAFL7N (EXT16/)	OSCIL 50-63%	F58	F57	
23	METER PADQ4X (SMAEF/)	100%	F62	F64	
E11	OPERATOR ACTION (INCR NOT ZERO)	MACHINE ACTION	A	D	
1	METER PAFL4P (LILOAD)	100%	F10	E2.2	
E12	OPERATOR ACTION	MACHINE ACTION	A	D	
1	HOLDING CLEAR - SET SGL SWITCH TO SGL RELEASE CLEAR - PRESS SGL PUSHBUTTON UNTIL MPM = ALL 1,S				
	METER PAFL4X (LINPE/)	0%	2	3	
2	WILL BE DIAGNOSED BY SUBSEQUENT MTRS				
3	METER PAFL4W (MUTYPE2)	0%	F65	2	

FAILURE DICTIONARY

F1	PAFL4 E5	
F2	PADI7 A7 B5 PAFL4 A5 E5 E1	
F3	PAFL7 E7	
F4	PAFL4 A3 A5 C1	
F5	PAFL7 C1 D1	B
		B
F6	PAFQ0 C3	B
		B
		B
F7	PAFQ0 B3 D5 D1 A3 CLEAR SWITCH	B
F8	PAFL4 B1 LOAD SWITCH	
F9	PAFL4 A3 A5 A7	
F10	PAFL4 A7 B3 C3 D3	
F11	PAFL4 A1 E5 PAFL7 D1 E1	
F12	PAFL4 A1 A5 D7	
F13	PAFL7 A1 B1 C1 C7 D1 D7	
F14	PAFQ0 C1	
F15	PADL1 B4	
F16	PADQ0 B7	
F17	PADL1 A3 A1 B1 C1 D1 CAPACITORS C15 C16 C17	
F18	PADK8 C7	
F19	PADK8 A1 B1 C7	
F20	DISCREET CARD PADM3 KEYBOARD MECHANISM	
F21	PAFL4 D3	
F22	PADK8 B5 D5	
F23	PAFL4 A7 C3 D3 E1 E3 E5	B
		B
F24	PAFL4 B3 C3 D3 PAFP1 B1	B
F24A	PAFQ3 A5 C7 E7	B
F25	PADQ3 E5 F7	
F26	PADK8 B5 C5 F7	
F27	PADL7 A5 TRANSISTOR B7C2 LAMP	

F28 PAFL4 A3 C1 E1
PAFL7 E5 F1

F29 PAFL7 E5 F1

F30 PAFL7 F1 F5

F31 PAFL7 E3 F1

F32 PAFL7 F1 F3

F33 PADQ3 C7 E7

F34 PADM0 E7 F3 F5

F35 PADM0 F3 F5

F36 PADM0 E3 E5 E7

F37 PADM0 E3 E5

F38 DISCREET CARD PADM6
PADM0 E7 F5 (E7 FOR CCKBU1/2, F5 FOR CCKBU4/8)
KEYBOARD MECHANISM

F39 DISCREET CARD PADM3
PADM0 E5 E7 (E5 FOR CCKBL1/2, E7 FOR CCKBL4/8)
KEYBOARD MECHANISM

F40 PAFQ0 C7 D1

F41 PAFL4 D7 E5

F42 PAFL4 B7 C5 D5

F43 PAFL4 B5 D5

F44 PAFL4 D5 E1 E5

F45 PAFL4 A1 A5 A7 B5 C5 D5 D7 E1 E5

F46 PAFL4 E1 E3

F47 PAFL4 A3 C1

F48 PAFL4 A3 C1 E5 E3 E1
PAFL7 E5 E3 F5 F3 F1

F49 PAFL4 C1
PADQ3 E3

F50 PAFL7 A3 A5 B7 F7

F51 PAFL7 B3 B5 B7 F7

F52 PAFL7 B7 C3 C5 F7

F53 PAFL7 B7 D3 D5 F7

F54 PAFL7 A3 A5

F55 PAFL7 B3 B5

F56 PAFL7 C3 C5

F57 PAFL7 D3 D5

F58 PAFL7 B7 F7

F59 PADQ3 C3 D5 E3 E1
F60 PADQ3 E7 E5 E1 F3

F61 PADQ3 F3

F62 PADQ3 E7 E5 F5

F63 PADQ3 F5

F64 PADI4 C7 D1 D7 E7

F65 PAFL4 F1 B

B

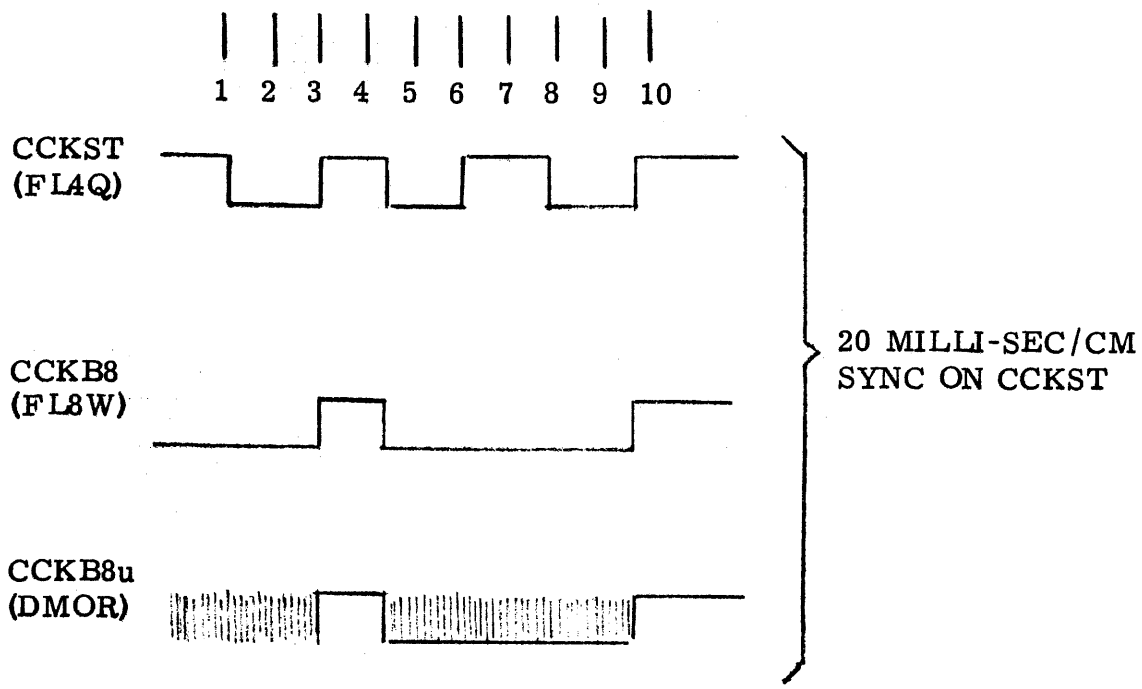
F66 PADQ3 D7 B

B

B

F67 PAFL4 A1 A5 D7 PAFP1 A1 F1 B

ILLUSTRATIONS



ELDRMTR ELECTRONIC LOADER
B 711-1 AND B 720 ELECTRONIC LOADER

* *

THIS MTR UTILIZES A 19 SECTION TEST TAPE 2602-1964 AND A DIAGNOSTIC TAPE 2602-1972.
SECTION 1 LOADS DATA AND CHECKS INCREMENTER.
SECTION 1A CHECKS START CODE DECODING
SECTION 2 LOADS DATA AND CHECKS DATA
SECTIONS3-10 CHECK LITE CHECK CIRCUITRY
SECTIONS11-19 CHECK LRC CHECK CIRCUITRY.
THE DIAGNOSTIC TAPE IS USED TO EXERCISE LOGIC CIRCUITRY FOR SIGNAL TRACING. (DIAGNOSTIC TAPE IS ONLY REFERRED TO BY THE MANUAL PROCEDURE).

CLOSE OBSERVATION OF TEST TAPE IS REQUIRED DURING LOADING.

REFER TO F60 BEFORE STARTING MTR

* *

	OPERATOR ACTION	MACHINE ACTION	A	D
1.	SET LOAD/NORMAL SWITCH TO LOAD. SET SGL SWITCH TO NORM. SET MTR SWITCH TO MTR. PRESS CLEAR PUSHBUTTON.	ERROR IND ON.	M1	2
2.	OBSERVE INCR.	INCR = 0.	3	M2
3.	INSURE THAT PAPER TAPE READER IS IN THE ON POSITION AND INDICATOR IS ON.		4	M3
4.	SET IRQ/EXT SWITCH TO IRQ.		5	
5.	LOAD TEST TAPE 2602-1964		5A	
5A.	TAPE READER UNABLE TO FEED TAPE.		M27	5B
5B.	ENTIRE TAPE FED THRU READER		M7	5C
5C.	OBSERVE PAPER TAPE	MOVEMENT STOPPED AT END OF SECTION 1	6	M4
6.	OBSERVE INCREMENTER	INCR = 0154	6A	M5
6A.	OBSERVE ERROR IND.	LOADER ERROR	F10	7
7.	OBSERVE MPM AND PRESS CLEAR PUSHBUTTON. TWO BITS AT A TIME SHOULD BE SHIFTING THRU MPM. IF DISAGREE GO TO M6. TAPE (PATTERN OF MPM WILL BE 2 BITS AT A TIME SHIFTING THRU MPM BITS 9-16 THEN A DATA WORD = OOFF. SAME PATTERN THRU BITS 1-8 + A DATA WORD = FFOO). MOVEMENT SHOULD STOP AT THE END OF SECTION 2.		8	M5
8.	OBSERVE MPM.	B721 MPM = 5AA5 B711-1 MPM = 4000	9	M6
9.	OBSERVE INCREMENTER	INCR = 0150	10	M8

NOTE 1

STEPS 10-17 BELOW CHECK LITE CHECK CIRCUITS. OBSERVE TAPE AS IT IS FED INTO READER. TAPE READER SHOULD STOP AFTER EACH TEST IS READ AND INDICATE LOADER ERROR.
LOADER ERROR IS INDICATED BY ERROR IND AS FOLLOWS:
B721 = 0001 + HALT INDICATOR
B711-1 = CONSOLE D8 INDICATOR ON.
IF TAPE FEEDS THRU ALL 8 SECTIONS OF LTCHK TESTS AND STOPS AT FIRST LRC CHECK REFER TO M9.

	OPERATOR ACTION	MACHINE ACTION	A	D
10.	WHILE DEPRESSING CLR PB SET IRQ/EXT SW TO CENTER POSITION. RELEASE CLR PB. LITE CHECK 40FE	LOADER ERROR	11	M9
11.	PRESS CLEAR PUSHBUTTON LITE CHECK 40FD	LOADER ERROR	12	F18
12.	PRESS CLEAR PUSHBUTTON LITE CHECK 40FB	LOADER ERROR	13	F19
13.	PRESS CLEAR PUSHBUTTON LITE CHECK 40F7	LOADER ERROR	14	F20
14.	PRESS CLEAR PUSHBUTTON LITE CHECK 407F	LOADER ERROR	15	F20
15.	PRESS CLEAR PUSHBUTTON LITE CHECK 40DF	LOADER ERROR	16	F21
16.	PRESS CLEAR PUSHBUTTON LITE CHECK 40BF	LOADER ERROR	17	F19
17.	PRESS CLEAR PUSHBUTTON LITE CHECK 40EF	LOADER ERROR	18	F21

NOTE 2

SET IRQ/EXT SWITCH TO CENTER POSITION
STEPS 18-25 BELOW CHECK LRC CHECK CIRCUITS. OBSERVE TAPE AS IT IS FED INTO READER. TAPE READER SHOULD STOP AFTER EACH TEST IS READ AND INDICATE LOADER ERROR.
LOADER ERROR IS INDICATED BY ERROR IND AS FOLLOWS:
B721 = 0001 + HALT INDICATOR
B711-1 = CONSOLE D8 INDICATOR ON.

	OPERATOR ACTION	MACHINE ACTION	A	D
18.	PRESS CLEAR PUSHBUTTON LRC CHECK	LOADER ERROR	19	M17
19.	PRESS CLEAR PUSHBUTTON LCR CHECK	LOADER ERROR	20	M18
20.	PRESS CLEAR PUSHBUTTON LRC CHECK	LOADER ERROR	21	M19
21.	PRESS CLEAR PUSHBUTTON LRC CHECK	LOADER ERROR	22	M20
22.	PRESS CLEAR PUSHBUTTON LRC CHECK	LOADER ERROR	23	M21

23.	PRESS CLEAR PUSHBUTTON LRC CHECK	LOADER ERROR	24	M22
24.	PRESS CLEAR PUSHBUTTON LRC CHECK	LOADER ERROR	25	M23
25.	PRESS CLEAR PUSHBUTTON LRC CHECK	LOADER ERROR	25A	M24
25A.	IF B721 OBSERVE HALT IND.	ON	26	M28
	IF B711-1 METER CG1 1B (CGSCLK1)	0%	26	M29
26.	IS MACHINE A B721.		26A	26B
26A.	B721 ONLY - PULL MPA-1 AND MPB-1 OUT OF BACKPLANE.		26C	
26B	B711-1 ONLY - CONNECT A JUMPER FROM SM3-1Y(CONMPM17) TO GROUND.		26C	
26C.	SET IRQ/EXT SWITCH TO CENTER POSITION PRESS CLEAR PUSHBUTTON	ERROR IND = B721 = 0010	27	M25
		B711-1 = D1 AND D8 CONSOLE LITES ON	27	M25
27.	PRESS CLEAR PUSHBUTTON PAPER TAPE SHOULD RUN OUT. REMOVE JUMPER IF B711-1. PLUG MPA-1 AND MPB-1 BACK IN IF B721. SET LOAD SWITCH TO NORMAL. PRESS CLEAR PUSHBUTTON SET REP/NORM SWITCH TO REP SET MTR SWITCH TO MEM THEN BACK TO MTR	ERROR INDICATORS = B721 = 0101	28	M26
		= B711-1 = D1 D2 AND D8 CONSOLE LITES ON	28	M26

* *
* NOTES *
* THIS STEP VERIFIES NANO PARITY ERROR DETECTION ON *
* A TYPE 1 INSTRUCTION AND PURGES MPM OF PARITY ERRORS*
* *

28.	SET REP/NORM SWITCH BACK TO NORM POSITION. SET IRQ/EXT SWITCH TO CENTER POSITION.		29	
29.	END OF ELDRMTR 2602 1956 GO TO PROC MTR			

* *

MANUAL PROCEDURES

M1.	OPERATOR ACTION (INITIAL ERROR)	MACHINE ACTION	A	D
1.	OBSERVE INCR	BIT D2 ON	F65	2
2.	IF B711-1 METER EO1 1W (EOERIND/)	100%	F81	3
	IF B721 METER EO2 1Y (EXT16/)	100%	F48	3
3.	METER LI8 2F (LIERR/)	0%	4	F43
4.	METER LI8 1J (LILTBD/)	100%	5	F2
5.	METER LI8 1P (LILRCNZ/)	0%	F1	6
6.	IF B711-1 GO TO 7.		7	F41
7.	METER CC5E 2T (CCI32/)	100%	F82	F83

M2.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	OBSERVE INCR	BIT D2 ON	F65	2
2.	METER LI8 1F (LILOAD)	100%	F3	3
3.	HOLDING CLEAR PUSHBUTTON METER LI8 2K (LIPCLRA/)	0%	5	4
4.	HOLDING CLEAR PUSHBUTTON METER LI7 1H (CGPCLR/)	0%	F66	F67
5.	METER LI8 1U (LIDSE/)	0%	F68	F69

M3.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	CHECK AC FUSE		2	F84
2.	METER LI8 1E (KBENF/)	0%	F92	3
3.	METER LI8 1F (LILOAD)	100%	2	M2.2
4.	METER LI8 2I (SMPERR)	0%	3	F42
5.	METER LI8 2K (LIPCLRA/)	100%	F4	4
6.	METER LI7 1H (CGPCLR/)	100%	F5	F6

M4.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	HAS TAPE MOVEMENT STOPPED AT THE BEGINNING OF SECTION 2.		M5	2
2.	HAS TAPE MOVEMENT STOPPED AT SECTION 11 (FIRST LRC CHECK)		F8	3
3.	OBSERVE INCR	INCR = 0000	6	4
4.	OBSERVE INCR	INCR = 0154	F9	5
5.	OBSERVE INCR	INCR = 0007	F90	M5
6.	REMOVE TEST TAPE AND LOAD DIAG TAPE 2602-1972 NOTE DIAG TAPE WILL STOP WITH LOADER ERROR INDICATION. PRESS CLEAR TO CONTINUE. WHILE DIAG TAPE IS BEING READ METER THE FOLLOWING POINTS.			
A.	MLL 2B (DATA1/)	50-60%	B	I
B.	MLL 2C (DATA2/)	50-60%	C	J
C.	MLL 2H (DATA3/)	50-60%	D	K
D.	MLL 2G (DATA4/)	50-60%	E	L
E.	MLL 2U (DATA5/)	50-60%	F	M
F.	MLL 2T (DATA6/)	50-60%	G	N
G.	MLL 2W (DATA7/)	50-60%	H	P
H.	MLL 2Y (DATA8/)	50-60%	F55	Q
I.	MLL 1D (1TRAK)	30-40%	F30	F11
J.	MLL 1E (2TRAK)	30-40%	F31	F11
K.	MLL 1F (3TRAK)	30-40%	F32	F11
L.	MLL 1C (4TRAK)	35-45%	F33	F11
M.	MLL 1W (5TRAK)	35-45%	F34	F11
N.	MLL 1V (6TRAK)	35-45%	F35	F11
P.	MLL 1X (7TRAK)	35-45%	F36	F11
Q.	MLL 1Y (8TRAK)	35-45%	F37	F11

M5.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	OBSERVE INCR.	INCR = 0000	2	3
2.	OBSERVE ERROR IND.	IND = 0001 OR		

		B711-1 D8 ON	M4.6	3
3.	OBSERVE ERROR IND.	IND = 0010 OR		
		B711-1 D1 ON	F12	4
4.	OBSERVE INCR.	INCR = 0004	F13	5
5.	OBSERVE INCR.	INCR = 0001	F15	6
6.	OBSERVE INCR.	INCR = 019C	F16	6A
6A.	OBSERVE INCR.	INCR = 00E1	F89	7
7.	OBSERVE INCR.	INCR = 02FC	F17	F7

M6.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	METER EO2 2E (EOERRST/)	100%	2	F95
	EO1 2S (EOERRST/)	100%	2	F95
2.	OBSERVE MPM	MPM = DAAD	F22	3
3.		MPM = 5EE5	F23	4
4.		MPM = 7AA7	F24	5
5.		MPM = 5BB5	F25	6
6.		MPM = 00A5	M27	7
7.		MPM = AA55	F28	8
8.		MPM = 0000	F28	9
9.		MPM = 0151	F96	10
10.	OBSERVE MPM. WHICH BIT (S) ARE INCORRECT.			
		EXT 1,5,9 OR 13.	F44	11
11.		2,6,10 OR 14.	F45	12
12.		3,7,11 OR 15.	F46	13
13.		4,8,12 OR 16.	F47	F29

M7.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	METER LI8 1F (LILOAD)	100%	6	2
2.	HOLDING CLEAR PUSHBUTTON METER LI8 2K (LIPCLRA/)	0%	4	3
3.	HOLDING CLEAR PUSHBUTTON METER LI7 1H (CGPCLR/)	0%	F66	F67
4.	HOLDING CLEAR PUSHBUTTON METER LI8 2U (CGCLEARC)	100%	5	F70
5.	METER LI8 1U (LIDSE/)	0%	F68	F69
6.	METER LI8 1D (LIFORT2/)	0%	7	F71
7.	IF B711-1 METER EO1 1P(EOFORT2/)	0%	11	F85
	IF B721 METER EO2 1V (EOFORT2/)	0%	8	F72
8.	METER CG2 2C (CGHALT)	0%	12	9
9.	METER CG2 2B (EOASPRST)	0%	10	F73
10.	METER CG2 1E (EOANYER)	0%	F74	
11.	METER EO1 1V (EOESTOP/)	100%	12	F86
12.				
12A.	REMOVE ALL TAPE FROM READER USING VOLTMETER METER MLL 1B (TTRAK)	+11-14V	12B	F93
12B.	RELOAD MTR TAPE AND METER SAME POINT.	+4-7V	13	F93
13.	RELOAD MTR TAPE AND METER MLL 2M (STROBE)	20-30%X10 SCALE	F40	F94

M8.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F51	

M9.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F52	

M17.	OPERATOR ACTION (SECT11LRC)	MACHINE ACTION	A	D
1.	NONE	TAPE DID NOT STOP UNTIL SECT. 11.	2	3
2.	OBSERVE IRQ/EXT SW.	IRQ POSITION	F53	F54
3.	OBSERVE INCR.	DID NOT RECOGNIZE SECTION 11 AND INCR = TO 0.	F55	F56

M18.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F61	

M19.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F62	

M20.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F62	

M21.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F63	

M22.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F61	

M23.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F64	

M24.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F64	

M25.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	OBSERVE TAPE	TAPE FEED STOPPED	2	F75
2.	OBSERVE ERROR IND.	= 0110	F76	F77
	(IF B711-1 OBSERVE ERR IND)	ON	F88	F77

M26.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	HOLDING CLEAR - SET SGL SWITCH TO SGL RELEASE CLEAR - PRESS SGL PUSHBUTTON UNTIL MPM = ALL 1,S METER LI8 2H (LINPE/)	0%	2	3
2.	WILL BE DIAGNOSED BY SUBSEQUENT MTRS.			
3.	METER LI8 2V (MUTYPE2)	0%	F78	2

M27.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	PRESS CLEAR PUSHBUTTON AND METER LI7 1B (CDSCLKE)	3-5%	2	F27
2.	METER LI8 1E (KBENF/)	0%	F26	F91

M28.	OPERATOR ACTION (CLOCK NOT INHIBITED BY ERROR)	MACHINE ACTION	A	D
1.	METER EO2 1P (CGHALT)	100%	F57	F58

M29.	OPERATOR ACTION (B711-1)	MACHINE ACTION	A	D
1.	METER EO1 1V (EOSTOP/)	0%	F79	F80

FAILURE DICTIONARY

F1	LI8 B1 D1 B7 F5 D5	1
F2	LI7 C1 E1 D3 C5 D5	1
F3	LI8 B3 D3 E3 C5 B5	
F4	LI8 D5 B7	3
F5	LI7 B1 C1	3
F6	CG2 D5 (B721) CG1 C3 (B711-1)	
F7	LI8 D1 C3 D3 E5 F5 E7 F7 C7 D7 D5 A3 B3	4
F8	LI8 A1 E1 F1 F5 C7	4
F9	RESTART MTR	4
F10	LI8 F1 C3 F5 C7 D7	ST6A
F11	LI8 D5 C7 D7 C3 B3 LI7 D1 F1 D3	5 5
F12	LI8 B5 D5	5
F13	LI8 B3 C3 D5 D7 LI7 B1 D1 E1 F1	5
F15	LI8 D1 D3 E5	5
F16	LI8 D1 D3 B3 E5 F5 LI7 A1 C1 B1 E1	5
F17	LI8 E5 F5	5
F18	LI7 E3 C5	
F19	LI7 B3 C5	
F20	LI7 A3 C5	
F21	LI7 F3 C5	
F22	LI7 C3 A7 B7	6
F23	LI7 C3 A5 C7	6
F24	LI7 C3 F5 D7	6
F25	LI7 C3 E7 F7	6
F26	LI7 D3 B5 D5	27
F27	CD1 C3 C7	27
F28	LI7 B5 LI8 B3 C3 A7	6 6
F29	LI7 F1 A5 F5 A7 B7 C7 D7 E7 F7	6 6

NOTE
F30 - F37 DISCRETE COMPONENTS ARE LOCATED BY GEOGRAPHICAL LOCATIONS ON BOARD.

F30	MLL A8B7,B4B7,A6D8,B3F2 B5F2,B4F0,A6F0.	4 4
F31	MLL A8B7,B4B7,B0D8,B3E8 B5E8,B4E6,A6E6.	4 4
F32	MLL C0B7,B4B7,B4D8,B3E4 B5E4,B4E2,A6E2.	4 4
F33	MLL C0B7,B4B7,B8D8,B3F6 B5F6,B4F4,A6F4.	4 4
F34	MLL E4B7,F0B7,E0D8,E7E8 E5E8,E6E6,F4E6.	4 4
F35	MLL E4B7,F0B7,E4D8,E7E4 E5E4,E6E2,F4E2.	4 4
F36	MLL F6B7,F0B7,E8D8,E7F2 E5F2,E6F0,F4F0.	4 4
F37	MLL F6B7,F0B7,F2D8,E7F6 E5F6,E6F4,F4F4.	4 4
F38	LI8 A3 B3 E7	5
F40	LI8 A5 D5 B1 A3 C3 D7	
F41	LI7 E5 A3 B3 E3 F3	
F42	721 SM5 B5 E5 711-1 SM3 B5 C5 A7	3 3
F43	721 E02 C3 E3 C7 A9 G9 711-1 E01 E5 C7 E7	1 1
F44	LI7 C3 B7 C7 EO2 G7 G9	
F45	LI7 A5 C3 C7 EO2 G9 EO1 E7	
F46	LI7 C3 F5 D7 EO2 G9 EO1 E7	
F47	LI7 C3 E7 F7 EO2 E3 G9 EO1 D5	
F48	REPLACE ERROR INDICATOR.	
F51	LI8 E5 A1 C7	
F52	LI8 A1 B1 E1 F1 LI7 F1 D3 E3 B5 C5 D5	
F53	LI8 E1 E5 C7	
F54	SET IRQ/EXT SWITCH TO IRQ AND RESTART MTR.	
F55	LI8 B7 D5 D1 F5 A1 F7 E3 B1 LI7 E5 A3	

F56 LI8 C5 E5 C7

F57 EO2 A3
REPLACE HALT INDICATOR.

F58 EO2 E5 F9 (B721)
EO1 C7 E7 (B711-1)
LI8 B1

F60 1. IN EARLY PRODUCTION MODELS A COMMON FAULT WAS FOUND WITH THE CARTRIDGE AND PLASTIC GUIDES IN REAR OF READER. IF GUIDES ARE BROKEN, INTERMITTENT LOADER ERRORS MAY OCCUR. A SLIGHT INCREASE IN LAMP VOLTAGE REDUCES THESE LOADER ERRORS, HOWEVER, THE LAMP LIFE IS ALSO REDUCED.
2. IF PROGRAM TAPES ARE OBSERVED TO BE STOPPING IN THE MIDDLE OF THE TEXT AND NO LOADER ERROR IS PRESENT REFER TO F97.

F61 LI7 B3 E5 18

F62 LI7 F3 E5

F63 LI7 A3 E5

F64 LI7 E3 E5

F65 LI8 B5

F66 LI7 B1 C1

F67 CG2 D5 (B721)
CG1 C3 (B711-1)

F68 LI8 F3 F5 E5 D5 B7 E7

F69 DEFECTIVE NORMAL/LOAD SWITCH

F70 CG2 C3 (B721)
CG1 A3 (B711-1)

F71 LI8 A7

F72 EO2 G5

F73 EO2 D3 F3 C5

F74 CG2 B5 A5 A1 A7 D5

F75 LI8 B1 D5

F76 EO2 F3 F9

F77 LI8 F7 E5 A5 A7
EO2 F5 C7
EO1 E3 (B711-1)

F78 LI8 C1 A5 F3 F7

F79 CG1 D1 C7

F80 EO1 C7 E7

F81 EO1 E5 F7

F82 CC9-2 A5 TRANS.B7C2
OR ERROR INDICATOR.

F83 CC5E F3 B5 C5 F7

F84 REPLACE AC FUSE

F85 EO1 D7

F86 EO1 A5 C7 E7

F87 CG2 A7 C7 D1

F88 EO1 E3 F3 E5

F89 LI7 A1

F90 LI8 A1

F91 LI8 A1 B1

F92 MLL C6B7,D2B7,D8B7

F93 DEFECTIVE READER

F94 MLL C2D8,C6B7,D8B7,
D9C7,D9C9

F95 EO2 B9
EO1 D1 F1 F7

F96 LI8 A7

F97 LI7 C1 A1 B1 E1
LI8 D1 D3

CMLDRMTR CARD MEMORY LOADER
B 771 PROCESSOR

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* THIS TEST UTILIZES AN 18 SECTION TEST DECK 2601 4043*
* SECTIONS 1 THRU 17 ARE USED IN THE TEST SEQUENCE *
* SECTION 18 (DIAGNOSTIC) IS USED ONLY WHEN DIRECTED *
* BY THE MANUAL PROCEDURES FOR SIGNAL TRACING *
* TEST DECK MUST BE IN PROPER SEQUENCE (SEE SECTION 4)*
*   SECTION 1 - 9 CARDS CONTAINING THE CHARACTER *
*               'A' AND 1 STOP CARD. *
*               USED TO VERIFY CARD SEQUENCE COUNTER, *
*               PROPER LOADING OF MPM AND THE ABILITY *
*               TO RECOGNIZE STOP CARDS. *
*                                                    *
*   SECTION 2 THRU 7 VERIFIES PROPER LOADING OF MPM *
*   SECTION 8 THRU 15 VERIFIES LRC CHRCK CIRCUITRY *
*   SECTION 16 USED FOR SEQUENCE CIRCUITRY CHECK. *
*   SECTION 17 USED FOR ERROR DETECTION *
*   SECTION 18 - DIAGNOSTIC DECK CONTAINS 256 CARDS *
*   PUNCHED WITH ALL CHARACTERS. *
*   USED FOR DEBUG ONLY. *
*                                                    *
*                      NOTE                          *
*                      ____                          *
*   TEST DECK AND DIAGNOSTIC DECK CARD FORMAT IS *
*   ILLUSTRATED IN SECTION 4 *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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	OPERATOR ACTION	MACHINE ACTION	A	D
1.	SET LOAD SWITCH TO LOAD SET SGL SWITCH TO NORM SET MTR SWITCH TO MTR PRESS CLEAR PUSHBUTTON	SPO ERROR IND ON	M1	2
2.	OBSERVE INCR	INCR = 0	3	M7
3.	INSURE CARD READER POWER IS ON.			
4.	LOAD TEST DECK INTO INPUT HOPPER AND PRESS START SWITCH ON CARD READER.			
4A.	OBSERVE OUTPUT HOPPER.	TOTAL OF 10 CARDS IN HOPPER.	4B	M3
4B.	OBSERVE INCR.	NOT EQUAL TO ZERO	5	M2
5.	SECTION 1 LOADED			
A	OBSERVE SPO INDICATORS	000	5B	M4
B	OBSERVE MPM	AAAA	5C	M5
C	OBSERVE INCR	0120	6	M5
6.	PRESS CLEAR PUSHBUTTON SECTION 2 LOADED		6A	F25
A	OBSERVE SPO INDICATORS	000	6B	M39
B	OBSERVE MPM	5555	6C	M40
C	OBSERVE INCR	0020	7	M40
7.	PRESS CLEAR PUSHBUTTON SECTION 3 LOADED			
A	OBSERVE SPO INDICATORS	000	7B	F74
B	OBSERVE MPM	0101	7C	M38
	OBSERVE INCR	0020	8	F70
8.	PRESS CLEAR PUSHBUTTON SECTION 4 LOADED			
A	OBSERVE SPO INDICATORS	000	8B	F70
B	OBSERVE MPM	0303	8C	F75
C	OBSERVE INCR	0020	9	M38
9.	PRESS CLEAR PUSHBUTTON SECTION 5 LOADED			
A	OBSERVE SPO INDICATORS	000	9B	F70
B	OBSERVE MPM	0404	9C	M38
C	OBSERVE INCR	0020	10	M38
10.	PRESS CLEAR PUSHBUTTON SECTION 6 LOADED.			
A	OBSERVE SPO INDICATORS	000	10B	F70
B	OBSERVE MPM	0606	10C	F75
C	OBSERVE INCR	0020	11	M38
11.	PRESS CLEAR PUSHBUTTON SECTION 7 LOADED			
A	OBSERVE SPO INDICATORS	000	11B	F70
B	OBSERVE MPM	0707	11C	F75
C	OBSERVE INCR	0020	12	M38

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                      NOTE                          *
*                      ____                          *
*                                                    *
* TESTS 8 THRU 15 CHECK LRC AND ONLY 1 CARD PER TEST. *
* OBSERVE SPO INDICATORS AFTER EACH CARD HAS BEEN READ*
* AND VERIFY A LOADER ERROR IS PRESENT. *
*                                                    *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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12.	PRESS CLEAR PUSHBUTTON SECTION 8 LOADED	1CARD READ AND SPO = 101	13	M6
13.	PRESS CLEAR PUSHBUTTON SECTION 9 LOADED	1CARD READ AND SPO = 101	14	F71
14.	PRESS CLEAR PUSHBUTTON SECTION 10 LOADED	1CARD READ AND SPO = 101	15	F71
15.	PRESS CLEAR PUSHBUTTON SECTION 11 LOADED	1CARD READ AND SPO = 101	16	F71
16.	PRESS CLEAR PUSHBUTTON SECTION 12 LOADED	1CARD READ AND SPO = 101	17	F71
17.	PRESS CLEAR PUSHBUTTON SECTION 13 LOADED	1CARD READ AND SPO = 101	18	F71
18.	PRESS CLEAR PUSHBUTTON SECTION 14 LOADED	1CARD READ AND SPO = 101	19	F71
19.	PRESS CLEAR PUSHBUTTON SECTION 15 LOADED	1CARD READ AND SPO = 101	20	F71

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                      NOTE                          *
* DO NOT PRESS CLEAR AFTER STEP 19 ABOVE *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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20.	METER FQ0/1 1B (CGSCLK1)	0%	21	M41
21.	PRESS CLEAR PUSHBUTTON OBSERVE SPO ERROR IND.	SECTION 16 LOADED 101	22	F89

22. CONNECT A JUMPER FROM DI7Y (MPM17) TO GRD
PRESS CLEAR PUSHBUTTON
SECTION 17 LOADED — SPO IND = 101 AND CARD READER WENT NOT READY — 23 — F87

23. REMOVE JUMPER
SET LOAD SWITCH TO NORMAL
PRESS CLEAR PUSHBUTTON
SET REP/NORM SWITCH TO REP
SET MTR SWITCH TO MEM THEN BACK TO MTR — SPO IND = 011 — 24 — M42

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* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                          NOTE                               *
* THIS STEP VERIFIES NANO PARITY ERROR DETECTION ON           *
* A TYPE 1 INSTRUCTION AND PURGES MPM OF PARITY ERRORS*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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24. END OF CMEMLDR MTR
GO TO PROC MTR
****

MANUAL PROCEDURES

M1	OPERATOR ACTION (INITIAL ERROR)	MACHINE ACTION	A	D
1.	OBSERVE SPO IND	100	7	2
2.	OBSERVE SPO IND	101	15	3
3.	OBSERVE SPO IND	001	11	4
4.	OBSERVE SPO IND	010	12	5
5.	OBSERVE SPO IND	011	13	F70
7.	METER DQ3/4 2X (SMAEF/)	0%	8	9
8.	METER FL4/5 1X (LINHSTP/)	0%	F95	F85
9.	METER DQ3/4 1U (EOIND4)	0%	F17	F96
11.	METER DQ3/4 2P (EOIND1)	0%	F17	F97
12.	METER DQ3/4 1T (EOIND2)	0%	F17	F98
13.	METER DQ3/4 2P (EOIND1)	0%	F17	14
14.	METER DQ3/4 1T (EOIND2)	0%	F17	F99
15.	METER DQ3/4 2P (EOIND1)	0%	F17	16
16.	METER DQ3/4 1U (EOIND4)	0%	F17	17
17.	METER FL7/8 2R (LIERR/)	100%	F96	18
18.	METER CRT4 1H (INC)	0%	19	F100
19.	METER FL7/8 1S (LILRCER/)	100%	F16	F15

M2	OPERATOR ACTION (INCR NOT COUNTING)	MACHINE ACTION	A	D
1.	METER FL4/5 1W (LILOAD/)	0%	6	2
2.	HOLDING CLEAR PUSHBUTTON METER FL4/5 2G (LIPCLRA/)	0%	4	3
3.	HOLDING CLEAR PUSHBUTTON METER FL7/8 2G (CGPCLR/)	0%	F25	F26
4.	HOLDING CLEAR PUSHBUTTON METER FL4/5 (CGCLEARC)	100%	5	F24
5.	METER FL4/5 2B (LDSE/)	0%	F93	F94
6.	METER FL4/5 2W (LIFORT2/)	0%	7	F21
7.	METER DQ3/4 1P (EOFORT2/)	0%	8	F22
8.	METER DQ3/4 1V (EOSTOP/)	100%	F42	F23

M3	OPERATOR ACTION	MACHINE ACTION	A	D
1.	OBSERVE CARD READER	NOT READY	F27	2
2.	OBSERVE CARD READER	NO CARDS WERE PICKED	3	4
3.	METER CRT4 1B (CDSCLK)	3-5%	7	F92
4.	OBSERVE CARD READER SEE NOTE#3 BELOW	ONLY 1 CARD FED INTO READY STATION	5	7
5.	INSURE LOAD SWITCH IS ON		6	F83
6.	METER FL4/5 2B (LDSE/)	0%	F28	F29
	WHILE DIAGNOSTIC DECK IS BEING READ FOLLOW STEPS 7 THRU 10. SEE NOTE #2 BELOW.			
7.	SCOPE CRT4 - 1E (LDRDSTB)	1USEC EVERY .65MS.	F91	8
8.	METER CRT4 - 1V (CSP)	95-100%	9	F101
9.	METER CRT2 - 1T (CRDC240)	0%	10	F102

10. METER CRT4 - I3 (CRD240/) 100% F103 F104

NOTE#1
IF VALUE INDICATED BY LITES IS NOT LISTED BELOW GO TO M38.
X = DON'T CARE

NOTE #2.
REMOVE CARDS FROM HOPPER. HOLDING THE STOP SWITCH WHILE DEPRESSING THE START SWITCH (IN THAT ORDER) WILL RUN THE CARD OUT OF THE READY STATION INTO THE STACKER.
ADD A JUMPER WIRE FROM DK9V (SCCL/) TO DK8Z (GROUND). STACK DIAGNOSTIC DECK IN INPUT HOPPER AND PRESS START SWITCH ON CARD READER.

NOTE#3
REMOVE CARDS FROM HOPPER. HOLDING THE STOP SWITCH WHILE DEPRESSING THE START SWITCH (IN THAT ORDER) WILL RUN THE CARD OUT OF THE READY STATION INTO THE STACKER.

M4. (LOADER ERROR)
FROM THE TABLE BELOW, SELECT THE VALUES WHICH ARE EQUAL TO THOSE INDICATED
SEE NOTE #1 ABOVE

SPO IND	MPM	INCR	
100			F85
101	AAAA	0060	M19
101	AAAA	001F	M20
101	AAAA	0021	M21
101	AAAA	003F	F30
101	2020	0071	M22
101	AAAA	0018	F31
101	0000	00BF	M23
101	AAAA	0020	F32
101	0000	0000	M24
101	AAAA	0000	M25
101	AAAA	0040	M26
101	AAAA	0080	M27
101	AAAA	00A0	M28
101	1010	0000	M29
101	A2A2	0000	M30
101	4545	0000	M31
101	A8A8	0020	M32
101	A8A8	0000	M32
101	AAAA	00E0	F90

M5 (DATA ERROR OR INCR ERROR).
FROM THE TABLE BELOW, SELECT THE VALUES WHICH ARE EQUAL TO THOSE INDICATED
SEE NOTE #1 ABOVE

SPO IND	MPM	INCR	
000	0000	00C6	F33
000	00AA	00A0	F34
000	AXAA	00A0	F35
000	XAAA	00A0	F36
000	00AA	0140	F38
000	00AA	013F	F39
000	0000	0024	F39
000	0000	0000	F40
000	0000	00CE	F41
000	AAAA	0000	F42
000	0000	00A0	M33
000	AA0A	00A0	F43
000	A2A2	00A0	M30
000	A8A8	00A0	M35
000	EAEA	00A0	M36
000	2A2A	00A0	M37
000	AA00	00A0	F44
000	ABAB	00A0	F45
000	5555	0020	F67
101	AAAA	0011	F105

M6	OPERATOR ACTION	MACHINE ACTION	A	D	
1.		SECTION 8 THRU 15 FED THRU CONTINOUSLY	F86	2	D
2.		2 CARDS WERE FED	F17	3	
3.	PUT 1ST CARD OF SECTION 8 IN READER AND LOAD			4	
4.	METER LILRCNZ/	100%	F87	F71	

M7	OPERATOR ACTION (INCR NOT ZERO)	MACHINE ACTION	A	D
1.	METER FL4/5 1W (LILOAD/)	0%	2	M2.2
2.	METER FL4/5 1X (LINHSTP/)	0%	F61	F21

NOTE#2
REMOVE CARDS FROM HOPPER. HOLDING THE STOP SWITCH WHILE DEPRESSING THE START SWITCH (IN THAT ORDER)

WILL RUN THE CARD OUT OF THE READY STATION INTO THE STACKER.
ADD A JUMPER WIRE FROM DK9V (SCCL/) TO DK8Z (GROUND). STACK DIAGNOSTIC DECK IN INPUT HOPPER AND PRESS START SWITCH ON CARD READER.

	OPERATOR ACTION	MACHINE ACTION	A	D
M19				
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER METER FL7/8 2M (RDIO4L/) SEE NOTE #2.	75-85%	F1	F2
M20.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER METER FL4/5 2C (CRTE08/) SEE NOTE #2	70-75%	F4	F3
M21.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER METER FL4/5 2F (CRTE16/) SEE NOTE#2	75-85%	F5	F6
M22	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER METER FL4/5 2U (CRTE64/) SEE NOTE#2	85-90%	F7	F8
M23	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SCOPE FL4/5 1C (CRCLM12/) SEE NOTE#2	.5MS WIDE EVERY 100MS	F9	F10
M24	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER THE FOLLOWING POINTS. SCOPE FL4/5 1L (CRCLM02/)	.5MS WIDE EVERY 100MS	2	F11
2.	METER FL4/5 2Q (LISOCT8)	35-40%	3	F12
3.	METER FL4/5 2Y (LIOCT4)	65-70%	4	F13
4.	METER FL4/5 2F (CRTE16/)	75-80%	F46	F47
M25	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER METER THE FOLLOWING POINTS. SEE NOTE#2 METER FL7/8 2T (RDI01L/)	75-85%	2	F48
2.	METER FL7/8 1R (RDI03L/)	75-85%	3	F49
3.	METER FL7/8 1L (RDI05L/)	45-55%	4	F50
4.	METER FL7/8 1Y (RDI06L/)	75-85%	F52	F51

	OPERATOR ACTION	MACHINE ACTION	A	D
M26				
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 1R (RDI03L/)	75-85%	F5O	F49
M27	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 1L (RDI05L/)	45-55%	F53	F50
M28	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 1Y (RDI06L/)	75-85%	F54	F51
M29	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 1V (RDI07L/)	75-85%	F54	F55
M30	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 2W (RDI08L/)	75-85%	F56	F57
M31	OPERATOR ACTION	MACHINE ACTION		
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 1F (RDI09L/)	55-65%	F28	F58
M32	OPERATOR ACTION	MACHINE ACTION	A	D
1	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 1Q (RDI02L/)	75-85%	F59	F60
M33	OPERATOR ACTION	MACHINE ACTION	A	D
1.	METER FL7/8 1B (CDSCLKE)	3-5%	F61	F62
M35	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 1H (RDI10L/)	25-35%	F63	F64
M36	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER SEE NOTE#2 METER FL7/8 1G (RDI11L/)	55-65%	F6O	F65
M37	OPERATOR ACTION	MACHINE ACTION	A	D
1.	WHILE DIAGNOSTIC DECK IS BEING READ BY CARD READER			

SEE NOTE#2
METER FL7/8 1I (RDI12L/) 40-50% F6O F66

M38 OPERATOR ACTION MACHINE ACTION A D
WHILE DIAGNOSTIC DECK IS
BEING READ BY CARD READER
METER THE FOLLOWING POINTS.
SEE NOTE#2

1	FL7/8	2E	(EXT01/)	93-98%	2	M37
2	FL7/8	2B	(EXT02/)	75-80%	3	M36
3	FL7/8	2F	(EXT03/)	75-80%	4	M35
4	FL7/8	1D	(EXT04/)	75-80%	5	M31
5	FL7/8	2U	(EXT05/)	93-98%	6	M30
6	FL7/8	1U	(EXT06/)	75-80%	7	F13
7	FL7/8	1X	(EXT07/)	75-80%	8	F68
8	FL7/8	2Q	(EXT08/)	75-80%	9	F69
9	FL7/8	2C	(EXT09/)	93-98%	10	F43
10	FL7/8	2K	(EXT10/)	75-80%	11	F43
11	FL7/8	2J	(EXT11/)	75-80%	12	F43
12	FL70,	1C	(EXT120)	75-80%	13	F43
13	FL7/8	2X	(EXT13/)	93-98%	14	F37
14	FL7/8	1W	(EXT14/)	75-80%	15	F37
15	FL7/8	2Y	(EXT15/)	75-80%	16	F37
16	FL7/8	2V	(EXT16/)	75-80%	F70	F37

M39 (LOADER ERROR)
FROM THE TABLE BELOW, SELECT
THE VALUES WHICH ARE EQUAL TO
THOSE INDICATED

NOTE

IF VALUE INDICATED BY LITES
IS NOT LISTED BELOW GO TO M38.
X = DON'T CARE

SPO IND	MPM	INCR	
101	4545	0000	F63
101	5555	001F	F71
101	5555	0027	F72
101	5555	0000	F73

M40 (DATA ERROR)
FROM THE TABLE BELOW SELECT
THE VALUES WHICH ARE EQUAL TO
THOSE INDICATED

NOTE

IF VALUE INDICATED BY LITES
IS NOT LISTED BELOW GO TO E38.
X = DON'T CARE

SPO IND	MPM	INCR	
000	4545	0020	M31
000	1515	0020	M36
000	7575	0020	M35
000	D5D5	0020	M37
000	5454	0020	F69
000	5X55	0020	F35
000	X555	0020	F36
000	555X	0020	F37
000	55X5	0020	F43

M41 OPERATOR ACTION MACHINE ACTION A D
(CLOCK NOT INHIBITED BY ERROR)

1. METER DQ3V (EOESTOP/) 0% F81 F82

M42 OPERATOR ACTION MACHINE ACTION A D

1. HOLDING CLEAR - SET SGL
SWITCH TO SGL
RELEASE CLEAR - PRESS
SGL PUSHBUTTON UNTIL
MPM = ALL 1'S
METER FL4/5 1U (LINPE/) 0% 2 3

2. WILL BE DIAGNOSED BY
SUBSEQUENT MTRS

3. METER FL4/5 IS (MUTYPE2) 0% F88 2

FAILURE DICTIONARY

F1	FL4/5 D3,F5 FL7/8 D1,D5
F2	CRT1 E1 CARD READER SIGNAL RDIO4L/
F3	CRT2 B5,B7
F4	FL4/5 A5,C5,D7 FL7/8 B3,B5,C5,D5,E5,C7
F5	FL4/5 B3
F6	CRT2 B5,C7
F7	FL4/5 F5,B7,C7
F8	CRT2 B1,C7
F9	FL4/5 D1,E1,A3,A5,D5,B7
F10	CRT2 C3,B1,A3,B5,B7
F11	CRT2 C3,B3,B1,A3,B5,C7,B7
F12	FL7/8 E7,F1
F13	FL7/8 D1,D5
F14	DI7/8 A7,B5 FL4/5 D7
F15	FL4/5 E1,C1,D5,F5 CRT4 D3
F16	FL7/8 D7,E7
F17	SPO C7 OR SPO ERROR LITES.
F18	DQ3/4 E5,F5
F19	DQ3/4 F3,E5
F20	DQ3/4 C3,E3,F3,F5
F21	FL4/5 F7
F22	DQ3/4 D7
F23	DQ3/4 A5,C7,E7
F24	FQ0/1 A3,B3,D1,D5 CLEAR SWITCH
F25	FL7/8 B1,B7
F26	FQ0/1 C3
F27	REFER TO TECH MANUAL FOR DETAILS OF NOT READY.
F28	FL7/8 B7 FL4/5 D1,E1,A3,B3,A5,C5, D5,F5,A7,B7,F7.
F29	LOAD SWITCH
F30	FL4/5 B5,C5
F31	FL4/5 B7
F32	FL4/5 E1,C3,D3,F3,D7
F33	FL4/5 B5
F34	FL4/5 C1 FL7/8 B3,D7
F35	FL7/8 F3,F5
F36	FL7/8 D3,A5
F37	FL7/8 E3,F7
F38	FL4/5 C1,B5
F39	FL4/5 B5
F40	FL4/5 C1,D1,B3,B5,D7
F41	FL4/5 D1,B5
F42	FL4/5 B3
F43	FL7/8 C3,A7
F44	FL7/8 B3,D7
F45	FL7/8 B1
F46	FL4/5 C3,D3,E3,F3,C1, E1,A5,F5,B7 CRT4 E1,D5,E5
F47	CRT2 B5,C7
F48	CRT1 E1 OR CARD READER SIGNAL RDI01L/
F49	CRT1 E1 OR CARD READER SIGNAL RDI03L/
F50	CRT1 E7 OR CARD READER SIGNAL RDI05L/
F51	CRT1 E7 OR CARD READER SIGNAL RDI06L/
F52	FL7/8 E1,D1,F1.
F53	FL7/8 C1,D1,E1.
F54	FL7/8 D1,F1
F55	CRT1 E7 OR CARD READER SIGNAL RDI07L/
F56	FL7/8 F1
F57	CRT1 E7 OR CARD READER SIGNAL RDI08L/
F58	CRT1 E7 OR CARD READER SIGNAL RDI09L/
F59	FL7/8 D1

F60 CRT1 E1 OR
CARD READER SIGNAL RDI02L/

F61 FL7/8 A3
FL4/5 B3,F7

F62 DQ0/1 C7,C3

F63 FL7/8 B7

F64 CRT1 E1 OR
CARD READER SIGNAL RDI01L/

F65 CRT1 E1 OR
CARD READER SIGNAL RDI11L/

F66 CRT1 E1 OR
CARD READER SIGNAL RDI12L/

F67 DIAGNOSTIC DECK IS OUT OF SEQUENCE

F68 FL7/8 D1,E5

F69 FL7/8 B1,E5

F70 CLEAR AND START MTR OVER AGAIN

F71 FL7/8 B5,C5,D5,E5,C7,A3,B3

F72 FL4/5 D7

F73 FL4/5 C3

F74 FL7/8 C5,E5

F75 FL7/8 B1,D1,F1

F77 FL4/5 C1,E1,C5,D7
FL7/8 A3,B3,C5,C7

F78 FL7/8 A3

F79 FL7/8 A3,B3,E5,C7

F80 REFER TO TECH MANUAL FOR ADJUSTMENTS

F81 FQ0/1 C7,D1

F82 DQ3/4 C7,E7

F83 SEE STEP 1 OF OPERATOR INSTRUCTIONS

F84 FL4/5 D5,F5
FL7/8 E7

F85 FL7/8 B1
FL4/5 C1,A3,B3,D7,F7

F86 FL7/8 E7,D7
FL4/5 E1,D5,F5

F87 FL4/5 E1,C1
DQ3/4 E3

F88 FL4/5 E5,E7

F89 FL4/5 E3,E1

F90 FL4/5 D3,F3,C3

F91. CRT4 B1,C1,F3,A7,B7,
F7,E5,A3,E3.
CRT2 B7,C7

F92 IF CARD READER DDP
IS IN
PORT 1 DQ0/1 D5,C3
PORT 2 OR 3 DQ0/1 C5,C3
PORT 4 OR 5 DQ0/1 B5,C3
PORT 6 OR 7 DQ0/1 A5,C3

F93 FL4/5 A3,B7,C5

F94 FL4/5 B1 OR LOAD SWITCH

F95 DI4/5 D1,B3,C7

F96 DQ3/4 E5,F5

F97 DQ3/4 E3,C3,E1

F98 DQ3/4 E5,F3,E1

F99 DQ3/4 E3,E5,F3

F100 CRT4 E5,D5

F101 CARD READER PROBLEM.

F102 CRT2 B1,B3,C7,B7.

F103 CRT4 D1,A5,B3,E5,E1,
D5,B5,C5,D3,F3.

F104 CRT3 B7,A3

F105 CRT2 B3.

ILLUSTRATIONS

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                                        NOTE#1
SECTION  1  -  9  CARDS  FIGURE  A  +  1  CARD  FIGURE  B
(SEQUENCE  NUMBERS  IN  COLUMNS  1-3  MUST  RANGE  FROM  001THRU009)
SECTION  2  -  1  CARD  FIGURE  C  +  1  CARD  FIGURE  D
SECTION  3  -  1  CARD  FIGURE  E  +  1  CARD  FIGURE  D
SECTION  4  -  1  CARD  FIGURE  F  +  1  CARD  FIGURE  D
SECTION  5  -  1  CARD  FIGURE  G  +  1  CARD  FIGURE  D
SECTION  6  -  1  CARD  FIGURE  H  +  1  CARD  FIGURE  D
SECTION  7  -  1  CARD  FIGURE  I  +  1  CARD  FIGURE  D
SECTION  8  -  1  CARD  FIGURE  J
SECTION  9  -  1  CARD  FIGURE  K
SECTION  10-  1  CARD  FIGURE  L
SECTION  11-  1  CARD  FIGURE  M
SECTION  12-  1  CARD  FIGURE  N
SECTION  13-  1  CARD  FIGURE  O
SECTION  14-  1  CARD  FIGURE  P
SECTION  15-  1  CARD  FIGURE  Q
SECTION  16-  1  CARD  FIGURE  R
SECTION  16A-1   CARD  FIGURE  S
SECTION  17   1  CARD  FIGURE  T
SECTION  18  -  DIAGNOSTIC  DECK
255  CARDS  FIGURE  U  +  1  CARD  FIGURE  V
                                FIGURE  A
*
*       SEQ  NO.  IN  COL  1  THRU  3.
*       MULTI-PUNCH  12,8,2,0  IN  COL  17  THRU  80.
*
*
                                FIGURE  B
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  010.
*       COL  13  PUNCH  1.  COL  23  PUNCH  0.  COL  24  PUNCH  2.
                                FIGURE  C
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       MULTI-PUNCH  -,5,9  IN  COL  17  THRU  80.
*
*
                                FIGURE  D
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  002.
*       COL  13  PUNCH  1.  COL  23  PUNCH  0.  COL  24  PUNCH  2.
                                FIGURE  E
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  80  PUNCH  1.
*
*
                                FIGURE  F
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  80  PUNCH  3.
                                FIGURE  G
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  80  PUNCH  4.
*
*
                                FIGURE  H
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  80  PUNCH  6.
                                FIGURE  I
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  80  PUNCH  7.
*
*
                                FIGURE  J
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  25  PUNCH  0.
                                FIGURE  K
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  25  PUNCH  12.
*
*
                                FIGURE  L
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  25  PUNCH  11.
                                FIGURE  M
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  25  PUNCH  1.
*
*
                                FIGURE  N
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  25  PUNCH  2.
                                FIGURE  O
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  25  PUNCH  4.
*
*
                                FIGURE  P
*
*       SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*       COL  17  THRU  25  PUNCH  8.
                                FIGURE  Q
```

```
*
*          SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*          COL  17   THRU  25   PUNCH  9.
*
*
                                        FIGURE  R
*
*          SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*          MULTI-PUNCH    12,0,2,8        IN  COL  17  THRU  80.
                                        FIGURE  S
*
*          SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  003.
*          MULTI-PUNCH    12;0,2,8        IN  COL  17  THRU  80.
*
*
                                        FIGURE  T
*
*          SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  001.
*          MULTI-PUNCH    12,0,2,8        IN  COL  17  THRU  80.
                                        FIGURE  U
*
*          SEQ  NO.  IN  COL  1  THRU  3  PROGRESS   FROM 001   THRU  255.
*          COLS.17,24,31,38,45,52,66,73,80          MULTI-PUNCH    12,0,5.
*          COLS.18,25,32,39,46,53,60,67,74          MULTI-PUNCH3,9.
*          COLS.19,26,33,40,47,54,61,68,75          MULTI-PUNCH    11,6.
*          COLS.20,27,34,41,48,55,62,69,76          MULTI-PUNCH    11,0,2,8,9.
*          COLS.21,28,35,42,49,56,63,70,77          MULTI-PUNCH    11,1,9.
*          COLS.22,29,36,43,50,57,64,71,78,           MULTI-PUNCH    0,4,9.
*          COLS.23,30,37,44,51,58,65,72,79          MULTI-PUNCH    11,0,7.
*
*
                                        FIGURE  V
*
*          SEQ  NO.  IN  COL  1  THRU  3  SHOULD  BE  256.
*          COL  13   PUNCH  1.   COL  23   PUNCH  0.   COL  24   PUNCH  2.
```

PROCMTR PROCESSOR
B 711, B 711-1, B 720, AND B 771

```
 PROGRAM-ID   PROCMTR.
*SET  SWITCHES--MTR    TO MTR,  IRQ  TO  CENTER,   LOAD  TO  LOAD      C
*PRESS   CLEAR,   LOAD  PROGRAM  -  1448    6948                       H
*
*B711    B771     SET  LOAD  SWITCH  TO  NORM  THEN  PRESS  CLEAR       H
*                 (ANY  MPM  PARITY   ERRORS  -  GO  TO  MCUMTR)        H
*
*B721     SET  ERS  SWITCH  TO  ERS,   LOAD  TO  NORM-PRESS   CLEAR     H
*         IF  EO2  HALT  OCCURS  AT  ANY  TIME   GO  TO  C99           H
*
*   PROG  STEP    INCR          OPERATOR  ACTION
*
*         1       0000      VERIFY  INCR  = 0
*                           IF  YES  FORCE  STEP  ONCE
*                           IF  NO   GO  TO  S1
*
*         2       080C      END  OF  SUCCESSOR  TEST
*                           VERIFY  INCR  = 080C  AND  FEAC  = 0059
*                           IF  BOTH  YES  FORCE  STEP  TWICE
*                           IF  NO  GO  TO  S1
*
*         IF  PROGRAM  LOOPS  AFTER  STEP  2  GO  TO  ERROR  #  C1     H
*
*         3       0110      END  OF  CONTROL  UNIT  TEST
*                           FORCE  STEP  TWICE  TO  BEGIN
*                           LOGIC  UNIT  TEST
*
*         4       02A9      MID-POINT   OF  LOGIC  UNIT  TEST
*                           FORCE  STEP  ONCE  TO  CONTINUE
*
*         5       08D0      END  OF  PROCMTR  -  GO  TO  BSWMTR         H
*                           (FORCE  STEP  WILL  LOOP  LOGIC  UNIT       B
*                           TEST).                                      B
*
*   NORMAL  INSTRUCTION   SEQUENCE
*           NOTE  '*'  INDICATES   FORCE  STEP  REQUIRED
*   0*1-3-4-6-7-8-9-A-C-D-F-10-11-12-13--15-16-18-1A-1B
*
*   1C-1D-1E-20-21-24-25-51-26-28-29-51--2A-2C-2D-2E-51
*
*   2F-31-32-51-33-35-36-37-38-51-39-3B--3C-3E
*
*   40-41-42-44-45-46-48-49-4A-4B-4C-4D--4E-54-55-56
*
*   800-801-7F7-7F8-7F9-7FB-7FC-7FD-7FE--800-802-803
*
*   7FF-800-805-806-808-809-80A-80B-51-880C
```

PROGRAM LISTING

```
0000  F000      WAIT.              NORMAL STOP-FORCE   STEP
0001  4002      MPCR = @0002@.                TEST TYPE 2 JUMP.
0002  F000      WAIT.                   ERROR MUBORC = 0
0003  0000      AMPCR = @0000@.               CALL WAIT NANO WITH TYPE 2
0004  8005      CPCR = @0005@.                TEST JUMP OF TYPE 2 CALL
0005  F000      WAIT.                   ERROR
0006  E000      LIT = 0.                      CALL WAIT NANO WITH TYPE 2
0007  D000      SAR = 0.                      CALL WAIT NANO WITH TYPE 2
0008  C000      LIT = 0 SAR = 0.              CALL WAIT NANO WITH TYPE 2
0009  F19E      IF NOT GC1 STEP ELSE SKIP.    TEST TRUE STEP
000A  F002      IF GC1 STEP ELSE SKIP.        TEST FALSE SKIP
000B  F000      WAIT.                   ERROR
000C  000E      AMPCR = @000E@.
000D  F187      IF GC1 STEP ELSE JUMP. SA=F             TEST FALSE JUMP
000E  F000      WAIT.                   ERROR
000F  F188      IF GC1 STEP ELSE SAVE.        TEST FALSE SAVE
0010  F005      IF GC1 STEP ELSE RETN.        TEST FALSE RETN
0011  F006      SET GC1.
0012  F0BB      IF NOT GC1 SKIP.              TEST FALSE STEP
0013  4014      MPCR = @0014@.                SA=15
0014  F000      WAIT.                   ERROR GC1 = 0
0015  0019      AMPCR = @0019@.
0016  F008      IF GC1 SKIP.                            TEST TRUE SKIP
0017  F000      WAIT.                   ERROR
0018  F0A1      IF GC1 JUMP.                  SA=1A     TEST TRUE JUMP
0019  F000      WAIT.                   ERROR
001A  F18B      IF GC1 SAVE.                            TEST TRUE SAVE
001B  F18A      IF GC1 RETN.                      TEST  TRUE RETN
001C  F00C      RESET GC1.
001D  001F      AMPCR = @001F@.
001E  F187      IF GC1 STEP ELSE JUMP. SA=20            TEST GC1 = 0
001F  F000      WAIT.                   ERROR
0020  F188      IF GC1 STEP ELSE SAVE.  TEST FALSE SAVE DONT SKIP
0021  4023      MPCR = @0023@.                SA=24
0022  F000      WAIT.                                   FILLER
0023  F000      WAIT.                   ERROR
0024  0050      AMPCR = SETGC1 - 1.
*                       NOTE:  ALL 'EXEC'S    DO 'SET  GC1'
0025  F186      IF GC1 STEP ELSE EXEC.        TEST FALSE EXEC
0026  F19E      IF NOT GC1 STEP ELSE SKIP.
0027  F000      WAIT.                   ERROR
0028  F00C      RESET GC1.
0029  F186      IF GC1 STEP ELSE EXEC.        TEST AMPCR UNCH'GD
002A  F008      IF GC1 SKIP.
002B  F000      WAIT.                   ERROR
002C  0050      AMPCR = SETGC1 - 1.
002D  F00C      RESET GC1.
002E  F00E      IF NOT GC1 EXEC.              TEST TRUE EXEC
002F  F008      IF GC1 SKIP.
0030  F000      WAIT.                   ERROR
0031  F00C      RESET GC1.
0032  F00E      IF NOT GC1 EXEC.              TEST AMPCR UNCH'GD
0033  F008      IF GC1 SKIP.
0034  F000      WAIT.                   ERROR
0035  F188      IF GC1 STEP ELSE SAVE.
0036  F00C      RESET GC1.
0037  F18B      IF GC1 SAVE.
0038  F00E      IF NOT GC1 EXEC.    TEST LAST 2 SAVES NOT DONE
0039  F008      IF GC1 SKIP.
003A  F000      WAIT.                   ERROR
003B  F18B      IF GC1 SAVE.          TEST TRUE SAVE INCREMENTS MPCR
003C  F19E      IF NOT GC1 STEP ELSE SKIP.
003D  F000      WAIT.                   ERROR MPCREN = 0 ON TRUE SAVE
003E  403F      MPCR = @003F@.                          SKIP
003F  F000      WAIT.                   ERROR F JMP/SKP  ALSO STEPS
```

```
0040  F00C        RESET  GC1.
0041  F188        IF  GC1  STEP  ELSE  SAVE.TEST    F SAVE  INCREMENTS  MPCR
0042  F002        IF  GC1  STEP  ELSE  SKIP.
0043  F000        WAIT.                       ERROR  MPCREN = 0  ON FALSE  SAVE
                  *                                  OR STP&SKP  ON FALSE  SKIP
                  *                                  OR TYPE 2 CALL  DONT  SAVE
0044  8044        CPCR = CSUCMTR - 4.      SA= +1
0045  F005        IF  GC1  STEP  ELSE  RETN.  TEST  AMPCR IS  UNCHANGED
0046  4047        MPCR = CSUCMTR - 1.      SA= +2
0047  F000        WAIT.                       ERROR F RETN  ALSO  DOES  JUMP
      CSUCMTR.
                  *  VERIFY  UNSATISFIED   COND SUCCESSOR  NOT DONE
                  *  AMPCR HAS 0044   TO OR WITH STEP  IF  SC ERROR
0048  F18A        IF  GC1  RETN.           SA= +1
0049  F0A1        IF  GC1  JUMP.           SA= +1
004A  F006        SET  GC1.
004B  F05F        B.                FILLER
004C  F005        IF  GC1  STEP  ELSE  RETN.  SA= +1
004D  F187        IF  GC1  STEP  ELSE  JUMP.  SA= +1
004E  4053        MPCR = SETGC1  + 2.
004F  F000        WAIT.                       ERROR F JMP/RETN  IS  UNCOND'L
0050  F000        WAIT.                       ERROR JMP OR RETN UNCONDITIONAL
      SETGC1.                   INSTRUCTION  TO BE PERFORMED  BY  EXECUT
0051  F006        SET  GC1.
0052  F000        WAIT.                       ERROR  MPCR CLKED  ON EXEC
0053  F000        WAIT.                       ERROR  NANO BIT  15  = 1
0054  07FF        AMPCR = HIBITS  - 1.
0055  4055        MPCR = @0055@.              TEST  AM UNCH,GD  BY  MPCR
0056  F0C9        JUMP.                       ERROR  MUAM-MP = 1  ON MPCR
0057  F000        WAIT.                ERROR  SC OR SC/  = 1  ON TYPE  2
                  *  BEGIN  FLAG  TEST
      CONTIN.
0058  F076        B = B111.        PRESET  DIAGNOSTIC  CALLER  ADDRESS
0059  F033        A2 = B.                                  ALL  1,S  =NONE
                  *                    TEST  FOR FLAGS  RESET  BY CLEAR
005A  F0BC        IF  NOT GC2  SKIP.
005B  8112        CPCR = FLGERDIA  - 1.      ERROR#  C2
005C  F0BF        IF  NOT LC1  SKIP.
005D  8112        CPCR = FLGERDIA  - 1.      ERROR#  C4
      RLC2.
005E  F0C0        IF  NOT LC2  SKIP.
005F  8112        CPCR = FLGERDIA  - 1.      ERROR#  C6
      RINT.
0060  F0C1        IF  NOT LC3  SKIP.
0061  8113        CPCR = FLGERDIA.           ERROR#  C8
0062  F0F6        SET  GC2.
0063  F018        SET  LC1.
0064  F019        SET  LC2.
0065  F01A        SET  INT.
0066  E006        LIT  = @06@.  CALL  NANO'SGC1'   TEST  COND  ADJ
0067  F0BB        IF  NOT GC1  SKIP.
0068  8180        CPCR = ERR1  - 1.          ERROR#  C9   COND  ADJ  = 1
                  *                    TEST  THAT  FLAGS  CAN  BE  SET
0069  F0A2        IF  GC2  SKIP.
006A  8180        CPCR = ERR1  - 1.          ERROR#  C10
006B  F014        IF  LC1  SKIP.
006C  8180        CPCR = ERR1  - 1.          ERROR#  C14
006D  F015        IF  LC2  SKIP.
006E  8180        CPCR = ERR1  - 1.          ERROR#  C16
006F  F01E        IF  LC3  SKIP.
0070  8180        CPCR = ERR1  - 1.          ERROR#  C18
0071  F01F        RESET  GC2.           TEST  THAT  FLAGS  CAN  BE  RESET
0072  F0BC        IF  NOT GC2  SKIP.
0073  8180        CPCR = ERR1  - 1.          ERROR#  C20
0074  F0BF        IF  NOT LC1  SKIP.
0075  8180        CPCR = ERR1  - 1.          ERROR#  C22
0076  F0C0        IF  NOT LC2  SKIP.
0077  8180        CPCR = ERR1  - 1.          ERROR#  C24
0078  F0C1        IF  NOT LC3  SKIP.
0079  8180        CPCR = ERR1  - 1.          ERROR#  C26
                  *     TEST  FOR  COND  ADJ  &  COND  TEST  DECODE  ERRORS

007A  F1A4        IF  NOT LC1  SET  LC1  SKIP.
007B  F000        WAIT.                       ERROR  TRUE STEP,  SAVE  OR
                  *                                  EXEC  ALSO  DOES  JUMP
007C  F014        IF  LC1  SKIP.
007D  8180        CPCR = ERR1  - 1.          ERROR#  C28  COND  ADJ  = 1
007E  F018        SET  LC1.
007F  F1A4        IF  NOT LC1  SET  LC1  SKIP.       LC1  SHOULD  NOT  SET
0080  F05F        B.                         STEP
0081  F0BF        IF  NOT LC1  SKIP.
0082  8180        CPCR = ERR1  - 1.          ERROR#  C30  COND  ADJ  = 1
0083  F0A8        IF  LC1  SET  LC1  SKIP.
0084  F05F        B.                    STEP
0085  F0BF        IF  NOT LC1  SKIP.
0086  8180        CPCR = ERR1  - 1.          ERROR#  C32  COND  ADJ  = 1
0087  F018        SET  LC1.
0088  F0A8        IF  LC1  SET  LC1  SKIP.                LC1  SHOULD  SET
0089  F05F        B.                         FILLER
008A  F014        IF  LC1  SKIP.
008B  8180        CPCR = ERR1  - 1.          ERROR#  C34  COND  ADJ  = 1
008C  F0B5        IF  NOT ABT  SKIP.    IF  ABT  ERR  SKIP  COND  ADJ  TEST
008D  40CE        MPCR = CTRTST  - 1.
008E  F0E8        MIR = B111.              SET  ABT                              B
008F  F09D        IF  ABT  SKIP.
0090  40CE        MPCR = CTRTST  - 1.
0091  F0E8        MIR = B111.                                                    B
0092  E050        LIT  = @50@.    CALL  NANO'IFABTSLC1'     N51  SC1  T2/0
0093  F19B        IF  NOT ABT  SET  LC1.                      N50  SC1  T2/1
0094  F0BF        IF  NOT LC1  SKIP.
0095  8180        CPCR = ERR1  - 1.          ERROR#  C36  COND  ADJ  = 1
0096  F006        SET  GC1.
0097  F05F        B.
0098  F0BC        IF  NOT GC2  SKIP.
0099  8180        CPCR = ERR1  - 1.          ERROR#  C40   SGC2
009A  F0F6        SET  GC2.
009B  F018        SET  LC1.
009C  F019        SET  LC2.
009D  F01A        SET  LC3.
009E  F180        IF  ABT  RESET  GC1.
009F  E00C        LIT  = @0C@.   CALL  'RGC1'   NANO
00A0  F181        IF  ABT  RESET  GC2.
00A1  E01F        LIT  = @1F@.   CALL  'RGC2'   NANO
00A2  F0BC        IF  NOT GC2  SKIP.
00A3  F008        IF  GC1  SKIP.
00A4  8180        CPCR = ERR1  - 1.          ERROR#  C42   RGC2
00A5  F0C0        IF  NOT LC2  SKIP.
00A6  F09D        IF  ABT  SKIP.
00A7  F0F9        WHEN RDC BEX.              FAILURE  F278                      H
00A8  E014        LIT  = @14@.    CALL  ' IFLC1'   NANO
00A9  F014        IF  LC1  SKIP.
00AA  8180        CPCR = ERR1  - 1.          ERROR#  C44
00AB  F019        SET  LC2.
00AC  F014        IF  LC1  SKIP.
00AD  F0BB        IF  NOT GC1  SKIP.
00AE  F09E        IF  AOV  SKIP.
00AF  F18E        IF  IRQ  SKIP.
00B0  E015        LIT  = @15@.    CALL  ' IF  LC2'   NANO
00B1  F015        IF  LC2  SKIP.
00B2  8180        CPCR = ERR1  - 1.          ERROR#  C45
00B3  F1B5        IF  URQ  SKIP.
00B4  F0FB        WHEN RMI MAR1 = BMAR + 1.
                  *                          FAILURE  F278                      H
00B5  F09E        IF  AOV  SKIP.
00B6  F0B2        IF  LST  SKIP.
00B7  F0BA        IF  NOT EXT  SKIP.
00B8  E01E        LIT  = @1E@.    CALL  'IFLC3'   NANO
00B9  F01E        IF  LC3  SKIP.
00BA  8180        CPCR = ERR1  - 1.          ERROR#  C46
00BB  F006        SET  GC1.
00BC  F00C        RESET  GC1.
00BD  F01F        RESET  GC2.
00BE  E018        LIT  = @18@.    CALL  'SETLC1'   NANO
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00BF  E019        LIT  = @19@.    CALL ' SET  LC2'   NANO
00C0  E01A        LIT  = @1A@.    CALL 'SET   LC3'   NANO
00C1  F014        IF  LC1  SKIP.
00C2  F0C0        IF  NOT LC2  SKIP.
00C3  8180        CPCR  = ERR1  -  1.          ERROR#  C48
00C4  F0C1        IF  NOT LC3  SKIP.
00C5  8180        CPCR  = ERR1  -  1.          ERROR#  C49
00C6  F006        SET  GC1.
00C7  F0E8        MIR  = B111.                                              B
00C8  F180        IF  ABT  RESET  GC1.    N5/0   SC1   N71
00C9  F0BB        IF  NOT GC1  SKIP.
00CA  8180        CPCR  = ERR1  -  1.          ERROR#  C96   EXTOP  = 0
00CB  F006        SET  GC1.
00CC  F199        IF  NOT ABT  RESET  GC1.   N5/1   SC0   N71
00CD  F0BB        IF  NOT GC1  SKIP.
00CE  8180        CPCR  = ERR1  -  1.          ERROR#  C97       EXTOP  = 0
              CTRTST.              COUNTER  TEST
                *  BEGIN  COUNTER  &  LIT  TEST
00CF  F02E        IF  COV  SKIP.
00D0  48D6        MPCR  = CONDTEST  -  1.                                   H
00D1  F02E        IF  COV  SKIP.
00D2  8184        CPCR  = ERR2  -  1.          ERROR#  C52   COV  NOT CLEARED
00D3  8184        CPCR  = ERR2  -  1.          ERROR#  C54   COV  = 1
              CONTCTRTST.
00D4  E000        LIT  = 0.
00D5  F0CA        LCTR.
              INCCTR.
00D6  F030        INC.
00D7  F05F        B.                      ALLOW  INC  TO  COMPLETE
00D8  F02E        IF  COV  SKIP.
00D9  811D        CPCR  = CTRDIA  -  1.
00DA  F0B8        IF  NOT COV  SKIP.
00DB  8184        CPCR  = ERR2  -  1.          ERROR#  C56   COV  NOT RST-TST
00DC  F0CA        LCTR.
00DD  F030        INC.
00DE  F02E        IF  COV  SKIP.
00DF  8184        CPCR  = ERR2  -  1.          ERROR#  C57   COV  LK AHD = 0
00E0  F0CA        LCTR.
00E1  F030        INC.
00E2  F0CA        LCTR.
00E3  F05F        B.                      COMPLETE  LAST  INST
00E4  F0B8        IF  NOT COV  SKIP.
00E5  8184        CPCR  = ERR2  -  1.          ERROR#  C58   COV  NOT RST-LD
00E6  F0CA        LCTR.                   TEST  LIT  UNCH,GD  BY  MPCR  &  CPCR
00E7  E000        LIT  = 0.
00E8  40E8        MPCR  = LITLDTST   -  1.
              LITLDTST.
00E9  80E9        CPCR  = LITLDTST.
00EA  F030        INC.
00EB  F02E        IF  COV  SKIP.
00EC  8184        CPCR  = ERR2  -  1.          ERROR#  C59   MPCR  CHGD  LIT
00ED  F0CA        LCTR.            TEST  PHASE  3  CLOCK  INHIBIT
00EE  F190        IF  LC1  INC.                INC  SHOULD  NOT  BE  DONE
00EF  F0B8        IF  NOT COV  SKIP.
00F0  8184        CPCR  = ERR2  -  1.          ERROR#  C60   3CLK  NOT  1HB-SC
00F1  F006        SET  GC1.               FORCE  SC  =  0
00F2  F030        INC.
00F3  F02E        IF  COV  SKIP.
00F4  F000        WAIT.                        ERROR#  C62   3CLK  OFF  W/N6=0
00F5  F00C        RESET  GC1.
00F6  F0CA        LCTR.
00F7  F018        SET  LC1.
00F8  F190        IF  LC1  INC.           INC  SHOULD  BE  DONE
00F9  F02E        IF  COV  SKIP.
00FA  8184        CPCR  = ERR2  -  1.          ERROR#  C63   3CLK  OFF  W/SC=1
00FB  F0CA        LCTR.
00FC  0030        AMPCR  = @30@.   CALL  'INC'    NANO
00FD  F0B8        IF  NOT COV  SKIP.
00FE  8184        CPCR  = ERR2  -  1.          ERROR#  C64   3CLK  W/  TYPE  2
00FF  F0CA        LCTR.
0100  F030        INC.
```

```
0101  F0BA        IF  NOT EXT  SKIP.
0102  F05F        B.                                FILLER
0103  F05F        B.
0104  F0F9        WHEN RDC  BEX.
0105  F0FB        WHEN RMI  MAR1  =  BMAR  +  1.
0106  F0CA        LCTR.
0107  002E        AMPCR  = @2E@.    CALL  'IFCOV'    NANO
0108  F02E        IF  COV  SKIP.
0109  8188        CPCR  = ERR3  -  1.          ERROR#  C65   COND  ADJ  =  1
010A  E0FF        LIT  = @FF@.
010B  F0CA        LCTR.
              CTRCAL1.
010C  8166        CPCR  = INC256   -  1.
010D  010B        AMPCR  = CTRCAL1   -  1.
010E  F02E        IF  COV  SKIP.
010F  814D        CPCR  = CTR0INDIA   -  1.
0110  F189        IF  GC1  STEP  ELSE  WAIT.    END  OF  CONTROL  UNIT  TEST
                *              FORCE  STEP  TWICE  TO  BEGIN  LOGIC  UNIT  TEST
                *-------------------------
0111  F000        WAIT.                    ERROR  FALSE  WAIT  DOES  STEP
                *                          (DISREGARD   WHEN  FORCE  STEPING)
0112  4198        MPCR  = AT00R   -  1.        GO  TO  LOGIC  UNIT  MTR          B
              FLGERDIA.
0113  F023        A2  = AMPCR.                 SAVE  CALLER  ADDRESS             B
0114  F01F        RESET  GC2.
0115  F0BC        IF  NOT GC2  SKIP.
0116  8180        CPCR  = ERR1  -  1.          ERROR#  C66    GC2  =  1
0117  F0BF        IF  NOT LC1  SKIP.
0118  8180        CPCR  = ERR1  -  1.          ERROR#  C68    LC1  =  1
0119  F0C0        IF  NOT LC2  SKIP.
011A  8180        CPCR  = ERR1  -  1.          ERROR#  C70    LC2  =  1
011B  F0C1        IF  NOT LC3  SKIP.
011C  8180        CPCR  = ERR1  -  1.          ERROR#  C72    LC3  =  1
011D  4180        MPCR  = ERR1  -  1.          FLAG  NOT  RESET  BY  CLEAR
              CTRDIA.                  COUNTER  DIAGNOSTIC                       B
011E  F023        A2  = AMPCR.             SAVE  CALLER  ADDRESS                 B
011F  F0CA        LCTR.
0120  8136        CPCR  = WFEXT  -  1.
0121  F030        INC.
0122  F0B8        IF  NOT COV  SKIP.
0123  8184        CPCR  = ERR2  -  1.          ERROR#  C74    COVFF  =  0
0124  00FF        AMPCR  = @0FF@.
0125  F060        B  = AMPCR.
0126  F095        CTR  = B.
0127  F052        A3  = B  L.
0128  D800        SAR  = 8.
              CONTCTRDIA.
0129  F0BA        IF  NOT EXT  SKIP.
012A  F000        WAIT.                    ERROR#  C75    NO  3CLKS
012B  F030        INC.
012C  F0B8        IF  NOT COV  SKIP.
012D  813B        CPCR  = MPMCTRDIA  -  1.
012E  F04C        A3  = A3  +  1.
012F  F09E        IF  AOV  SKIP.
0130  8128        CPCR  = CONTCTRDIA  -  1.
0131  F05A        A3  = Z.
0132  F030        INC.
0133  F03F        A3  EQV  Z.
0134  F0B5        IF  NOT ABT  SKIP.
0135  8184        CPCR  = ERR2  -  1.          ERROR#  C76   NO  COV-NO  INC
0136  8184        CPCR  = ERR2  -  1.          ERROR#  C78   NO  COV-CTR  INCS
              WFEXT.                   WAIT  FOR  NEXT  EXT
0137  F0A0        IF  EXT  SKIP.
0138  F05F        B.                NOTE:IF   PROG  LOOPS  ON  THIS  AND  THE     B
0139  F0A0        IF  EXT  SKIP.           NEXT  2  ADDRESSES  EXT  IS  FAULTY.
013A  4138        MPCR  = WFEXT  +  1.  GO  TO  MCUMTR.                          B
013B  F0C9        JUMP.
              MPMCTRDIA.           MPM  TO  LIT,   LIT  TO  CTR  DIAGNOSTIC
013C  F07B        B  = 0.
013D  F095        CTR  = B.
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013E  F15A        B = CTR.
013F  F030        INC.                                                    B
0140  F02E        IF COV SKIP.
0141  8184        CPCR = ERR2 - 1.          ERROR# C80 CTR IN-LIT&BSW
                  *                         SEE B UPPER FOR BIT NO
0142  F07B        B = 0.
0143  F10A        A1 = LIT EQV B.                                         B
0144  E000        LIT = @00@.                                             B
0145  F09D        IF ABT SKIP.
0146  8184        CPCR = ERR2 - 1.          ERROR# C82 LIT REG BIT = 1    C
0147  F10A        A1 = LIT EQV B.                                         C
0148  F09D        IF ABT SKIP.                                            C
0149  8184        CPCR = ERR2 - 1.          ERROR# C84 LIT CHG ON TYP1    C
014A  F0CA        LCTR.
014B  E000        LIT = 0.
014C  F15A        B = CTR.
014D  8184        CPCR = ERR2 - 1.          ERROR# C86 CTR IN FROM LIT
                  CTR0INDIA.                CTR ZERO INPUT DIAGNOSTIC
014E  F076        B = B111.
014F  F095        CTR = B.
0150  F052        A3 = B L.                 SET A3 = FF00
0151  D800        SAR = 8.
0152  F15A        B = CTR.
0153  F017        A1 = B.
                  LPCTR0INDIA.
0154  F030        INC.
0155  F15A        B = CTR.
0156  F04C        A3 = A3 + 1.
0157  F0B7        IF NOT AOV SKIP.
0158  415B        MPCR = CONTCTR0INDIA - 1.
0159  F02E        IF COV SKIP.
015A  4153        MPCR = LPCTR0INDIA - 1.
015B  8188        CPCR = ERR3 - 1.          ERROR# C88 CTR/INPUT BIT=1
                  *                         SEE A1 UPPER FOR BIT NO.
                  CONTCTR0INDIA.
015C  F02E        IF COV SKIP.
015D  8188        CPCR = ERR3 - 1.          ERROR# C90 NO COV- CTR BAD
                  *                       B CONTAINS CTR INCR'D TO FF
015E  F076        B = B111.
015F  F07F        B = B R.                            SET B = 00FF
0160  E0FF        LIT = @FF@.
0161  F10A        A1 = LIT EQV B.
0162  F09D        IF ABT SKIP.
0163  8188        CPCR = ERR3 - 1.          ERROR# C92 LIT BIT = 0
                  *                       SEE A1 LOWER OFF FOR BIT NO.
0164  F0CA        LCTR.
0165  F15A        B = CTR.                  SEE B UPPER FOR BIT NO.
0166  8188        CPCR = ERR3 - 1.          ERROR# C94 CTR IN FROM LIT
                  *                           SEE B UPPER FOR BIT NO.
                  INC256.                 INC CTR 256 TIMES.
0167  F0C1        IF NOT LC3 SKIP.
0168  F0C9        JUMP.
                  *                       SEE A1 LOWER OFF FOR BIT NO.
0169  F1B7        INC IF COV JUMP.
016A  F1B7        INC IF COV JUMP.
016B  F1B7        INC IF COV JUMP.
016C  F1B7        INC IF COV JUMP.
016D  F1B7        INC IF COV JUMP.
016E  F1B7        INC IF COV JUMP.
016F  F1B7        INC IF COV JUMP.
0170  F1B7        INC IF COV JUMP.
0171  F1B7        INC IF COV JUMP.
0172  F1B7        INC IF COV JUMP.
0173  F1B7        INC IF COV JUMP.
0174  F1B7        INC IF COV JUMP.
0175  F1B7        INC IF COV JUMP.
0176  F1B7        INC IF COV JUMP.
0177  F1B7        INC IF COV JUMP.
0178  F1B7        INC IF COV JUMP.
0179  F09A        EXEC.                   RESTORE CALLING ADDRESS         B
```

```
017A  F1A5        IF NOT LC1 SET LC1 JUMP.
017B  F1A6        IF NOT LC2 SET LC2 JUMP.
017C  F19D        IF NOT GC1 SET GC1 JUMP.
017D  F00C        RESET GC1.
017E  F1A1        IF NOT GC2 SET GC2 JUMP.
017F  F01F        RESET GC2.
0180  F1A8        IF NOT INT SET INT JUMP.          END OF CNT256
                  ERR1.
0181  F18E        IF IRQ SKIP.          REPEAT FAILING TEST IF IRQ
0182  418C        MPCR = DERR - 1.
0183  8873        CPCR = FLAG-RESET - 3.
0184  4057        MPCR = CONTIN - 1.
                  ERR2.
0185  F18E        IF IRQ SKIP.          REPEAT FAILING TEST IF IRQ
0186  418C        MPCR = DERR - 1.
0187  8873        CPCR = FLAG-RESET - 3.
0188  40CE        MPCR = CTRTST - 1.
                  ERR3.
0189  F18E        IF IRQ SKIP.          REPEAT FAILING TEST IF IRQ
018A  418C        MPCR = DERR - 1.
018B  8873        CPCR = FLAG-RESET - 3.
018C  4109        MPCR = CTRCAL1 - 3.
                  DERR.
018D  F0DA        MIR = AMPCR.
018E  F000        WAIT.             ERROR-SEE MIR FOR INCR ADDRS OF E#
                  *                         IF MIR = 0000 GO TO F395
018F  F0DB        MIR = A1.
0190  F000        WAIT.                     DISPLAY A1 (EQV TST RESULT)
0191  F0E1        MIR = B.
0192  F000        WAIT.                     DISPLAY B (CTR LD RESULT)
                  *                   FORCE STEP FOR ERROR OVER-RIDE
0193  F0DD        MIR = A2.
0194  F09D        IF ABT SKIP.        YES - CONTINUE ADDRESS IS IN A2.  B
0195  F102        AMPCR = A2.          NO - CONTINUE ADDRESS IS IN A2.  B
0196  F05F        B.                        COMPLETE LAST INST
0197  F0C9        JUMP.
0198  F050        IF ABT SET LC1.     NANO TO BE CALLED BY TYPE 2
                  *              END OF SUCCESSOR & CONTROL UNIT PROGRAM
                  *-------------------------------
                  *
                  *
                  *     ******      LOGIC UNIT MTR ******
                  *
                  AT00R0.
                  AT00R.
0199  F05F        B.
019A  F0F7        SKIP.
019B  887C        CPCR = SGLSTPP - 1.
019C  F0E6          MIR = B000.
019D  F0B5        IF NOT ABT SKIP.
                  ******************ALU          OUTPUT EQUAL ZEROS ************
019E  8657        CPCR = AT00 - 1.
019F  0198          AMPCR = AT00R - 1.
                  *********************         FIRST TIME ABT HAS BEEN USED**
                  *********************         AMODE A AMODE B HAS BEEN ACTIVE*
                  *********************         FIRST TIME AS3A AS3B AS0A AS0B
                  ATB01R.
01A0  F076          B = B111.                                  0 + 1 TEST
01A1  F0E8        MIR = B111.
                  ******************FIRST            TIME N28 N29&N31 ARE ACTIVE.  B
                  **************FIRST          TIME AS2A AS2B C1N/ ARE ACTIVE.  B
                  **************FIRST          TIME R1M CODE 1101 IS ACTIVE.    B
                  ******************ALU          OUTPUT EQUAL ONES **************
01A2  F09D        IF ABT SKIP.
01A3  8695        CPCR = ATB01 - 1.
                  ******************FIRST            TIME - NOT ABT - IS ACTIVE.  B
01A4  019F        AMPCR = ATB01R - 1.                                           B
                  ATB01R1.
01A5  F0E6          MIR = B000.
                  ******************ALU          OUTPUT EQUAL ZEROS **************
```

```
01A6  F0B5          IF  NOT  ABT  SKIP.
01A7  8688          CPCR  =  AT01  -  1.
01A8  01A4          AMPCR  =  ATB01R1  -  1.
                  AT001.
                  * TEST  LST  LOGIC
                  ********************          FIRST  TIME  LST  HAS  BEEN  T5STED*
01A9  F0E8          MIR  =  B111.
01AA  F076          B  =  B111.                                  0  +  1  TEST.
                  ****************ALU          OUTPUT  EQUAL  ONES  *************
01AB  F0C3          IF  NOT  LST  SKIP.
01AC  81C7          CPCR  =  AT02  -  1.
01AD  01A8          AMPCR  =  AT001  -  1.
                  * ERROR  PATH  LST  TEST  FAILED
01AE  F0E8          MIR  =  B111.
                  AT001R.
01AF  F0A4          IF  IRQ  JUMP.
01B0  F000          WAIT.                        ERROR  #  L8
                  *                            FORCE  STEP
01B1  F076          B  =  B111.
01B2  F0B7          IF  NOT  AOV  SKIP.
01B3  875B          CPCR  =  CARIN  -  1.
                  ****************ALU          OUTPUT  EQUAL  ONES  *************
01B4  01A8          AMPCR  =  AT001  -  1.
01B5  F089          B  =  LIT.
01B6  E001          LIT  =  1.
01B7  F095          CTR  =  B.                TEST  DROPPING  OF  BIT.                B
01B8  F030          INC.
01B9  F0EF          MIR  =  Z.
                  ****************          MIR  EQUALS  0001  ******************
01BA  F0B8          IF  NOT  COV  SKIP.
01BB  81BE          CPCR  =  AT04  -  1.
01BC  01A8          AMPCR  =  AT001  -  1.
01BD  81D2          CPCR  =  LSTERROR  -  1.
01BE  01A8          AMPCR  =  AT001  -  1.
                  AT04.
01BF  F0A3          IF  IRQ  EXEC.
01C0  F0A4          IF  IRQ  JUMP.
01C1  F000          WAIT.                        ERROR  #  L10
                  *                            FORCE  STEP
                  * CHECK  LUADD16  LOGIC.
01C2  F0E1          MIR  =  B.
01C3  F000          WAIT.
01C4  F0E8          MIR  =  B111.
                  ****************          MIR  EQUALS  FFFF  ******************
01C5  F000          WAIT.
01C6  F09A          EXEC.
01C7  F0C9          JUMP.
                  AT02.
                  * TEST  LST  LOGIC
01C8  F0E6          MIR  =  B000.
                  ****************          ALU  OUTPUT  EQUAL  0000  *************
                  ********************          LST  -  NOT  ACTIVE-  TEST*******
01C9  F0C3          IF  NOT  LST  SKIP.
01CA  86EE          CPCR  =  AT06  -  1.
01CB  01C7          AMPCR  =  AT02  -  1.
                  AT002.
01CC  F0E8          MIR  =  B111.
01CD  F076          B  =  B111.               TEST  LST  IN  -  1  -  STATE           B
                  ****************          ALU  OUTPUT  EQUAL  FFFF  *************
01CE  F0C3          IF  NOT  LST  SKIP.
01CF  81D8          CPCR  =  AT07  -  1.
01D0  01CB          AMPCR  =  AT002  -  1.
01D1  81D2          CPCR  =  LSTERROR  -  1.
01D2  01CB          AMPCR  =  AT002  -  1.
                  LSTERROR.
01D3  F0A3          IF  IRQ  EXEC.
01D4  F0A4          IF  IRQ  JUMP.
01D5  F0E1          MIR  =  B.                DISPLAY  ADDER  OUTPUT                  B
01D6  F000          WAIT.                          ERROR  #  L9
01D7  F09A          EXEC.
01D8  F0C9          JUMP.
                  AT07.
01D9  F0E8          MIR  =  B111.
01DA  F076          B  =  B111.
                  ****************          ALU  EQUALS  FFFF  ******************
                  ********************          FIRST  TIME  MST  HAS  BEEN  ACTIVE**
01DB  F0C4          IF  NOT  MST  SKIP.
01DC  81FA          CPCR  =  AT08  -  1.
01DD  01D8          AMPCR  =  AT07  -  1.
01DE  F0A4          IF  IRQ  JUMP.
01DF  F000          WAIT.                        ERROR  #  L21
01E0  C87F          SAR  =  8  LIT  =  @7F@.
01E1  F0CA          LCTR.                                        CTR  =80
01E2  F08A          B  =  Z.                                     Z  =  8000
01E3  E000          LIT  =  0.
01E4  F07D          B  =  B  C.               SHIFT  BIT  1  TO  BIT  9  POSITION     B
01E5  F095          CTR  =  B.                CHECK  DROPPING  MS  BIT                B
01E6  F030          INC.
01E7  F0E1          MIR  =  B.
                  ****************          MIR  =  0080  ************************
                  AT070.
01E8  F0B8          IF  NOT  COV  SKIP.
01E9  81F4          CPCR  =  AT071  -  1.
01EA  81EB          CPCR  =  MSTADDERR  -  1.
01EB  01D8          AMPCR  =  AT07  -  1.
                  MSTADDERR.
01EC  F000          WAIT.                        ERROR  #  L23
01ED  F0E1          MIR  =  B.
01EE  F000          WAIT.
01EF  F0E6          MIR  =  B000.
01F0  F000          WAIT.
01F1  F0E8          MIR  =  B111.
01F2  F000          WAIT.
01F3  F09A          EXEC.
01F4  F0C9          JUMP.
                  AT071.
01F5  F0E1          MIR  =  B.
                  ***MIR  =  0100  FROM  STEP  AT07  +  10.  IF  MIR  =  0000  THEN     B
                  ***LUADD01  OR  LUADD08  COULD  HAVE  FAILED                          B
01F6  F000          WAIT.                        ERROR  #  L22
01F7  F0E8          MIR  =  B111.
                  * IF  MIR  =  FFFF  THEN  MST  -  1  MIGHT  HAVE  FAILED
01F8  F000          WAIT.
01F9  878F          CPCR  =  Y-SELTEST  -  1.
01FA  0198          AMPCR  =  AT00R  -  1.
                  AT08.
                  * TEST  MST  LOGIC
01FB  F0E6          MIR  =  B000.
01FC  F07B          B  =  B000.                                  0  +  0  TEST
                  ****************          ALU  =  B  =  0000  ******************
01FD  F0C4          IF  NOT  MST  SKIP.
01FE  86FA          CPCR  =  AT08F  -  1.
                  AT09.
                  * TEST  MST  LOGIC
                  ********************          CHECK  MST  NOT  ACTIVE  CASE*******
01FF  F0E8          MIR  =  B111.
0200  F076          B  =  B111.                                  0  +  1
                  ****************          ALU  =  B  =  FFFF  ******************
0201  F0C4          IF  NOT  MST  SKIP.
0202  8204          CPCR  =  AT10  -  1.
0203  81F4          CPCR  =  AT071  -  1.
0204  01FE          AMPCR  =  AT09  -  1.
                  AT10.
                  * TEST  AOV  LOGIC
0205  F0E6          MIR  =  B000.
0206  F07B          B  =  B000.                                  0  +  0
                  ****************          ALU  =  B  =  0000  ******************
0207  F0B7          IF  NOT  AOV  SKIP.
0208  824A          CPCR  =  AT10F  -  1.
                  ********************          FIRST  TIME  AOV  NOT  ACTIVE  ****
0209  0204          AMPCR  =  AT10  -  1.
                  *
```

```
          AT11.
020A  F0CA      LCTR.
      ********************             FIRST  TIME  FOR  N48  BEING  ACTIVE*
020B  E000      LIT  =  0.                            CTR  SET   TO  FF
      *                                               Z  +  1
020C  F0F0     MIR  =  0  +  Z  +  1.   CAUSE  OVERFLOW  TO  OCCUR            B
      ********************             FIRST  TIME  FOR  Z  -YSEL-   &  X  +Y
      ************FIRST         TIME  N21  N22  N24  N26&N30  ARE  ACTIVE.    B
020D  E0FF      LIT  =  @FF@.                         Z  =  FFFF
020E  F0B7     IF  NOT  AOV  SKIP.
020F  8253     CPCR  =  AT12  -  1.
      *****************            MIR  =  0000  ***********************
      ********************             FIRST  TIME  FOR  AOV  BEING  ACTIV
      *    ERROR  PATH
0210  0209     AMPCR  =   AT11  -  1.
0211  F0A4     IF  IRQ  JUMP.
0212  F000     WAIT.                          ERROR  #  L26
0213  F08A      B  =  Z.                                Z  =  FFFF
0214  F0B5     IF  NOT  ABT  SKIP.
0215  8228     CPCR  =  ATF11   -  1.
      *****************            B  =  FFFF  *************************
0216  F1DB      MIR  =  0  +  Z.
0217  F0B5     IF  NOT  ABT  SKIP.
0218  821A     CPCR  =  ATF111   -  1.
      *****************            MIR  =  FFFF  ***********************
0219  F000     WAIT.
021A  F0C9     JUMP.
          ATF111.
021B  F000     WAIT.                          ERROR  #  L30
021C  F05A     A3  =  Z.
021D  F04C     A3  =  A3  +  1.
      *****************            MIR  =  0000  ***********************
      *  MIR  =  FFFF   + 0001    NOTE  THAT  CARIN  =  0.
021E  F0B7     IF  NOT  AOV  SKIP.
021F  8222     CPCR  =  ATF112   -  1.
0220  0209      AMPCR  =  AT11  -  1.
0221  870A     CPCR   =  X-SELTEST    -  1.
0222  0209      AMPCR  =  AT11  -  1.
          ATF112.                                         OAD  TYPE  FAILURE
0223  F0DE     MIR  =  A3.
      *****************            MIR  =  0000  ***********************
0224  F000     WAIT.                          ERROR  #  L29
0225  F0E8     MIR   =  B111.
      *****************            MIR  =  FFFF  ***********************
0226  F000     WAIT.
0227  F09A      EXEC.
0228  F0C9      JUMP.                                     0  +  D
          ATF11.
0229  F05A     A3  =  Z.
022A  F04C     A3  =  A3  +  1.
      *****************            MIR  =  0000  ***********************
022B  F0B7     IF  NOT  AOV  SKIP.
022C  875B     CPCR  =  CARIN  -  1.
022D  0209      AMPCR  =  AT11  -  1.
022E  F05A     A3  =  Z.
022F  F04C     A3  =  A3  +  1.
      *****************            MIR  =  0000  ***********************
0230  F0C3     IF  NOT  LST  SKIP.
0231  8764     CPCR  =    OR-INH8    -  1.
0232  0209     AMPCR  =  AT11  -  1.
0233  F076      B  =  B111.
0234  F0CA      LCTR.                                     0  +  1
0235  E0FF      LIT   =  @FF@.
0236  F05A      A3  =  Z.
0237  E001     LIT   =  1.            00001   +  11  -  11  =  00  -  00       B
0238  F06E      B  =  A3  +  B.
0239  F0E1     MIR  =  B.
023A  F0FE     Z  EQV  B.
023B  E000     LIT   =  0.
023C  F0B5     IF  NOT  ABT  SKIP.
```

```
023D  824A     CPCR   =  AT10F   -  1.
023E  0209     AMPCR  =  AT11  -  1.
023F  F076      B  =  B111.
0240  F06E      B  =  A3  +  B.
      *  A3  =  0001     B  =  0001    +  FFFF  (OP  CODE  0000)
0241  F0C4     IF  NOT  MST  SKIP.
0242  8222     CPCR  =  ATF112   -  1.
0243  0209      AMPCR  =  AT11  -  1.
      **B=0000=MIR.(SEE       7  STEPS  BACK  (B=A3+B)   WHERE  A3  =  0001    B
0244  F0E1      MIR  =  B.
0245  F000     WAIT.                          ERROR  #  L28
0246  F06E      B  =  A3  +  B.
0247  F0E1     MIR  =  B.
0248  F000     WAIT.
0249  F09A      EXEC.
024A  F0C9      JUMP.
       AT10F.
024B  F0A3     IF  IRQ  EXEC.
024C  F0A4      IF  IRQ  JUMP.
024D  F000     WAIT.                          ERROR  #  L25
024E  F0DA      MIR  =  AMPCR.                              AOV  FAILURE
024F  F000     WAIT.
0250  F0E1      MIR  =  B.
0251  F000     WAIT.
0252  F09A      EXEC.
0253  F0C9      JUMP.
       AT12.
      *  TEST  OVERFLOW  ELEMENTS  WITH  OPERATION    0  RIM  0
0254  F0E8     MIR   =  B111.
0255  F076      B  =  B111.                                0  +  1
      *****************            B  =  FFFF  *************************
      ********************             TEST  AOV  NOT  ACTIVE*************
0256  F0B7     IF  NOT  AOV  SKIP.
0257  824A     CPCR  =  AT10F   -  1.
0258  0253      AMPCR  =  AT12  -  1.
       AT13.
      *  CHECK  DROPPING  BIT  ON  Z  BUS  TO  ALU
0259  F0CA      LCTR.                                      CTR  =  FF
025A  E000      LIT   =  0.                                 Z  =  FFFF
      **************FIRST         TIME  Z  INPUT  TO  X-SEL  &  N1M  ACTIVE     B
      **************A3         NOT  CHECKED  AT  THIS  TIME*************        B
025B  F05A     A3  =  Z.  1  +  0  CHECK  DROPPING  BITS  FROM  Z  TO  ADDER   B
025C  E0FF     LIT   =  @FF@.                           IN  X-SELECT           B
      *********FIRST       TIME  NQE1  NQE3  ACTL1  &  ACTL2  ARE  ACTIVE      B
025D  F09D     IF  ABT  SKIP.
025E  870A     CPCR  =  X-SELTEST   -  1.
      *****************            A3  =  FFFF  *************************
      *  ERROR  (  DROPPED  BIT(S)    GO  TO  X-SEL   TEST
025F  0258      AMPCR  =  AT13  -  1.
0260  F1DB      MIR  =  0  +  Z.
      *****************            MIR  =  FFFF  ***********************
      ********************             MIR  IS  NOT  CHECKED  AT  THIS  TIME
0261  F0B7     IF  NOT  AOV  SKIP.
0262  824A     CPCR  =  AT10F   -   1.
0263  0258      AMPCR  =  AT13  -  1.
       AT14.
      *  CHECK  N28-N31    DECODING  &  CARDIN  LOGIC
0264  F0F0      MIR  =  0  +  Z  +  1.
0265  E0FE      LIT   =  @FE@.                              Z  =  FFFE
0266  F09D     IF  ABT  SKIP.
0267  8771     CPCR  =  ADDERTEST  -  1.
      *****************            MIR  =  FFFF  ***********************
0268  0263      AMPCR  =  AT14  -  1.
0269  F0F0      MIR  =  0  +  Z  +  1.
026A  E0FF      LIT   =  @FF@.
026B  F09E     IF  AOV  SKIP.
026C  8771     CPCR  =  ADDERTEST  -  1.
      *****************            MIR  =  0000  ************************
026D  0263      AMPCR  =  AT14  -  1.
```

```
          AT15.
026E   F1DA         MIR  =  0  OAD  Z.                         (X   +(X   V  Y)Q5
026F   F09D        IF  ABT  SKIP.
0270   8771        CPCR  =  ADDERTEST  -  1.
*****************              MIR  =  FFFF   *************************
0271   026D         AMPCR  =  AT15  -  1.
0272   F1DA         MIR  =  0  OAD  Z.
0273   F0B7        IF  NOT  AOV  SKIP.
0274   8771        CPCR  =  ADDERTEST  -  1.
*****************              MIR  =  FFFF   *************************
0275   026D         AMPCR  =  AT15  -  1.
0276   F1D9         MIR  =  0  OAD  B000.                      (0   +  (0   V  0))
0277   F0C4        IF  NOT  MST  SKIP.
0278   82A3        CPCR  =  ADDERTEST1  -  1.
0279   026D         AMPCR  =   AT15  -  1.
027A   F1D9        MIR   =  0   OAD  B000.
*****************              MIR  =  0000   *************************
027B   F0C3        IF  NOT  LST  SKIP.
027C   82A3        CPCR  =  ADDERTEST1   -  1.
027D   026D         AMPCR  =  AT15   -  1.
          AT16.
*********FIRST         TIME  FOR  AAD  -  CODE  1010   -  X+(X&Y)                         B
027E   F1D8        MIR  =  0  AAD  Z.                                                       B
027F   F0C4        IF  NOT  MST  SKIP.
0280   82A3        CPCR  =  ADDERTEST1   -  1.
*****************              MIR  =  0000   *************************
0281   027D         AMPCR  =   AT16  -  1.
0282   F1D8         MIR  =  0  AAD  Z.
0283   F0C3        IF  NOT  LST  SKIP.
*****************              MIR  =  0000   *************************
0284   82A3        CPCR  =  ADDERTEST1   -  1.
0285   027D         AMPCR  =   AT16  -  1.
          AT17.
0286   F0CA        LCTR.
0287   E000        LIT    =  0.
0288   F1DD         MIR  =  0  -  Z  -  1.                      X  +  Y  PRIME
0289   E0FF         LIT    =  @FF@.
*********FIRST         TIME  FOR  X-Y-1   -  CODE  1101                                     B
028A   F0C4        IF  NOT  MST  SKIP.
028B   82A3        CPCR  =  ADDERTEST1   -  1.
*****************              MIR  =  0000   *************************
028C   0285         AMPCR  =   AT17  -  1.
          AT18.
028D   F0CA         LCTR.                                       LIT   =  FF
028E   E0FF        LIT   =  @FF@.
028F   F1DD         MIR  =  0  -  Z  -  1.                      Z  =  0000
0290   E000        LIT   =  0.               0  +  0  PRIME  (0   +  1)                       B
0291   F09D        IF  ABT  SKIP.
0292   82A3        CPCR  =  ADDERTEST1   -  1.
*****************              MIR  =  FFFF   *************************
0293   028C         AMPCR  =   AT18  -  1.
          AT19.
0294   F1DC         MIR  =  0  -  Z.                            X  +  Y  PRIME  +  1
*********FIRST         TIME  FOR  X  -  Y  CODE  1111                                       B
*********FIRST         TIME  AS1A&AS1B   ARE  ACTIVE                                        B
0295   F09E        IF  AOV  SKIP.
*****************              MIR  =  0000   *************************
0296   82A3        CPCR  =  ADDERTEST1   -  1.
0297   0293         AMPCR  =   AT19  -  1.
          AT20.
0298   F0CA         LCTR.                                       LIT   =  0
0299   E000        LIT    =  0.
029A   F1DC         MIR  =  0  -  Z.                              Z  =  FFFF
029B   E0FF         LIT   =  @FF@.                              X  +  Y  PRIME  +  1
029C   F0C4        IF  NOT  MST  SKIP.
029D   82A3        CPCR  =  ADDERTEST1   -  1.
*****************              MIR  =  0001   *************************
029E   0297         AMPCR  =   AT20  -  1.
029F   F1DC         MIR  =  0  -  Z.
02A0   F0C3        IF  NOT  LST  SKIP.
02A1   82A7        CPCR  =  AT21  -  1.
*****************              MIR  =  0001   *************************
```

```
02A2   82A3        CPCR  =  ADDERTEST1   -  1.
02A3   0297          AMPCR  =  AT20  -  1.
       ADDERTEST1.
02A4   F0A3        IF  IRQ  EXEC.
02A5   F0A4        IF  IRQ  JUMP.
02A6   F000        WAIT.                          ERROR  #  L31
02A7   4771        MPCR  =  ADDERTEST  -  1.
       AT21.
02A8   F0AE        IF  LC3  SET  LC3,   SKIP.
02A9   F000        WAIT.
*********        FORCE  STEP.
       AT800.
02AA   8875        CPCR    =  FLAG-RESET   -  1.
******************************LC1               =  LC2   =  GC1   =  GC2  =  0          B
02AB   F0CA          LCTR.
02AC   E000          LIT   =  0.                            SET    CTR   =  FF
02AD   F17A          CTR   =  CTR  +  LIT   +  1.
02AE   E0FF          LIT   =  @FF@.
*********FIRST        TIME  N18  N19&N46   ARE  ACTIVE.   TEST   3                       B
***********CHECKED         Z  INPUT   TO  ALU.   THIS  CONCERSN                          B
***********TESTING          N17  TO  N26  DECODING  FOR  LIT  AND                         B
***********COUNTER          INPUTS   TO  ALU  VIA   X&Y-SEL.                              B
*        CTR  *    1111111100000000         *   X-SEL   INPUT
*        LIT  *    0000000011111111         *   Y-SEL   INPUT
*         +1  *                        1    *   ENABLE  CARIN
*        **************************
**SUM*10000000000000000*            AOV  SET   GATE  0  TO  CTR(CTR   =FF)             B
02AF   F0B7        IF  NOT  AOV  SKIP.
02B0   42B2        MPCR  =  AT8001    -  1.
02B1   F018          SET  LC1.                                TO  ADDER.
02B2   42C0        MPCR    =  AT900   -  1.
       AT8001.
02B3   F030        INC.          CTR  =  FF  +  1  =  0  +  COV                              B
02B4   F02E          IF  COV  SKIP.
02B5   F019          SET  LC2.
       AT8002.
*  LIT   =  FF  AND  CTR  =  0
02B6   F17A        CTR  =  CTR   +  LIT  +  1.
*  0000    +  00FF   +  1  =  0100,    CAUSING  CTR  TO  BE  SET  TO  FF.
02B7   F17C        CTR  =  LIT   +  CTR.    CTR  =FF  Z=FFFF                                 B
********************          N23  ACTIVE**********************
*  THE  OPERATION   CAUSES  THE  FOLLOWING  TO  OCCURR
*        LIT          0000000011111111          X-SELECT
*        CTR          1111111100000000          Y-SELECT
*        ***************************
*        SUM          1111111111111111                   SET  CTR  =  0
02B8   F09D        IF  ABT  SKIP.       CHECK  IF  WE  DROPPED  A  BIT                       B
02B9   F018          SET  LC1.                                 IF  YES  SET  LC1
02BA   F1DC          MIR  =  0  -  Z.                          (X   +Y  PRIME   +1)
02BB   E000          LIT   =  0.
****************              MIR  =  0000    *************************
02BC   F09E          IF  AOV  SKIP.                             Z  =  0
02BD   F018          SET  LC1.
02BE   F030          INC.
02BF   F0B8          IF  NOT  COV  SKIP.
02C0   F019          SET  LC2.
       AT900.
02C1   F0CE          LMAR.
*******        NQE1  &  NQE3    ACTIVE   DIFFERENT   SET  OF  GATES****
02C2   E000          LIT   =  0.                              0  TO  MAR.
02C3   F0CA          LCTR.
02C4   E0FE          LIT   =  @FE@.                         1  TO  CTR
02C5   F0E9          MIR   =  BMAR.
02C6   F0B2        IF  LST  SKIP.       TEST  LSB  BIT  OF  MAR=0                            B
02C7   F0F7          SKIP.                                     YES
02C8   42D2        MPCR   =  AT900G2    -  1.
02C9   F0F5          SAVE.
02CA   F030          INC.                                      STEP  MAR  TO  FF
********************         N43   N45.N46     ARE  ACTIVE*********
02CB   F0D7          MAR1  =  BMAR  +  1.
```

```
02CC  F0E9          MIR  =  BMAR.
02CD  F02E           IF  COV  SKIP.
02CE  48BD          MPCR  =  DOJMP  -  1.
02CF  F0E9          MIR  =  BMAR.
02D0  F0B2           IF  LST  SKIP.
02D1  F006           SET  GC1.
02D2  42D5          MPCR  =  AT900G1A  -  1.
                 AT900G2.
02D3  F006           SET  GC1.                                  MAR PATH FAILED
02D4  F0CE           LMAR.
02D5  E0FF           LIT  =  @FF@.
                 AT900G1A.
02D6  F0E9          MIR  =  BMAR.
02D7  F179          CTR  =  BMAR  +  1.      BMAR +1  =0     CTR  =  FF                B
02D8  F030           INC.
02D9  F02E          IF  COV  SKIP.
02DA  8866          CPCR  =  AT900E  -  1.
02DB  02A9           AMPCR  =  AT800  -  1.
02DC  F0BF          IF  NOT  LC1  SKIP.
02DD  8866          CPCR  =  AT900E  -  1.
02DE  02A9           AMPCR  =  AT800  -  1.
02DF  F0C0          IF  NOT  LC2  SKIP.
02E0  886B          CPCR  =  AT900E4  -  1.
02E1  02A9           AMPCR  =  AT800  -  1.
02E2  F0BB          IF  NOT  GC1  SKIP.
02E3  8630          CPCR  =  AGC1TEST  -  1.
02E4  02A9           AMPCR  =  AT800  -  1.
                 AT1100.
02E5  8875          CPCR  =  FLAG-RESET  -  1.
02E6  F0CA           LCTR.
02E7  E0FF           LIT  =  @FF@.
02E8  F05A           A3  =  Z.
                 **********                  N34  N35  &  N36  ACTIVE**********
02E9  E000           LIT  =  0.
02EA  F115          A1  =  Z.
02EB  F128          A2  =  Z.
                 A3-TST-0.
02EC  F03D           A3  EQV  B000.
                 **********                  EQV  ACTIVE  CODE  1001**********
                 **********                 TEST  A3  FOR  ZEROS**********
02ED  F09D           IF  ABT  SKIP.
02EE  8846          CPCR  =  AT1100F  -  1.
                 **********           A3  =  0  ******************************
                 *  A1=A2=A3>.
02EF  02E4           AMPCR  =  AT1100  -  1.
                 A2-TST-0.
02F0  F124           A2  EQV  Z.
                 **********                       TEST  A2  FOR  ZEROS**********
02F1  F09D           IF  ABT  SKIP.
02F2  8846          CPCR  =  AT1100F  -  1.
                 **********           A1  =  A2  =  A3  =  0  ********************
02F3  02E4           AMPCR  =  AT1100  -  1.
                 A1-TST-0.
                 **********                  TEST  A1  FOR  ZEROS  **************
02F4  F112           A1  EQV  Z.
02F5  F09D           IF  ABT  SKIP.
02F6  8846          CPCR  =  AT1100F  -  1.
                 **********           A1  =  A2  =  A3  =  0  ********************
02F7  02E4           AMPCR  =  AT1100  -  1.
02F8  F0CA           LCTR.
02F9  E000           LIT  =  0.
02FA  F05A           A3  =  Z.
02FB  E0FF           LIT  =  @FF@.
02FC  F115          A1  =  Z.
02FD  F128          A2  =  Z.
                 A3-TST-F.
                 **********                  TEST  A3  FOR  ONES  **************
02FE  F03F           A3  EQV  Z.
02FF  F09D           IF  ABT  SKIP.
0300  8846          CPCR  =  AT1100F  -  1.
                 **********  ---      A1  =  A2  =  A3  =  FFFF  ****************
0301  02E4           AMPCR  =  AT1100  -  1.
                 A2-TST-F.
                 **********                       TEST  A2  FOR  ONES**************
0302  F124           A2  EQV  Z.
0303  F09D           IF  ABT  SKIP.
0304  8846          CPCR  =  AT1100F  -  1.
                 *  A1=A2=A3=FFFF
                 A1-TST-F.
0305  02E4           AMPCR  =  AT1100  -  1.
                 **********                       TEST  A1  FOR  ONES**************
0306  F112           A1  EQV  Z.
0307  F09D           IF  ABT  SKIP.
0308  8846          CPCR  =  AT1100F  -  1.
                 **********           A1  =  A2  =  A3  =  FFFF  ****************
0309  02E4           AMPCR  =  AT1100  -  1.
                 *  CHECK  ADDRESSING     A1  A2  A3
030A  F0CA           LCTR.
030B  E0FF           LIT  =  @FF@.
030C  F115          A1  =  Z.
030D  E001           LIT  =  1.
030E  F128          A2  =  Z.
030F  E002           LIT  =  2.
0310  F058           A3  =  LIT.
0311  E003           LIT  =  3.
0312  F03F           A3  EQV  Z.
0313  F09D           IF  ABT  SKIP.
0314  8846          CPCR  =  AT1100F  -  1.
0315  02E4           AMPCR  =  AT1100  -  1.
0316  F112           A1  EQV  Z.
0317  E001           LIT  =  1.
0318  F09D           IF  ABT  SKIP.
0319  8846          CPCR  =  AT1100F  -  1.
                 **********           A1  =  A3  =  1    A2  =  2  ****************
031A  02E4           AMPCR  =  AT1100  -  1.
031B  F043           A3  =  A2.
031C  F124           A2  EQV  Z.
031D  E002           LIT  =  2.
031E  F09D           IF  ABT  SKIP.
031F  8846          CPCR  =  AT1100F  -  1.
                 **********           A2  =  A3  =  2    A1  =  1  ****************
0320  02E4           AMPCR  =  AT1100  -  1.
0321  F02A          A2  =  A2  +  1.
0322  F03F           A3  EQV  Z.
0323  E002           LIT  =  2.
0324  F09D           IF  ABT  SKIP.
0325  8846          CPCR  =  AT1100F  -  1.
                 **********           A2  =  3  A3  =  2  A1  =  1  ****************
0326  F042           A3  =  A1.
0327  F03F           A3  EQV  Z.
0328  E001           LIT  =  1.
0329  F09D           IF  ABT  SKIP.
032A  8846          CPCR  =  AT1100F  -  1.
                 **********           A3  =  A1  =  1    A2  =  3  ****************
032B  02E4           AMPCR  =  AT1100  -  1.
032C  F012          A1  =  A1  +  1.
032D  F03F           A3  EQV  Z.
032E  F09D           IF  ABT  SKIP.
032F  8846          CPCR  =  AT1100F  -  1.
                 **********           A3  =  1    A2  =  3    A1  =  2    ************
0330  02E4           AMPCR  =  AT1100  -  1.
0331  F043           A3  =  A2.
0332  F03F           A3  EQV  Z.
0333  E003           LIT  =  3.
0334  F09D           IF  ABT  SKIP.
0335  8846          CPCR  =  AT1100F  -  1.
                 **********           A3  =  A2  =  3    A1  =  2  ****************
0336  02E4           AMPCR  =     AT1100  -  1.
```

```
                EQVTST.
               **THIS   TEST   CHECKS   THAT  EQV  FUNCTION   WORKS  CORRECTILY
0337    F0CA          LCTR.
0338    E0FF          LIT   =  @FF@.
0339    F054          A3   =  B000.
033A    F03F          A3   EQV     Z.
033B    E001          LIT    =  1.
033C    F09D          IF   ABT   SKIP.
033D    8346          CPCR    =  EQVTST1    -   1.
               ********************          TEST      EQV  FOR  VALUES   NOT  EQUAL*
               *********************A3                UNEQUAL  TO  Z***************          B
               *                             A3   =  0     Z  =  0001
               *  SINCE     A3  NOTEQUAL  TO  Z  WE  SHOULD  SKIP   OVER  CALL.
033E    0336          AMPCR  =  EQVTST   -  1.
033F    F0A4    *     IF   IRQ   JUMP.
0340    F08A          B   =  Z.
0341    F0E1          MIR   =  B.
               ****************             MIR   =  FFFE   **********************
0342    F000          WAIT.                              ERROR  #  L41
0343    F0DE          MIR   =  A3.
0344    F000          WAIT.
0345    85BE          CPCR    =  BSWEXR  -   1.
0346    F000          WAIT.                              ERROR  #  L42
                EQVTST1.
0347    F05A          A3   =  Z.
               ********************                TEST   EQV   VALUES   EQUAL*********
0348    F03F          A3  EQV   Z.
               ****************             A3   =  Z  =  0001     ********************
0349    F09D          IF   ABT   SKIP.
034A    F0F7          SKIP.
034B    8354          CPCR     =  EQVTST2    -   1.
034C    0336          AMPCR  =  EQVTST   -  1.
034D    F0A4          IF   IRQ   JUMP.
034E    F08A          B   =  Z.
034F    F0E1          MIR   =  B.
               ****************             MIR   =  FFFF   **********************
0350    F000          WAIT.                              ERROR  #  L43
0351    F0DE          MIR   =  A3.
0352    F000          WAIT.
0353    85BE          CPCR     =      BSWEXR  -   1.
0354    F000          WAIT.                              ERROR  #  L44
                EQVTST2.
                AT1800.
               *  CHECK  ALU  TO  BSW    TO  B-REG    TO  ALU
               *  CHECK  ALU  TO  B-SEL    TO  B-REG    TO  ALU
               ********************N37              N39   N40   ACTIVE**************
0355    F07B            B   =  B000.
0356    F054            A3   =  B000.
0357    F03C            A3   EQV  B.
               ********************             ALU  TO  BSW  TO  B-REG     -ZEROS-****
0358    F09D            IF  ABT  SKIP.
0359    87C1          CPCR   =  AT1800F     -   1.
               ****************             B   =  0000      *************************
035A    F076            B   =  B111.
035B    F054            A3   =  B000.
035C    F04F            A3   =  A3  -   LIT.
035D    E000            LIT    =  0.
035E    F05F            B.
               ********************             ALU  TO  BSW  TO  B-REG    -ONES-******
035F    F09D            IF   ABT   SKIP.
0360    87C1          CPCR    =  AT1800F     -   1.
               ****************             B   =  FFFF      *************************
                AT1801.
0361    F07B            B   =  B000.
0362    F054            A3   =  B000.
0363    F03C            A3   EQV   B.
0364    F09D            IF   ABT   SKIP.
               ****************             A3     =     B   =   0000******************
0365    87C1          CPCR   =  AT1800F     -   1.
```

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                AT2000.
               *EXRCISE    BSW  &  CNTRLS   FOR  ERR  DETECTION    AND  NOT  ISOLATN       B
0366    F076            B   =  B111.
0367    F051            A3   =  B.
               *  IF  WE  PICK   UP  DATA  ON  THE  ABOVE  TEST
               *  THEN  JUMP   TO  THE   BSW  TEST.
0368    F03C            A3   EQV   B.        L40#1;BSW=FFFF;F=X+Y;X=0000;Y=FFFF             B
0369    F09D            IF   ABT   SKIP.     L40#2;BSW=FFFF;F=X         EQV  Y;X,Y     =FFFF B
036A    8853            CPCR    =  AT2000F     -   1.
036B    85BE            CPCR    =  BSWEXR   -   1.
               ****************             B   =  FFFF   ***************************      *
               *IF   WE  DROP  BITS   ON  THE  ABOVE   TEST    JU  P  TO  BSW  TEST        B
                BADTST.
               *THIS   TESTS    TRANSFER   OF  ZEROS   &  ONES   FROM  ALU   TO  BREG      B
036C    F07B            B   =  B000.
036D    F054            A3   =  B000.
               ********************                 BAD  ACTIVE*******************
               ********************                 XOR  ACTIVE      CODE  0110    ********
               ********************                 ALU  TO  B-REG      ZEROS      *********
036E    F166            BAD  A3   =     A3   +  B.
036F    F054            A3     =  B000.
               *  WE  ARE  ONLY  INTERESTED     IN  BAD  PATH  AT  THIS   POINT.
0370    F03C            A3  EQV  B.
0371    F09D            IF   ABT  SKIP.
0372    87CD            CPCR    =  AT1800F2      -   1.
               ****************             B   =  0000      ************************
0373    F076            B   =  B111.
0374    F017            A1    =  B.
0375    F054            A3   =  B000.
               ********************                  ALU  TO  B-REG     -ONES-     ********
0376    F166            BAD  A3   =     A3   +  B.
0377    F042            A3   =  A1.
0378    F05F            B.
0379    F09D            IF   ABT   SKIP.
037A    87CD            CPCR    =  AT1800F2      -   1.
               ****************             B   =  FFFF      ************************
                AT1900.       MIR   TEST
037B    F054            A3   =  B000.
037C    F0E6            MIR     =  0.
               ********************                N41    ACTIVE   ******************
               ********************                TEST   MIR  FOR  ZEROS*************
               ********************                 N38   ACTIVE     *****     ***********
037D    F08D            BMI.                       BSW  =  0000;NB41      =1              B
037E    F03C            A3  EQV   B.               NB28-31=1001;NB37-40=1101              B
037F    F09D            IF   ABT   SKIP.           X=0000;Y=0000;ABT=1                    B
               ****************             MIR   =  0000    **********************
0380    8820            CPCR   =  AT1900F     -   1.
0381    037A             AMPCR   =  AT1900     -   1.
0382    F0CA            LCTR.
0383    E000            LIT     =     0.
0384    F05A            A3     =     Z.
               ********************                TEST    MIR   FOR   ONES   *   ***********
0385    E0FF            LIT     =  @FF@.
               *WE  WISH   TOTRANSFER    FFFF   FROM  A3   TO  MIR  TO  B  &  CHCK  B     B
0386    F0E8            MIR     =  B111.
               ****************             MIR   =   FFFF    **********************
0387    F08D             BMI.
0388    F05F             B.
0389    F09D             IF   ABT  SKIP.
038A    8820            CPCR   =  AT1900F     -   1.
038B    037A             AMPCR   =     AT1900     -   1.
                BC4-TST.
               *  BC4   TEST   BEGINS    HERE
038C    F058             A3   =  LIT.
038D    E001             LIT    =  1.
038E    F076             B   =  B111.
               ********************                N32    ACTIVE*******************
038F    F032             A2   =  A3.
0390    F129            BC4   A2   =  A3   +  B.
               ********************                TEST   BC4   ZEROS   CASE************
```

```
0391   F0DD       MIR  =  A2.   FOR  DISPLAY   SGL  STP   OP(MIR   =  A2  +  B  C.)
         *****************              MIR  =  0000    ************************
0392   F054       A3    =  B000.                              EXPECTED    VALUE.
0393   F032       A2    =  A3.
0394   F0CB       LIT   EQV   B.                              B  =  0.
0395   E000       LIT    =  0.
0396   F09D       IF   ABT   SKIP.
         *****************              B  =  0000   *************************
0397   8817     CPCR    =  AT2100F     -  1.
0398   038B       AMPCR  =  BC4-TST     -  1.
         *********************              TEST   BC4   ONES   CASE**************
0399   F168     BC4.                                                                  B
039A   F0CA       LCTR.
039B   E0CC       LIT    =  @CC@.
039C   F05A       A3   =  Z.
039D   E033       LIT    =  @33@.
039E   F032       A2   =  A3.                                 EXPECTED    VALUE.
039F   F0FE       Z  EQV   B.
03A0   F09D       IF   ABT   SKIP.
         *****************              B  =  3333   *************************
03A1   8817     CPCR    =  AT2100F     -  1.
03A2   038B       AMPCR  =  BC4-TST     -  1.
03A3   F058       A3   =  LIT.
03A4   E001       LIT    =  1.
03A5   F076       B   =  B111.
03A6   F032       A2   =  A3.
         *********************              BC4  CLEARING    B-REG*************
03A7   F129     BC4  A2   =  A3   +  B.
03A8   F0DD       MIR  =  A2.   FOR  DISPLAY   SGL  STP   OP  (MIR   =  A2   +  B  C.
         *****************              MIR  =  0000    ************************
03A9   F054       A3    =  B000.
03AA   F032       A2  =    A3.                                EXPECTED    VALUE
03AB   F0CB       LIT   EQV   B.
03AC   E000       LIT    =  0.
03AD   F09D       IF   ABT   SKIP.
03AE   8817     CPCR    =  AT2100F     -  1.
03AF   038B     AMPCR  =  BC4-TST     -  1.
       DC8-TST.
03B0   F07B       B   =  B000.
03B1   F16B       BC8.
         *********************              BC8   ONES   CASE*******************
         *  BC8     TEST   BEGINS    HERE
03B2   F0CA       LCTR.
03B3   E0CF       LIT    =  @CF@.
03B4   F05A       A3   =  Z.
03B5   E030       LIT    =  @30@.
03B6   F032       A2   =  A3.
         *****************           A3   =  3030    EXPECTED    VALUE************
03B7   F0FE       Z  EQV  B.
03B8   F09D       IF   ABT   SKIP.
03B9   8817     CPCR    =  AT2100F     -  1.
03BA   03AF     AMPCR  =  DC8-TST     -  1.
03BB   F076       B   =  B111.
03BC   F16B       BC8.
         *********************              BC8   RESETTING    B-REG*************
03BD   F0FE       Z   EQV   B.                                Z  =  3030.
03BE   F09D       IF   ABT     SKIP.
03BF   8817     CPCR    =  AT2100F     -  1.
         *****************              B  =  3030   *************************
03C0   03AF       AMPCR  =  DC8-TST     -  1.
       AMPCR-BZEROS.
       AMPCR-TST.
         *  CHECK  AMPCR  TO  ADDER  PASSING    ZEROS
03C1   F0DA         MIR  =  AMPCR.
03C2   0000         AMPCR  =  0.
         *****************              MIR  =  0000    ************************
         *********************              TEST   AMPCR   TO   ALU   FOR   ZEROS   CASE
03C3   F08D         BMI.
03C4   F054         A3   =  B000.
03C5   F03C         A3   EQV   B.
03C6   F09D     IF   ABT   SKIP.
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03C7   8857       CPCR   =  AMPCR-TST-F3     -  1.
03C8   03C0         AMPCR  =  AMPCR-TST     -  1.
       AMPCR-BONES.
         *  CHECK  PASSING    ONES  FROM  AMPCR  TO  ALU
03C9   F0DA         MIR  =  AMPCR.
03CA   3FFF       AMPCR   =  @3FFF@.
         *****************              MIR  =  1FFF   *************************
         *********************              TEST   AMPCR   TO   ALU   FOR   ONES   CASE*
03CB   F08D         BMI.
03CC   F0CA         LCTR.
03CD   E0C0       LIT    =  @C0@.
03CE   F05A       A3     =    Z.
03CF   E0FF         LIT    =  @FF@.
03D0   F0FE         Z  EQV   B.
03D1   F09D         IF   ABT   SKIP.
03D2   8857       CPCR   =  AMPCR-TST-F3     -  1.
03D3   03C0         AMPCR  =  AMPCR-TST    -  1.
       B-REG-AMPCR1S.
         *  CHECK  B-REG   TO  AMPCR  PASSING    ONES
03D4   F076         B  =  B111.
03D5   F05B         AMPCR  =  B.
         **************N42          ACTIVE   -  BSW  TO  AMPCR  (FFFF)                 B
03D6   F07B         B  =  B000.
03D7   F0DA         MIR   =  AMPCR.
         *****************              MIR   =  1FFFF   **********************
03D8   F08D         BMI.
03D9   F05A         A3   =  Z.
03DA   F0FE         Z  EQV  B.
03DB   F09D         IF   ABT   SKIP.
03DC   8857       CPCR   =  AMPCR-TST-F3     -  1.
03DD   03C0         AMPCR  =  AMPCR-TST    -  1.
       B-REG-AMPCR0S.
         *  CHECK    B-REG    TO  AMPCR  PASSING    ZEROS
03DE   F054         A3  =  B000.
03DF   F07B         B  =  B000.
03E0   F05B         AMPCR  =  B.
         *************_*******                  BSW   TO    AMPCR    ZEROS   CASE
03E1   F0DA         MIR   =  AMPCR.
03E2   F076         B  =  B111.
         *****************              MIR   =  0000
03E3   F08D         BMI.
03E4   F03C         A3  EQV  B.
03E5   F09D         IF   ABT   SKIP.
03E6   8857       CPCR   =  AMPCR-TST-F3     -  1.
03E7   03C0         AMPCR  =    AMPCR-TST    -  1.
       BR1-TST.
03E8   F076         B  =  B111.
         *********************              N43   ACTIVE    *********************
         *********************TEST                 PASSING    ONES   TO   MAR1********
03E9   F0D5         MAR1  =  B.
03EA   F07B         B   =  B000.
03EB   F033       A2  =  B.
         *********************              N44    ACTIVE*********************
         *********************              PASSING    ZEROS     TO   BR2***********
03EC   F16E       BR2   =  B.       NOTE  THAT  ONLY  BR2   IS   RESET                  B
03ED   F05E       ASR.              PLACE  BR1   &  MAR  ON  OS  LINES                  B
         *********************              N51     ACTIVE*******************
03EE   F076       B  =  B111.       B  EQUALS  EXPECTED    VALUE                        B
03EF   F035       A2   =  BMAR.     OS  SHOULD   EQUAL   FFFF.                          B
         *  A2   =  FFFF   =  B     MAR1  TEST   FOR  ONES
03F0   F09D         IF   ABT   SKIP.
03F1   8817       CPCR   =  AT2100F     -  1.
         *BR1   &  BR2  TEST   ERROR  PATH  SHALL   RETURN   TO  NEXT  STEP.            B
         *THE   OPERATOR   MUST  KEEP   A  HISTORY   OF  FAILURES    IN   ORDER.         B
         *TO   ISOLATE    TO  THE  APPROPRIATE     CHIPS.                               B
03F2   03E7         AMPCR   =    BR1-TST    -  1.
03F3   F0CE         LMAR.
03F4   E000         LIT    =  0.
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03F5   F07B          B  =  B000.
03F6   F05D        ASE.                PLACE  BR2  ON  OS  LINES                      B
            *********************              N54  ACTIVE***********************
03F7   F035          A2  =  BMAR.                               RETURN  0000   TO  A2
03F8   F043          A3  =  A2.
03F9   F03C          A3  EQV  B.
            ********************A2                 =  A3    =ZEROS*****************
03FA   F09D          IF  ABT  SKIP.
03FB   8817        CPCR  =  AT2100F    -  1.
            *  A2  =  0000    =  B    MAR2  TEST   FOR  ZEROS
03FC   03E7          AMPCR  =  BR1-TST    -  1.
03FD   F07B          B  =  B000.
03FE   F0D5          MAR1  =   B.
            *********************              CHECK  MAR1  FOR  ZEROS*************     *
03FF   F076          B  =  B111.
0400   F16E          BR2  =   B.
0401   F07B        B  =  B000.         EXPECTED   VALUE  MAR2.                        B
0402   F05E          ASR.
0403   F035        A2  =  BMAR.        RETURN  MAR1  TO  A2                           B
            *********************              A2  =  A3  =    0000ZEROS************
0404   F043          A3  =  A2.
0405   F03C          A3  EQV  B.
0406   F09D          IF  ABT  SKIP.
0407   8817        CPCR  =  AT2100F    -  1.
            *  A2  =  0000    =  B    MAR1  TEST   FOR  ZEROS
0408   03E7          AMPCR  =  BR1-TST    -  1.
0409   F0CE          LMAR.
040A   E0FF          LIT   =  @FF@.
040B   F076          B  =  B111.                                  EXPECTED   VALUE
040C   F05D          ASE.                                         SEL   MAR2  BUS
040D   F035          A2  =  BMAR.                                 OS  =  MAR2
            *********************              A2     FFFF************************
040E   F09D          IF  ABT  SKIP.
040F   8817        CPCR  =  AT2100F    -  1.
            *  A2  =  FFFF    =  B    MAR2  TEST   FOR  ONES
0410   03E7          AMPCR  =  BR1-TST    -  1.
0411   F076          B  =  B111.
0412   F0D5          MAR1  =  B.
0413   F07B          B  =  B000.
0414   F16E          BR2  =  B.
0415   F05E          ASR.
0416   F076        B  =  B111.         EXPECTED   VALUE  MAR1                         B
0417   F035          A2  =  BMAR.
            *********************              A2     =FFFF**********************
0418   F09D          IF  ABT  SKIP.
0419   8817        CPCR  =  AT2100F    -  1.
            *  A2  =  FFFF    =  B    MAR1  TEST   FOR  ONES
041A   03E7          ·AMPCR  =  BR1-TST    -  1.
041B   F0CE          LMAR.
041C   E000          LIT   =  0.
041D   F07B        B  =  B000.         EXPECTED   VALUE  FROM  BMAR                   B
041E   F05D          ASE.
041F   F035          A2  =  BMAR.
            *********************              A2    =0000**********************
0420   F043          A3  =  A2.
0421   F03C          A3  EQV  B.
0422   F09D          IF  ABT  SKIP.
0423   8817        CPCR  =  AT2100F    -  1.
            *  A2  =  0000    =  B    MAR2  TEST   FOR  ZEROS.
0424   03E7          AMPCR  =  BR1-TST    -  1.
            *  END  OF  BR1   AND  BR2   TESTS.
             ADDCYTST.
            *  THIS   TEST   CHECKS  THE  ADDER  AGAINST   THE  CTR
0425   F0CA          LCTR.
0426   E0FE          LIT   =  @FE@.
0427   F05A          A3   =  Z.                                      Z  =  0101
0428   E001          LIT   =  1.
            *  INCREMENT   VALUE  TO  A3
0429   F08A          B  =  Z.
            *  START   WITH  B  =  0101
```

```
042A   F030          INC.
            *  CHECK  ADDER  AGAINST   CTR
             ADDCYTST1.
042B   F0B8          IF   NOT  COV  SKIP.
042C   8432        CPCR     =  ADDCYTST2   -  1.
042D   F0B5          IF   NOT  ABT  SKIP.
042E   8831        CPCR   =  ADDCYTSTF   -  1.
042F   0424          AMPCR  =    ADDCYTST   -  1.
0430   F04D          A3  =  A3   +  B.
0431   F030          INC.
            *********************              TEST  CTR  AGAINST   ADDER  LOGIC****
0432   442A          MPCR    =  ADDCYTST1   -  1.
             ADDCYTST2.
0433   F03B          A3.
            *********************              A3   =    FFFF     *******************
0434   F09D          IF  ABT  SKIP.
0435   8831        CPCR   =  ADDCYTSTF   -  1.
            *****************           A3   =  FFFF    *************************
0436   0424          AMPCR  =  ADDCYTST  -  1.
0437   F054          A3   =  B000.
0438   8136          CPCR   =  WFEXT  -  1.
0439   F0CA          LCTR.
043A   E020          LIT    =  @20@.
             ADDCYTST3.
            *THIS   TEST   PASSES   DATA  FROM  A3-A1-MAR1-A2-MIR-B.                  B
            *CHECK  A3=B.   REPEAT   FOR  DATA  +  1.                                 B
043B   F05E          ASR.
043C   F016          A1  =  A3.
            *  A3(COUNT)    TO  A1  TO  MAR1  TO  A2  TO  MIR  TO  B.
043D   F0D0          MAR1  =  A1.
043E   F035          A2  =  BMAR.
043F   F0DD          MIR  =  A2.
0440   F08D          BMI.
            **************CHECK         DATA  IN  B  =  A3                                B
0441   F03C          A3  EQV  B.
0442   F09D        IF  ABT  SKIP.      WAS  A  BIT   DROPPED                              B
0443   8831        CPCR   =  ADDCYTSTF   -  1.
0444   043B        AMPCR  =  ADDCYTST3.      NOTE.   IF  REPEATING   A3=B000              B
0445   F0BA        IF  NOT  EXT  SKIP.
0446   88B8        CPCR   =  LINC   -  1.
            *****************              INCREMENT    A3  BY  1   ****************
0447   F04C          A3   =  A3   +  1.
0448   F09D          IF  ABT  SKIP.
0449   443A        MPCR    =  ADDCYTST3   -  1.
            *  END  ADDER  TEST.
             Y-SEL-TST.
            *THIS   TEST  CONTINUES   Y-SEL   TEST  OF  THE  BFTF   FUNCTION              B
044A   F07B          B  =  B000.
            *****************           B  =  0000     **************************
            *  TEST  COMPLEMENTING   B01   AND  B16.
044B   F159          B  =  BFTF.
            ********************               N20    N25  ACTIVE******.**********
            ********************               CHECK    COMPLEMENT  OF  B01   &  B16**
044C   F0CA          LCTR.
044D   E07F          LIT   =  @7F@.
044E   0455          AMPCR  =  Y-SEL-TST1      -  1.
044F   F0FE          Z  EQV  B.
0450   E001          LIT   =  1.
0451   F09C          IF  ABT  JUMP.
0452   0449          AMPCR  =  Y-SEL-TST       -  1.
0453   F0A4          IF  IRQ  JUMP.
0454   F0E1          MIR  =  B.
            *  MIR  SHOULD  EQUAL  8001
            *   ERROR  VALUE   NOW  IN  MIR.    EXPECTED   VALUE  =  8001
0455   F000          WAIT.                            ERROR  #  L45
             Y-SEL-TST1.
            *  THIS  TEST  IS  A  CONTINUATION   OF  Y-SEL-TST     ABOVE
            *HERE  8001   NOT  0000    IS  COMPLEMENTED.                                 B
0456   F08A        B  =  Z.                                       Z  =  8001.
0457   F159        B  =  BFTF.
            **************TEST          COMPLEMENTING  01   &  016   FROM  1  TO  0      B
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0458  F0CA          LCTR.
0459  E0FF          LIT  = @FF@.
045A  0461          AMPCR = Y-SEL-TST2     - 1.
045B  F0FE          Z EQV B.
045C  E000          LIT  = 0.
045D  F09C          IF ABT JUMP.
045E  0449          AMPCR = Y-SEL-TST      - 1.
045F  F0A4          IF IRQ JUMP.
0460  F0E1          MIR = B.
                *  ERROR VALUE  NOW IN MIR.   EXPECTED  VALUE = 0000
0461  F000          WAIT.                          ERROR # L46
                 Y-SEL-TST2.
                *  END TEST
                 IC-TST.
                *  THIS  TEST  CHECKS  INHIBIT   CARRY  FROM  BIT  9  TO  8.
0462  F076            B = B111.
0463  F054            A3 = B000.
0464  F04C            A3 = A3 + 1.
0465  F016            A1 = A3.
0466  0471            AMPCR =  IC-TST1    - 1.
0467  F1DE          BC8 MIR = A1 + B IC.
                ********************          N27    ACTIVE*********************
                ********************           TEST  IC  TRUE  CASE  *************
0468  F0CA          LCTR.
0469  E000          LIT  = 0.
046A  F08D          BMI.
046B  F0FE          Z EQV B.                                    Z = FF00
046C  F09C          IF ABT JUMP.
046D  0461          AMPCR = IC-TST   - 1.
046E  F0A4          IF IRQ JUMP.
046F  F000          WAIT.                          ERROR # L47
                ****************          MIR = FF00      **********************
0470  F0E1          MIR = B.
0471  F000          WAIT.
                *  MIR EQUALS  VALUE  GENERATED  BY  EQUALITY  TEST
                 IC-TST1.
                 FUNCTTST.
                *THIS  TEST  CHECKS  ADDITIONAL  ADDER  FUNCTION  DECODING      B
                *  N28  TO  N31).
0472  F054          A3 = B000.                              A3 = 0
0473  F0DE          MIR = A3.
0474  F077          B  = B001.                               B  = 00001
                ****************          MIR = 0001    ************************
0475  F0E1          MIR = B.
0476  F04C          A3 = A3 + 1.                            A3 = 1
0477  F0DE          MIR = A3.
                ****************MIR          = 1
0478  F04F          A3 = A3 - LIT.                          A3 = 0
0479  E001          LIT  = 1.
047A  F0DE          MIR = A3.
                ****************MIR          = 0
047B  F04E          A3 = A3 + LIT.                          A3 = 00FF
                ****************MIR          = 00FF
047C  E0FF          LIT  = @FF@.
047D  F0DE          MIR = A3.
047E  F04D          A3 = A3 + B.
047F  F04C          A3 = A3 + 1.
0480  F0DE          MIR = A3.
                ****************MIR          = 0101
0481  F06F          B  =  A3 OR B.                          B  =0101
                ********************          OR CODE 1110*******************
0482  F0E1          MIR = B.
0483  F04E          A3 = A3 + LIT.        A3=0101    + 00FF   = 0200          B
0484  F0DE          MIR = A3.
                ****************MIR          = 0200
0485  F06F          B = A3 OR B.                            B = 0301
0486  F0E1          MIR = B.
                ****************MIR          = 0301
0487  F04E          A3 = A3 + LIT.                          A3 = 02FF
0488  F0DE          MIR =  A3.
                ****************MIR          = 02FF
0489  F049          A3 = A3 XOR B.
048A  F0DE          MIR = A3.
048B  F071            B  =  A3.
                ****************MIR          = 01FE
048C  F0CA          LCTR.
048D  E0FE          LIT  = @FE@.                                Z = 01FE
048E  F03F          A3 EQV Z.
048F  F09D          IF ABT SKIP.
0490  8614          CPCR = FUNCTTSTF   - 1.
0491  0471          AMPCR = FUNCTTST   - 1.
0492  F15F          B  =  Z IMP B.
                ********************          IMP  CODE 1000*******************
                **************X          NOT OR Y = FEFE  OR 01FE   = FFFE                B
0493  E001          LIT  = 1.
0494  F0E1          MIR = B.                                    Z = 0101
                ****************MIR          = 01FE
0495  F160          B = Z NAN B.  B= XNOT OR YNOT=FEFE  OR 0001=FEFF                 B
0496  F0E1          MIR = B.
                ****************          MIR = FEFE  ************************
0497  F0CA          LCTR.
0498  F0FE          Z EQV B.                                    LIT  = 1.
0499  E0FF          LIT  = @FF@.
049A  F09D          IF ABT SKIP.
049B  8614          CPCR = FUNCTTSTF   - 1.
049C  0471          AMPCR = FUNCTTST   - 1.
                *  END OF FUNCTION  TEST.
                 BTT0TST.
049D  F076          B = B111.
049E  F075          B = BTT0.
                ********************TEST             BTT0  FUNCTION***************
049F  F0E1          MIR = B.
04A0  F0CA          LCTR.
04A1  E000          LIT  = 0.
04A2  F0FE          Z EQV B.
04A3  E0FE          LIT  = @FE@.
04A4  F0B5          IF NOT ABT SKIP.
04A5  84A8          CPCR =  BTT1TST    - 1.
04A6  049C          AMPCR = BTT0TST    - 1.
04A7  F0A4          IF IRQ JUMP.
04A8  F000          WAIT.                          ERROR # L48
                 BTT1TST.
04A9  F07B                B =  B000.
04AA  F158          B = BTT1.
04AB  F0E1          MIR = B.
04AC  F0CA          LCTR.
04AD  E0FF          LIT  = @FF@.
04AE  F0FE          Z EQV B.
04AF  E001          LIT  = 1.
04B0  F0B5          IF NOT ABT SKIP.
04B1  84B4          CPCR =  BTT1TST1   - 1.
04B2  04A8          AMPCR = BTT1TST    - 1.
04B3  F0A4          IF IRQ JUMP.
04B4  F000          WAIT.                          ERROR # L49
                 BTT1TST1.
                ********************          INHIBIT   INPUT   B-REG   FROM BSW***
                 BSW-TO-B-INH.
04B5  F054          A3  = B000.
04B6  F0DE          MIR =  A3.
04B7  F076          B = B111.
04B8  F08C            BMI MIR = B.
04B9  F03C          A3 EQV B.
04BA  F0B5          IF NOT ABT SKIP.
04BB  84C0          CPCR =  BSW-TO-B-INH1      - 1.
04BC  04B4          AMPCR =  BSW-TO-B-INH      - 1.
04BD  F0A4          IF IRQ JUMP.
04BE  F000          WAIT.                          ERROR # L50
                ********************          MIR = FFFF  ********************
04BF  F0E1          MIR = B.
04C0  F000          WAIT.
                ********************          MIR = 0000    ********************
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                BSW-TO-B-INH1.
04C1    F08C        BMI    MIR    =   B.
04C2    F05F        B.
04C3    F0B5        IF  NOT  ABT  SKIP.
04C4    84C9        CPCR   =    BSW-TO-INH2     -  1.
04C5    04B4        AMPCR   =    BSW-TO-B-INH       -  1.
04C6    F0A4        IF  IRQ  JUMP.
04C7    F000        WAIT.                          ERROR  #  L51
              **********************          MIR  =  0000    *******************
04C8    F0E1        MIR  =  B.
04C9    F000        WAIT.
              **********************          MIR  =  FFFF    *******************
              *    END IF  INHIBIT   INPUT  TO  B-REG   TEST.
                BSW-TO-INH2.
              *********************          TEST  A3  INHIBIT    INPUT    FUNCTION
                A-REG-INH.
04CA    F054              A3   =    B000.
04CB    F076        B  =  B111.
04CC    F04D      * A3    =    A3       + B.
04CD    F0B5        IF  NOT  ABT  SKIP.
04CE    84D2        CPCR   =    A3-INH    -  1.
04CF    04C9        AMPCR  =  A-REG-INH     -  1.
04D0    F0A4        IF  IRQ  JUMP.
04D1    F0DE          MIR  =  A3.
04D2    F000        WAIT.                          ERROR  #  L52
              **********************          MIR  =  FFFF    *******************
                A3-INH.
                A3-REG-INH.
04D3    F054           A3    =    B000.
              *********************         TEST  A2  INHIBIT    INPUT    FUNCTION**
04D4    F032        A2     =     A3.
04D5    F076        B  =  B111.
04D6    F031        A2     =    A2  +   B.
04D7    F0B5        IF  NOT  ABT  SKIP.
04D8    84DC        CPCR   =    A2-INH     -  1.
04D9    04C9          AMPCR    =  A-REG-INH        -  1.
04DA    F0A4        IF  IRQ  JUMP.
04DB    F0DD        MIR  =  A2.
              *****************          MIR  =  FFFF   ***********************
04DC    F000        WAIT.                          ERROR  #  L53
                A2-INH.
04DD    F016        A1     =     A3.
04DE    F076        B  =  B111.
              *********************TEST            A1  INHIBIT    INPUT   FUNCTUON***
04DF    F010        A1     =    A1     +    B.
04E0    F0B5        IF  NOT  ABT  SKIP.
04E1    84E5        CPCR   =    A1-INH    -  1.
04E2    04C9        AMPCR  =  A-REG-INH     -  1.
04E3    F0A4        IF  IRQ  JUMP.
04E4    F0DB          MIR   =    A1.
              **********************          MIR  =  FFFF    *******************
04E5    F000        WAIT.                          ERROR  #  L54
                A1-INH.
04E6    F076        B  =  B111.
04E7    F051        A3    =  B.
04E8    F07B        B  =       B000.
              **************TEST         A3  INHIBIT   INPUT  FUNCTION,    FFFF   CASE     B
04E9    F04D        A3     =     A3       + B.
04EA    F0B5        IF  NOT  ABT  SKIP.
04EB    84EF        CPCR  =  A3-INH1     -  1.
04EC    04C9          AMPCR    =  A-REG-INH      -  1.
04ED    F0A4        IF  IRQ  JUMP.
04EE    F0DE          MIR  =     A3.
              *****************          MIR  =  FFFF   ***********************
04EF    F000        WAIT.                          ERROR  #  L55
                A3-INH1.
04F0    F032        A2     =     A3.
04F1    F07B        B  =       B000.
              **************TEST         A2  INHIBIT   INPUT  FUNCTION,    FFFF   CASE     B
04F2    F031        A2     =    A2  +   B.
04F3    F0B5        IF  NOT  ABT  SKIP.
04F4    84F8        CPCR   =    A2-INH1     -  1.
04F5    04C9        AMPCR  =  A-REG-INH     -  1.
04F6    F0A4        IF  IRQ  JUMP.
04F7    F0DD        MIR   =  A2.
              *****************          MIR  =  FFFF   ***********************
04F8    F000        WAIT.                          ERROR  #  L56
                A2-INH1.
04F9    F016        A1     =    A3.
04FA    F07B        B  =      B000.
              **************TEST         A1  INHIBIT   INPUT  FUNCTION,    FFFF   CASE     B
04FB    F010        A1       =    A1     +   B.
04FC    F0B5        IF  NOT  ABT  SKIP.
04FD    8501        CPCR  =  A1-INH1     -  1.
04FE    04C9        AMPCR  =  A-REG-INH     -  1.
04FF    F0A4        IF  IRQ  JUMP.
0500    F0DB        MIR  =  A1.
              *****************          MIR  =  FFFF   ***********************
0501    F000        WAIT.                          ERROR  #  L57
                A1-INH1.
                MIR-INH.
0502    F076        B  =  B111.
0503    F0E1        MIR    =    B.
0504    F07B        B  =      B000.
              ************TEST        MIR  INHIBIT    INPUT   FUNCTION,   FFFF   CASE     B
0505    F08D        BMI.
0506    F05F        B.
0507    F0B5        IF  NOT  ABT  SKIP.
0508    850C        CPCR   =    MIR-INH1     -  1.
0509    0501        AMPCR    =    MIR-INH    -  1.
050A    F0A4        IF  IRQ  JUMP.
050B    F0E1        MIR  =  B.
              *********************          MIR  =  FFFF    *******************
050C    F000        WAIT.                          ERROR  #  L58
                MIR-INH1.
050D    F07B        B  =      B000.
050E    F0E1        MIR    =    B.
050F    F076        B  =  B111.
0510    F051        A3    =  B.
0511    F08D        BMI.
0512    F04D        A3     =    A3       + B.
0513    F0B5        IF  NOT  ABT  SKIP.
0514    8518        CPCR   =    MIR-INH2     -  1.
0515    0501        AMPCR    =    MIR-INH    -  1.
0516    F0A4        IF  IRQ  JUMP.
0517    F0E1        MIR  =  B.
              *********************          MIR  =  0000    *******************
0518    F000        WAIT.                          ERROR  #  L59
                MIR-INH2.
                AMPCR-INH.
0519    F076        B  =  B111.
051A    F05B        AMPCR    =    B.
051B    F07B        B  =      B000.
051C    F0DA        MIR      =    AMPCR.
051D    F08D        BMI.
051E    F0CA         LCTR.
051F    E0C0        LIT    =  @C0@.
0520    F0FE         Z  EQV    B.
0521    E0FF        LIT     =     @FF@.
0522    F0B5        IF  NOT  ABT  SKIP.
0523    8526        CPCR   =    AMPCR-INH1     -  1.
0524    0518        AMPCR  =    AMPCR-INH     -  1.
0525    F0A4        IF  IRQ  JUMP.
0526    F000        WAIT.                          ERROR  #  L60
              *****************          MIR  =  FFFF   ***********************
                AMPCR-INH1.
0527    F07B        B  =      B000.
0528    F05B          AMPCR    =      B.
0529    F076        B  =  B111.
052A    F051          A3    =   B.
052B    F0DA        MIR      =      AMPCR.
052C    F08D        BMI.
```

```
052D  F04D         A3   =   A3      + B.
052E  F0B5         IF  NOT  ABT  SKIP.
052F  8532         CPCR  =   AMPCR-INH2   -  1.
0530  0518         AMPCR =   AMPCR-INH    -  1.
0531  F0A4         IF  IRQ  JUMP.
0532  F000         WAIT.                        ERROR  #  L61
             **********************       MIR  =  0000   *******************
         AMPCR-INH2.
         BR1-INH.
0533  F05E         ASR.
0534  F076         B  =  B111.
0535  F0D5         MAR1  =    B.
0536  F16E         BR2   =  B.
0537  F07B         B  =      B000.
0538  F0E9         MIR    =    BMAR.
0539  F0B5         IF  NOT  ABT  SKIP.
053A  853D         CPCR   =   BR1-INH1    -  1.
053B  0532         AMPCR  =    BR1-INH    -  1.
053C  F0A4         IF  IRQ   JUMP.
053D  F000         WAIT.                        ERROR  #  L62
             **********************       MIR  =  FFFF   *******************
         BR1-INH1.
053E  F05D         ASE.
053F  F07B         B  =      B000.
0540  F0E9         MIR    =    BMAR.
0541  F0B5         IF  NOT  ABT  SKIP.
0542  8545         CPCR   =  BR2-INH2     -  1.
0543  0532         AMPCR  =    BR1-INH    -  1.
0544  F0A4         IF  IRQ   JUMP.
0545  F000         WAIT.                        ERROR  #  L63
             **********************       MIR  =  FFFF   *******************
         BR2-INH2.
0546  F05E         ASR.
0547  F07B         B  =      B000.
0548  F16E         BR2   =  B.
0549  F0D5         MAR1  =    B.
054A  F076         B  =  B111.
054B  F051         A3    =    B.
054C  F0E9         MIR    =    BMAR.
054D  F08D         BMI.
054E  F04D         A3    =   A3      + B.
054F  F0B5         IF  NOT  ABT  SKIP.
0550  8553         CPCR   =   BR1-INH2    -  1.
0551  0532         AMPCR  =    BR1-INH    -  1.
0552  F0A4         IF  IRQ   JUMP.
0553  F000         WAIT.                        ERROR  #  L64
             **********************       MIR  =  0000   *******************
         BR1-INH2.
0554  F05D           ASE.
0555  F07B         B  =      'B000.
0556  F0E9         MIR    =    BMAR.
0557  F08D           BMI.
0558  F04D         A3    =   A3      + B.
0559  F0B5         IF  NOT  ABT  SKIP.
055A  855D         CPCR   =  BR2-INH3     -  1.
055B  0532           AMPCR   =  BR1-INH    -  1.
055C  F0A4         IF  IRQ   JUMP.
055D  F000         WAIT.                        ERROR  #  L65
             **********************       MIR  =  0000   *******************
         BR2-INH3.
         Z-INH.
055E  F0CA         LCTR.
055F  E000         LIT       =  0.
0560  F0EF         MIR   =    Z.
0561  E0FF         LIT    =  @FF@.
0562  F07B         B      =    B000.
0563  F0EF         MIR      =   Z.
0564  F0B5         IF  NOT  ABT  SKIP.
0565  8568         CPCR   =  Z-INH1    -  1.
0566  055D         AMPCR  =  Z-INH     -  1.
0567  F0A4         IF  IRQ   JUMP.
0568  F000         WAIT.                        ERROR  #  L66
             **********************       MIR  =  FFFF   *******************
```

```
                 Z-INH1.
0569  F0CA           LCTR.
056A  F05A             A3     =    Z.
056B  E000             LIT      =  0.
056C  F076           B  =  B111.
056D  F03F             A3  EQV  Z.
056E  F0B5           IF  NOT  ABT  SKIP.
056F  8573           CPCR   =  Z-INH2    -  1.
0570  055D           AMPCR  =  Z-INH     -  1.
0571  F0A4           IF  IRQ  JUMP.
0572  F0EF           MIR    =  Z.
0573  F000           WAIT.                        ERROR  #  L67
               **********************       MIR  =  0000   *******************
                 Z-INH2.
                 NORTST.
0574  F0CA           LCTR.
0575  E0FF           LIT     =  @FF@.
0576  F07B           B    =  B000.
               *   *****************      00FF     NOR   0000     =   FF00   *******
0577  F161           B  =  Z  NOR    B.
0578  F0CA           LCTR.
0579  E000           LIT     =  0.
057A  F0FE           Z  EQV  B.
057B  F09D           IF  ABT  SKIP.
057C  85FD           CPCR   =  NORTSTF   -  1.
057D  F161           B    =  Z  NOR  B.
               *   *****************     FF00   NOR  FF00   =    00FF    ***********
057E  F0CA           LCTR.
057F  E0FF           LIT     =  @FF@.
0580  F0FE           Z  EQV  B.
0581  F09D           IF  ABT  SKIP.
0582  85FD           CPCR   =  NORTSTF   -  1.
                 NRITST.
               *   *****************       Z    =  00FF
0583  F076           B    =  B111.
               *   *****************      00FF     NRI   FFFF     =   FF00********
0584  F05A           A3   =  Z.
0585  F14C           B  =  A3   NRI   B.
0586  F0CA           LCTR.
0587  E000           LIT   =  0.
0588  F0FE           Z   EQV    B.
0589  F09D           IF  ABT  SKIP.
058A  8607           CPCR   =  NRITSTF   -  1.
058B  F0CA           LCTR.
058C  E0FF           LIT     =  @FF@.
               *   *****************       FF00     NRI  00FF     =//FF     ********
058D  F08A           B    =  Z.
058E  F128           A2   =  Z.
058F  F0CA           LCTR.
0590  E000           LIT   =  0.
0591  F05A           A3   =  Z.
0592  F14C           B  =  A3   NRI   B.
0593  F116           A2  EQV   B.
0594  F09D           IF  ABT  SKIP.
0595  8607           CPCR   =  NRITSTF   -  1.
                 LUA3PBP1.
0596  F0CA           LCTR.
0597  E0AB           LIT    =  @AB@.
0598  F08A           B  =  Z.
0599  E0AA           LIT    =  @AA@.
059A  F17A           CTR   =  CTR  +  LIT   +  1.
059B  F0EF           MIR   =  Z.
059C  F0FE           Z  EQV  B.
059D  F09D           IF . ABT  SKIP.
059E  8614           CPCR   =  FUNCTTSTF    -  1.
059F  0595           AMPCR  =  LUA3PBP1     -  1.
                 XMYM1TEST.
05A0  F058           A3  =  LIT.
05A1  E002           LIT   =  2.
05A2  F077           B  =  B001.
05A3  F12B           A3  -   B  -  1.
05A4  F09E           IF  AOV  SKIP.
               *          A3  +  B/   =    AOV  +  0
```

```
05A5  8614          CPCR  =  FUNCTTSTF   -  1.
05A6  059F          AMPCR   =  XMYM1TEST   -  1.
                LUOADTEST.
05A7  F0CA          LCTR.
05A8  E006          LIT   =  6.
05A9  F1DA          MIR   =  0  OAD  Z.
05AA  F08D          BMI.
05AB  F051          A3    =  B.
05AC  F03F          A3    EQV  Z.
05AD  F09D          IF   ABT   SKIP.
05AE  8614          CPCR  =  FUNCTTSTF   -  1.
05AF  05A6          AMPCR  =  LUOADTEST   -  1.                    B
                AADTEST.
05B0  F0CA          LCTR.
05B1  E0FF          LIT   =  @FF@.
05B2  F089           B   =  LIT.
05B3  E006          LIT   =  6.
05B4  F15E          B   =    Z  AAD  B.
05B5  E00D          LIT     =  @0D@.
05B6  F0E1          MIR   =  B.
05B7  F0FE           Z  EQV  B.
05B8  E011          LIT   =  @11@.
05B9  F09D          IF   ABT   SKIP.
05BA  8614          CPCR  =  FUNCTTSTF   -  1.
05BB  05AF          AMPCR  =  AADTEST   -  1.
05BC  48E2          MPCR  =  STCTEST   -  1.                       H
05BD  F05F          B.                    FILLER                   B
05BE  F05F          B.                    FILLER                   B
                BSWEXR.
05BF  F0CA           LCTR.
05C0  E0EE          LIT   =  @EE@.
05C1  F05A          A3    =  Z.
05C2  E011          LIT   =  @11@.
05C3  F08A          B   =  Z.
05C4  F0FE          Z  EQV  B.                ADDER  =  1111       B
05C5  F09D          IF   ABT   SKIP.
05C6  8611          CPCR  =  BSWEXRF   -  1.
05C7  F0CA          LCTR.
05C8  E0DD          LIT   =    @DD@.
05C9  F05A          A3    =    Z.
05CA  E022          LIT   =  @22@.
05CB  F08A          B   =  Z.
05CC  F0FE          Z  EQV  B.                ADDER  =  2222       B
05CD  F09D          IF   ABT   SKIP.
05CE  8611          CPCR  =  BSWEXRF   -  1.
05CF  F0CA          LCTR.
05D0  E0BB          LIT   =  @BB@.
05D1  F05A          A3    =    Z.
05D2  E044          LIT   =  @44@.
05D3  F08A          B   =  Z.
05D4  F0FE          Z  EQV  B.                ADDER  =  4444       B
05D5  F09D          IF   ABT   SKIP.
05D6  8611          CPCR  =  BSWEXRF   -  1.
05D7  F0CA          LCTR.
05D8  E077          LIT     =    @77@.
05D9  F05A          A3    =    Z.
05DA  E088          LIT     =       @88@.
05DB  F08A          B   =  Z.
05DC  F0FE          Z  EQV  B.                ADDER  =  8888       B
05DD  F09D          IF   ABT   SKIP.
05DE  8611          CPCR  =  BSWEXRF   -  1.
05DF  F0CA          LCTR.
05E0  E00F          LIT     =  @0F@.
05E1  F05A          A3    =    Z.
05E2  E000          LIT     =    0.
05E3  F08A          B   =  Z.
05E4  F0FE          Z  EQV  B.                ADDER  =  F000       B
05E5  F09D          IF   ABT   SKIP.
05E6  8611          CPCR  =  BSWEXRF   -  1.
05E7  F0CA          LCTR.
05E8  E0F0          LIT   =  @F0@.
05E9  F05A          A3    =    Z.
05EA  E000          LIT   =  0.
05EB  F08A          B   =  Z.
05EC  F0FE          Z  EQV  B.                ADDER  =  0F00       B
05ED  F09D          IF   ABT   SKIP.
05EE  8611          CPCR  =  BSWEXRF   -  1.
05EF  F0CA          LCTR.
05F0  E0FF          LIT     =  @FF@.
05F1  F05A          A3    =    Z.
05F2  E0F0          LIT     =  @F0@.
05F3  F08A          B   =  Z.
05F4  F0FE          Z  EQV  B.                ADDER  =  00F0       B
05F5  F09D          IF   ABT   SKIP.
05F6  8611          CPCR  =  BSWEXRF   -  1.
05F7  F05A          A3    =    Z.
05F8  E00F          LIT     =  @0F@.
05F9  F08A          B   =  Z.
05FA  F0FE          Z  EQV  B.                ADDER  =  000F       B
05FB  F09D          IF   ABT   SKIP.
05FC  8611          CPCR  =  BSWEXRF   -  1.
05FD  48BD          MPCR  =  DOJMP   -  1.
                NORTSTF.
05FE  F0DA          MIR   =    AMPCR.
05FF  F05F          B.
0600  0573          AMPCR   =    NORTST   -  1.
0601  F0A4          IF   IRQ   JUMP.
0602  F000          WAIT.                          ERROR  #  L68
0603  F0EF          MIR   =  Z.    EXPECTED     VALUE
0604  F000          WAIT.
0605  F0E1          MIR   =    B.                ACTUAL  VALUE
0606  F000          WAIT.
0607  F0C9          JUMP.
                NRITSTF.
0608  F0DA          MIR   =  AMPCR.
0609  F05F          B.
060A  0582          AMPCR   =  NRITST    -  1.
060B  F0A4          IF   IRQ   JUMP.
060C  F000          WAIT.                          ERROR  #  L69
060D  F0EF          MIR   =  Z.    EXPECTED   VALUE
060E  F000          WAIT.
060F  F0E1          MIR   =  B.               ACTUAL  VALUE
0610  F000          WAIT.
0611  F0C9          JUMP.
                BSWEXRF.
0612  F0EF          MIR   =  Z.
0613  F0F8          WHEN IRQ   STEP.                          ERROR  #  L70   B
0614  45BE          MPCR  =  BSWEXR   -  1.                                 B
                FUNCTTSTF.
0615  F0A3          IF   IRQ   EXEC.
0616  F0A4          IF   IRQ   JUMP.
0617  F000          WAIT.                          ERROR  #  L71
0618  F09A          EXEC.
0619  F0C9          JUMP.
                AT900E1.
061A  F000          WAIT.                          ERROR  #  L37
061B  F054           A3   =  B000.
061C  F03D          A3   EQV  B000.                CHECK  THE  ZEROS  CASE  B
061D  F09D           IF   ABT    SKIP.
061E  8864          CPCR  =  BSWTST   -  1.
061F  F07B          B   =  B000.                   MAR/CTR  GATES  FAILED   B
0620  F095           CTR   =  B.
0621  F030           INC.
0622  F0EF          MIR   =  Z.
0623  F000          WAIT.                          ERROR  #  L38
0624  F076           B   =  B111.
0625  F095           CTR     =  B.
0626  F0EF            MIR   =  Z.
0627  E000            LIT   =  0.
0628  F000          WAIT.
0629  F0D5            MAR1  =    B.                          MAR PATH  FAILED
062A  F0E9            MIR   =  BMAR.
```

```
062B  F000          WAIT.
062C  F07B            B = B000.
062D  F0D5            MAR1 = B.
062E  F0E9            MIR = BMAR.                                  DISPLAY  ZEROS.
062F  F000          WAIT.
0630  42A9          MPCR = AT800  - 1.
              AGC1TEST.
0631  F0A3          IF IRQ EXEC.
0632  F0A4          IF IRQ JUMP.
0633  F0E9            MIR = BMAR.
0634  F000          WAIT.                    ERROR L35      WAIT 1    MIR = XXXX    B
0635  F0CE            LMAR.
0636  E0FF          LIT  = @FF@.
0637  F0E9            MIR = BMAR.
0638  F000          WAIT.                                   WAIT 2    MIR = XXFF    B
0639  F07B          B = B000.
063A  F0E1          MIR = B.
063B  F000          WAIT.                                   WAIT 3    MIR = 0000    B
063C  F05E          ASR.
063D  F0D5          MAR1 = B.
063E  F0E9          MIR = BMAR.
063F  F000          WAIT.                                   WAIT 4    MIR = 0000    B
0640  F076          B = B111.
0641  F0E1          MIR = B.
0642  F000          WAIT.                                   WAIT 5    MIR = FFFF    B
0643  F0D5          MAR1 = B.
0644  F0E9          MIR = BMAR.
0645  F000          WAIT.                                   WAIT 6    MIR = FFFF    B
0646  F0CA          LCTR.
0647  F0D5          MAR1 = B.
0648  F0E9          MIR = BMAR.
0649  F000          WAIT.                                   WAIT 7    MIR = FFFF    B
064A  F0CA          LCTR.
064B  E0FF          LIT  = @FF@.
064C  F0EF            MIR = Z.
064D  E001          LIT  = 1.
064E  F000          WAIT.                                   WAIT 8    MIR = 0001    B
064F  F0CA          LCTR.
0650  E000          LIT  = 0.
0651  F0EF          MIR = Z.
0652  E0FE          LIT  = @FE@.
0653  F000          WAIT.                                   WAIT 9    MIR = FFFE    B
0654  85BE          CPCR  = BSWEXR - 1.
0655  F000          WAIT.
0656  878F          CPCR  = Y-SELTEST  - 1.
0657  070A          AMPCR  = X-SELTEST  - 1.
              AT00.
0658  F0A3          IF IRQ EXEC.
0659  F0A4          IF IRQ JUMP.
065A  F000          WAIT.                                ERROR # L1
            * BASIC ADDER TEST FAILED   B = B000
065B  F0CA            LCTR.
065C  E000            LIT  = 0.
065D  F05A            A3 = Z.                                    1 + 0
065E  E0FF            LIT  = @FF@.                               Z = FFFF
065F  F0B5          IF NOT ABT SKIP.
0660  8667          CPCR  = ATF00  - 1.
0661  0198            AMPCR = AT00R  - 1.
0662  F076          B = B111.                    POSSIBLE  FAILURES              B
0663  F0B5          IF NOT ABT SKIP.
0664  878F          CPCR  = Y-SELTEST  - 1.
0665  0198            AMPCR = AT00R  - 1.
0666  8771          CPCR  = ADDERTEST  - 1.
0667  0198            AMPCR = AT00R  - 1.
              ATF00.
0668  F07B            B = B000.
0669  F0B5          IF NOT ABT SKIP.
066A  8676          CPCR  = ATF01  - 1.
066B  0198            AMPCR = AT00R  - 1.
066C  F0A4          IF IRQ JUMP.
066D  F0E1          MIR = B.
```

```
066E  F000          WAIT.                                ERROR # L4
066F  F0E8          MIR  = B111.
0670  F000          WAIT.
0671  F09A          EXEC.
0672  F0C9          JUMP.
              ATF02.
0673  F0E1          MIR = B.                    DISPLAY  ADDER OUTPUT           B
            * MIR = B = 0000  SEE STEP ATF00  B = B000
0674  F000          WAIT.                                ERROR # L6
0675  F09A            EXEC.
0676  F0C9            JUMP.
              ATF01.
0677  F000          WAIT.                                ERROR # L2
0678  F0C3          IF NOT LST SKIP.
0679  8672          CPCR  = ATF02  - 1.
067A  0198            AMPCR = AT00R  - 1.
            * CHECKING FOR BIT PICK-UP IN ADDER LOGIC
067B  F000          WAIT.                                ERROR # L3
067C  F07B            B = B000.
067D  F07D            B = B C.
067E  D800            SAR = 8.
067F  F07D            B = B C.
0680  F095            CTR = B.
0681  F030            INC.
0682  F0E1            MIR = B.
            * MIR SHOULD EQUAL 0000  IF NO BIT PICK-UP
0683  F0B8          IF NOT COV SKIP.
0684  8688          CPCR  = AT01  - 1.
0685  0198            AMPCR = AT00R  - 1.
0686  F000          WAIT.                                ERROR # L7
0687  F09A          EXEC.
0688  F0C9          JUMP.
              AT01.                          ABT-1 SIGNAL FAILURE EXERCISE   B
            *BASIC  ADDER OPERATIONS FAILED.  FAILURE IN ABT LOGIC           B
            * OR ADIN(N)--1
0689  F0A3          IF IRQ EXEC.
068A  F0A4            IF IRQ JUMP.
068B  F000          WAIT.                                ERROR # L14
            * MIR = 0 FROM STEP ATB01 + 12.
068C  F0DA          MIR = AMPCR.          DISPLAY  WHERE ERROR OCCURRED.     B
068D  F000          WAIT.
068E  F0E1            MIR = B.
            * MIR = B = 0000  SEE STEP ATF01 +6
068F  F000          WAIT.
0690  F0E8          MIR  = B111.
            ****************          MIR = FFFF  ************************
0691  F000          WAIT.
0692  F0E6          MIR  = 0.
0693  F000          WAIT.
            ****************          MIR = 0000.************************
0694  F09A            EXEC.
0695  F0C9            JUMP.
              ATB01.
0696  0198          AMPCR = AT00R  - 1.
0697  F0A4          IF IRQ JUMP.
0698  F000          WAIT.                                ERROR # L11
            *                                                    ATB01  SUBR.
0699  F076            B = B111.
069A  F0C3          IF NOT LST SKIP.
069B  86B9          CPCR  = ATBF01  - 1.
069C  0198          AMPCR = AT00R  - 1.
069D  F076            B = B111.
069E  F0B3          IF  MST  THEN SKIP.
            ****************          B = FFFF  ************************
069F  86AB            CPCR  = ATBF02  - 1.
06A0  0198          AMPCR = AT00R  - 1.
06A1  F0CA            LCTR.
06A2  E000            LIT  = 0.
06A3  F0F0            MIR = 0 + Z + 1.
            ****************          MIR = 0000  ************************
```

```
06A4  E0FF          LIT  = @FF@.
06A5  F0B7          IF  NOT AOV  SKIP.
06A6  8688          CPCR  = AT01  - 1.
06A7  0198          AMPCR  = AT00R  - 1.
06A8  019F           AMPCR  = ATB01R  - 1.
06A9  F000          WAIT.
                AAA.
06AA  F000          WAIT.                              ERROR  #  L12
06AB  4198          MPCR  = AT00R  - 1.
                ATBF02.
06AC  F0CA           LCTR.
06AD  E000           LIT  = 0.
06AE  F05A           A3  = Z.
06AF  F0B5          IF  NOT ABT  SKIP.
06B0  86B3          CPCR  = ATB04  - 1.
06B1  0198          AMPCR  = AT00R  - 1.
06B2  86A9          CPCR  = AAA - 1.
06B3  0198          AMPCR  = AT00R  - 1.
                ATB04.
06B4  F04F          A3  = A3  -  LIT.              CHECK  N28-N31     DECODING          B
06B5  E001           LIT  = 1.
06B6  F0DE          MIR  = A3.
06B7  F000          WAIT.                              ERROR  #  L15
06B8  F09A           EXEC.
06B9  F0C9           JUMP.
                ATBF01.
06BA  F0CA           LCTR.
06BB  E000           LIT  = 0.
06BC  F05A           A3  = Z.
06BD  E0FF           LIT  = @FF@.                                  Z  =  FFFF
06BE  F0B5          IF  NOT ABT  SKIP.
06BF  87B7          CPCR  = MANUAL  - 1.
06C0  0198          AMPCR  = AT00R  - 1.
06C1  F07B           B  = B000.
06C2  F0C3          IF  NOT LST  SKIP.
06C3  86D6          CPCR  = ATBF012  - 1.
06C4  0198          AMPCR  = AT00R  - 1.
06C5  F07B           B  = B000.
06C6  F07D           B  = B C.
06C7  D800           SAR  = 8.
06C8  F07D           B  = B C.
06C9  F095           CTR  = B.
06CA  F030           INC.
06CB  F0B8          IF  NOT COV  SKIP.
06CC  87BC          CPCR  = ANDCHECK  - 1.
06CD  0198          AMPCR  = AT00R  - 1.
06CE  86CF          CPCR  = ATB0111  - 1.
06CF  0198          AMPCR  = AT00R  - 1.
                ATB0111.
06D0  F000          WAIT.                              ERROR  #  L16
                ATB0112.
06D1  F0E8          MIR  = B111.
                ****************          MIR  =  FFFF  ************************
06D2  F000          WAIT.
06D3  F0E6          MIR  = 0.
                ****************          MIR  =  0000  ************************
06D4  F000          WAIT.
06D5  F09A           EXEC.
06D6  F0C9           JUMP.
                ATBF012.
06D7  F076           B  = B111.
06D8  F0B7          IF  NOT AOV  SKIP.
06D9  875B          CPCR  = CARIN  - 1.
06DA  0198          AMPCR  = AT00R  - 1.
06DB  F07B           B  = B000.
06DC  F000          WAIT.                              ERROR  #  L19
06DD  F0C4          IF  NOT MST  SKIP.
06DE  87B7          CPCR  = MANUAL  - 1.
06DF  0198          AMPCR  = AT00R  - 1.
06E0  F07B           B  = B000.
06E1  F07D           B  = B C.
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```
06E2  D800           SAR  = 8.
06E3  F07D           B  = B C.
06E4  F095           CTR  = B.
06E5  F030           INC.
06E6  F030           INC.
06E7  F030           INC.
06E8  F0E1           MIR  = B.
                *    B  = B000   0001   BSW  ASSUMS  WE  PICK  UP  A  BIT  16
                *    B  = B C    0101   BSW
                *    B  = B C    0201   BSW
                *    CTR  = B    0202   BSW
06E9  F0B8          IF  NOT COV  SKIP.
06EA  87B9          CPCR  = XPYP1TEST  - 1.
06EB  0198          AMPCR  = AT00R  - 1.
06EC  F000          WAIT.                              ERROR  #  L20
06ED  86CF          CPCR  = ATB0111  - 1.
06EE  0198          AMPCR  = AT00R  - 1.
                AT06.
06EF  F0A3          IF  IRQ  EXEC.
06F0  F0A4          IF  IRQ  JUMP.
06F1  F000          WAIT.                              ERROR  #  L13
06F2  F089           B  = LIT.
06F3  E001           LIT  = 1.                                                        B
06F4  F095           CTR  = B.
06F5  F030           INC.                                                             B
06F6  F0B8          IF  NOT COV  SKIP.
06F7  81D2          CPCR  = LSTERROR  - 1.
06F8  01C7           AMPCR  = AT02  - 1.
06F9  81BE          CPCR  = AT04  - 1.
06FA  01C7           AMPCR  = AT02  - 1.
                AT08F.
06FB  01FA          AMPCR  = AT08  - 1.
06FC  F0A4          IF  IRQ  JUMP.
06FD  F000          WAIT.                              ERROR  #  L24
06FE  F0CA           LCTR.
06FF  E0FF           LIT  = @FF@.
0700  F08A           B  = Z.                                       Z  =  0000
0701  E000           LIT  = 0.
0702  F07D           B  = B C.
0703  D800           SAR  = 8.
0704  F095           CTR  = B.
0705  F030           INC.
0706  F0B8          IF  NOT COV  SKIP.
0707  81F4          CPCR  = AT071  - 1.
0708  01FA           AMPCR  = AT08  - 1.
0709  81EB           CPCR  = MSTADDERR  - 1.
070A  01FA           AMPCR  = AT08  - 1.
                X-SELTEST.
070B  F0A3          IF  IRQ  EXEC.
070C  F0A4          IF  IRQ  JUMP.
070D  F000          WAIT.                              ERROR  #  L94
                *         IN  THIS  SET  OF  TESTS  WE SET  Y-SEL  INPUT  TO  0
                *           AND VARY X-SEL  INPUTS.
                *                100    Z + 0   = B
                *                001    LIT  + 0  = B
                *                011    LIT  TO  CTR  CTR  + 0
                *                010    ZOPT  + 0
                *                101    A1  + 0  = MIR
                *                110    A2  + 0  = MIR
                *                111    A3  + 0  = MIR
070E  F076          B  = B111.              ONES  TO  B  0+1                         B
070F  F017          A1  = B.                IF  A  BIT  IS  PICKED  UP               B
0710  F033          A2  = B.                IN  X-SEL  THEN  B  WILL  NOT            B
0711  F051          A3  = B.                BE  SET  TO  ALL  ONES.                  B
0712  F0CA           LCTR.
0713  E000           LIT  = 0.
0714  F051           A3  = B.
0715  E0FF           LIT  = @FF@.                                  Z  =  FFFF
0716  F0EF           MIR  =  Z.
0717  F09D          IF  ABT  SKIP.
0718  8746          CPCR  = X-SELF1  - 1.
0719  0198          AMPCR  = AT00R  - 1.
```

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071A  F000          WAIT.                                   ERROR # L90
071B  F0DB            MIR = A1.
071C  F09D          IF ABT SKIP.
071D  874E          CPCR = X-SELF2   - 1.
071E  0198          AMPCR = AT00R  - 1.
071F  F000          WAIT.                                   ERROR # L91
0720  F0DD            MIR = A2.
0721  F09D          IF ABT SKIP.
0722  874E          CPCR = X-SELF2   - 1.
0723  0198          AMPCR = AT00R  - 1.
0724  F000          WAIT.                                   ERROR # L92
0725  F0DE            MIR = A3.
0726  F09D              IF ABT SKIP.
0727  874E          CPCR = X-SELF2   - 1.
0728  0198          AMPCR = AT00R  - 1.
0729  F089            B = LIT.                                          LIT = FF.
                  X-SEL1.
072A  F085          B = LIT XOR B.
072B  F095          CTR = B.
072C  F030            INC.
072D  F0EF            MIR = Z.
072E  F02E          IF COV SKIP.
072F  874E          CPCR = X-SELF2   - 1.
0730  070A            AMPCR = X-SELTEST   - 1.
0731  F000          WAIT.                                   ERROR # L90
                  X-SEL0.
                  *SET NORM/SGL SWITCH TO SGL. PRESS SGL PULSE PB                B
                  *CHECK BIT PICKUP IN X-SEL GATES.                              B
0732  F000          WAIT.                                   ERROR # L72
0733  F07B            B = B000.
0734  F017            A1 = B.
0735  F033            A2 = B.
0736  F051            A3 = B.
0737  F0CA            LCTR.
0738  E0FF            LIT = @FF@.
0739  F0EF            MIR = Z.                                        Z = 0000
                  *                                                   MIR = 0000
073A  E000            LIT = 0.
073B  F000          WAIT.
073C  F0DB            MIR = A1.
073D  F000          WAIT.
                  *                                                   MIR = 0000
073E  F0DD            MIR = A2.
073F  F000          WAIT.
                  *                                                   MIR = 0000
0740  F0DE            MIR = A3.
0741  F000          WAIT.
                  *                                                   MIR = 0000
0742  F0E1            MIR = B.
0743  F000          WAIT.
                  *                                                   MIR = 0000
0744  F0E8          MIR = B111.
0745  F000          WAIT.
                  *                                                   MIR = FFFF
                  * GO TO NORMAL PULSE POSITION
0746  4198          MPCR = AT00R  - 1.
                  X-SELF1.
0747  F000          WAIT.                                   ERROR # L73
0748  F076            B = B111.                 CHECK IF X-SEL IS ALWAYS 1.    B
0749  F05F            B.                        CHECK IF B WAS SET TO ONES.    B
074A  F09D          IF ABT SKIP.
074B  8771          CPCR = ADDERTEST  - 1.
074C  0198          AMPCR = AT00R  - 1.
074D  F0E1          MIR = B.
074E  F000          WAIT.                                   ERROR # L74
                  X-SELF2.
                  * MIR = FFFF
074F  F000          WAIT.                                   ERROR # L75
0750  F0DB          MIR = A1.                 EXERCISE X-SEL CONTROLS.       B
0751  F000          WAIT.
0752  F0DD            MIR = A2.
0753  F000          WAIT.
0754  F0DE            MIR = A3.
0755  F000          WAIT.
0756  F0EF            MIR = Z.
0757  F000          WAIT.
0758  F0E6          MIR = 0.
0759  F000          WAIT.
                  ********************GETTING BIT PICKUP                         B
075A  F09A            EXEC.
075B  F1E7            RETN.
                  CARIN.                  CHECKOUT OF CARRY                      B
075C  F0A3          IF IRQ EXEC.
075D  F0A4            IF IRQ JUMP.
075E  F000          WAIT.                                   ERROR # L76
075F  F0CA            LCTR.
0760  E000            LIT = 0.
0761  F0F0            MIR = 0 + Z + 1.
0762  E0FF            LIT = @FF@.
0763  F000          WAIT.                                                 MIR = 0000   B
                  *  Z = FFFF THEREFORE MIR = 0000 WITH AOV SET.
0764  8630            CPCR = AGCITEST  - 1.
                  OR-INH8.                                                POSSIBLE ERRORS
0765  F0A3          IF IRQ EXEC.
0766  F0A4            IF IRQ JUMP.
0767  F000          WAIT.                                   ERROR # L77
0768  F0F0          MIR = 0 + Z + 1.
0769  F000          WAIT.                                                 MIR = 0000   B
076A  F076          B = B111.
                  *  ********************          CHECK N26 = 1 ********************
076B  F0E1          MIR = B.
076C  F000          WAIT.                                                 MIR = FFFF   B
076D  F07B          B = B000.
076E  F0E1          MIR = B.
                  *  ********************          CHECK N26 = 0 ********************
076F  F000          WAIT.                                                 MIR = 0000   B
0770  878F          CPCR = Y-SELTEST   - 1.
0771  0198          AMPCR = AT00R  - 1.
                  ADDERTEST.
0772  F0A3          IF IRQ EXEC.                    +53                           B
0773  F0A4          IF IRQ JUMP.                    +54                 MIR = FFFF B
0774  F000          WAIT.           WAIT #1   ERROR # L78                         B
0775  F0E8          MIR = B111.
0776  F000          WAIT.           WAIT #2                             MIR = FFFF B
0777  F0E6          MIR = 0.
0778  F07B          B = B000.
0779  F000          WAIT.           WAIT #3                             MIR = 0000 B
077A  F0CA            LCTR.
077B  E0AA            LIT = @AA@.
077C  F161          B = Z NOR B.          (NOT X)&(NOT Y),  B=0                   B
077D  E055            LIT = @55@.
077E  F0E1          MIR = B.                                                      B
077F  F000          WAIT.           WAIT #4                             MIR = AAAA B
0780  F076            B = B111.
0781  F084          B = LIT NRI B.
0782  F0E1            MIR = B.
0783  F000          WAIT.           WAIT #5                             MIR = AAAA B
0784  F077            B = B001.
0785  F160          B = Z NAN B.                    XNOT OR YNOT                  B
0786  F0E1            MIR = B.
0787  F000          WAIT.           WAIT #6                             MIR = FFFE B
0788  F077            B = B001.
0789  F15F            B = Z IMP B.                    X-PRIME OR Y
078A  F0E1            MIR = B.                        MIR = AAAB
078B  F000          WAIT.           WAIT #7                             MIR = AAAB B
078C  F0F0          MIR = 0 + Z + 1.
078D  F000          WAIT.           WAIT #8                             MIR = 5556 B
078E  F09A          EXEC.
078F  F0C9          JUMP.
```

```
                Y-SELTEST.
                *                Y-SEL  WE VARY Y WHILE HOLDING X CONTSTANT.
                *                     B = B000
                *                     B = B001
                *                     B = B111
                *                     B = BTT0
                *                     B = BTT1
                *                     A3= 0 + LIT
                *                   MIR = 0 + Z
                *                     B = AMPCR
                *                     B = BMAR
0790  F0A3            IF IRQ EXEC.
0791  F0A4             IF IRQ JUMP.
0792  F000            WAIT.          WAIT #9    ERROR # L79      MIR = 5556      B
0793  F07B             B = B000.                                 0 + 0
0794  F0E1             MIR = B.                                  DISPLAY B.
0795  F000            WAIT.          WAIT #10                     MIR = 0000      B
0796  F158            B = BTT1.                 CHECK TRUE MASK FOR 0 STATE     B
0797  F0E1             MIR = B.                                  DISPLAY
0798  F000            WAIT.          WAIT #11                     MIR = 0001      B
0799  F076             B = B111.                                 0 + 1
079A  F0E1             MIR = B.                                  DISPLAY
079B  F075            B = BTT0.                 CHECK TRUE MASK FOR 1 STATE     B
079C  F0E1             MIR = B.                                  DISPLAY
079D  F000            WAIT.          WAIT #12                     MIR = FFFE      B
079E  F07B             B = B000.                                 0 TO B
079F  F051             A3 = B.                                   B TO A3
07A0  F13D            A3 = 0 + LIT.             CHECK LIT SELECTION             B
07A1  E0FF             LIT = @FF@.
07A2  F0DE             MIR = A3.                                 DISPLAY VALUE
07A3  F000            WAIT.          WAIT #13                     MIR = 00FF      B
07A4  F0DA             MIR = AMPCR.                              CHECK AMPCR SEL
07A5  F0CA             LCTR.                                     LIT = FF
07A6  F1DB             MIR = 0 + Z.                              Z = 0000
07A7  E000             LIT = 0.
07A8  F000            WAIT.          WAIT #14                     MIR = 0000      B
07A9  F0CA             LCTR.                                     LIT = 0
07AA  F1DB             MIR = 0 + Z.
07AB  E0FF             LIT = @FF@.
07AC  F000            WAIT.          WAIT #15                     MIR = FFFF      B
07AD  F0D5             MAR1 = B.                                 B = 0 SET ZEROS
07AE  F16E            BR2 = B.
07AF  F0E9             MIR = BMAR.
07B0  F000            WAIT.          WAIT #16                     MIR = 0000      B
07B1  F076             B = B111.
07B2  F0D5             MAR1 = B.                                 B = ONE SET ONES
07B3  F16E            BR2 = B.
07B4  F0E9             MIR = BMAR.
07B5  F000            WAIT.          WAIT #17                     MIR = FFFF      B
07B6  F09A             EXEC.
07B7  F0C9             JUMP.
                MANUAL.
07B8  F000            WAIT.                      ERROR # L5
07B9  46D0            MPCR = ATB0112   - 1.
                XPYPITEST.
07BA  F000            WAIT.                      ERROR # L17
07BB  F09A             EXEC.
07BC  F0C9             JUMP.
                ANDCHECK.
07BD  F000            WAIT.                      ERROR # L18
07BE  F0E1             MIR = B.
07BF  F000            WAIT.
07C0  F09A             EXEC.
07C1  F0C9             JUMP.
                AT1800F.
07C2  0354            AMPCR = AT1800   - 1.
07C3  F0A4            IF IRQ JUMP.
07C4  F0E1            MIR = B.                                                   B
07C5  F000            WAIT.                      ERROR # L80                     B
07C6  F0DE            MIR = A3.                                                  B
07C7  F000            WAIT.                                                      B
07C8  F08D            BMI.                                                       B
07C9  F03C            A3 EQV B.                                                  B
07CA  F09D            IF ABT SKIP.                                               B
07CB  F000            WAIT.                                                      B
07CC  F000            WAIT.                                                      B
07CD  4354            MPCR = AT1800    - 1.                                      B
                AT1800F2.
                *  BADTST ERROR SUBROUTINE
07CE  036B            AMPCR = BADTST   - 1.                                      B
07CF  F0A4            IF IRQ JUMP.                                               B
07D0  F0DE             MIR = A3.
07D1  F000            WAIT.                      ERROR # L82                     B
07D2  F0E1             MIR = B.
07D3  F000            WAIT.
07D4  F07B             B = B000.                                                 B
07D5  F0E1             MIR = B.                                                  B
07D6  F000            WAIT.                                                      B
                AT1800F1.
07D7  F076             B = B111.                                                 B
07D8  F0E1             MIR = B.                                                  B
07D9  F000            WAIT.                                                      B
07DA  F0E6             MIR = 0.                                                  B
07DB  F000            WAIT.                                                      B
07DC  F0E8             MIR = B111.                                               B
07DD  F000            WAIT.                                                      B
07DE  436B            MPCR = BADTST    - 1.                                      B
                AT1900FC.
07DF  F0A3             IF IRQ EXEC.
07E0  F0A4             IF IRQ JUMP.
07E1  F000            WAIT.          WAIT #18   ERROR # L85      MIR = 0000      B
07E2  F08D            BMI.
07E3  F0E1            MIR = B.
07E4  F000            WAIT.          WAIT #19                    MIR = 0000      B
07E5  F0CA            LCTR.
07E6  E000            LIT = 0.
07E7  F0EF             MIR = Z.
07E8  E0FF            LIT = @FF@.
07E9  F000            WAIT.          WAIT #20                    MIR = FFFF      B
07EA  F0E8            MIR = B111.
07EB  F08D            BMI.
07EC  F0E1            MIR = B.
07ED  F000            WAIT.          WAIT #21                    MIR = FFFF      B
07EE  F076             B = B111.
07EF  F0E1             MIR = B.
07F0  F000            WAIT.          WAIT #22                    MIR = FFFF      B
07F1  F05E            ASR.
07F2  F0D5             MAR1 = B.
07F3  F0E9             MIR = BMAR.
07F4  F000            WAIT.          WAIT #23                    MIR = FFFF      B
07F5  F09A             EXEC.
07F6  F0C9            JUMP.
                *-------------------------------
                *                SUCCESSOR HIGH BITS TEST
07F7  07F8            AMPCR = HIBITS   - 8.
07F8  F0C9            JUMP.
07F9  F008            IF GC1 SKIP.               TEST M+2 ADDER CARRIES
07FA  F000            WAIT.                             FILLER
07FB  F18B            IF GC1 SAVE.
07FC  F18A            IF GC1 RETN.
07FD  0800            AMPCR = HIBITS.
07FE  F008            IF GC1 SKIP.               TEST M+2 ADDER CARRIES          B
07FF  F002            IF GC1 STEP ELSE SKIP.     TEST M+1 ADDER CARRIES
                HIBITS.
                *  NOTE---HIGHBITS MUST BE LOCATED AT ADDRESS 0800
0800  F18A            IF GC1 RETN.               TEST A+2 ADDER CARRIES
0801  47F6            MPCR = HIBITS   - 10.
0802  0000            AMPCR = 0.                 CLR AM FOR SAVE TEST
0803  87FE            CPCR = HIBITS   - 2.
0804  F000            WAIT.                             FILLER
0805  4805            MPCR = HIBITS   + 5.
0806  F008            IF GC1 SKIP.
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0807  F000          WAIT.                FILLER
0808  0809          AMPCR = HIBITS   + 9.
0809  F0C9          JUMP.
080A  0050          AMPCR = SETGC1   - 1.
080B  F09A          EXEC.
080C  F18C          IF  GC1  WAIT.          END OF SUCCESSOR  TEST
                    *                       FE  ACTION  REQUIRED
                    *                       VERIFY  FE  ADDRESS  CTR  =  0059
                    *
                    *       IF  YES         FORCE  STEP  TWICE  TO  BEGIN
                    *                       CONTROL  UNIT  TEST
                    *
                    *       IF  NO          GO TO S1
                    *                       (RE-RUN  MTR IN  SINGLE  CLOCK
                    *                       MODE TO FIND  SEQUENCE  ERROR)
                    *
080D  F000          WAIT.                   ERROR TRUE  WAIT  DOES  STEP
                    *                       (DISREGARD  WHEN FORCE  STEPING)
080E  F00C          RESET  GC1.
080F  4057          MPCR = CONTIN  - 1.
                    *----------------------------------
                    AT1900FB.
0810  F0A3          IF  IRQ  EXEC.
0811  F0A4          IF  IRQ  JUMP.
                    *PATH  ALU-MIR-MEM-BREG-ALU     FAILED.   FAILURE                B
                    *  OCCURRED  IN  THE  B-SEL  LOGIC  AND/OR  ITS  CONTROLS
0812  F0DE          MIR = A3.
0813  F08D          BMI.
0814  F0E1          MIR = B.
0815  F000          WAIT.                        ERROR  #  L84
0816  F09A          EXEC.
0817  F0C9          JUMP.
                    AT2100F.
0818  F0A3          IF  IRQ  EXEC.
0819  F0A4          IF  IRQ  JUMP.
081A  F0DA          MIR = AMPCR.        ADDRESS  WHERE ERROR  WAS  DETECTED      B
081B  F000          WAIT.                        ERROR  #  L86
081C  F0E1          MIR = B.
                    *   EXPECTED  VALUE                                          H
081D  F000          WAIT.
081E  F0DD          MIR = A2.
                    *   ACTUAL  VALUE                                            H
081F  F000          WAIT.
0820  F1E7          RETN.
                    AT1900F.
0821  F0A3          IF  IRQ  EXEC.
0822  F0A4          IF  IRQ  JUMP.
0823  F054          A3  =  B000.
0824  F0DE          MIR = A3.
0825  0864          AMPCR = DATAMEM1.
0826  F0CF          MAR1 = AMPCR.
0827  F0F3          MW1.
0828  F05F          B.
0829  F0F1          MR1.
082A  F0F9          WHEN RDC  BEX.
082B  F03C          A3  EQV  B.
082C  F09D          IF  ABT  SKIP.
082D  880F          CPCR = AT1900FB    - 1.
082E  037A          AMPCR = AT1900     - 1.
082F  F000          WAIT.                        ERROR  #  L88
                    *MIR  TEST  FAILED  IN  PATH  ALU-MIR-BREG-ALU               B
0830  87DE          CPCR =  AT1900FC   - 1.
0831  037A          AMPCR = AT1900     - 1.
                    ADDCYTSTF.
0832  F0A3          IF  IRQ  EXEC.
0833  F0A4          IF  IRQ  JUMP.
0834  F0A0          IF  EXT  SKIP.
0835  F0BA          IF  NOT  EXT  SKIP.
0836  F0A0          IF  EXT  SKIP.
0837  F0F7          SKIP.
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0838  F000          WAIT.
                    **********                EXT  FAILED  GO  TO  MCU  MTR.
0839  F000          WAIT.                        ERROR  #  L32
                    **********          A3  =  A1  =  MAR1  =  A2  =  MIR  =  B-REG  *
083A  F0DA          MIR = AMPCR.
                    *  MIR  CONTAIN  THE  ADDRESS  WHERE  FAILURE  OCCURS.
083B  F000          WAIT.
083C  F0DE          MIR = A3.
083D  F000          WAIT.
083E  F0DB          MIR = A1.
083F  F000          WAIT.
0840  F0E9          MIR = BMAR.
0841  F000          WAIT.
0842  F0DD          MIR = A2.
0843  F000          WAIT.
0844  F0E1          MIR = B.
0845  F000          WAIT.
0846  F1E7          RETN.
                    AT1100F.
                    *  A-REG  ERROR  SUBROUTINE
                    *  A-REG  ERROR  AND  EQV  DECODING  BITS  N28-N31   ERROR  SUBR   B
0847  F0A3          IF  IRQ  EXEC.
0848  F0A4          IF  IRQ  JUMP.
0849  F0DA          MIR = AMPCR.                 GET  ERROR  ADDRESS             B
084A  F000          WAIT.                        ERROR  #  L33
084B  F0DE          MIR =  A3.
084C  F000          WAIT.
084D  F0DD          MIR = A2.
084E  F000          WAIT.
084F  F0DB          MIR = A1.
0850  F000          WAIT.
0851  F0EF          MIR = Z.
                    *  Z  CONTAINS  THE  EXPECTED  VALUES  FOR  A1-A3
0852  F000          WAIT.
0853  F1E7          RETN.                  ALLONS  CONTINUATION  OF  TESTING       B
                    AT2000F.
0854  F0BD          IF  NOT  IRQ  SKIP.                                           B
0855  4365          MPCR = AT2000    - 1.                                         B
0856  F000          WAIT.                        ERROR  #  L40
                    *          BEEN  TESTED  WITH  SAR  INPUTS.   WE  WANT  PASS  DATA
                    *          THRU  BSW  WITH  0  SHIFT,   IF  WE  GOT  TO  THIS  POINT
                    *          THEN  THE  TEST   FAILED.
0857  4864          MPCR  = BSWTST  - 1.
                    AMPCR-TST-F3.
                    *  AMPCR  ERROR  SUBR.
0858  F0A3          IF  IRQ  EXEC.
0859  F0A4          IF  IRQ  JUMP.
                    *  MIR  =  VALUE  FROM  AMPCR  TO  MIR  VIA  ALU
085A  F000          WAIT.                        ERROR  #  L89
085B  F0DE          MIR = A3.
085C  F000          WAIT.
                    *  THE  VALUES  PASSED  (SEE  TEST  8  )ARE  0000  AND  1FFF
                    *  IF  THE  NEXT  TWO  WAIT  DISPLAYS  0000  AND  THEN  1FFF
                    *PROBLEM  IS  IN  PATH  BSW-AMPCR  OR  AMPCR-YSEL              B
085D  F0DA          MIR = AMPCR.
085E  0000          AMPCR = 0.
085F  F000          WAIT.
0860  F0DA          MIR = AMPCR.
0861  3FFF          AMPCR = @3FFF@.
0862  F000          WAIT.
0863  43E7          MPCR  = BR1-TST  - 1.
                    DATAMEM1.
0864  F05F          B.
                    BSWTST.
0865  F000          WAIT.                        ERROR  #  L39
0866  F1E7          RETN.
                    AT900E.
0867  F0A3          IF  IRQ  EXEC.
0868  F0A4          IF  IRQ  JUMP.
0869  F000          WAIT.                        ERROR  #  L34
```

```
086A  F015          IF  LC2  SKIP.
086B  8630          CPCR  =  AGC1TEST  -  1.
                AT900E4.
086C  F076          B  =  B111.                          MAR/CTR  OR  BSW  FAILED      B
086D  F0E1          MIR  =  B.
086E  F0B5          IF  NOT  ABT  SKIP.
086F  8619          CPCR  =  AT900E1  -  1.
0870  F000          WAIT.                          ERROR  #  L36
                *IF  AN ERROR  IS  DETECTED  GO TO BSW TST                            B
0871  F0E6          MIR  =  0.
0872  F000          WAIT.
0873  4864          MPCR  =  BSWTST  -  1.
0874  F01E          IF  LC3  SKIP.
0875  F01E          IF  LC3  SKIP.
                FLAG-RESET.
0876  F00C          RESET  GC1.                                  RESET  FLAGS
0877  F01F          RESET  GC2.
0878  F014          IF  LC1  SKIP.
0879  F015          IF  LC2  SKIP.
087A  F015          IF  LC2  SKIP.
087B  F091          CALL.
087C  F091          CALL.
                SGLSTPP.
087D  F0E8          MIR  =  B111.                0                                    B
087E  F0E6          MIR  =  B000.                +1                                   B
087F  F076          B  =  B111.                  +2                MIR  =  FFFF       B
0880  F0E1          MIR  =  B.                   +3                MIR  =  0000       B
0881  F07B          B  =  B000.                  +4                                   B
0882  F0E1          MIR  =  B.                   +5                MIR  =  FFFF       B
0883  F0DA          MIR  =  AMPCR.               +6                                   B
0884  3FFF          AMPCR  =  @3FFF@.            +7                MIR  =  0000       B
0885  F0DA          MIR  =  AMPCR.               +8                                   B
0886  0000          AMPCR  =  0.                 +9                MIR  =  3FFF       B
0887  F01D          A1  =  LIT.                  +10                                  B
0888  E001          LIT  =  1.                   +11               MIR  =  0000       B
0889  F038          A2  =  LIT.                  +12                                  B
088A  E002          LIT  =  2.                   +13                                  B
088B  F058          A3  =  LIT.                  +14                                  B
088C  E003          LIT  =  3.                   +15                                  B
088D  F0DB          MIR  =  A1.                  +16                                  B
088E  F0DD          MIR  =  A2.                  +17                                  B
088F  F0DE          MIR  =  A3.                  +18               MIR  =  0001       B
0890  F0CA          LCTR.                        +19               MIR  =  0002       B
0891  E0FF          LIT  =  @FF@.                +20               MIR  =  0003       B
0892  F0EF          MIR  =  Z.                   +21                                  B
0893  E000          LIT  =  0.                   +22                                  B
0894  F08D          BMI.                         +23                                  B
0895  F0E1          MIR  =  B.                   +24               MIR  =  0000       B
0896  F0CA          LCTR.                        +25                                  B
0897  F0EF          MIR  =  Z.                   +26                                  B
0898  E0FF          LIT  =  @FF@.                +27                                  B
0899  F0D5          MAR1  =  B.                  +28                                  B
089A  F08D          BMI.                         +29               MIR  =  FFFF       B
089B  F05E          ASR.                         +30                                  B
089C  F0E9          MIR  =  BMAR.                +31                                  B
089D  F0D5          MAR1  =  B.                  +32                                  B
089E  F0E9          MIR  =  BMAR.                +33               MIR  =  0000       B
089F  F05D          ASE.                         +34                                  B
08A0  F08D          BMI.                         +35               MIR  =  FFFF       B
08A1  F0DD          MIR  =  A2.                  +36                                  B
08A2  F16E          BR2  =  B.                   +37                                  B
08A3  F054          A3  =  B000.                 +38               MIR  =  0002       B
08A4  F032          A2  =  A3.                   +39                                  B
08A5  F016          A1  =  A3.                   +40                                  B
08A6  F0E9          MIR  =  BMAR.                +41                                  B
08A7  F0DE          MIR  =  A3.                  +42                                  B
08A8  F076          B  =  B111.                  +43               MIR  =  FFFF       B
08A9  F051          A3  =  B.                    +44               MIR  =  0000       B
08AA  F0DE          MIR  =  A3.                  +45                                  B
08AB  F0DD          MIR  =  A2.                  +46                                  B
08AC  F032          A2  =  A3.                   +47               MIR  =  FFFF       B
08AD  F0DD          MIR  =  A2.                  +48               MIR  =  0000       B
08AE  F0DB          MIR  =  A1.                  +49                                  B
08AF  F016          A1  =  A3.                   +50               MIR  =  FFFF       B
08B0  F0DB          MIR  =  A1.                  +51               MIR  =  0000       B
08B1  8771          CPCR  =  ADDERTEST  -  1.    +52                                  B
08B2  08B2          AMPCR  =  ADCOMPL  -  1.
                ADCOMPL.
08B3  878F          CPCR  =  Y-SELTEST  -  1.
08B4  08B4          AMPCR  =  Y-SELCOMPL  -  1.
                Y-SELCOMPL.
08B5  F0E6          MIR  =  0.
08B6  87DE          CPCR  =  AT1900FC  -  1.
08B7  08B7          AMPCR  =  AT1900COMPL  -  1.
                AT1900COMPL.
08B8  4198          MPCR  =  AT00R  -  1.
                LINC.
08B9  F0B8          IF  NOT  COV  SKIP.
08BA  8831          CPCR  =  ADDCYTSTF  -  1.
08BB  F030          INC.
08BC  043A          AMPCR  =  ADDCYTST3  -  1.
08BD  F0C9          JUMP.
                DOJMP.          CLEAR  BSW  &  JUMP.
08BE  F008          IF  GC1  SKIP.
08BF  F187          IF  GC1  STEP  ELSE  JUMP.
08C0  F0C9          JUMP.
                ABTTST.
08C1  F038          A2  =  LIT.
08C2  E001          LIT  =  1.
                ABTTEST.
08C3  F022          A2  EQV  B000.
08C4  F0B5          IF  NOT  ABT  SKIP.
08C5  88D2          CPCR  =  ABTFAULT  -  1.
08C6  F02A          A2  =  A2  +  1.
08C7  F09E          IF  AOV  SKIP.                                                    B
08C8  48C2          MPCR  =  ABTTEST  -  1.
                AOVTEST.                                                          B
08C9  F02A          A2  =  A2  +  1.                                              B
08CA  F0B7          IF  NOT  AOV  SKIP.                                           B
08CB  88D2          CPCR  =  ABTFAULT  -  1.                                      B
08CC  F021          A2.                                                           B
08CD  F09D          IF  ABT  SKIP.                                                B
08CE  48C8          MPCR  =  AOVTEST  -  1.                                       B
08CF  F01E          IF  LC3  SKIP.
08D0  F000          WAIT.                          END  OF  'PROC  MTR'
                *                                  FORCE  STEP  TO  RECYCLE
                *                                  LOGIC  UNIT  MTR.
08D1  F01A          SET  LC3.
08D2  4198          MPCR  =  AT00R  -  1.
                ABTFAULT.
08D3  08C2          AMPCR  =  ABTTEST  -  1.                                      B
08D4  F0A4          IF  IRQ  JUMP.
08D5  F000          WAIT.          ERROR  #  L93                                 B
08D6  F0C9          JUMP.
                CONDTEST.                                                         H
08D7  08DA          AMPCR  =  CONDTEST1  -  1.                                    H
08D8  F1AE          IF  NOT  URQ  SKIP.                                           H
08D9  40D3          MPCR  =  CONTCTRTST  -  1.                                    H
08DA  F1B2          IF  URQ  SET  GC1  ELSE  JUMP.                                H
                CONDTEST1.                                                        H
08DB  08DC          AMPCR  =  CONDTEST2  -  1.                                    H
08DC  F1B2          IF  URQ  SET  GC1  ELSE  JUMP.                                H
                CONDTEST2.                                                        H
08DD  F0BB          IF  NOT  GC1  SKIP.                                           H
08DE  8184          CPCR  =  ERR2  -  1.          FAILURE  F522  (CONDIT  ADJ)    H
08DF  F0BC          IF  NOT  GC2  SKIP.                                           H
08E0  8184          CPCR  =  ERR2  -  1.          FAILURE  F522  (CONDIT  ADJ)    H
08E1  8873          CPCR  =  FLAG-RESET  -  3.                                    H
08E2  40D3          MPCR  =  CONTCTRTST  -  1.                                    H
```

```
          STCTEST.                                                    H
08E3 F0E6      MIR = B000.                                            H
08E4 F08D      BMI.                    FOLLOW BMI WITH A TYPE 1       H
08E5 F1BA      LIT EQV 0.              HAVING MPM BIT 8 SET TO        H
08E6 F0E1      MIR = B.                TEST STC CARD DOES NOT         H
08E7 F0FF      0 EQV B.                GATE MPM ONTO MIR              H
08E8 F09D      IF ABT SKIP.                                           H
08E9 F000      WAIT.                   FAILURE F521                   H
               *                                   (MIR SET BY STC)   H
08EA 48C0      MPCR = ABTTST - 1.                                     H
          FINISH.
```

NOTES

IF THE IRQ SWITCH IS SET TO IRQ ANY ERROR OCCURING AFTER PROGRAM STEP 2 WILL CAUSE THE PROGRAM TO LOOP ON THE INSTRUCTIONS THAT DETECTED THE ERROR FOR SIGNAL TRACING. IN THE EVENT THE NORMAL MTR PROCEDURE DOES NOT CORRECT THE FAILURE THIS MODE MAY BE USED. (REF L101).

MANUAL PROCEDURES

S1	OPERATOR ACTION	MACHINE ACTION			
1	HOLDING CLEAR PUSHBUTTON				
2	PLACE CLK SWITCH TO SGL				
3	HOLDING FST PRESS & RELEASE SGL PUSHBUTTON				
4	CONTINUE SINGLE PULSES OBSERVE THE INCR DISPLAY CHECKING AGAINST THE NORMAL INSTRUCTION SEQUENCE NOTING ALL ERRORS UNTIL ONE OF THE THREE CONDITIONS AGREES	1	INCR STOPS	5	4
		2	INCR LOOPS	6	4
		3	INCR EXCEEDS PROGRAM BOUNDS: GREATER THAN 0057 BUT NOT WITHIN 07F7-080D.	7	4
5	OBSERVE HEX VALUE DISPLAY OF INCR. FIND VALUE IN SEQUENCE ERROR LIST 1----				
6	OBSERVE MAX HEX VALUE OF INCR DISPLAYED DURING LOOP. (EXCLUDE THE VALUE '51') FIND VALUE IN SEQ ERR LIST 1----				
7	OBSERVE HEX VALUE OF INCR DISPLAY 1 CLOCK BEFORE PROG BOUNDS EXCEEDED. FIND VALUE IN SEQUENCE ERROR LIST 1----				

-NOTE 1--
FIND OBSERVED SEQ ERROR IN SEQUENCE ERROR LIST.
IF NOT LISTED - USE MOST SIMILAR

EXAMPLES OF SEQUENCE ERRORS IN SINGLE STEP (S1 STEP 4)

1 INCREMENTER STOPS -
NORMAL INCR SEQUENCE OCCURS UNTIL 0010, THEN INCR GOES FROM 0010 TO 0013 (ERROR). FROM 0013, INCR GOES TO 0016 (NORMAL) FROM 0016, INCR GOES TO 0017 (ERROR) WHICH IS A WAIT.
TWO SEQ ERRORS OCCURRED (0010 - 0013) & (0016 - 0017)
ENTRY TO SEQUENCE ERROR LIST IS INCR VALUE AT WAIT (0017)
DISREGARD LEADING ZEROS. UNDER INCR COLUMN OF SEQ ERR LIST THERE ARE 11 DIFFERENT SEQ ERRORS LISTED FOR 17. THE MOST SIMILAR TO THAT OBSERVED IS USED TO INDICATE FAILURE # (F280 & F390 IN THIS EXAMPLE)

2 INCREMENTER LOOPS -
INCR SEQUENCE - 0010-0006-0007-0008-0009-000A-0010 ETC
ENTRY TO SEQUENCE ERROR LIST IS HIGHEST INCR VALUE IN LOOP (0010 IN THIS EXAMPLE) UNDER INCR COLUMN OF SEQ ERROR LIST THERE ARE 5 DIFFERENT LOOPING SEQUENCES LISTED FOR 10. USE THE MOST SIMILAR TO THAT OBSERVED TO INDICATE FAILURE # (F275 IN THIS EXAMPLE)

3 INCREMENTER EXCEEDS PROGRAM BOUNDS
NORM INCR SEQ OCCURS UNTIL 0800, THEN INCR GOES TO 0401
NOTE SINGLE STEPPING BEYOND PROG BOUNDS HAS UNPREDICTABLE RESULTS
ENTRY TO SEQUENCE ERROR LIST IS LAST INCR VALUE PRIOR TO EXCEEDING PROG BOUNDS (0800 IN THIS EXAMPLE)
THE MOST SIMILAR SEQ ERROR UNDER 800 INDICATES FAIL - F221

*
* NORMAL INSTRUCTION SEQUENCE
* NOTE '*' INDICATES FORCE STEP REQUIRED
*
* 0*1-3-4-6-7-8-9-A-C-D-F-10-11-12-13--15-16-18-1A-1B
*
* 1C-1D-1E-20-21-24-25-51-26-28-29-51--2A-2C-2D-2E-51
*
* 2F-31-32-51-33-35-36-37-38-51-39-3B--3C-3E
*
* 40-41-42-44-45-46-48-49-4A-4B-4C-4D--4E-54-55-56
*
* 800-801-7F7-7F8-7F9-7FB-7FC-7FD-7FE--800-802-803
*
* 7FF-800-805-806-808-809-80A-80B-51-880C

SEQUENCE ERROR LIST

INCR	SEQUENCE ERROR	FAILURE NUMBER
0	UNABLE TO FORCE STEP	F201
0	0-1 1-2 ETC (SEQUENTIAL)	F202
0	9-0	F203, F328
0	A-0	F204
0	D-0	F205
0	F-0	F206
0	10-0	F207
0	12-0	F329
0	16-0	F218-F328
0	18-0	F210
0	1B-0	F208
0	1E-0	F209
0	56-0	F211
0	0-7FE	F240
0	0-3001	F264
0	0-3801	F215-F377
1	NONE	F212
1	1-83	F213
1	1-103, 203, OR 403	F214
1	1-1003,2003, OR 3003	F264
2	0-2	F365
2	1-2	F212-F215-F377
2	4-2	F212
2	10-2	F216
2	11-2	F213-F219
2	800-2	F220
2	801-2	F221
3	NONE	F376
3	LOOPING 3-1	F222-F365-F377
5	0-5	F365
5	0-3 3-5	F224
5	3-5	F223
5	4-5	F222
5	7-B B-5	F225
5	7-D D-5	F210
5	9-5	F394
5	A-D D-5	F227
5	D-5	F228
5	13-5	F213
5	44-5	F213
5	800-5	F381
6	NONE	F229-F377
7	NONE	F229-F230-F377
9	NONE	F231-F396
A	NONE	F232
A	LOOPING A-6	F396
A	LOOPING A-8-9	F233
A	LOOPING A-4-6-7-8-9	F234
A	A-8C	F235
A	A-10C	F248-F318
A	A-1FC	F237
A	A-20C	F238

A	A-40C		F239
A	A-80C		F240
A	A-100C		F242
A	A-1F0C		F241
A	A-200C		F243
A	A-300C		F244
B	0-B		F365
B	1-B		F212
B	9-B		F218-F245-F395
B	A-B		F230-F395-F396
B	C-B		F246
B	D-B		F247
B	16-8	9-B	F248
B	18-A	A-B	F226-F250-F379
B	26-8	9-B	F249
B	800-1	9-B	F252
B	800-4	9-B	F305
B	803-4	9-B	F214
B	806-8	9-B	F241
B	809-A	A-B	F251
D	NONE		F259
D	LOOPING	D-1---D	F378
D	LOOPING	D-7-8-9-A-C	F258-F293
D	D-8F		F253
D	D-FF		F226
D	D-10F		F254
D	D-1FF		F301
D	D-20F		F256
D	D-40F		F257
D	D-80F		F260
D	D-F0F		F381
D	D-100F		F251-F261
D	D-1F0F		F251
D	D-200F		F262
D	D-300F		F217
E	0-E		F365
E	A-E		F225-F265
E	D-E		F266-F396
E	D-D	D-E	F208-F285
E	F-E		F270-F288
E	1B-C	D-E	F267-F268-F304
E	808-51-C	D-E	F382
F	NONE		F269
F	D-F		F270
10	NONE		F208-F270-F271
10	D-10		F272-F396
10	LOOPING	10-1-3-4-6-8-9-A-C-D-F	F273-F274
10	LOOPING	10-6-7-8-9-A	F275
10	LOOPING	10-9-A-C-D-F	F273-F302
10	LOOPING	10-D	F273
10	LOOPING	10-F	F273-F303
10	LOOPING	10-D-C-D-F	F302
10	10-91		F276
10	10-111		F221-F323
10	10-211		F322
10	10-411		F321
10	10-811		F252-F305
10	10-1F1		F267
10	10-1011		F306-F384
10	10-1F11		F221
10	10-2011		F306-F383
10	10-3011		F306
12	NONE		F269
14	A-14		F275
14	10-12	12-14	F273
14	12-14		F398-F397-F395
14	16-14		F275
14	1B-14		F277

17	1-13 16-17	F213	D
17	4-8 13-17	F212	
17	D-17	F272	
17	D-13 16-17	F272	
17	F-11 12-17	F279	
17	10-13 16-17	F280-F390	
17	10-15 16-17	F281	
17	10-1B 16-17	F282	
17	12-17	F279-F328	
17	16-17	F255-F394	
17	18-17	F208	
18	LOOPING 18-11-12-13-15-16-18	F283	
18	LOOPING 18-10-11-12-13-15-16-18	F212	
19	10-19	F277	
19	18-19	F272-F394	
1A	18-1A	F269-F270	
1B	NONE	F208	
1B	0-1 (WITHOUT FST)	F270	
1B	0-1 9-B 11-13 18-1B	F394	
1B	0-1 F-11 12-14 14-11 1A-1F 1F-1B	F396	
1B	18-1B	F266-F284	
1B	1A-1B	F285	
1B	LOOPING 1B-18	F281	
1F	A-1F	F275	
			H
1F	A-F 16-1F	F287	H H
1F	D-1F	F250-F272-F286	
1F	D-10 1B-1D 1E-1F	F289	
1F	F-1F	F225	
1F	10-1F	F273	
1F	16-1B 1B-1F	F208	
1F	16-1F	F279-F329-F294	
1F	18-1E 1E-1F	F247	
1F	1A-1F	F288	
1F	1B-1D 1E-1F	F279-F392	
1F	1B-1F	F225-F270	
1F	1E-1F	F327-F332-F400	

21	LOOPING 21-4----21	F213	
22	1E-22	F291	
22	0-X 51-22 (X=1 THRU F)	F365	
22	F-11 20-22	F396	
22	D-11 18-1C 1E-22	F272	
23	1-23	F213	
23	20-23	F288	
25	NONE	F269	
25	25-29	F258-F272	
25	25-59	F258-F272	
25	25-71	F401	
27	18-1C 25-53-26-27	F292	
27	25-59-26-27	F258-F272	
27	25-71-26-27	F401	
27	29-27	F208	
			H
29	D-10 18-20 25-26 29-60	F283	H H
29	LOOPING 29-21-28	F212	
2B	D-10 18-20 25-26 29-60 2A-2B	F283	
2B	1E-28 29-28 28-2A 2A-2B	F293	
2B	29-26 2A-2B	F208	
2E	2D-2E	F269	
2F	LOOPING 2F-21-----51-2F	F237-F275	
30	D-2F 2F-30	F295	
30	10-31 32-30	F304	
30	16-20 25-26 26-30	F275	
30	1E-30	F387	
30	2F-30	F227	
32	LOOPING 32-10-31	F296	
34	32-2F 33-34	F208	
38	38-37	F208	
39	NONE	F265	
3A	10-21 38-31 31-39 39-3A	F208-F226	
3A	38-36 39-3A	F208	
3D	39-3D	F275	
3D	3C-3D	F230	

3E	LOOPING 3E-38---3E	F212	
3F	A-F 1E-3F	F294-F328	H
3F	A-F 26-2 3C-3F	F218-F297	H H
3F	16-1C 26-2C 2F-35 39-3F	F298	
3F	1E-3F	F279	
42	A-2C 42-64	F249	
42	LOOPING 42-4-----42	F300	
43	1-43	F213	
43	2F-39 42-4C 4C-43	F234	
43	42-43	F288	
43	45-43	F285	
45	LOOPING 45-6-----45	F267-F299	
45	LOOPING 45-44	F282	
47	45-47	F225	
48	LOOPING 48-46	F213-F324-F325	
4C	LOOPING 4C-6-7-8-9-A	F300	
4F	D-4F	F299-F301	
4F	48-4F	F208	
4F	49-4F	F225	
4F	4C-4F	F225	
4F	4D-4F	F225	
51	9-F 25-51-77	F225	
52	0-1 1A-1C 2E-51-52	F396	
52	0-1 2E-51-52	F270	
52	A-2C 2F-51-52	F237	
52	10-51 51-52	F308-F309	
52	25-51-52	F246	
52	25-51-56-51-52	F219	
53	25-51-52-53	F270	
56	NONE	F312	
56	4-5 A-B D-E----56-57 (ALLTYPE 1,S STEP)	F377	H
56	1E-10 10-21 56-700	F301-F251	H H
56	1E-10 10-21 56-7F0	F272-F301	
56	LOOPING 56-45	F226-F273-F274	
56	LOOPING 56-55	F304-F226-F391	

56	56-100	F382-F380	F
56	56-400	F313	
56	56-600	F314	
56	56-700	F315	
56	56-780	F309-F310	
56	56-7C0	F301	
56	56-7E0	F311	
56	56-840	F386	G
56	56-3FXX	F356	G G
111	110-111 WITHOUT FST	F208-F269	F
7F7	7F7-0F8	F382	F F
7F8	25-11 29-11 32-11 38-11 7F8-7B9	F316	
7F8	7F8-3F9	F316	
7F8	7F8-5F9	F320	
7F8	7F8-6F9	F319	
7F8	7F8-779	F317	
7F8	7F8-880	F387	
7F9	A-1C 26-38 38-39 39-4B 7F9-80B	F237-F275	
7F9	7F9-3FB	F239	
7F9	7F9-5FB	F238	
7F9	7F9-6FB	F318	
7F9	7F9-76A	F213	
7F9	7F9-77B	F235	
7FA	0-801 7F9-7FA	F214	
7FA	A-1C 26-38 42-54 7F9-7FA	F248	
7FA	26-38 42-54 7F9-7FA	F237	
7FA	45-4E 7F9-7FA	F273-F302	
7FC	7FC-3FD	F321	
7FC	7FC-5FD	F322	
7FC	7FC-6FD	F323	
7FC	7FC-77D	F276	
7FC	7FC-7DD	F296-F304	H
7FE	7FE-0	F240	H H
7FE	7FE-700	F237-F241	
7FE	7FE-900	F318	

7FE	7FE-A00		F383	
7FE	7FE-C00		F385	
800	800-101		F381	
800	800-401		F221	
800	800-601		F221	
800	800-701		F221-F267	
800	800-704		F381	
800	800-781		F267	
800	800-7E1		F267	
801	LOOPING	801-7F7----801	F273	H
				H
801	LOOPING	801-7FC-801	F302	H
801	800-3F7		F214	
801	801-5F7		F214	
801	801-6F7		F214	
801	801-8F7		F214	
803	1-803	803-FFF	F214	
804	45-48	800-804	F273	
80B	80B-851		F389	H
				H
80C	45-48		F303	H
80D	0-1 80C-80D	WITHOUT FST	F269-F365	H
				H
80D	80C-80D	WITHOUT FST	F263-F269	H

C1	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER CU1-1L #FP4L! (PSIRQ/)	100%	F393	2	
					B
					B
2	SET SGL SWITCH TO SGL,NOTE				B
	INCR & FIND IN PROG LISTING.				B
	PRESSING SGL PUSHBUTTON				B
	ADVANCE INCR UNTIL AN				B
	'IF IRQ SKIP'OR'IF IRQ JUMP'				B
	INSTRUCTION IS REACHED		3	2	B
					B
					B
3	HOLDING FST PRESS SGL ONCE	INCR ADVANCES 1	4	2	B
4	SET SGL SWITCH TO NORM				
	OBSERVE INCR & PROCEED				
	PER PROGRAM INSTRUCTION				
	A PROCESSOR ERROR HAS BEEN DETECTED				
	CONTINUE PROC MTR.				
	AN IRQ PROBLEM HAS ALSO BEEN				
	DETECTED. CONSOLE MTR WILL				
	HAVE TO BE RUN.				

C2	F278-F326-F333	
C4	F278-F334-F335	
C6	F278-F326-F336	
C8	F278-F333-F335	
C9	F324	
C10	F278-F326-F337	
C14	F278-F338	
C16	F278	
C18	F341-F393	
C20	F326-F337-F340	
C22	F342	
C24	F343	
C26	F344	
C28	F325-F330	B
		B
C30	F330-F335-F395	B
C32	F330	
C34	F325-F330	
C36	F345	
C40	F324	
C42	F324-F327	B
		B
C44	F324-F346	B
C45	F347	
C46	F324-F344	B
		B
C48	F324	B
		B
		B
C49	F324	B
C52	F348-F349	B
		B
C54	F350-F404	B
C56	F344-F349	
C57	F352	
C58	F353-F373	
C59	F354	
C60	F355-F395	
C62	F356	

C63 F356

C64 F353-F356

C65 F326-F353

C66 F333-F357

C68 F236-F395

C70 F330-F336-F357

C72 F393-F399

C74 F344-F349

C75 F358

C76 F348-F359-F373

C78 OPERATOR ACTION MACHINE ACTION

METER CG1-1F #FQ0F! (CG3CLKA) 3-5%
IF GOOD F351-F359-F360
IF BAD F358

C80	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRESS FST TWICE			
2	OBSERVE MIR	ALL DIGITS = 0	F348	3
3	OBSERVE MIR	DIGIT A = F	F361	4
4	OBSERVE MIR	DIGIT B = F	F362	

C82	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRESS FST ONCE	NOTE: DISREGARD MIR DIGITS A & B		
2	OBSERVE MIR ONLY	DIGIT C = 0	F363-F364	3
3	OBSERVE MIR ONLY	DIGIT D = 0	F365-F366	4
4	OBSERVE MIR	DIGIT C = F	F366	5
5	OBSERVE MIR	DIGIT D = F	F364	6
6			F354-F348	

C84 F367

C86	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRESS FST TWICE			
2	OBSERVE MIR	DIGITS A&B = FF	F367	3
3	OBSERVE MIR	DIGIT A = F	F368	4
4			F369	

C88	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRESS FST ONCE			
2	OBSERVE MIR	DIGIT A = 0	F375	3
3			F374	

C90 F372

C92	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRESS FST ONCE			
2	OBSERVE MIR	DIGITS C&D = 0	F367	3
3	OBSERVE MIR	DIGIT C = 0	F363-F364	4
4	OBSERVE MIR	DIGIT D = 0	F365-F366	5
5	OBSERVE MIR	DIGIT C = F	F366	6
6			F364	

C94	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRESS FST TWICE			
2	OBSERVE MIR	DIGITS A&B = FF	F354-F348	3
3	OBSERVE MIR	DIGIT A = 0	F368	4
4			F369	

C96 F340

C97 F340

C99 EO2 HALT IND ON

1 OBSERVE EO2 ERROR CODE INDICATORS FOR NEXT STEP NO. (HEX)

IND	
0	SMCU MTR
1 THRU 5	FEMT MTR
6	C100
7 THRU B	SMCU MTR
C THRU F	2

2 UNEXPECTED STEALS ARE OCCURRING TO DETERMINE WHICH DDP IS AT FAULT

A. REMOVE DMC & DM3 CARDS
RE-RUN PROCMTR ERROR RECURS 2B 2C

B. REMOVE CLB & CLC CARDS OF EACH PMLC 1 AT A TIME UNTIL PROCMTR RUNS THEN USE M1 OF PMLC MTR MANUAL PROCEDURES

C. GO TO M1 OF UCDD MTR MANUAL PROCEDURES

C100 THIS PROCEDURE APPLIES TO ANY PROGRAM EXPERIENCING AN MPM PARITY ERROR AND ASSUMES THE EO2 HALT IND IS ON AND THE DESCRIPTOR IND = 6 WHETHER DUE TO A SECOND ERROR, OR A FIRST ERROR IN ERROR STOP (ERS) OR LOAD MODE.

1.OBSERVE INCR (THIS IS ERROR ADDRESS).

2.USING PROG LISTING OF PROG IN MEMORY FIND MPM VALUES FOR ERROR ADDRESS AND FOR ADDRESS 0000.

3.WHEN HALT IND IS ON MEMORY IS ALTERNATING BETWEEN ADDRESS 0000 AND THE ERROR ADDRESS (INCR). SET SGL SWITCH TO SGL & PRESS SGL PB TO OBSERVE THESE 2 MPM VALUES.

NOTE MEMORY ADDRESS CAN BE VERIFIED BY STATE OF SIGNAL EOERRST/ AT EO2-2E.
IF 0% (LOW) MEM ADDRESS = 0000
IF 100% (HIGH) MEM ADDRESS = INCR

4.COMPARE DISPLAYED MPM VALUE OF ERROR ADDRESS WITH VALUE IN PROG LISTING TO DETERMINE BIT NO IN ERROR. IF THE VALUES COMPARE CHECK STATE OF ODD PARITY BIT AT SM5-1Y (MPM17). WHEN ADDRESS AND BIT NO OF ERROR ARE DETERMINED GO TO FEMT MTR M30.

NOTE THE MEMORY MODULE (MPA-N & MPB-N) FAILING CAN BE EXCHANGED WITH A HIGHER MODULE AND THE SMCUMTR USED TO ISOLATE THE FAILURE. SEE FEMTMTR M30 FOR DESCRIPTION OF MEMORY.

L1 RECORD MIR AND THEN FORCE STEP. READ INCR TO DETERMINE NEXT MANUAL PROCEDURE TO PERFORM.

L2 RECORD MIR AND THEN FORCE STEP. READ INCR TO DETERMINE THE NEXT MANUAL PROCEDURE TO BE EXECUTED.

L3 RECORD MIR AND THEN FORCE STEP. READ INCR TO FIND NEXT MANUAL PROCEDURE.

L4 WAIT | MIR VALUE | FUNCTION

1	0000	MIR = B = B000
2	FFFF	MIR = B111

*****READ	MIR VALUE	DOES MIR = 0000	1	2
1	FORCE STEP AND GO TO PROCEDURE L5 STEP 4			
2	READ MIR	DOES MIR = X000 FOR X = 1 THRU F	5	3
3	READ MIR	DOES MIR = 0X00 FOR X = 1 THRU F	7	4
4	READ MIR	DOES MIR = 00X0 FOR X = 1 THRU F	9	11
5	READ MIR	DOES A1 = 1	F189	6
6	READ MIR	DOES A2 = 1	F189	F190
7	READ MIR	DOES B1 = 1	F191	9
8	READ MIR	DOES B2 = 1	F191	F192
9	READ MIR	DOES C1 = 1	F193	12
10	READ MIR	DOES C2 = 1	F193	F194
11	READ MIR	DOES D1 = 1	F195	15
12	READ MIR	DOES D2 = 1	F195	F196
L5	READ MIR	DOES MIR = FF01	1	17
1	FORCE STEP AND READ MIR	DOES MIR = FFFF	F15	2
2	READ MIR	DOES MIR = 00FF	F7	3
3	READ MIR	DOES MIR = 0000	F21	4
4	READ MIR	DOES MIR = BFFF	F22	5
5	READ MIR	DOES MIR = DFFF	F23	6
6	READ MIR	DOES MIR = EFFF	F24	7
7	READ MIR	DOES MIR = F7FF	F25	8
8	READ MIR	DOES MIR = FBFF	F26	9
9	READ MIR	DOES MIR = FDFF	F27	10
10	READ MIR	DOES MIR = FEFF	F28	11
11	READ MIR	DOES MIR = FF7F	F29	12
12	READ MIR	DOES MIR = FFBF	F30	13
13	READ MIR	DOES MIR = FFDF	F31	14
14	READ MIR	DOES MIR = FFEF	F32	15
15	READ MIR	DOES MIR = FFF7	F33	16
16	READ MIR	DOES MIR = FFFB	F34	22

17 DOES MIR EQUAL ONE OF FOLLOWING VALUES:

MIR	F-NUMBER	MIR	F-NUMBER
7FFF	F3	FF7F	F29
BFFF	F22	FFBF	F30
DFFF	F23	FFDF	F31
EFFF	F24	FFEF	F32
F7FF	F25	FFF7	F33
FBFF	F26	FFF3	F34
FDFF	F27	FFFD	F35
FEFF	F28		

IF YES REPLACE CHIPS

IF NO GO TO STEP 18

18	READ MIR	DOES MIR = 80FF	F8	19
19	READ MIR	DOES MIR = 0001	F18	20

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 20   READ MIR                    DOES MIR = 00FF          F7    21
 21   READ MIR                    DOES MIR = 8001          F15   22
 22   READ MIR                    DOES MIR = F0FF          F16   23
 23   READ MIR                    DOES MIR = FF0F          F17   24
 24   READ MIR                    DOES MIR = 0FFF          F19   25
 25   READ MIR                    DOES MIR = FF00          F20    1
L6    REPLACE CHIPS SPECIFIED  BY F2
L7    REPLACE CHIPS SPECIFIED  BY F1
L8    FORCE STEP AND READ INCR
      FOR PROCEDURE INFORMATION
L9    REPLACE CHIPS SPECIFIED  BY F10
L10   READ MIR                    DOES MIR = 0001          1     5
  1   FORCE STEP AND READ MIR    DOES MIR = 0002          F4    2
  2   READ MIR                   DOES MIR = 0003          F5    F6
  3   READ MIR                   DOES MIR = 00FF          F7    4
  4   READ MIR                   DOES MIR = 0000          F8    F6
  5   READ MIR                   DOES D1 AND D2 = 11      F4    3
L11   RECORD MIR                 DOES MIR = FFFF          F516  1
  1   PRESS FST AND INCREMENTER
        WILL DISPLAY ADDRESS OF
        NEXT MANUAL PROCEDURE
L12   READ MIR                    DOES MIR = 0000          F11   1
  1   READ MIR                    DOES MIR = 00FE          F12   2
  2   READ MIR                    DOES MIR = 70FE          F13   F14
L13   RECORD MIR AND THEN FORCE STEP  READ INCR  FOR NEXT PROCEDURE
L14   FORCE STEP TWO (2) TIMES

                TABLE OF WAIT ADDRESS VALUES

                WAIT | MIR VALUES | FUNCTIONS

                  1  | MIR        | MIR = MIR
                  2  | AMPCR      | MIR = AMPCR
                  3  | B-REGISTER | MIR = B
                  4  | FFFF       | MIR = B111
                  5  | 0000       | MIR = 0

  1   READ MIR                    DOES MIR = FFFF          2     8
  2   FORCE STEP READ MIR         DOES MIR = FF00          3     4
  3   FORCE STEP READ MIR         DOES MIR = 00FF          F7    10
  4   READ MIR                    DOES MIR = FFFE          5     6
  5   FORCE STEP READ MIR         DOES MIR = 0001          F8    L99
  6   READ MIR                    DOES MIR = FFFC          7     8
  7   FORCE STEP                  DOES MIR = 0003          F9    L99
  8   READ MIR                    DOES MIR = FFF0          F8    9
  9   READ MIR                    DOES MIR = 0000          F8    L99
 10   READ MIR                    DOES MIR = 0003          F9    L99
L15   REPLACE CHIPS SPECIFIED  BY F49
L16   FORCE STEP & OBSERVE MIR   MIR = FFFF               1     3
  1   FORCE STEP & OBSERVE MIR   MIR = 0000               2     4
  2   WAS VALUE RECORDED IN L11  7FFF                     F41   L101
  3   FIND MIR VALUE IN TABLE FOR F#
      IF VALUE NOT LISTED USE F44

      MIR    F#              MIR    F#
      7FFF   F41,F42         FF7F   F36,F37
      BFFF   F41,F42         FFBF   F36,F37
      DFFF   F41,F42         FFDF   F38,F37
      EFFF   F41,F42         FFEF   F38,F37
      CFFF   F42,F43         FFCF   F38,F37
      3FFF   F41,F42         FFOF   F36,F37
      0FFF   F41,F44

      F7FF   F39,F40         FFF7   F34
      FBFF   F39,F40         FFFB   F34
      FDFF   F39,F40         FFFD   F35
      FEFF   F39,F40         FFFE   F35
      FCFF   F39,F40         FFFC   F35
      F0FF   F39,F40         FFF0   F35,F37

  4   FIND MIR VALUE IN TABLE FOR F#
      IF VALUE NOT LISTED USE F37

      MIR    F#              MIR    F#
      1000   F42             0010   F38
      2000   F42             0020   F38
      4000   F41             0040   F36
      8000   F41             0080   F36
      C000   F41             00F0   F36
      F000   F41             00C0   F36,F38
      3000   F42             0030   F36,F38

      0100   F40             0001   F35
      0200   F40             0002   F35
      0400   F39             0004   F34
      0800   F39             0008   F34
      0F00   F39,F40         000F   F34
      0C00   F39,F40         000C   F34
      0300   F39,F40         0003   F35
```

L17	REPLACE CHIPS SPECIFIED BY F35			
L18	WAS MIR RECORDED IN L11		TBL 1	F515

TABLE 1

RECORDED VALUE	SUSPECTED CHIPS
7FFF OR BFFF	F507,F197
DFFF OR EFFF	F508,F197
F7FF OR FBFF	F509,F197
FDFF OR FEFF	F510,F197
FF7F OR FFBF	F511,F197
FFDF OR FFEF	F512,F197
FFF7 OR FFFB	F513,F197
FFFD	F514,F197

L19	RECORD MIR AND FORCE STEP. INCR SPECIFIES NEXT MANUAL PROCEDURE			
L20	RECORD MIR AND FORCE STEP. INCR SPECIFIES NEXT MANUAL PROCEDURE			
L21	RECORD MIR AND FORCE STEP. INCR SPECIFIES NEXT MANUAL PROCEDURE			
L22	REPLACE CHIPS SPECIFIED BY F153			
L23	REPLACE CHIPS SPECIFIED BY F153			
L24	FORCE STEP AND READ INCR. INCR SPECIFIES NEXT MANUAL PROCEDURE			
L25	READ MIR	DOES MIR = FF00	13	1

WAIT	MIR VALUE	FUNCTIONS
1	XXXX	
2	AMPCR	
3	B-REGISTER	

1	FORCE STEP TWO(2) TIMES READ MIR	DOES MIR = XFFF FOR X = 0 THRU F	4	2
2	READ MIR	DOES MIR = FXFF FOR X = 0 THRU F	7	3
3	READ MIR	DOES MIR = FFXF FOR X = 0 THRU F	9	14
4	READ MIR	DOES A1 = 0	F50	5
5	READ MIR	DOES A2 = 0	F51	6
6	READ MIR	DOES A4 = 0	F52	F53
7	READ MIR	DOES B1 = 0	F54	8
8	READ MIR	DOES B2 = 0	F55	F56
9	READ MIR	DOES C1 = 0	F57	10
10	READ MIR	DOES C2 = 0	F58	F59
11	READ MIR	DOES D1 = 0	F60	12
12	READ MIR	DOES D2 = 0	F61	F62
13	GO TO PROCEDURE L99			
14	READ MIR	DOES MIR = FFFX FOR X = 0 THRU F	11	15
15	READ MIR	DOES MIR = 0XFF FOR X = 0 THRU F	7	16
16	READ MIR	DOES MIR = 00XF FOR X = 0 THRU F	9	11
L26	RECORD MIR AND THEN FORCE STEP. GO TO THE L NUMBER SPECIFIED BY THE NEW INCR VALUE			
	DOES WAIT HAVE AN L NUMBER ASSIGNED TO IT.		1	F1
1	GO TO THE SPECIFIED L NUMBER			
L28	READ MIR	DOES MIR = 0000	F45	1
1	GO TO L76 STEP 1			
L29	FORCE STEP & READ MIR	DOES MIR = FFFF	F188	1

WAIT	MIR	FUNCTION
1	A3	
2	FFFF	MIR = B111

1	FORCE STEP AND READ INCR FOR NEXT SPECIFIED MANUAL PROCEDURE			
L30	RECORD MIR AND FORCE STEP. READ INCR FOR NEXT MANUAL PROCEDURE. (MIR = 0 + Z WHERE Z = FFFF)			
L31	RECORD MIR AND FORCE STEP. READ INCR FOR NEXT MANUAL PROCEDURE.			
L32	READ AND RECORD MIR (MIR = MIR) FORCE STEP AND RECORD MIR (MIR = AMPCR) FORCE STEP AND RECORD MIR (MIR = A3) FORCE STEP AND RECORD MIR (MIR = A1) FORCE STEP AND RECORD MIR (MIR = BMAR) FORCE STEP AND RECORD MIR (MIR = A2) FORCE STEP AND RECORD MIR (MIR = B)			
	DOES MIR = A3 = A1 = BMAR = A2 = B		7	1
1	USING RECORDED DATA	DOES RECORDED MIR = 0000	2	5
2	USING RECORDED DATA	DOES RECORDED A3 = 0FFF	F154	3
3	USING RECORDED DATA	DOES RECORDED A3 = 00FF	F155	4

```
 4  USING  RECORDED  DATA        DOES  RECORDED  A3   = 000F   F156    8      H
 5  USING  RECORDED  DATA        DOES  RECORDED  A1   = BMAR    6     F116
 6  USING  RECORDED  DATA        DOES  RECORDED  A3   = A1     L99    F176
 7  USING  RECORDED  DATA        DOES  RECORDED  MIR  = 0000   F153     2
                                                                          H
                                                                          H
 8  RUN MCUMTR (B721   -  SMCUMTR)                                        H
    IF  AN EXT ERROR IS  INDICATED  -  FOLLOW  MCU (SMCU)                 H
                                       MANUAL PROCEDURES                  H
    IF  AN EXT ERROR IS  NOT INDICATED  -  USE  PROCMTR  -  F157          H

L33 MIR DISPLAYS  ADDRESS  WHERE ERROR  WAS DETECTED.
     FORCE  STEP
          READ  AND RECORD  MIR
          MIR  = A3  REGISTER
     FORCE  STEP
          READ  AND RECORD  MIR
          MIR  = A2  REGISTER
     FORCE  STEP
          READ  AND RECORD  MIR
          MIR  = A1  REGISTER
     FORCE  STEP  MIR  = Z-REG    DOES  Z  =  A3  =  A2  =  A1          48     1

 1                                DOES  A3  =  A2  =  A1-REG             25    124

      WAIT  |  MIR     |

        1   |  AMPCR  |
        2   |  A3-REG |
        3   |  A2-REG |
        4   |  A1-REG |
        5   |  Z-REG  |

 2                                IS  A3-REG  UNEQUAL  TO  Z-
                                  REGISTER                              121     3

 3                                IS  A2-REG  UNEQUAL  TO  Z-
                                  REGISTER                              115    118

 4                                DOES  A1-REGISTER   =  X000   F99      5
                                   FOR  X  =  1  THRU  F

 5                                DOES  A1-REGISTER   =  0X00   F102     6
                                   FOR  X  =  1  THRU  F

 6                                DOES  A1-REGISTER   =  00X0   F105     7
                                   FOR  X  =  1  THRU  F
                                                                          B
                                                                          B
 7                                DOES  A1  =  000X             F10      8    B
                                   FOR  X  =  1  THRU  F

 8                                DOES  A1-REGISTER   =  XFFF   F99      9
                                   FOR  X  =  0  THRU  E

 9                                DOES  A1-REGISTER   =  FXFF   F102    10
                                   FOR  X  =  0  THRU  E

10                                DOES  A1-REGISTER   =  FFXF   F105    F108
                                   FOR  X  =  0  THRU  E

11                                DOES  A2-REGISTER   =  X000   F100    12
                                   FOR  X  =  1  THRU  F

12                                DOES  A2-REGISTER   =  0X00   F103    13
                                   FOR  X  =  1  THRU  F

13                                DOES  A2-REGISTER   =  00X0   F106    14
                                   FOR  X  =  1  THRU  F

14                                DOES  A2-REGISTER   =  000X   F109    15
                                   FOR  X  =  1  THRU  F

15                                DOES  A2-REGISTER   =  XFFF   F100    16
                                   FOR  X  =  0  THRU  E

16                                DOES  A2-REGISTER   =  FXFF   F103    17

17                                DOES  A2-REGISTER   =  FFXF   F106    F109

18                                DOES  A3-REGISTER   =  X000   F101    19
                                   FOR  X  =  1  THRU  F

19                                DOES  A3-REGISTER   =  0X00   F104    20
                                   FOR  X  =  1  THRU  F

20                                DOES  A3-REGISTER   =  00X0   F107    21
                                   FOR  X  =  1  THRU  F

21                                DOES  A3-REGISTER   =  000X   F110    22
                                   FOR  X  =  1  THRU  F

22                                DOES  A3-REGISTER   =  XFFF   F101    23
                                   FOR  X  =  0  THRU  E

23                                DOES  A3-REGISTER   =  FXFF   F104    24
                                   FOR  X  =  0  THRU  E

24                                DOES  A3-REGISTER   =  FFXF   F107    F110
                                   FOR  X  =  0  THRU  E

25                                DOES  A3-REGISTER   =  X000     32     26
                                   FOR  X  =  1  THRU  F

26                                DOES  A3-REGISTER   =  0X00     34     27
                                   FOR  X  =  1  THRU  F

27                                DOES  A3-REGISTER   =  00X0     36     28
                                   FOR  X  =  1  THRU  F

28                                DOES  A3-REGISTER   =  000X     38     29
                                   FOR  X  =  1  THRU  F

29                                DOES  A3-REGISTER   =  XFFF     40     30
                                   FOR  X  =  0  THRU  E

30                                DOES  A3-REGISTER   =  FXFF     42     31
                                   FOR  X  =  0  THRU  E

31                                DOES  A3-REGISTER   =  FFXF     44     46
                                   FOR  X  =  0  THRU  E

32                                DOES  BIT  A1  =  1                   F111    33

33                                DOES  BIT  A2  =  1                   F111    F77

34                                DOES  BIT  B1  =  1                   F78     35

35                                DOES  BIT  B2  =  1                   F78     F79

36                                DOES  BIT  C1  =  1                   F80     37

37                                DOES  BIT  C2  =  1                   F80     F81

38                                DOES  BIT  D1  =  1                   F82     39

39                                DOES  BIT  D2  =  1                   F82     F83
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40		DOES BIT A1 = 0	F111	41	
41		DOES BIT A2 = 0	F111	F77	
42		DOES BIT B1 = 0	F78	43	
43		DOES BIT B2 = 0	F78	F79	
44		DOES BIT C1 = 0	F80	45	
45		DOES BIT C2 = 0	F80	F81	
46		DOES BIT D1 = 0	F82	47	
47		DOES BIT D2 = 0	F82	F83	
48	READ MIR	DOES MIR = FFFF	F112	49	
49	READ MIR	DOES MIR = 0000	F113	50	
50	READ MIR	DOES MIR = 80FF	F114	51	
51	PRESS CLEAR				B
	A. PRESS FST NINE (9) TIMES (0850)				B
	B. PLACE SGL/NORM SW TO SGL POSITION				B
	C. DEPRESS FST PB AND THEN DEPRESS & RELEASE SGL PB				
	D. RELEASE FST PB				
	E. PRESS AND RELEASE SGL PB TWO (2) TIMES (0852)				B
	F. READ MIR	DOES MIR = X000 FOR X = 1 THRU F	58	52	
52	READ MIR	DOES MIR = 0X00 FOR X = 1 THRU F	61	53	
53	READ MIR	DOES MIR = 00X0 FOR X = 1 THRU F	64	54	
54	READ MIR	DOES MIR = 000X FOR X = 1 THRU F	67	55	
55	READ MIR	DOES MIR = XFFF FOR X = 0 THRU E	70	56	
56	READ MIR	DOES MIR = FXFF FOR X = 0 THRU E	73	57	
57	READ MIR	DOES MIR = FFXF FOR X = 0 THRU E	76	79	
58	READ MIR	DOES BIT A1 = 1	82	59	
59	READ MIR	DOES BIT A2 = 1	84	60	
60	READ MIR	DOES BIT A4 = 1	85	86	
61	READ MIR	DOES BIT B1 = 1	87	62	
62	READ MIR	DOES BIT B2 = 1	88	63	
63	READ MIR	DOES BIT B4 = 1	89	90	

64	READ MIR	DOES BIT C1 = 1	91	65	
65	READ MIR	DOES BIT C2 = 1	92	66	
66	READ MIR	DOES BIT C4 = 1	93	94	
67	READ MIR	DOES BIT D1 = 1	95	68	
68	READ MIR	DOES BIT D2 = 1	96	69	
69	READ MIR	DOES BIT D4 = 1	97	98	
70	READ MIR	DOES BIT A1 = 0	99	71	
71	READ MIR	DOES BIT A2 = 0	100	72	
72	READ MIR	DOES BIT A4 = 0	101	102	
73	READ MIR	DOES BIT B1 = 0	103	74	
74	READ MIR	DOES BIT B2 = 0	104	75	
75	READ MIR	DOES BIT B4 = 0	105	106	
76	READ MIR	DOES BIT C1 = 0	107	77	
77	READ MIR	DOES BIT C2 = 0	108	78	
78	READ MIR	DOES BIT C4 = 0	109	110	
79	READ MIR	DOES BIT D1 = 0	111	80	
80	READ MIR	DOES BIT D2 = 0	112	81	
81	READ MIR	DOES BIT D4 = 0	113	114	
82	METER LU2-1 2F #FR9F! (LUADD04) 100%		F51	83	
83	EXECUTE BSWMTR				
84	METER LU2-1 1F #FR8F! (LUADD03) 100%		F51	83	
85	METER LU2-1 2E #FR9E! (LUADD02) 100%		F53	83	
86	METER LU2-1 1B #FR8B! (LUADD01) 100%		F53	83	
87	METER LU2-2 2F #FR6F! (LUADD08) 100%		F54	83	
88	METER LU2-2 1F #FR5F! (LUADD07) 100%		F54	83	
89	METER LU2-2 2E #FR6E! (LUADD06) 100%		F55	83	
90	METER LU2-2 1B #FR5B! (LUADD05) 100%		F55	83	
91	METER LU2-3 2F #FR3F! (LUADD12) 100%		F58	83	
92	METER LU2-3 1F #FR2F! (LUADD11) 100%		F58	83	
93	METER LU2-3 2E #FR3E! (LUADD10) 100%		F59	83	
94	METER LU2-3 1B #FR2B! (LUADD09) 100%		F59	83	
95	METER LU2-4 2F #FR0F! (LUADD16) 100%		F61	83	
96	METER LU2-4 1F #FQ9F! (LUADD15) 100%		F61	83	
97	METER LU2-4 2E #FR0E! (LUADD14) 100%		F62	83	
98	METER LU2-4 1B #FQ9B! (LUADD13) 100%		F62	83	
99	METER LU2-1 2F #FR9F! (LUADD04) 0%		F51	83	

100	METER	LU2-1	1F	#FR8F!	(LUADD03)	0%	F51	83
101	METER	LU2-1	2E	#FR9E!	(LUADD02)	0%	F53	83
102	METER	LU2-1	1B	#FR8B!	(LUADD01)	0%	F53	83
103	METER	LU2-2	2F	#FR6F!	(LUADD08)	0%	F54	83
104	METER	LU2-2	1F	#FR5F!	(LUADD07)	0%	F54	83
105	METER	LU2-2	2E	#FR6E!	(LUADD06)	0%	F55	83
106	METER	LU2-2	1B	#FR5B!	(LUADD05)	0%	F55	83
107	METER	LU2-3	2F	#FR3F!	(LUADD12)	0%	F58	83
108	METER	LU2-3	1F	#FR2F!	(LUADD11)	0%	F58	83
109	METER	LU2-3	2E	#FR3E!	(LUADD10)	0%	F59	83
110	METER	LU2-3	1B	#FR2B!	(LUADD09)	0%	F59	83
111	METER	LU2-4	2F	#FR0F!	(LUADD16)	0%	F61	83
112	METER	LU2-4	1F	#FQ9F!	(LUADD15)	0%	F61	83
113	METER	LU2-4	2E	#FR0E!	(LUADD14)	0%	F62	83
114	METER	LU2-4	1B	#FQ9B!	(LUADD13)	0%	F62	83

115	DOES A2-REGISTER = X00X FOR X = 1 THRU F	83	116
116	DOES A2-REGISTER = 0X0X FOR X = 1 THRU F	83	117
117	DOES A2-REGISTER = 00XX FOR X = 1 THRU F	83	11
118	DOES A1-REGISTER = X00X FOR X = 1 THRU F	83	119
119	DOES A1-REGISTER = 0X0X FOR X = 1 THRU F	83	120
120	DOES A1-REGISTER = 00XX FOR X = 1 THRU F	83	4
121	DOES A3-REGISTER = X00X FOR X = 1 THRU F	83	122
122	DOES A3-REGISTER = 0X0X FOR X = 1 THRU F	83	123
123	DOES A3-REGISTER = 00XX FOR X = 1 THRU F	83	18
124	ARE A1,A2 AND A3 UNIQUE (ALL DIFFERENT IN VALUE)	125	2
125	DOES A1 = XXX1 FOR X = 0 THRU F	51	126
126	DOES A2 = XXX2 FOR X = 0 THRU F	51	127
127	DOES A3 = XXX3 FOR X = 0 THRU F	51	2

L34 RECORD MIR AND FORCE STEP.
READ INCR (MPCR) FOR NEXT PROCEDURE

L35 TO CORRELATE THIS PROCEDURE TO THE PROGRAM THE WAIT NUMBERS ARE LISTED BOTH HERE AND IN THE PROGRAM LISTING. THE APPROXIMATE ADDRESS FOR L35 IS 0634 WHICH IS ALSO WAIT 1.

THE EXPECTED VALUES FOR THIS ERROR SUBR ARE

WAIT	VALUE OF MIR	SOURCE REG
1	XXXX	BR1/BR2/MAR
2	XXFF	MAR
3	0000	B-REG
4	0000	MAR1
5	FFFF	B-REG
6	FFFF	MAR1
7	FFFF	MAR1
8	0001	CTR/LIT
9	FFFE	CTR/LIT

	READ MIR WAIT #1	DOES MIR = 00FF	1	6
1	FORCE STEP READ MIR WAIT #2	DOES MIR = 00FF	2	F163
2	FORCE STEP READ MIR WAIT #3	DOES MIR = 0000	3	F163
3	FORCE STEP READ MIR WAIT #4	DOES MIR = 0000	4	F161
4	FORCE STEP READ MIR WAIT #5	DOES MIR = FFFF	5	F163
5	FORCE STEP READ MIR WAIT #6	DOES MIR = FFFF	F160	F163
6	READ MIR WAIT #1	DOES MIR = 0000	7	13
7	FORCE STEP READ MIR WAIT #2	DOES MIR = 0000	10	8
8	READ MIR WAIT #2	DOES MIR = 00FF	18	26
9	GO TO BSWTEST			
10	FORCE STEP READ MIR WAIT #3	DOES MIR = 0000	11	26
11	FORCE STEP READ MIR WAIT #4	DOES MIR = 0000	26	12
12	FORCE STEP READ MIR WAIT #5	DOES MIR = FFFF	F164	26
13	READ MIR	DOES MIR = 00XX FOR X = 1 THRU F	14	16
14	FORCE STEP READ MIR WAIT #2	DOES MIR = 00FF	18	15
15	READ MIR	DOES MIR = 000F	26	F165

16	FORCE STEP WAIT #2	DOES MIR = XX7F			F166	63
17	FORCE STEP READ MIR	DOES MIR = 01FE			F159	F158
18	FORCE STEP FOUR TIMES WAIT #6					
19	READ MIR	DOES BIT D1 = 0			F164	20
20	READ MIR	DOES BIT D2 = 0			F164	21
21	READ MIR	DOES BIT D4 = 0			F164	22
22	READ MIR	DOES BIT D8 = 0			F164	23
23	READ MIR	DOES BIT C1 = 0			F166	24
24	READ MIR	DOES BIT C2 = 0			F166	25
25	READ MIR	DOES BIT C4 = 0			F166	26
26	FORCE STEP UNTIL INCREMENTER REACHES ADDRESS OF WAIT #7 (APPROXIMATE ADDRESS 0648)					
	GO TO STEP 29					
29	PERFORM FOLLOWING OPERATIONS THE FIRST TRY PRESS 'FST' PB AND READ MIR FOR THE VALUE OF 0001 (SEE TABLE OF EXPECTED VALUES FOR WAIT(#8)) IF MIR = 0001 GO TO STEP 47, OTHERWISE PRESS 'CLEAR' AND REPEAT THE TEST. WHEN YOU ARRIVE AT THIS STEP (29) THE SECOND TIME THEN GO TO 29 (A) AND PERFORM THE STEPS AS DIRECTED. A. PLACE SGL/NORM SW TO SGL POSITION B. DEPRESS FST PB AND THEN DEPRESS & RELEASE SGL PB C. RELEASE FST PB D. PRESS AND RELEASE SGL PB FIVE (5) TIMES (NOW AT 0653)					
30	METER LU2-1 2F #FR9F!	(LUADD04)	100%		F51	32
31	EXECUTE BSWMTR					
32	METER LU2-1 1F #FR8F!	(LUADD03)	100%		F51	33
33	METER LU2-1 2E #FR9E!	(LUADD02)	100%		F53	34
34	METER LU2-1 1B #FR8B!	(LUADD01)	100%		F53	35
35	METER LU2-2 2F #FR6F!	(LUADD08)	100%		F54	36
36	METER LU2-2 1F #FR5F!	(LUADD07)	100%		F54	37
37	METER LU2-2 2E #FR6E!	(LUADD06)	100%		F55	38
38	METER LU2-2 1B #FR5B!	(LUADD05)	100%		F55	39
39	METER LU2-3 2F #FR3F!	(LUADD12)	100%		F58	40
40	METER LU2-3 1F #FR2F!	(LUADD11)	100%		F58	41
41	METER LU2-3 2E #FR3E!	(LUADD10)	100%		F59	42
42	METER LU2-3 1B #FR2B!	(LUADD09)	100%		F59	43
43	METER LU2-4 2F #FR0F!	(LUADD16)	0%		F61	44
44	METER LU2-4 1F #FQ9F!	(LUADD15)	100%		F61	45
45	METER LU2-4 2E #FR0E!	(LUADD14)	100%		F62	46
46	METER LU2-4 1B #FQ9B!	(LUADD13)	100%		F62	47
47	IF IN THE SGL PULSE MODE PRESS SGL PB ONE TIME AND OBSERVE THAT THE WAIT LIGHT IS LIT. MIR SHOULD = 0001 IF IT IS NOT AND YOU TOOK CORRECT METER READINGS ON ALL THE LISTED POINTS (ABOVE) THEN GO TO THE BSW MTR. IF MIR = 0001 AND THIS IS THE FIRST TRY PERFORM A PRELIMINARY CHECK ON THE DATA BY PRESSING 'FST' THEN CHECK MIR FOR THE VALUE FFFE. (SEE WAIT #9). IF A BIT(S) IS DROPPED 'CLEAR' AND REPEAT THE TEST. WHEN YOU ARRIVE AT THIS STEP (47) THE SECOND TIME REPEAT STEP 29 (A),(B),(C) AND (D) AND PLACE MTR METER ON THE FOLLOWING PINS:					
	METER LU2-1 2F #FR9F!	(LUADD04)	0%		F51	48
48	METER LU2-1 1F #FR8F!	(LUADD03)	0%		F51	49
49	METER LU2-1 2E #FR9E!	(LAUDD02)	0%		F53	50
50	METER LU2-1 1B #FR8B!	(LUADD01)	0%		F53	51
51	METER LU2-2 2F #FR6F!	(LUADD08)	0%		F54	52
52	METER LU2-2 1F #FR5F!	(LUADD07)	0%		F54	53
53	METER LU2-2 2E #FR6E!	(LUADD06)	0%		F55	54
54	METER LU2-2 1B #FR5B!	(LUADD05)	0%		F55	55
55	METER LU2-3 2F #FR3F!	(LUADD12)	0%		F58	56
56	METER LU2-3 1F #FR2F!	(LUADD11)	0%		F58	57
57	METER LU2-3 2E #FR3E!	(LUADD10)	0%		F59	58
58	METER LU2-3 1B #FR2B!	(LUADD09)	0%		F59	59
59	METER LU2-4 2F #FR0F!	(LUADD16)	100%		F61	60
60	METER LU2-4 1F #FQ9F!	(LUADD15)	0%		F61	61
61	METER LU2-4 2E #FR0E!	(LUADD14)	0%		F62	62
62	METER LU2-4 1B #FQ9B!	(LUADD13)	0%		F62	31
63	READ MIR	DOES MIR = XXBF			F166	64
64	READ MIR	DOES MIR = XXDF			F166	65
65	READ MIR	DOES MIR = XXEF			F166	66
66	READ MIR	DOES MIR = XXFX			F164	67
67	READ MIR	DOES MIR = XX1F			F166	68
68	READ MIR	DOES MIR = XX3F			F166	69
69	READ MIR	DOES MIR = XX00			F164	70
70	READ MIR	DOES MIR = XX0X			F164	17

L36 GO TO PROCEDURE L39

WAIT	MIR	FUNCTION
1	FFFF	MIR = B = B111.
2	0000	MIR = 0.

L37 FORCE STEP AND READ INCR (MPCR) FOR NEXT PROCEDURE

L38 REPLACE CHIPS SPECIFIED BY F124

WAIT	MIR	FUNCTION
1	00XX	Z = B = B000 + 1
2	0000	Z = B = B111
3	FFFF	MAR1 = B = B111
4	0000	MAR1 = B = B000.

L39 REPEAT TEST AT800 IN THE SGL PULSE MODE.

A. PRESS CLEAR THEN PRESS FST FIVE (5) TIMES TO ADVANCE INCR TO PROG STEP 4 (02A9). E E

B. SET SGL/NORM SWITCH TO SGL POSITION

C. TURN WAIT IND OFF BY HOLDING FST PB THEN PRESS & RELEASE SGL PB, THEN RELEASE FST.

D. PRESSING SGL PB ADVANCE INCR TO 02AF (12 TIMES)

E. CHECK THE FOLLOWING PINS WITH THE MTR METER FOR 0% READING E E E E E E E E E E E E E E E E

	LU2-1	2F	#FR9F!	(LUADD04)	1	F51
1	LU2-1	1F	#FR8F!	(LUADD03)	2	F51
2	LU2-1	2E	#FR9E!	(LUADD02)	3	F53
3	LU2-1	1B	#FR8B!	(LUADD01)	4	F53
4	LU2-2	2F	#FR6F!	(LUADD08)	5	F54
5	LU2-2	1F	#FR5F!	(LUADD07)	6	F54
6	LU2-2	2E	#FR6E!	(LUADD06)	7	F55
7	LU2-2	1B	#FR5B!	(LUADD05)	8	F55
8	LU2-3	2F	#FR3F!	(LUADD12)	9	F58
9	LU2-3	1F	#FR2F!	(LUADD11)	10	F58
10	LU2-3	2E	#FR3E!	(LUADD10)	11	F59
11	LU2-3	1B	#FR2B!	(LUADD09)	12	F59
12	LU2-4	2F	#FR0F!	(LUADD16)	13	F61
13	LU2-4	1F	#FQ9F!	(LUADD15)	14	F61
14	LU2-4	2E	#FR0E!	(LUADD14)	15	F62
15	LU2-4	1B	#FQ9B!	(LUADD13)	16	F62

16 METER LUBSW01 THRU LUBSW16 ON LU1 #FQ3-! E E
1L 2B 1C 1E 1I 2J 2K 1N E E
2Q 2S 1V 2X 1Y 1W 2Y 2L ALL = 0% 16A 32 E E E E

16A PRESSING SGL PB ADVANCE INCR TO 02B8 (5-6 TIMES) E
THEN METER THE FOLLOWING PINS FOR 100%

	LU2-1	2F	#FR9F!	(LUADD04)	17	F51
17	LU2-1	1F	#FR8F!	(LUADD03)	15	F51
18	LU2-1	2E	#FR9E!	(LUADD02)	19	F53
19	LU2-1	1B	#FR8B!	(LUADD01)	20	F53
20	LU2-2	2F	#FR6F!	(LUADD08)	21	F54
21	LU2-2	1F	#FR5F!	(LUADD07)	22	F54
22	LU2-2	2E	#FR6E!	(LUADD06)	23	F55
23	LU2-2	1B	#FR5B!	(LUADD05)	24	F55
24	LU2-3	2F	#FR3F!	(LUADD12)	25	F58
25	LU2-3	1F	#FR2F!	(LUADD11)	26	F58
26	LU2-3	2E	#FR3E!	(LUADD10)	27	F59
27	LU2-3	1B	#FR2B!	(LUADD09)	28	F59
28	LU2-4	2F	#FR0F!	(LUADD16)	29	F61
29	LU2-4	1F	#FQ9F!	(LUADD15)	30	F61
30	LU2-4	2E	#FR0E!	(LUADD14)	31	F62
31	LU2-4	1B	#FQ9B!	(LUADD13)	32	F62

32 GO TO BSWMTR. B B

L40 REFER TO THE PROGRAM LISTING AND NOTE THE B
ADDRESSES OF L40#1 & L40#2. (APPROXIMATE B
ADDRESS BEING 0368). B B B B

GO TO L100. B A A

L41 READ MIR DOES MIR = 0001 1 3 A
1 FORCE STEP AND READ MIR DOES MIR = 0000 F125 2 A
2 FORCE STEP AND THEN READ INCR FOR NEXT PROCEDURE. A
3 FORCE STEP AND GO TO STEP 2. A

L42 REPLACE CHIPS SPECIFIED BY F125

WAIT	MIR	FUNCTION
1	0001	MIR = B = Z = 0001
2	0000	MIR = A3 = B000

A A

L43 READ MIR DOES MIR = 0001 1 3 A
1 FORCE STEP AND READ MIR DOES MIR = 0001 F125 2 A
2 FORCE STEP AND THEN READ INCR FOR NEXT PROCEDURE. A
3 FORCE STEP AND GO TO STEP 2. A

L44 REPLACE CHIPS SPECIFIED BY F125
L45 METER CG1-0Q #FQ0Q! (CG3CLKD) 3-5% F144 F500 B

L46 REPLACE CHIPS SPECIFIED IN F146

L47 REPLACE CHIPS SPECIFIED IN F145

L48 REPLACE CHIPS SPECIFIED IN F176

L49 REPLACE CHIPS SPECIFIED BY F176

L50 READ MIR DOES MIR = FFFF 1 4

1 FORCE STEP READ MIR DOES MIR = X000 FOR X = 1 THRU F F149 2

2 READ MIR DOES MIR = 0X00 FOR X = 1 THRU F F150 3

3 READ MIR DOES MIR = 00X0 F151 F152

4 FORCE STEP AND READ INCR FOR NEXT PROCEDURE

L51 READ MIR DOES MIR = 0000 1 4

1 FORCE STEP READ MIR DOES MIR = XFFF F149 2

2 READ MIR DOES MIR = FXFF F150 3

3 READ MIR DOES MIR = FFXF F151 F152

4 GO TO L50 STEP 1

L52 GO TO L33 STEP 18
MIR NOW CONTAINS THE A3 VALUE.

L53 GO TO L33 STEP 11
MIR NOW CONTAINS THE A2 VALUE.

L54 GO TO L33 STEP 4
MIR NOW CONTAINS THE A1 VALUE.

L55 GO TO L33 STEP 18
MIR NOW CONTAINS THE A3 VALUE.

L56 GO TO L33 STEP 11
MIR NOW CONTAINS THE A2 VALUE.

L57 GO TO L33 STEP 4
MIR NOW CONTAINS THE A1 VALUE.

L58 GO TO L82 STEP 1 H

H

L59 GO TO L82 STEP 1 (IF B721 - SEE L84 BEFORE PROCEEDING) H

L60 GO TO L89
MIR NOW CONTAINS THE ACTUAL VALUE (A.V.)

L61 GO TO L89
MIR NOW CONTAINS THE ACTUAL VALUE (A.V.)

L62 REPLACE CHIPS SPECIFIED BY F517

L63 REPLACE CHIPS SPECIFIED BY F517

L64 REPLACE CHIPS SPECIFIED BY F518

L65 REPLACE CHIPS SPECIFIED BY F518

L66 REPLACE CHIPS SPECIFIED BY F519

L67 REPLACE CHIPS SPECIFIED BY F519

L68 REPLACE CHIPS SPECIFIED BY F125

L69 REPLACE CHIPS SPECIFIED BY F125 B
B

L70 B
1 PRESS CLEAR B
SET IRQ SWITH TO IRQ B
RERUN MTR AFTER PROG STEP 4 PROG WILL LOOP ON ERROR B
B
B
2 SET SGL SWITCH TO SGL B
OBSERVE INCR VALUE AND B
FIND CORRESPONDING IN- B
STRUCTION IN PROG LISTING B
B
B
3 CONTINUE PRESSING SGL B
UNTIL INCR REACHES B
'CPCR = BSWEXRF - 1' B
INSTRUCTION 4 3 B
B
B
4 NOTE VALUE OF INC B
B
B
5 CONTINUE PRESSING SGL B
UNTIL INCR IS TWO LESS H
THAN VALUE NOTED IN B
STEP 4 6 5 B
B
B
6 OBSERVE PROG LISTING B
FOR 'EXPECTED ADDER B
OUTPUT VALUE' (4 HEXA- B
DECIMAL DIGITS REPRE- B
SENTING THE STATE OF B
LUADD01 THRU LUADD16) B
B
B
7 METER ADDER BITS 1-4 B
LU2-1 1B #FR8B! (LUADD01) DO OUTPUTS EQUAL B
LU2-1 2E #FR9E! (LUADD02) FIRST DIGIT OF B
LU2-1 1F #FR8F! (LUADD03) EXPECTED VALUE 8 F19 B
LU2-1 2F #FR9F! (LUADD04) B
B
B
8 METER ADDER BITS 5-8 B
LU2-2 1B #FR5B! (LUADD05) DO OUTPUTS EQUAL B
LU2-2 2E #FR6E! (LUADD06) SECOND DIGIT OF B
LU2-2 1F #FR5F! (LUADD07) EXPECTED VALUE 9 F16 B
LU2-2 2F #FR6F! (LUADD08) B
B
B
9 METER ADDER BITS 9-12 B
LU2-3 1B #FR2B! (LUADD09) DO OUTPUTS EQUAL B
LU2-3 2E #FR3E! (LUADD10) THIRD DIGIT OF B
LU2-3 1F #FR2F! (LUADD11) EXPECTED VALUE 10 F17 B
LU2-3 2F #FR3F! (LUADD12) B
B
B
10 METER ADDER BITS 13-16 B
LU2-4 1B #FQ9B! (LUADD13) DO OUTPUTS EQUAL B
LU2-4 2E #FR0E! (LUADD14) FOURTH DIGIT OF B
LU2-4 1F #FQ9F! (LUADD15) EXPECTED VALUE 11 F200 B
LU2-4 2F #FR0F! (LUADD16) B

11	GO TO BSWMTR.			
L71	READ MIR	DOES MIR = 03FF	F114	1
1	READ MIR	DOES MIR = 000X FOR X = 1 THRU F	F114	2
2	READ MIR	DOES MIR = 0303	F114	3
3	DOES MIR EQUAL ONE OF THESE VALUES			

MIR	F-NUMBER
03FE	F198
0100	F198
00FE	F198
ANOTHER VALUE	F116

L72	READ MIR	DOES MIR = 0XXX FOR X = 1 THRU F	F63	1

WAIT	EXPECTED VALUE	FUNCTION
1	XXXX	
2	0000	MIR = Z.
3	0000	MIR = A1
4	0000	MIR = A2
5	0000	MIR = A3
6	0000	MIR = B
7	FFFF	MIR = B111

1	READ MIR	DOES MIR = X0XX FOR X = 1 THRU F	F64	2
2	READ MIR	DOES MIR = XX0X FOR X = 1 THRU F	F65	F66
L73	READ MIR	DOES MIR = 0000	F75	1
1	READ MIR	DOES MIR = FF00	F75	2
2	READ MIR	DOES MIR = 00FF	F75	3
3	FORCE STEP AND GO TO PROCEDURE L74 STEP 2			
L74	READ MIR	DOES MIR = 0000	F75	1
1	READ MIR	DOES MIR = FF00	F75	2
2	FORCE STEP FIVE (5) TIMES AND READ MIR	DOES MIR = FXXX FOR X = 0 THRU E	3	5
3	READ MIR	DOES MIR = XFXX FOR X = 0 THRU E	4	8
4	READ MIR	DOES MIR = XXFX FOR X = 0 THRU E	15	10
5	READ MIR	DOES A1 = 1	7	6
6	READ MIR	DOES A4 = 1	F51	F50
7	READ MIR	DOES A2 = 1	F50	F51
8	READ MIR	DOES B1 = 1	9	F55
9	READ MIR	DOES B2 = 1	F56	F55
10	READ MIR	DOES C1 = 1	11	F58
11	READ MIR	DOES C2 = 1	F59	F58
12	READ MIR	DOES C8 = 0	13	14
13	READ MIR	DOES D2 = 0	F61	F62
14	READ MIR	DOES D4 = 0	F62	F61
15	READ MIR	DOES MIR = XXXF FOR X = 0 THRU E	16	12
16	FORCE STEP	DOES MIR = FXXX FOR X = 0 THRU E	3	5
L75	READ MIR	DOES A8 = 0	F67	1

WAIT	MIR	FUNCTION
1	FFFF	MIR = B = B111
2	A1	
3	A2	
4	A3	
5	Z	
6	0000	MIR = B000

1	READ MIR	DOES A4 = 0	F67	2
2	READ MIR	DOES A2 = 0	F68	3
3	READ MIR	DOES A1 = 0	F68	4
4	READ MIR	DOES B8 = 0	F69	5
5	READ MIR	DOES B4 = 0	F69	6
6	READ MIR	DOES B2 = 0	F70	7
7	READ MIR	DOES B1 = 0	F70	8
8	READ MIR	DOES C8 = 0	F71	9
9	READ MIR	DOES C4 = 0	F71	10
10	READ MIR	DOES C2 = 0	F72	11
11	READ MIR	DOES C1 = 0	F72	12
12	READ MIR	DOES D8 = 0	F73	13
13	READ MIR	DOES D4 = 0	F73	F74
L76	FORCE STEP & READ MIR	DOES MIR = 0000	48	1

WAIT	EXPECTED VALUE	FUNCTION
1	XXXX	
2	0000	MIR = 0+Z+1.

1	READ MIR	DOES MIR = FFFX FOR X = 0 THRU E	2	6
2	READ MIR	DOES MIR = FFFE	F35	3
3	READ MIR	DOES MIR = FFFC	F34	4

4	READ MIR	DOES MIR = FFF8	F34	5
5	READ MIR	DOES MIR = FFF0	F38	F34
6	READ MIR	DOES MIR = FFX0 FOR X = 0 THRU E	7	11
7	READ MIR	DOES MIR = FFE0	F38	8
8	READ MIR	DOES MIR = FFC0	F36	9
9	READ MIR	DOES MIR = FF80	F36	F501
11	READ MIR	DOES MIR = FX00 FOR X = 0 THRU F	12	16
12	READ MIR	DOES MIR = FE00	F40	13
13	READ MIR	DOES MIR = FC00	F39	14
14	READ MIR	DOES MIR = F800	F39	15
15	READ MIR	DOES MIR = F000	F42	F39 F40
16	READ MIR	DOES MIR = X000 FOR X = 1 THRU F	17	20
17	READ MIR	DOES MIR = E000	F42	18
18	READ MIR	DOES MIR = C000	F41	19
19	READ MIR	DOES MIR = 8000	F41	47
20	READ MIR	DOES MIR = 00XX FOR X = 1 THRU F	21	40
21	FORCE STEP	DOES MIR = 0000	22	F47
22	FORCE STEP	DOES MIR = 00FF	F46	F48
23	READ MIR	DOES MIR = FFFF	F7	24
24	READ MIR	DOES D1 = 0	F34	25
25	READ MIR	DOES D2 = 0	F34	26
26	READ MIR	DOES D4 = 0	F35	27
27	READ MIR	DOES D8 = 0	F35	28
28	READ MIR	DOES C1 = 0	F36	29
29	READ MIR	DOES C2 = 0	F36	30
30	READ MIR	DOES C4 = 0	F38	31
31	READ MIR	DOES C8 = 0	F38	32
32	READ MIR	DOES B1 = 0	F39	33
33	READ MIR	DOES B2 = 0	F39	34
34	READ MIR	DOES B4 = 0	F40	35
35	READ MIR	DOES B8 = 0	F40	36
36	READ MIR	DOES A1 = 0	F42	37
37	READ MIR	DOES A2 = 0	F42	38
38	READ MIR	DOES A4 = 0	F41	39
39	READ MIR	DOES A8 = 0	F41	L99
40	READ MIR	DOES MIR = 0F03	F1	41
41	READ MIR	DOES MIR = 0003	F1	42
42	READ MIR	DOES MIR = 8100	F1	43
43	READ MIR	DOES MIR = 0000	F1	44
44	READ MIR	DOES MIR = FF01	F34	45
45	READ MIR	DOES MIR = 0100	F34	46
46	READ MIR	DOES MIR = FF02	F1	23

47 DOES MIR EQUAL ONE OF THESE VALUES

MIR	F-NUMBER
F000	F41,F42
0000	F40,F41,F42
D000	F41,F42
4000	F41,F42

IF YES REPLACE DESIGNATED CHIPS

IF NO REPLACE CHIPS OF F48

48 DID PREVIOUSLY RECORDED VALUE

EQUAL ONE OF THE VALUES BELOW

MIR	F-NUMBER
FFFX	F45
FFX0	F36,F38
FX00	F39,F40
X000	F41,F42

FOR X= 0 THRU F

IF YES REPLACE DESIGNATED CHIPS

IF NO REPLACE CHIPS OF F45

L77 FORCE STEP READ MIR DOES MIR = FFFF 1 F148

WAIT	EXPECTED VALUE	FUNCTION
1	XXXX	
2	0000	MIR = Z+1
3	FFFF	MIR = B = B111
4	0000	MIR = B = B000

```
 1    FORCE  STEP  READ MIR       DOES  MIR  =  FFFE              F148      2

 2    FORCE  STEP  READ MIR       DOES  MIR  =  0000              F148      F187

L78   IF  THIS  IS  THE SECOND  PASS  THRU  THIS
       ERROR  ROUTINE  AND F168   CHIPS   WERE
       REPLACED   THEN  PERFORM  OPERATIONS   BEGINNING
       IN  L33   STEP   51.B    OTHERWISE      GO  TO  STEP   1

 1   WAS MIR RECORDED IN L31

     IF  YES  GO  TO  STEP  12  USING
         RECORDED  VALUE  AS  1ST  WORD

     IF  NO READ & RECORD MIR VALUES
       1.  RECORD  MIR.  (FIRST    WORD)
       2.  FORCE  STEP  AND THEN RECORD  MIR  (SECOND   WORD)
       3.  FORCE  STEP  AND RECORD  MIR
       4.  FORCE  STEP  AND RECORD  MIR
       5.  FORCE  STEP  AND RECORD  MIR
       6.  FORCE  STEP  AND RECORD  MIR
       7.  FORCE  STEP  AND RECORD  MIR
       8.  FORCE  STEP  AND RECORD  MIR
     GO  TO  STEP  2

    LISTED   BELOW  IS  THE  TABLE  OF  FUNCTIONS  TESTED  AND
   EXPECTED   VALUES

     WAIT|   MIR  VALUE        |  FUNCTION

       1   |    XXXX           |
       2   |    FFFF           |     MIR  =  B111
       3   |    0000           |     MIR  =  B000
       4   |    AAAA           |     B  =  Z  NOR  B.
       5   |    FFAA           |     B  =  LIT  NRI  B
       6   |    FFFE           |     B  =  Z  NAN  B.
       7   |    AAAB           |     B  =  Z  IMP  B.
       8   |    5556           |     MIR  =  0  +  Z  +  1
           |                   |

 2     CHECK  THE  PATTERN  BELOW  FOR
      MIR  VALUES
           1   FFFF
           2   FFFF
           3   0000
           4   AAAA
           5   FFAA
           6   FFFE
           7   AAAB
           8   5556     DO  RECORDED  VALUES  AGREE  THIS  TABLE   F168      3

 3   DO  RECORDED  VALUES  AGREE  WITH  THIS  TABLE                 F 98      4
                                                                    F169

           1   0000
           2   FFFF
           3   0000
           4   AAAA
           5   FFAA
           6   FFFE
           7   AAAB
           8   5556

 4   DOES  THIRD  WORD  =  X000   WHERE  X  =  1  THRU  F           F170      5

 5   DOES  THIRD  WORD  =  0X00   WHERE  X  =  1  THRU  F           F171      6

 6   DOES  THIRD  WORD  =  00X0   WHERE  X  =  1  THRU  F           F172      7

 7   DOES  THIRD  WORD  =  000X   WHERE  X  =  1  THRU  F           F173      8
 8   DOES  THIRD  WORD  =  X00X   WHERE  X  =  1  THRU  F            12       9

 9   DOES  FOURTH  WORD  =  EXPECTED   VALUE                         10      F 98
                                                                             F175

10   DOES  FIFTH   WORD  =  EXPECTED   VALUE                         28      F 98
                                                                             F175

11   DOES  EIGHTH  WORD  =  EXPECTED   VALUE                        F 98    F 98
                                                                    F174    F175

12   READ  FIRST   WORD          DOES  1ST  WORD  =  7FFF           F53      13

13   READ  FIRST   WORD          DOES  1ST  WORD  =  BFFF           F53      14

14   READ  FIRST   WORD          DOES  1ST  WORD  =  DFFF           F51      15

15   READ  FIRST   WORD          DOES  1ST  WORD  =  EFFF           F51      16

16   READ  FIRST   WORD          DOES  1ST  WORD  =  F7FF           F55      17

17   READ  FIRST   WORD          DOES  1ST  WORD  =  FBFF           F55      18

18   READ  FIRST   WORD          DOES  1ST  WORD  =  FDFF           F54      19

19   READ  FIRST   WORD          DOES  1ST  WORD  =  FEFF           F54      20

20   READ  FIRST   WORD          DOES  1ST  WORD  =  FF7F           F59      21

21   READ  FIRST   WORD          DOES  1ST  WORD  =  FFBF           F59      22

22   READ  FIRST   WORD          DOES  1ST  WORD  =  FFDF           F58      23

23   READ  FIRST   WORD          DOES  1ST  WORD  =  FFEF           F58      24

24   READ  FIRST   WORD          DOES  1ST  WORD  =  FFF7           F62      25

25   READ  FIRST   WORD          DOES  1ST  WORD  =  FFFB           F62      26

26   READ  FIRST   WORD          DOES  1ST  WORD  =  FFFD           F61      27

27   READ  FIRST   WORD          DOES  1ST  WORD  =  FFFE           F61      F174

28   READ  SIXTH   WORD          DOES  THE  6TH  WORD
                                   EQUAL  EXPECTED   VALUE          11      F169

L79   REPLACE  CHIPS  SPECIFIED
      BY  F147

       WAIT  |  EXPECTED  VALUE  |  FUNCTION          Y-SELTEST

         1   |     XXXX          |
         2   |     0000          |  MIR=  B=  B000
         3   |     0001          |  MIR  =  B  =  BTT1.
         4   |     FFFE          |  MIR  =  B  =  BTT0
         5   |     00FF          |  A3  =  0  +  LIT
         6   |     0000          |  MIR=  0  +  Z
         7   |     FFFF          |  MIR=  0  +  Z
         8   |     0000          |  MIR  =  BMAR
         9   |     FFFF          |  MIR  =  BMAR

L80   READ  &  RECORD  MIR  (B-REGISTER)
      GO  TO  STEP  1.
```

1 PRESS FORCE STEP (FST) AND RECORD MIR (A3-REGISTER)
GO TO STEP 2.

2 DOES A3 = B — 9 3

3 IF THE B VALUE APPEARS IN THE FOLLOWING
TABLE REPLACE THE DESIGNATED CHIPS
IF NOT GO TO STEP 4

B-REGISTER VALUES				F-NUMBER
7FFF	OR 8000	OR 3FFF		F91,F77
BFFF	OR 4000			F77
DFFF	OR 2000	OR CFFF		F92,F76
EFFF	OR 1000			F76
F7FF	OR 0800	OR F3FF		F78
FBFF	OR 0400			F78
FDFF	OR 0200	OR FCFF		F79
FEFF	OR 0100			F79
FF7F	OR 0080	OR FF3F		F80
FFBF	OR 0040			F80
FFDF	OR 0020	OR FFCF		F81
FFEF	OR 0010			F81
FFF7	OR 0008	OR FFF3		F82
FFFB	OR 0004			F82
FFFD	OR 0002	OR FFFC		F83
FFFE	OR 0001			F83

4 DOES B EQUAL ONE OF THESE VALUES

B-REGISTER VALUES				F-NUMBER
C000	OR 3000	OR 0FFF	OR F000	F87
0C00	0300	F0FF	0F00	F88
00C0	0030	FF0F	00F0	F89
000C	0003	FFF0	000F	F90

IF YES REPLACE DESIGNATED CHIPS

IF NO GO TO STEP 5

5 DOES A3 = FFFF & B= 0000 — F84,F85 6

6 DOES B= XX30 — F504 7

7 DOES B= 3330 — F85 8

8 DOES B= 3333 — F505 9

9 DOES B = XXFF — F503 10

10 GO TO L101

L82 READ AND RECORD MIR (WAIT 1)

WAIT	MIR	REMARKS
1	A3	EXPECTED VALUE
2	B	ACTUAL VALUE
3	0000	MIR = B = B000
4	FFFF	MIR = B = B111
5	0000	MIR = B000
6	FFFF	MIR = B111

GO TO STEP 1

1 PRESS FST AND RECORD MIR (WAIT 2)
REPEAT THIS OPERATION FOR WAITS 3,4,5&6
GO TO STEP 2

2 ARE THE VALUES IN WAITS 3,4,5&6
EQUAL TO THE LISTED VALUES. — 3 L101

3 DOES THE EXPECTED VALUE DIFFER
FROM THE ACTUAL (A3 NOT=B) — 4 11

4 READ THE B VALUE (WAIT2).
IF IT EQUALS A VALUE IN THE FOLLOWING
TABLE REPLACE THE DESIGNATED CHIPS
IF NOT GO TO STEP 5

B-REGISTER VALUES				F-NUMBER
7FFF	OR 8000	OR 3FFF		F91,F77
BFFF	OR 4000			F77
DFFF	OR 2000	OR CFFF		F92,F76
EFFF	OR 1000			F76
F7FF	OR 0800	OR F3FF		F78
FBFF	OR 0400			F78
FDFF	OR 0200	OR FCFF		F79
FEFF	OR 0100			F79
FF7F	OR 0080	OR FF3F		F80
FFBF	OR 0040			F80
FFDF	OR 0020	OR FFCF		F81
FFEF	OR 0010			F81
FFF7	OR 0008	OR FFF3		F82
FFFB	OR 0004			F82
FFFD	OR 0002	OR FFFC		F83
FFFE	OR 0001			F83

5 DOES A3 = FFFF — 6 7

6 DOES B = 0000 — F84,F85 7

7 DOES B = XX30, X = 0 THRU F — F89,F85 8

8 DOES B = 3330 — F85 9

9	DOES B = 3333		F85	10	B
10	DOES B EQUAL ONE OF THESE VALUES				B
	B-REGISTER VALUES	F-NUMBER			B
	C000 OR 3000 OR 0FFF OR F000	F87			B
	0C00 OR 0300 OR FOFF OR 0F00	F88			B
	00C0 OR 0030 OR FF0F OR 00F0	F89			B
	000C OR 0003 OR FFF0 OR 000F	F90			B
	IF YES REPLACE DESIGNATED CHIPS				B
	IF NO GO TO L101				B
11	DOES B = FFFF OR 0000		L99	L101	B
L83	FORCE STEP AND READ MPCR FOR NEXT PROCEDURES				H
L84	IS SYSTEM 721		4	1	H
1	READ MIR	DOES MIR = X000 FOR X = 1 THRU F	F126	2	H
2	READ MIR	DOES MIR = 0X00 FOR X = 1 THRU F	F127	3	H
3	READ MIR	DOES MIR = 00X0 FOR X = 1 THRU F	F128	F129	H
4	REMOVE CARDS PER L88 NOTE 1 THEN RE-RUN MTR	SAME ERROR RECURS	5	F521	H
5	INSTALL CARDS	GO TO STEP 1 OF L# INDICATED BY PROGRAM			H
L85	GO TO MANUAL PROCEDURE L88 STEP 2				
L86	FORCE STEP AND READ MIR DOES MIR = FFFF (EXPECTED DATA - NOTE FOR LATER REFERENCE)		1	19	H
	WAIT | MIR | FUNCTION				
	1 |AMPCR| ADDR WHERE ERROR WAS DETECTED				
	2 |B-REG| EXPECTED VALUE (MIR = B)				
	3 | A2 | ACTUAL VALUE (MIR = A2)				
1	FORCE STEP READ MIR	DOES MIR = 00FF	42	2	
2	READ MIR	DOES MIR = 0000	F120	3	
3	READ MIR	DOES BIT A1 = 0	F116	4	
4	READ MIR	DOES BIT A2 = 0	F116	5	
5	READ MIR	DOES BIT A4 = 0	F116	6	
6	READ MIR	DOES BIT A8 = 0	F116	7	
7	READ MIR	DOES BIT B1 = 0	F117	8	
8	READ MIR	DOES BIT B2 = 0	F117	9	
9	READ MIR	DOES BIT B4 = 0	F117	10	
10	READ MIR	DOES BIT B8 = 0	F117	11	
11	READ MIR	DOES BIT C1 = 0	F118	12	
12	READ MIR	DOES BIT C2 = 0	F118	13	
13	READ MIR	DOES BIT C4 = 0	F118	14	
14	READ MIR	DOES BIT C8 = 0	F118	15	
15	READ MIR	DOES BIT D1 = 0	F119	16	
16	READ MIR	DOES BIT D2 = 0	F119	17	
17	READ MIR	DOES BIT D4 = 0	F119	18	
18	READ MIR	DOES BIT D8 = 0	F119	43	
19	FORCE STEP READ MIR	DOES MIR = 3300	F122	19A	H
19A	READ MIR	DOES MIR = FF00	42	20	H
20	WAS EXPECTED VALUE = 0000		41	34	H
21	READ MIR	DOES MIR = 3300	F120	22	H
22	READ MIR	DOES BIT A1 = 1	F116	23	H
23	READ MIR	DOES BIT A2 = 1	F116	24	
24	READ MIR	DOES BIT A4 = 1	F116	25	
25	READ MIR	DOES BIT A8 = 1	F116	26	
26	READ MIR	DOES BIT B1 = 1	F117	27	
27	READ MIR	DOES BIT B2 = 1	F117	28	
28	READ MIR	DOES BIT B4 = 1	F117	29	
29	READ MIR	DOES BIT B8 = 1	F117	30	
30	READ MIR	DOES BIT C1 = 1	F118	31	
31	READ MIR	DOES BIT C2 = 1	F118	32	
32	READ MIR	DOES BIT C4 = 1	F118	33	
33	READ MIR	DOES BIT C8 = 1	F118	F119	
34	READ MIR	DOES MIR = 0333	F120	35	
35	READ MIR	DOES MIR = 3033	F121	36	
36	READ MIR	DOES MIR = 3303	F122	37	
37	READ MIR	DOES MIR = 3330	F123	38	
38	READ MIR	DOES MIR = X000 FOR X = 1 THRU F	F120	39	

39 READ MIR — DOES MIR = 0X00 FOR X = 1 THRU F — F121 40

40 READ MIR — DOES MIR = 00X0 FOR X = 1 THRU F — F122 F123

41 READ MIR — DOES MIR = 3333 — F123 21

42 PLACE THE IRQ/EXT SWITCH TO THE IRQ POSITION AND RESTART THE PROC MTR. OBSERVE THAT PROGRAM IS LOOPING.
EO2-1C #DQ3D! (EOOSEL) 14% — 44 F199

43 SET IRQ/EXT SW TO IRQ POSITION AND RECYCLE THE PROC MTR. PUT MTR METER ON
MU3-2D #FN9D! (MUINH8/) 100% — 44 F177

44 GO TO MANUAL PROCEDURE L99

L87 FORCE STEP AND READ INCR

L88 IS SYSTEM 721 — 17 1

1 FORCE STEP AND THEN READ MIR (07E1) — DOES MIR = 0000 — 1A 4

WAIT	MIR	FUNCTION
0 (07E1)	0000	MIR=A3
1 (07E4)	0000	BMI,MIR=B
2 (07E9)	FFFF	MIR=Z
3 (07ED)	FFFF	MIR=B111,BMI,MIR=B

1 FORCE STEP AND READ MIR (07E4) — DOES MIR = FFFF — 3 2

2 READ MIR (07E4) — DOES MIR = 3030 — F506 4

3 FORCE STEP AND READ MIR (07E9) — DOES MIR = FFFF — L101 4

4 READ MIR — DOES MIR = 0000 — 13 5

5 READ MIR — DOES MIR = XFFF FOR X = 0 THRU E — F139 6

6 READ MIR — DOES MIR = FXFF FOR X = 0 THRU E — F140 7

7 READ MIR — DOES MIR = FFXF FOR X = 0 THRU E — F141 8

8 READ MIR — DOES MIR = FFFX FOR X = 0 THRU E — F142 9

9 READ MIR — DOES MIR = X000 FOR X = 1 THRU F — F139 10

10 READ MIR — DOES MIR = 0X00 FOR X = 1 THRU F — F140 11

11 READ MIR — DOES MIR = 00X0 FOR X = 1 THRU F — F141 12

12 READ MIR — DOES MIR = 000X FOR X = 1 THRU F — F142 L101

13 FORCE STEP READ MIR — DOES MIR = XFFF FOR X = 0 THRU E — F139 14

14 READ MIR — DOES MIR = FXFF FOR X = 0 THRU E — F140 15

15 READ MIR — DOES MIR = FFXF FOR X = 0 THRU E — F141 16

16 READ MIR — DOES MIR = FFFX FOR X = 0 THRU E — F142 F138

17 REMOVE CARDS LISTED IN L88 NOTE 1 RE-RUN MTR — SAME ERROR RECURS — 19 18

18 INSTALL CARDS LISTED IN L88 NOTE 1 METER STC-1H (MIRINH/) 100% — F521 F520

19 INSTALL CARDS LISTED IN L88 NOTE 1 GO TO L88 STEP 1

*** L88 NOTE 1 ***
CARDS INVOLVED ARE - STC - DMC - DDC AND CLB & CLC OF ALL PMLC DDPS

L89 (IF B721 - SEE L84 BEFORE PROCEEDING)

1.RECORD MIR FORCE STEP.
2.RECORD MIR FORCE STEP.
3.RECORD MIR FORCE STEP.
4.RECORD MIR.
DOES THE ACTUAL VALUE EQUAL EXPECTED VALUE — 32 31

WAIT	MIR VALUE	FUNCTION
1	XXXX	ACTUAL VALUE (A.V.)
2	A3	EXPECTED DISPLAY
3	0000	MIR = AMPCR = 0
4	3FFF	MIR = AMPCR = 3FFF

1 DOES A.V. = 00FF — F179 2

2 DOES A.V. = 3000 — F130 3

3		DOES A.V. = 0001	F131	4	
4		DOES A.V. = 0002	F131	5	
5		DOES A.V. = 0004	F132	6	
6		DOES A.V. = 0008	F132	7	
7		DOES A.V. = 0010	F133	8	
8		DOES A.V. = 0020	F133	9	
9		DOES A.V. = 0040	F134	10	
10		DOES A.V. = 0080	F134	11	
11		DOES A.V. = 0100	F135	12	
12		DOES A.V. = 0200	F135	13	
13		DOES A.V. = 0400	F136	14	
14		DOES A.V. = 0800	F136	15	
15		DOES A.V. = 1000	F137	16	
16		DOES A.V. = 2000	F137	17	
17		DOES A.V. = 3FFE	F131	18	
18		DOES A.V. = 3FFD	F131	19	
19		DOES A.V. = 3FFB	F132	20	
20		DOES A.V. = 3FF7	F132	21	
21		DOES A.V. = 3FEF	F133	22	
22		DOES A.V. = 3FDF	F133	23	
23		DOES A.V. = 3FBF	F134	24	
24		DOES A.V. = 3F7F	F134	25	
25		DOES A.V. = 3EFF	F135	26	
26		DOES A.V. = 3DFF	F135	27	
27		DOES A.V. = 3BFF	F136	28	
28		DOES A.V. = 37FF	F136	29	
29		DOES A.V. = 2FFF	F137	30	B
					B
30		DOES A.V. = 1FFF	F137	42	B
31		DO THEY DIFFER BY ONE BIT.	3	33	
32		IS THE EXPECTED AND ACTUAL VALUE EQUAL TO 0	41	40	B
33		DOES A.V. = 000X FOR X = 1 THRU F	F181	34	
34		DOES A.V. = 00X0 FOR X = 1 THRU F	F182	35	
35		DOES A.V. = 0X00 FOR X = 1 THRU F	F183	36	
36		DOES A.V. = X000 FOR X = 1 THRU 3	F184	37	
37		DOES A.V. = 3FFX FOR X = 0 THRU E	F181	38	
38		DOES A.V. = 3FXF FOR X = 0 THRU E	F182	39	
39		DOES A.V. = 3XFF FOR X = 0 THRU E	F183	1	
40		IS THE THIRD WORD EQUAL TO ZERO	41	F185	
41		DOES 4TH WORD EQUAL 3FFX (X = 0 THRU E)	F181	13	B
					B
					B
42		DOES A.V. = 4000	F53	43	B
					B
					B
43		DOES 4TH WORD EQUAL 3FXF (X = 0 THRU E)	F182	44	B
					B
					B
					B
44		DOES 4TH WORD EQUAL 3XFF (X = 0 THRU E)	F183	45	B
					B
					B
					B
45		DOES 4TH WORD EQUAL XFFF (X = 0,1,2)	F184	F185	B
L90	READ MIR	DOES MIR = 0000	F75	1	
1	READ MIR	DOES MIR = FF00	F75	2	
2	READ MIR	DOES MIR = FFFF	F72	3	
3	READ MIR	DOES MIR = 00FF	F75	4	
4	FORCE STEP & READ MPCR FOR NEXT MANUAL PROCEDURE				
L91	READ MIR	DOES MIR = 0000	F75	1	
1	READ MIR	DOES MIR = FF00	F75	2	
2	FORCE STEP & READ MPCR FOR NEXT MANUAL PROCEDURE				
L92	READ MIR	DOES MIR = 0000	F75	1	
1	READ MIR	DOES MIR = FF00	F75	2	
2	FORCE STEP & READ MPCR FOR NEXT MANUAL PROCEDURE				
					B
					B
L93	REPLACE CHIPS SPECIFIED IN F502				B
L94	READ MIR	DOES MIR = 0000	F75	1	
1	READ MIR	DOES MIR = FF00	F75	2	
2	FORCE STEP & READ MPCR FOR NEXT MANUAL PROCEDURE				
					B
					B
L99	***PROCEDURE***				B
					B
					B
1	PRESS CLEAR PUSHBUTTON				B

2 PRESS FST FOUR(4) TIMES
(PROG STEP 3 + 1FST)

3 PRESS FST THEN SGL PB
BEFORE RELEASING FST PB

4 PRESS SGL PB TWO(2) TIMES

5 PRESS FST THEN SGL PB
BEFORE RELEASING FST PB

6 PRESS SGL PB TWO(2) TIMES.
THE PROGRAM IS NOW IN SINGLE STEP ROUTINE AT LABEL 'SGLSTPP'(APPROX ADDR 087D)

7 PRESS SGL PB AND COMPARE VALUES IN MIR WITH THOSE IN TABLE L99-1A. IF THERE IS A DISCREPANCY REPEAT STEPS (1) THRU(6) AND METER THE PINS LISTED IN TABLE L99-1B.

NOTE 1. THE STEP NUMBER OF TABLE 1A ALSO APPEARS IN THE PROGRAM LISTING AT THE APPROPRIATE INCR VALUE AND CAN BE USED TO MAINTAIN AN ACCURATE COUNT OF SINGLE STEPS.

8 WHEN WAIT APPEARS SET
SGL/NORM SWITCH TO NORMAL

9 PRESS FST AND OBSERVE MIR AGREES WITH THE EXPECTED VALUES OF TABLE 2A. IF IT DISAGREES REPEAT STEPS 1 THRU 9 TO MONITOR THE SIGNALS OF TABLE 2B.

NOTE 2. LOOP MONITORING MAY BE ACCOMPLISHED BY REPEATING L99 WITH THE IRQ SWITCH SET TO IRQ. THE PROGRAM WILL NOW LOOP ON THOSE INSTRUCTIONS WHICH DETECTED THE ERROR. IN THIS MODE THE FIELD ENGINEER MUST TROUBLESHOOT BY HIS OWN EXPERTISE.

DESCRIPTION

L99 PROVIDES A MEANS OF TROUBLESHOOTING PROBLEMS WHICH HAVE NOT BEEN IDENTIFIED BY PREVIOUS TESTS. IT REQUIRES THAT THE OPERATOR POSSESS A BLOCK DIAGRAM KNOWLEDGE OF THE PROCESSOR AND BE ABLE TO SIGNAL TRACE THROUGH THE SUSTEM DOCUMENTATION. A LIST OF SUSPECTED CHIPS IS PROVIDED FOR EACH DATA OR CONTROL SIGNAL IN WHICH A PROBLEM WAS OBSERVED. HOWEVER IF CHIP REPLACEMENT IS NOT THE CURE THOSE SIGNALS WILL PROVIDE A MEANINGFUL STARTING POINT FOR TROUBLESHOOTING.

IT IS RECOMMENDED THAT INITIALLY L99 BE COMPLETED IN ITS ENTIRETY. IF THE FAULT APPEARS AT MORE THAN ONE ADDRESS THOSE AREAS NOT COMMON TO BOTH MEASUREMENTS CAN BE ELIMINATED AS PROBLEM AREAS. L99 SHOULD NOW BE REPEATED FOLLOWING THE FAULT ISOLATION TABLES AND UTILIZING THE INFORMATION OBTAINED ABOVE.

L99 SHARES SUBROUTINES WITH OTHER ERROR ROUTINES. BECAUSE OF THIS THE L NUMBERS ENCOUNTERED IN THE PROGRAM LISTING DURING PERFORMANCE OF L99 SHOULD BE IGNORED.

SEVEN (7) TABLES ARE INCLUDED IN L99; NAMELY, 1A,1B,1C, 2A,2B,2C& 3. TABLE 1A IDENTIFIES THE EXPECTED MIR VALUE AND THE DATA PATH TESTED IN THE SINGLE STEP (SGLSTPP) PORTION OF THE PROGRAM.(THE ADDRESS OF 'SGLSTPP' IS APPROXIMATELY 087D.) THE STEP NUMBER IS THE NUMBER OF ADDRESSES (CLOCK PULSES) FROM LABEL 'SGLSTPP' AND IS REFERENCED IN THE PROGRAM LISTING.

TABLE 1B IDENTIFIES THE SIGNALS TO BE MONITORED IF A CONTROL FUNCTION IS SUSPECT. A CONTROL FUNCTION WOULD BE SUSPECT IF THE DISPLAYED VALUE AND THE EXPECTED VALUE DIFFERED BY MORE THAN ONE BIT. THE SIGNALS ARE INDEXED PER ADDRESS FROM 'SGLSTPP' AND ARE CHARACTERIZED FOR ONLY THE FIRST TIME THEY APPEAR.

IF THE FAILURE IS APPARENTLY A DATA FAILURE TROUBLESHOOT PER TABLE 3 INITIALLY. IF TABLE 3 DOES NOT IDENTIFY THE PROBLEM THEN USE EITHER TABLE 1B OR 2B AS APPLICABLE. A DATA FAILURE IS DEFINED AS A DISCREPANCY OF ONLY ONE BIT AT THE FIRST OBSERVED FAILURE. OTHERWISE IT IS A CONTROL FAILURE.

TABLE 1C IDENTIFIES SUSPECTED CHIPS PER CONTROL SIGNALS LISTED IN TABLE 1B.

TABLE 2A IDENTIFIES THE EXPECTED VALUE IN MIR AND THE FUNCTION TESTED IN THE FORCED STEP PORTION OF THIS ROUTINE. THE FORCED STEP PORTIONS WITH APPROXIMATE ADDRESSES ARE 'ADDERTEST'(0771), 'Y-SELTEST'(078E) AND 'AT1900FC'(07DE). THE ADDRESSES OF THE WAITS ARE DEFINED AS WAIT 1 IS THE FIRST WAIT OF 'ADDERTEST'; WAIT 9 IS THE FIRST OF'Y-SELTEST' WAIT 18 IS THE FIRST OF 'AT1900FC'.

TABLE 2B IDENTIFIES THE SIGNALS TO BE MONITORED IF A CONTROL FUNCTION IS SUSPECT. (REFER TO TABLE 1B DESCRIPTION) THE SIGNALS ARE INDEXED PER WAIT NUMBER AS EXPLAINED IN DESCRIPTION OF TABLE 2A.

TABLE 2C IDENTIFIES THE SUSPECTED CHIPS PER CONTROL SIGNALS LISTED IN TABLE 2B.

TABLE 3 IDENTIFIES SUSPECTED CHIPS FOR A DATA FAILURE (1 BIT). THE OPERATOR MUST IDENTIFY THE SUSPECTED CHIPS BY OBSERVING WHICH BIT WAS IN ERROR AND BY ASCERTAINING THE DATA PATH FROM TABLES 1A OR 2A.

AN EXAMPLE WILL HELP TO ILLUSTRATE THE FOREGOING DISCUSSIO

FAULT: FUNCTION- LUADIN02 (SOURCE OPEN)
LOCATION- PAFS1 B7-9 OPEN

DATA: STEP NO.- +2
EXPECTED VALUE- FFFF
OBSERVED VALUE- BFFF
ERROR- BIT 2 IS 0 IN MIR

STEP NO.+2 IS THE FIRST OBSERVED FAILURE. SINCE THE OBSERVED AND EXPECTED VALUES DIFFER BY ONLY 1 BIT (LUMIR02/). THE FAILURE IS A DATA TYPE. THEREFORE PROCEED TO TABLE 3. AT THIS STEP NO. THE RESULTS OF INSTRUCTION MIR=B111 (APPROXIMATE ADDRESS 087D) ARE DISPLAYED. FROM TABLE 1A THE DATA PATH IS Y-SELECT-ADDER-BSW-MIR.

SINCE A CLOCK PULSE IS REQUIRED TO LOAD A REGISTER (E.G. MIR) THE INPUT AND OUTPUT DATA MUST BE OBSERVED PRIOR TO AND SUCCEEDING THAT PULSE RESPECTIVELY. CONSEQUENTLY THE Y-SELECT, ADDER AND BSW CIRCUITS MUST BE OBSERVED AT THE STEP (+1) PREVIOUS TO THE FAULT TO DETERMINE IF MIR02/ INPUT WAS INCORRECT. THEREFORE REPEAT L99 PROCEDURE TO ARRIVE AT THE ADDRESS OF 'SGLSTPP'+1. MONITOR THE FOLLOWING SIGNALS LISTED IN TABLE L99-3 IN THE DESIGNATED ORDER:

SIGNAL	DUTY CYCLE	INTERFACE FUNCTION (SEE NOTE 1)
LUADIN02	0%	Y-SELECT-ADDER NOTE. X&Y INPUTS TO ADDER ARE 0.
LUADD02	100%	ADDER-BSW NOTE. ADDER FUNCTION IS X + Y/.
LUBSW02	100%	BSW-MIR NOTE. NO SHIFTING IN BSW.

PRESS SINGLE STEP AND MONITOR

LUMIR02/	0%	MIR OUTPUT

IN THIS EXAMPLE THE FAULT WOULD HAVE BEEN OBSERVED WHEN MONITORING LUADIN02. FINDING LUADIN02 IN Y-SELECT SECTION OF TABLE L99-3 REPLACE SUSPECT CHIPS.

NOTE 1.

INTERFACE FUNCTION DEFINES WHICH SECTION OF TABLE L99-3 TO USE. THE SECTIONS ARE:

A) BR1,BR2 AND MAR OUTPUT PINS
B) ADDER OUTPUT PINS
C) CTR,LIT OUTPUT PINS
D) Y-SELECT OUTPUT PINS
E) MIR OUTPUT PINS
F) AMPCR OUTPUT PINS
G) BSW OUTPUT PINS

TABLE L99-1A

STEP	MIR	FUNCTION
+0	0000	
+2	FFFF	Y-SEL TO ADDER TO BSW TO MIR
+3	0000	Y-SEL TO ADDER TO BSW TO MIR
+5	FFFF	B=FFFF TO Y-SEL TO ADDER TO BSW TO MIR
+7	0000	B=0000 TO Y-SEL TO ADDER TO BSW TO MIR
+9	3FFF	3FFF TO AMPCR TO Y-SEL TO ADDER TO BSW TO MIR
+11	0000	0000 TO AMPCR TO Y-SEL TO ADDER TO BSW TO MIR
+18	0001	LIT = 1 TO A1 TO MIR (VIA ADDER)
+19	0002	LIT = 2 TO A2 TO MIR (VIA ADDER)
+20	0003	LIT = 3 TO A3 TO MIR (VIA ADDER)
+24	0000	Z = 0 TO MIR (VIA ADDER)
+29	FFFF	Z = FFFF TO MIR (VIA ADDER)
+33	0000	MIR=0 TO B TO MAR1 TO MIR (VIA ADDER)
+35	FFFF	MIR=FFFF TO B TO MAR1 TO MIR (VIA ADDERS)
+38	0002	A2 TO MIR (A2 = 2)
+43	FFFF	MIR=FFFF TO B TO BR2 TO MIR
+44	0000	MIR=0 TO B TO BR2 TO MIR
+47	FFFF	B=FFFF TO A3 TO MIR
+48	0000	0 TO Y-SEL TO A3 TO A2 TO MIR
+50	FFFF	B=FFFF TO A3 TO A2 TO MIR
+51	0000	A1=0 TO MIR
+54	FFFF	A1=FFFF TO MIR

TABLE L99-1B

STEP NO.	SIGNAL	BOARD	PIN	DESCRIPTION (SEE NOTE 1)
ALL STEPS	MUDN42	MU2	1X	#FPIX! 0%
ALL STEPS	MUNB20	MU3	1W	#FN8W! 0%
ALL STEPS	MUINH8/	MU3	2D	#FN9D! 100%
	3 CLK (SEE NOTE 2)			
+1	MUAMODEA	MU3	2B	#FN9B! -1
+1	MUENB1/	MU2	2N	#FP2N! 3
+1	MUENB3/	MU2	1P	#FP1P! 3
+1	MUNB21/	MU3	2V	#FN9V! 3
+1	MUNB26/	MU3	2S	#FN9S! 3
+1	MUCIN/	MU3	2C	#FN9C! -1
+1	MUAS2A	MU3	2G	#FN9G! 1
+1	MUAS2B	MU3	1I	#FN8I! 1
+3	MUNB37	MU3	1N	#FN8N! 1
+7	MUSELBB1	MU2	1R	#FP1R! 4
+7	MUSELBB2	MU2	1N	#FP1N! 4
+7	MU3CLK1/	MU2	1F	#FP1F! -1
+11	MUNB34	MU3	1P	#FN8P! 2
+11	MUNQE3	MU2	1S	#FP1S! 9
+13	MUNB35	MU3	2N	#FN9N! 2
+15	MUNB36	MU3	2M	#FN9M! 2
+17	MUACTL2	MU2	2Y	#FP2Y! -1
+17	MUNQE1	MU2	1T	#FP1T! 3
+18	MUACTL1	MU2	2S	#FP2S! -2
+24	MUNB38A	MU3	2E	#FN9E! 1
+24	MUNB38B	MU3	2J	#FN9J! 1
+29	MUDN43	MU4	2V	#FN6V! 1
+31	EOASR/	E01	2I	#DQ4I! 4
+32	MUSELBA1	MU2	2R	#FP2R! 1
+32	MUSELBA2	MU2	2P	#FP2P! 1
+35	E00SEL	E01	1D	#DQ3D! +35----WAIT #23
+38	MUDN44	MU4	1U	#FN5U! 1

NOTE 1. X INDICATES THAT AT THE SPECIFIED STEP NO. THE SIGNAL WILL CHANGE FROM 0% TO 100% DUTY CYCLE AND WILL REMAIN FOR X ADDRESSES. (SIMILARLY, _X INDI_ CATES 100% TO 0%.) THESE SIGNALS ARE DESCRIBED ONLY AT THE FIRST STEP NO. IN WHICH THEY APPEAR. THEY MAY APPEAR AT SUCCEEDING STEP NOS. AND FOR DIFFERENT DURATIONS.

NOTE 2. '3CLOCK' SHOULD BE MONITORED ON A WAIT INSTRUCTION. AFTER PRESSING CLEAR THE PROGRAM WILL RETURN TO ADDRESS 0000 WHICH IS A WAIT. MTR METER SHOULD INDICATE A 3-5% DUTY CYCLE.

TABLE L99-1C

SIGNAL	BOARD		SUGGESTED CHIP REPLACEMENTS
EOASR/	E01	#DQ3!	A1,A3,A5,C1
EOOSEL	E01	#DQ3!	A1,A3,A5
MUACTL1	MU2	#FP1!	A5,D5,E3,F1,F5
MUACTL2	MU2	#FP1!	A5,D5,E3,F1,F5
MUAMODEA	MU3	#FN8!	A5,C3,D5,D7,E5,E7,F5,F7
MUAS2A(&B)	MU3	#FN8!	B5,E7,F7
MUCIN/	MU3	#FN8!	A7,D5,D7,E5,E7,F5
MU3CLK1/	MU2	#FP1!	B7
MUDN42	MU2	#FP1!	A5,D5,F7
MUDN43	MU2	#FP1!	A5,B7,D5,F7
MUDN44	MU2	#FP1!	A5,B7,D5,F7
MUENB1/	MU2	#FP1!	A5,B3,C3,D1,D5,D7
MUENB3/	MU2	#FP1!	A5,B3,C3,D1,D5,D7
MUINH8/	MU3	#FN8!	D3,E3,F7
MUNB20	MU3	#FN8!	F3,F7
MUNB21/	MU3	#FN8!	F3,F7
MUNB26/	MU3	#FN8!	D1,E1,F7
MUNB34	MU3	#FN8!	D1,D3,E3,F7
MUNB35	MU3	#FN8!	D1,D3,E3,F7
MUNB36	MU3	#FN8!	D1,D3,E3,F7
MUNB37	MU3	#FN8!	B5,D1,F3,F7
MUNB38B(&A)	MU3	#FN8!	C1,E1,F7
MUNQE1	MU2	#FP1!	A5,D1,D5,E1,E3
MUNQE3	MU2	#FP1!	A5,D1,D5,E1,E3,E5
MUSELBA1	MU2	#FP1!	A5,B3,C1,D1,D3,D5,E5
MUSELBB1	MU2	#FP1!	A5,C3,D1,D3,D5,E5

TABLE L99-2A

WAIT	MIR	FUNCTION
1	FFFF	
2	FFFF	Y-SELECT TO ADDER TO BSW TO MIR
3	0000	Y-SELECT TO ADDER TO BSW TO MIR
4	AAAA	B = Z NOR B.
5	FFAA	B = LIT NRI B.
6	FFFE	B = Z NAN B.
7	AAAB	B = Z IMP B.
8	5556	MIR = 0 + Z + 1.
9	5556	
10	0000	Y-SELECT TO ADDER TO BSW TO MIR
11	0001	BTT1 TO B, B TO MIR
12	FFFE	BTT0 TO B, B TO MIR
13	00FF	A3 = 0 + LIT. A3 TO MIR (LIT = FF)
14	0000	MIR = 0 + Z Z = 0
15	FFFF	MIR = 0 + Z Z = FFFF
16	0000	0000 TO MAR1, 00 TO BR2,BMAR TO MIR
17	FFFF	FFFF TO MAR1, FF TO BR2, BMAR TO MIR
18	0000	
19	0000	MIR TO B, B TO MIR (MIR = 0000)
20	FFFF	Z TO MIR (Z = FFFF)
21	FFFF	MIR TO B, B TO MIR (MIR = 0)
22	FFFF	FFFF TO B, B TO MIR
23	FFFF	B TO MAR1, ASR, BMAR TO MIR

TABLE L99-2B

WAIT NO.	CLOCK NO. (SEE NOTE 2)	SIGNAL	BOARD	PIN		DESCRIPTION (SEE NOTE 1)
3	5	MUAS3A	MU3	1H	#FN8H!	-2
3	5	MUAS3B	MU3	1E	#FN8E!	-2
4	4	MUAS1A	MU3	2L	#FN9L!	1
4	4	MUAS1B	MU3	1K	#FN8K!	1
4	4	MUASOA	MU3	2K	#FN9K!	-1
4	4	MUAS0B	MU3	1L	#FN8L!	-1
5	3	MUNB25	MU3	2Y	#FN9Y!	1

NOTE 1. SAME AS NOTE 1 OF TABLE 1B

NOTE 2. TO REACH A CLOCK NO. X OF A WAIT NO PLACE SGL/NORM SWITCH TO SGL POSITION. DEPRESS FST PB THEN SGL PB BEFORE RELEASING FST. (VERIFY WAIT INDICATOR IS EXTINGUISHED.) DEPRESSING SGL X-1 MORE TIMES WILL GENERATE THE SIGNAL.

TABLE L99-2C

SIGNAL	BOARD		SUGGESTED CHIP REPLACEMENTS
MUAS3A(&B)	MU3	#FN8!	B7,C5,D5,D7,E5,E7,F5,F7
MUAS1A(&B)	MU3	#FN8!	C5,C7,D5,D7,E5,E7,F5,F7
MUAS0A(&B)	MU3	#FN8!	C5,C7,D5,D7,E5,E7,F7
MUNB25	MU3	#FN8!	F3,F7

TABLE L99-3A

BR1, BR2 AND MAR OUTPUT PINS

BOARD	PIN		SIGNAL	BOARD	CHIPS
MU4	1V	#FN5V!	(MUOS01)	MU4	D5,E7,F3,F5,F7
MU4	1S	#FN5S!	(MUOS02)	MU4	D5,E7,F3,F5,F7
MU4	2Y	#FN6Y!	(MUOS03)	MU4	D5,E7,F3,F5,F7
MU4	2U	#FN6U!	(MUOS04)	MU4	D5,E7,F3,F5,F7
MU4	2P	#FN6P!	(MUOS05/)	MU4	D3,D5,D7,E3,F5
MU4	2T	#FN6T!	(MUOS05)	MU4	D3,D5,D7,E3,F5
MU4	1R	#FN5R!	(MUOS06/)	MU4	D3,D5,D7,E3,F5
MU4	2S	#FN6S!	(MUOS06)	MU4	D3,D5,D7,E3,F5
MU4	2R	#FN6R!	(MUOS07)	MU4	D3,D5,D7,E3,F5
MU4	1T	#FN5T!	(MUOS08)	MU4	D3,D5,D7,E3,F5
MU5	1R	#FN2R!	(MUOS09)	MU5	A7,E3,E7,F7

MU5	1U	#FN2U!	(MUOS10)	MU5	A7,E3,E7,F7
MU5	2R	#FN3R!	(MUOS11)	MU5	A7,E3,E7,F7
MU5	2U	#FN3U!	(MUOS12)	MU5	A7,E3,E7,F7
MU5	1H	#FN2H!	(MUOS13)	MU5	A7,C3,C7,F7
MU5	1J	#FN2J!	(MUOS14)	MU5	A7,C3,C7,F7
MU5	1I	#FN2I!	(MUOS15)	MU5	A7,C3,C7,F7
MU5	2J	#FN3J!	(MUOS16)	MU5	A7,C3,C7,F7

TABLE L99-3B

ADDER OUTPUT PINS

BOARD	PIN		SIGNAL	BOARD	CHIPS
LU2-1	1B	#FR8B!	(LUADD01)	LU2-1	A7,B/C3,C7,D3,D5,D7,E7
LU2-1	2E	#FR9E!	(LUADD02)	LU2-1	A7,B/C3,C7,D3,D5,D7,E7
LU2-1	1F	#FR8F!	(LUADD03)	LU2-1	A3,A7,B/C3,C7,D5,D7,E7
LU2-1	2F	#FR9F!	(LUADD04)	LU2-1	A3,A7,B/C3,C7,D5,D7,E7
LU2-2	1B	#FR5B!	(LUADD05)	LU2-2	A7,B/C3,C7,D3,D5,D7,E7
LU2-2	2E	#FR6E!	(LUADD06)	LU2-2	A7,B/C3,C7,D3,D5,D7,E7
LU2-2	1F	#FR5F!	(LUADD07)	LU2-2	A3,A7,B/C3,C7,D5,D7,E7
LU2-2	2F	#FR6F!	(LUADD08)	LU2-2	A3,A7,B/C3,C7,D5,D7,E7
LU2-3	1B	#FR2B!	(LUADD09)	LU2-3	A7,B/C3,C7,D3,D5,D7,E7
LU2-3	2E	#FR3E!	(LUADD10)	LU2-3	A7,B/C3,C7,D3,D5,D7,E7
LU2-3	1F	#FR2F!	(LUADD11)	LU2-3	A3,A7,B/C3,C7,D5,D7,E7
LU2-3	2F	#FR3F!	(LUADD12)	LU2-3	A3,A7,B/C3,C7,D5,D7,E7
LU2-4	1B	#FQ9B!	(LUADD13)	LU2-4	A7,B/C3,C7,D3,D5,D7,E7
LU2-4	2E	#FR0E!	(LUADD14)	LU2-4	A7,B/C3,C7,D3,D5,D7,E7
LU2-4	1F	#FQ9F!	(LUADD15)	LU2-4	A3,A7,B/C3,C7,D5,D7,E7
LU2-4	2F	#FR0F!	(LUADD16!	LU2-4	A3,A7,B/C3,C7,D5,D7,E7

TABLE L99-3C

CTR AND LIT OUTPUT PINS

BOARD	PIN		SIGNAL	BOARD	CHIPS
MU5	2Q	#FN3Q!	(MUCTR1)	MU5	A7,E3,F7
MU5	1Q	#FN2Q!	(MUCTR2)	MU5	A7,E3,F7
MU5	2P	#FN3P!	(MUCTR3)	MU5	A7,E3,F7
MU5	2L	#FN3L!	(MUCTR4)	MU5	A7,E3,F7
MU5	2E	#FN3E!	(MUCTR5)	MU5	A7,C3,F7
MU5	2G	#FN3G!	(MUCTR6)	MU5	A7,C3,F7
MU5	1G	#FN2G!	(MUCTR7)	MU5	A7,C3,F7
MU5	1E	#FN2E!	(MUCTR8)	MU5	A7,C3,F7
MU1-2	2K	#FM7K!	(MULIT1)	LU4-1 LU7-1	B7 B7 B721
MU1-2	1L	#FM6L!	(MULIT2)	LU4-1 LU7-1	B7 B7 B721
MU1-2	2L	#FM7L!	(MULIT3)	LU4-1 LU7-1	A7,E7,F3 A7,E5,F5 B721
MU1-2	2N	#FM4N!	(MULIT4)	LU4-1 LU7-1	A7,E7,F3 A7,E5,F5 B721
MU1-3	2K	#FM4K!	(MULIT5)	LU4-2 LU7-2	B7 B7 B721
MU1-3	1L	#FM3L!	(MULIT6)	LU4-2 LU7-2	B7 B7 B721
MU1-3	2L	#FM4L!	(MULIT7)	LU4-2 LU7-2	A7,E7,F3 A7,E5,F5 B721
MU1-3	2N	#FM4N!	(MULIT8)	LU4-2 LU7-2	A7,E7,F3 A7,E5,F5 B721

TABLE L99-3D

Y-SELECT OUPUT PINS

SIGNAL	BOARD	PIN		BOARD	CHIPS	
(LUADIN01)	LU3-1	2W	#FS2W!	LU3-1 LU6-1	B7,D1,D5,E3,E7,F3 B7,D1,D5,E3,E5,F5	B721
(LUADIN02)	LU3-1	2J	#FS2J!	LU3-1 LU6-1	B7,D1,D5,E3,E7,F3 B7,D1,D5,E3,E5,F5	B721
(LUADIN03)	LU3-1	1K	#FSIK!	LU3-1 LU6-1	A7,D1,D5,E3,E7 A7,D1,D5,E3,E5	B721
(LUADIN04)	LU3-1	2D	#FS2D!	LU3-1 LU6-1	A7,D1,D5,E3,D7 A7,D1,D5,E3,E5	B721
(LUADIN05)	LU3-2	2W	#FS5W!	LU3-2 LU6-2	B7,D1,D5,E3,E7,F3 B7,D1,D5,E3,E5,F5	B721
(LUADIN06)	LU3-2	2J	#FS5J!	LU3-2 LU6-2	B7,D1,D5,E3,E7,F3 B7,D1,D5,E3,E5,F5	B721
(LUADIN07)	LU3-2	1K	#FS4K!	LU3-2 LU6-2	A7,D1,D5,E3,E7 A7,D1,D5,E3,E5	B721
(LUADIN08)	LU3-2	2D	#FS5D!	LU3-2 LU6-2	A7,D1,D5,E3,E7 A7,D1,D5,E3,E5	B721
(LUADIN09)	LU4-1	2D	#FS8D!	LU4-1 LU7-1	B7,D1,D5,E3,E7 B7,D1,D5,E3,E5	B721
(LUADIN10)	LU4-1	2J	#FS8J!	LU4-1 LU7-1	B7,D1,D5,E3,E7 B7,D1,D5,E3,E5	B721
(LUADIN11)	LU4-1	1K	#FS7K!	LU4-1 LU7-1	A7,D1,D5,E3,E7,F3 A7,D1,D5,E3,E5,F5	B721
(LUADIN12)	LU4-1	2W	#FS8W!	LU4-1 LU7-1	A7,D1,D5,E3,E7 A7,D1,D5,E3,E5	F3 F5 B721
(LUADIN13)	LU4-2	2D	#FT1D!	LU4-2 LU7-2	B7,D1,D5,E3,E7 B7,D1,D5,E3,E5	B721
(LUADIN14)	LU4-2	2J	#FT1J!	LU4-2 LU7-2	B7,D1,D5,E3,E7 B7,D1,D5,E3,E5	B721

(LUADIN15)	LU4-2	1K	#FT0K!	LU4-2	A7,D1,D5,E3,E7,F3	
				LU7-2	A7,D1,D5,E3,E5,F5	B721
(LUADIN16)	LU4-2	2W	#FT1W!	LU4-2	A7,D1,D5,C3,E7,F3	
				LU7-2	A7,D1,D5,C3,E5,F5	B721

TABLE L99-3E

MIR OUTPUT PINS

SIGNAL	BOARD	PIN		BOARD	CHIPS	
(LUMIR01/)	LU3-1	1U	#FS1U!	LU3-1	D1,D3,E5,F3,F7	
				LU6-1	D1,D3,E7,F5,F7	B721
(LUMIR02/)	LU3-1	2M	#FS2M!	LU3-1	D1,D3,E5,F3,F7	
				LU6-1	D1,D3,E7,F5,F7	B721
(LUMIR03/)	LU3-1	2S	#FS2S!	LU3-1	C3,D1,E5,F3,F7	
				LU6-1	C3,D1,E7,F5,F7	B721
(LUMIR04/)	LU3-1	1S	#FS1S!	LU3-1	C3,D1 E5,F3,F7	
				LU6-1	C3,D1,E7,F5,F7	B721
(LUMIR05/)	LU3-2	1U	#FS4U!	LU3-2	D1,D3,E5,F3,F7	
				LU6-2	D1,D3,E7,F5,F7	B721
(LUMIR06/)	LU3-2	2M	#FS5M!	LU3-2	D1,D3,E5,F3,F7	
				LU6-2	D1,D3,E7,F5,F7	B721
(LUMIR07/)	LU3-2	1S	#FS4S!	LU3-2	C3,D1,E5,F3,F7	
				LU6-2	C3,D1,E7,F5,F7	B721
(LUMIR08/)	LU3-2	2S	#FS5S!	LU3-2	C3,D1,E5,F3,F7	
				LU6-2	C3,D1,E7,F5,F7	B721
(LUMIR09/)	LU4-1	1S	#FS75!	LU4-1	D1,D3,E5,F3,F7	
				LU7-1	D1,D3,E7,F5,F7	B721
(LUMIR10/)	LU4-1	2S	#FS8S!	LU4-1	D1,D3,E5,F3,F7	
				LU7-1	D1,D3,E7,F5,F7	B721
(LUMIR11/)	LU4-1	2M	#FS8M!	LU4-1	C3 D1 E5 F3 F7	
				LU7-1	C3 D1 E7 F5 F7	B721
(LUMIR12/)	LU4-1	1U	#FS7U!	LU4-1	C3 D1 E5 F3 F7	
				LU7-1	C3,D1,E7,F5,F7	B721
(LUMIR13/)	LU4-2	1S	#FT0S!	LU4-2	D1 D3 E5 F3 F7	
				LU7-2	D1 D3 E7 F5 F7	B721
(LUMIR14/)	LU4-2	2S	#FT1S!	LU4-2	D1 D3 E5 F3 F7	
				LU7-2	D1 D3 E7 F5 F7	B721
(LUMIR15/)	LU4-2	2M	#FT1M!	LU4-2	C3 D1 E5 F3 F7	
				LU7-2	C3 D1 E7 F5 F7	B721
(LUMIR16/)	LU4-2	1U	#FT0U!	LU4-2	C3 D1 E5 F3 F7	
				LU7-2	C3 D1 E7 F5 F7	B721

TABLE L99-3F

AMPCR OUTPUT PINS

SIGNAL	BOARD	PIN		CHIPS
(MUAMX)	MU1-4	1Q	#FM0Q!	A5,A7,C3,E1
(MUAM00)	MU1-4	2X	#FM1X!	A5,A7,C3,F1
(MUAM01)	MU1-1	2U	#FNOU!	A5,A7,B3,C1
(MUAM02)	MU1-1	1V	#FM9V!	A5,A7,B3,D1
(MUAM03)	MU1-1	1Q	#FM9Q!	A5,A7,C3,E1
(MUAM04)	MU1-1	2X	#FN0X)	A5,A7,C3,F1
(MUAM05)	MU1-2	2U	#FM7U!	A5,A7,B3,C1
(MUAM06)	MU1-2	1V	#FM6V!	A5,A7,B3,D1
(MUAM07)	MU1-2	1Q	#FM6Q!	A5,A7,C3,E1
(MUAM08)	MU1-2	2X	#FM7X!	A5,A7,C3,F1
(MUAM09)	MU1-3	2U	#FM4U!	A5,A7,B3,C1
(MUAM10)	MU1-3	1V	#FM3V!	A5,A7,B3,D1
(MUAM11)	MU1-3	1Q	#FM3Q!	A5,A7,C3,E1
(MUAM12)	MU1-3	2X	#FM4X!	A5,A7,C3,F1

TABLE L99-3G

BSW OUTPUT PINS

BOARD	PIN		SIGNAL	
LU1	1L	#FQ3L!	LUBSW01	GO TO BSWMTR
LU1	2B	#FQ4B!	LUBSW02	GO TO BSWMTR
LU1	1C	#FQ3C!	LUBSW03	GO TO BSWMTR
LU1	1E	#FQ3E!	LUBSW04	GO TO BSWMTR
LU1	1I	#FQ3I!	LUBSW05	GO TO BSWMTR
LU1	2J	#FQ4J!	LUBSW06	GO TO BSWMTR
LU1	2K	#FQ4K!	LUBSW07	GO TO BSWMTR
LU1	1N	#FQ3N!	LUBSW08	GO TO BSWMTR
LU1	2Q	#FQ4Q!	LUBSW09	GO TO BSWMTR
LU1	2S	#FQ4S!	LUBSW10	GO TO BSWMTR
LU1	1V	#FQ3V!	LUBSW11	GO TO BSWMTR
LU1	2X	#FQ4X!	LUBSW12	GO TO BSWMTR
LU1	1Y	#FQ3Y!	LUBSW13	GO TO BSWMTR
LU1	1W	#FQ3W!	LUBSW14	GO TO BSWMTR
LU1	2Y	#FQ4Y!	LUBSW15	GO TO BSWMTR
LU1	2L	#FQ4L!	LUBSW16	GO TO BSWMTR

L100

A SET IRQ AND RERUN UNTIL PROGRAM LOOPS ON ERROR

NOTE

IF PROGRAM DOES NOT LOOP L100 CANNOT BE USED; THEREFORE, GO TO L99.

B	SET SGL/NORM SWITCH TO SINGLE		
C	PRESS SINGLE PUSHBUTTON UNTIL PROGRAM REACHES THE ADDRESS OF 'LXX#1' JUST PREVIOUSLY NOTED IN THE L XX FROM WHICH L100 WAS ENTERED.		
1	IS EXPECTED ADDER OUTPUT ALL ONES (FFFF) (SEE NOTE 1)	4	2
2	DOES BSW EQUAL EXPECTED VALUE (SEE NOTE 2)	8	3
3	DOES ADDER EQUAL EXPECTED VALUE	12	9
4	METER LUABT FOR 100% DUTY CYCLE ON CU1-2C #FP5C!	6	5
5	IS ADDER OUTPUT ALL ONES (FFFF)	13	9
6	DOES BSW EQUAL ALL ONES (FFFF)	8	7
7	IS ADDER OUTPUT ALL ONES (FFFF)	12	13
8	PRESS SINGLE PUSHBUTTON THEN GO TO STEP 9		
9	ARE Y-SELECT INPUTS TO ADDER CORRECT	10	L99
10	ARE ADDER CONTROL INPUTS CORRECT	11	TBL 1B
11	IS MORE THAN 1 BIT IN ERROR	TBL4	TBL 2 (NOTE 3)
12	PERFORM BSWMTR		
13	IDENTIFY IN WHICH GROUP OF BITS FAILURE OCCURS AND REPLACE CORRESPONDING CHIP.		

BIT FAILURE	CHIP	REPLACEMENT	
1-4	LU2-1	#FR8!	B/C3
5-8	LU2-2	#FR5!	B/C3
9-12	LU2-3	#FR2!	B/C3
13-16	LU2-4	#FQ9!	B/C3

NOTE 1. EXPECTED VALUE OF ADDER AND BSW INPUTS & OUTPUTS ARE GIVEN IN PROGRAM LISTING AT ADDRESSES OF '#1 & #2' NOTED IN PREVIOUS L NO.

NOTE 2. ADDER CONTROL SIGNAL DEFINITION IS GIVEN IN TABLE 1A SIGNAL PIN DEFINITION IS GIVEN IN TABLE 3 FOR ADDER INPUTS (Y-SELECT & X-SELECT),ADDER & BSW OUTPUTS.

NOTE 3. IF TABLE 2 DOES NOT ISOLATE ERROR GO TO TABLE 4.

TABLE 1A

NB28-31	FUNCTION	ADDER INPUT FUNCTION					
		AS3 (NOTE 3)	AS2	AS1	AS0	MODEA	CIN/
0000	X+Y	1	0	0	1	1	1
0001	XNORY (X/Y/)	0	0	0	1	0	X
0010	XNRIY (X/Y)	0	0	1	0	0	X
0011	X+Y+1	1	0	0	1	1	0
0101	XOADY (X B						
0110	XXORY (XY/)OR(X/Y)	0	1	1	0	0	X
0111	XNIMY (XY/)	0	1	1	1	0	X
1000	XIMPY (X/ORY)	1	0	0	0	0	X
1001	XEQVY (XY)OR(X/Y/)	1	0	0	1	0	X
1010	XAADY (X+XY)	1	0	0	0	1	1
1011	XANDY (XY)	1	0	1	1	0	X
1100	X-Y-1 (X+Y/)	0	1	1	0	1	0
1101	XRIMY (XORY/)	1	1	0	1	0	X
1110	XORY (XORY)	1	1	1	0	0	X
1111	X-Y (X+Y/+1)	0	1	1	0	1	1

NOTES.

1 MODEA VALUES GIVEN ARE AT BACKPLANE & ARE INVERTED ON LU4 PRIOR TO ADDER CHIP INPUT.

2 WHEN MODEA (MU3-1B) #FN8B! IS LOW (LOGIC FUNCTIONS), CIN/ CAN BE EITHER '0' OR '1'. CIN/ PERTAINS TO THE LEAST SIGNIFICANT DIGIT ONLY.

3 THE PIN DESIGNATIONS ON MU3 #FN8! FOR THE INPUT CONTROLS ARE - AS3A (1H) AS2A (2G) AS1A (2L) AS0A (1L) MODEA (2B) AS3B (1E) AS2B (1I) AS1B (1K) AS0B (2K) CIN/ (2C)

4 PRIOR TO USING THIS TABLE EACH FUNCTION MUST BE DETERMINED FROM THE PROGRAM LISTING AT THE INSTRUCTION CORRESPONDING TO '#1'. SEVERAL EXAMPLES WILL ILLUSTRATE HOW EACH FUNCTION IS DETERMINED. AS REFERENCES USE THE NANO LIST AND THE SERIES B700 HANDBOOK (QUICK REFERENCE GUIDE) PAGES 18&19.

EXAMPLES.

INSTRUCTION	NAN0 ADDR	BITS 28-31	ALU FNCT	BITS 17-19	X INP	BITS 20-26	Y INP
MAR1=A1	00D0	0000	X+Y	101	A1	0000000	B000
MIR=B	00E1	0000	X+Y	000	0	0110001	BTTT
A1=AMPCR	0007	0000	X+Y	000	0	0011001	AMPCR
B=A3 NRI B	014C	0010	X NRI Y	111	A3	0110001	BTTT
B=B01T	0155	1101	X RIM Y	000	0	1100010	B10F

TABLE 1B (REPLACEMENT CHIPS FOR TABLE 1A)

FUNCTION	REPLACEMENT CHIPS		
AS0A/B	MU3	#FN8!	C5,C7,D5,D7,E7,F5,F7
AS1A/B	MU3	#FN8!	C5,C7,D5,D7,E5,E7,F7
AS2A/B	MU3	#FN8!	B5,D7,E7,F7
AS3A/B	MU3	#FN8!	B7,C5,D5,D7,E5,E7,F5,F7
MODEA	MU3	#FN8!	A5,D5,D7,E5,E7,F5,F7
CIN/	MU3	#FN8!	A7,D5,D7,E5,E7,F5,F7

TABLE 2

BITS IN ERROR	BOARD		SUSPECTED CHIPS
BITS 1/2	LU2-1	#FR8!	A7,B/C3,C7,D3,D5,D7
	MU5	#FN2!	D5,D7,E3
BITS 3/4	LU2-1	#FR8!	A3,A7,B/C3,C7,D5,D7
	MU5	#FN2!	D5,D7,E3
BITS 5/6	LU2-2	#FR5!	A7,B/C3,C7,D3,D5,D7
	MU5	#FN2!	D5,D7,E3
BITS 7/8	LU2-2	#FR5!	A3,A7,B/C3,C7,D5,D7
	MU5	#FN2!	D5,D7,E3
BITS 9/10	LU2-3	#FR2!	A7,B/C3,C7,D3,D5,D7
	MU1-2	#FM6!	C7
BITS 11/12	LU2-3	#FR2!	A3,A7,B/C3,C7,D5,D7
	MU1-2	#FM6!	C7
BITS 13/14	LU2-4	#FQ9!	A7,B/C3,C7,D3,D5,D7
	MU1-3	#FM3!	C7
BITS 15/16	LU2-4	#FQ9!	A3,A7,B/C3,C7,D5,D7
	MU1-3	#FM3!	C7

TABLE 3

BIT NO.	Y-SELECT			ADDER OUTPUT			BSW OUTPUT		
1	LU2-1	1E	#FR8E!	LU2-1	1B	#FR8B!	LU1	1L	#FQ3L!
2	LU2-1	2L	#FR9L!	LU2-1	2E	#FR9E!	LU1	2B	#FQ4B!
3	LU2-1	2K	#FR9K!	LU2-1	1F	#FR8F!	LU1	1C	#FQ3C!
4	LU2-1	2G	#FR9G!	LU2-1	2F	#FR9F!	LU1	1E	#FQ3E!
5	LU2-2	1E	#FR5E!	LU2-2	1B	#FR5B!	LU1	1I	#FQ3I!
6	LU2-2	2L	#FR6L!	LU2-2	2E	#FR6E!	LU1	2J	#FQ4J!
7	LU2-2	2K	#FR6K!	LU2-2	1F	#FR5F!	LU1	2K	#FQ4K!
8	LU2-2	2G	#FR6G!	LU2-2	2F	#FR6F!	LU1	1N	#FQ3N!
9	LU2-3	1E	#FR2E!	LU2-3	1B	#FR2B!	LU1	2Q	#FQ4Q!
10	LU2-3	2L	#FR3L!	LU2-3	2E	#FR3E!	LU1	2S	#FQ4S!
11	LU2-3	2K	#FR3K!	LU2-3	1F	#FR2F!	LU1	1V	#FQ3V!
12	LU2-3	2G	#FR3G!	LU2-3	2F	#FR3F!	LU1	2X	#FQ4X!
13	LU2-4	1E	#FQ9E!	LU2-4	1B	#FQ9B!	LU1	1Y	#FQ3Y!
14	LU2-4	2L	#FR0L!	LU2-4	2E	#FR0E!	LU1	1W	#FQ3W!
15	LU2-4	2K	#FR0K!	LU2-4	1F	#FQ9F!	LU1	2Y	#FQ4Y!
16	LU2-4	2G	#FR0G!	LU2-4	2F	#FR0F!	LU1	2L	#FQ4L!

TABLE 4

FAILURE		REPLACEMENT CHIPS		
BITS 1-4	ONLY	LU2-1	#FR8!	A3,A7,B/C3,C7,D3,D5,D7,E7
BITS 5-8	ONLY	LU2-2	#FR5!	A3,A7,B/C3,C7,D3,D5,D7,E7
BITS 9-12	ONLY	LU2-3	#FR2!	A3,A7,B/C3,C7,D3,D5,D7,E7
BITS 13-16	ONLY	LU2-4	#FQ9!	A3,A7,B/C3,C7,D3,D5,D7,E7

2 PRESS FST FOUR (4) TIMES (INCR = 0111)
SET SGL/NORM SWITCH TO SGL

3 PRESS FST THEN SGL PB WAIT LITE GOES OFF

4 PRESS SGL PB TWO (2) TIMES (INCR = 0199)

MORE THAN ONE DIGIT

MU2	#FP1!	D1,E1,E3,F1,F5
MU3	#FN8!	D1,D3,E3

L101

1 SET IRQ SWITCH TO IRQ

2 PRESS CLEAR

3 REPEAT PROGRAM STEPS UNTIL PROGRAM LOOPS ON ERROR.
IF PROGRAM DOES NOT LOOP GO TO L99.

FAILURE DICTIONARY

NOTE. THE OPERATOR MUST NOW EXERCISE HIS TROUBLESHOOTING EXPERTISE. INFORMATION HELPFUL IN FAULT ISOLATION IS GIVEN IN THE PROGRAM LISTING SUCH AS, ADDER FUNCTION, FAILURES ARE FOR B711/711-1, B771 & B721. CHIPS ARE LISTED IN RIGHT HAND COLUMN ONLY WHEN CHIPS DIFFER FOR THAT SYSTEM. LEFT HAND COLUMN APPLIES TO ALL SYSTEMS NOT LISTED ON RIGHT.

F1	MU2	B3,C3,D1,D5,D7,E5			
	MU5	B7,D7			
F2	MU3	C5,C7,D5,D7,E7			
	MU2	C5,D5,D7,E7			
F3	LU4-2	A7,E3,E7,F3	B721	LU7-2	A7,E3,E5,F5
	MU3	F3		MU3	F3
	LU3-1	B7		LU6-1	B7
F4	MU2	D1,E1,E3,F5	B721	MU2	D1,E1,E3,F5
	MU3	E1		MU3	E1
	LU4-2	A7		LU7-2	A7
	LU2-4	A3,B/C3		LU2-4	A3,B/C3
F5	MU3	A7			
F6	MU3	A7,E1	B721	MU3	A7,E1
	MU2	D1,E1,F1		MU2	D1,E1,F1
	LU4-2	A3		LU7-2	A3
	LU2-4	B/C3		LU2-4	B/C3
F7	MU3	A7,C5,C7,D7,E5	B721	MU3	A7,C5,C7,D7,E5
	MU2	D1,E1,E3,F5		MU2	D1,E1,E3,F5
	LU4-2	A7		LU7-2	A7
F8	MU3	E1,F3	B721	MU3	E1,F3
	CU1	B1,B/C3		CU1	B1,B/C3
	LU4-2	A7,F3		LU7-2	A7,F5
	MU2	B3,C3,D1,D5,D7		MU2	B3,C3,D1,D5,D7
F9	LU4-2	A7,F3	B721	LU7-2	A7,F5
	CU1	B1,B/C3		CU1	B1,B/C3
F10	LU4-1	A7,C3	B721	LU7-1	A7,C3
	LU4-2	A7		LU7-2	A7
	MU3	D1,D3,E3		MU3	D1,D3,E3
	LU2-4	A3,D3,D5,D7,E7		LU2-4	A3,D3,D5,D7,E7
	MU2	E3,F1,F3		MU2	E3,F1,F3
F11	MU3	D7,E3,E5,E7,F5,F7			
	CU1	B1,B/C3			
F12	MU5	F7			
F13	MU3	F7			
F14	MU3	E3,E5,E7,F3,F5,F7			
	MU5	F7			
F15	MU2	B3,C3,D1,D7			
F16	LU2-2	B/C3,D5			
F17	LU2-3	B/C3,D5			

F18	MU3	A5,D5,E5,F3				
F19	LU2-1	B/C3,D5				
F20	MU3	C7				
F21	MU2	B3	B721	MU2	B3	
	LU3-1	B7		LU6-1	B7	
F22	LU3-1	A7,B7	B721	LU6-1	A7,B7	B
	LU2-1	B/C3		LU2-1	B/C3	
F23	LU3-1	A7,B7	B721	LU6-1	A7,B7	B
	LU2-1	B/C3		LU2-1	B/C3	
F24	LU3-1	A7,B7	B721	LU6-1	A7,B7	B
	LU2-1	B/C3		LU2-1	B/C3	
F25	LU3-2	A7,B7	B721	LU6-2	A7,B7	B
	LU2-2	B/C3		LU2-2	B/C3	
F26	LU3-2	A7,B7	B721	LU6-2	A7,B7	B
	LU2-2	B/C3		LU2-2	B/C3	
F27	LU3-2	A7,B7	B721	LU6-2	A7,B7	B
	LU2-2	B/C3		LU2-2	B/C3	
F28	LU3-2	A7,B7	B721	LU6-2	A7,B7	B
	LU2-3	B/C3		LU2-3	B/C3	
F30	LU4-1	A7,B7	B721	LU7-1	A7,B7	B
	LU2-3	B/C3		LU2	B/C3	
F31	LU4-1	A7,B7	B721	LU7-1	A7,B7	B
	LU2-3	B/C3		LU2-3	B/C3	
F33	LU4-2	A7,B7	B721	LU7-2	A7,B7	B
	LU2-4	B/C3		LU2-4	B/C3	
F34	LU2-4	B/C3	B721	LU2-4	B/C3	
	MU2	D1,D7,E5		MU2	D1,D7,E5	
	MU3	C5,C7,F3		MU3	C5,C7,F3	
	LU4-2	A7,B7		LU7-2	A7,B7	B
F35	LU4-2	A7,E7,F3	B721	LU7-2	A7,E5,F5	
	MU3	F3		MU3	F3	
	MU2	D1		MU2	D1	
	LU2-4	B/C3		LU2-4	B/C3	
F36	LU2-3	B/C3	B721	LU2-3	B/C3	
	LU4-1	B7		LU7-1	B7	
F37	MU2	B3,C3,D1,F3				
F38	LU2-3	B/C3	B721	LU2-3	B/C3	
	LU4-1	A7,E7,F3		LU7-1	A7,E5,F5	
F39	LU3-2	B7,E7,F3	B721	LU6-2	B7,E5,F5	
	LU2-2	B/C3		LU2-2	B/C3	
F40	LU3-2	A7	B721	LU6-2	A7	
	LU2-2	B/C3		LU2-2	B/C3	
F41	LU3-1	B7,E7,F3	B721	LU6-1	B7,E5,F5	
	MU3	F3		MU3	F3	
	LU2-3	B/C3		LU2-3	B/C3	
	MU2	B3,C3,D1,D5,D7		MU2	B3,C3,D1,D5,D7	
F42	LU3-1	A7	B721	LU6-1	A7	
	LU2-3	B/C3		LU2-3	B/C3	
F43	MU2	D1				
F44	LU3-1	B7,D5,E7,F3	B721	LU6-1	B7,D5,E5,F5	
	MU3	F3		MU3	F3	
F45	LU4-2	A7,B7	B721	LU7-2	A7,B7	
	MU2	C1,D5		MU2	C1,D5	
	LU2-4	B/C3		LU2-4	B/C3	
F46	MU2	C3,D1,D3,E5				
	MU3	A7,C5,C7				B
F47	MU2	C3,D3,D7,E5				
F48	MU2	B7,C3,D1,D5				
F49	CU1	B1,B/C3				
	MU2	E1,E3,F1,F5				
	MU3	B1,C1,E3				
F50	LU2-1	A3,B/C3,D3,D5				
	MU2	E1,E3				
	MU3	B5				B
F51	LU2-1	A3,B/C3,D5,F5	B721	LU2-1	A3,B/C3,D5,F5	
	LU3-1	A7		LU6-1	A7	
	MU3	B5		MU3	B5	B
	MU5	D7		MU5	D7	B
F52	LU2-1	B/C3,D3,D5,F5	B721	LU2-1	B/C3,D3,D5,F5	
	LU3-1	B7,E7,F3		LU6-1	B7,E5,F5	
F53	LU2-1	B/C3,D3	B721	LU2-1	B/C3,D3	
	MU2	C1,D1,D3,E5		MU2	C1,D1,D3,E5	
	LU3-1	B7		LU6-1	B7	
	MU5	D7		MU5	D7	B
F54	MU2	E1,E3	B721	MU2	E1,E3	
	LU2-2	A3,B/C3		LU2-2	A3,B/C3	
	LU3-2	A7		LU6-2	A7	
	MU5	B7		MU5	B7	
F55	LU2-2	A3,B/C3,D5	B721	LU2-2	A3,B/C3,D5	
	LU3-2	A7,B7		LU6-2	A7,B7	B
	MU5	B7		MU5	B7	B
F56	LU2-2	B/C3,D3,D5,E5,F5	B721	LU2-2	B/C3,D3,D5,E5,F5	
	LU3-2	B7,E7,F3		LU6-2	B7,E5,F5	
F57	MU2	E1,E3	B721	MU2	E1,E3	
	LU2-3	A3,B/C3,E5,F5		LU2-3	A3,B/C3,E5,F5	
	LU4-1	A7		LU7-1	A7	
F58	LU2-3	A3,B/C3,D5,E5,F5	B721	LU2-3	A3,B/C3,D5,E5,F5	
	LU4-1	A7		LU7-1	A7	
F59	LU2-3	B/C3,D3,D5,E5,F5	B721	LU2-3	B/C3,D3,D5,E5,F5	
	LU4-1	B7,E7,F3		LU7-1	B7,E5,F5	

F60	MU2	E1,E3	B721	MU2	E1,E3	
	MU3	F7		MU3	F7	
	LU2-4	A3,B/C3		LU2-4	A3,B/C3	
	LU4-2	A7		LU7-2	A7	
F61	LU2-4	A3,B/C3,D5,E5,F5	B721	LU2-4	A3,B/C3,D5,E5,F5	
	LU4-2	A7		LU7-2	A7	
F62	LU2-4	B/C3,D3,D5,E5,F5	B721	LU2-4	B/C3,D3,D5,E5,F5	
	LU4-2	A7		LU7-2	A7	
F63	LU2-1	D5				
	MU2	E3,F1,F5				
F64	LU2-2	D5				
F65	LU2-3	D5				
	MU2	E3,F1,F5				
F66	LU2-4	D5				
	MU2	D5,E3,F1,F5				
F67	MU2	B3,C3,D1,D7	B721	MU2	B3,C3,D1,D7	
	LU3-1	B7,E7,F3		LU6-1	B7,E5,F5	
	LU2-1	B/C3		LU2-1	B/C3	
F68	MU2	B3,C3,D1,D7	B721	MU2	B3,C3,D1,D7	
	LU3-1	A7		LU6-1	A7	
	LU2-1	B/C3		LU2-1	B/C3	
F69	MU2	B3,C3,D1,D7	B721	MU2	B3,C3,D1,D7	
	LU3-2	B7,E7,F3		LU6-2	B7,E5,F5	
	LU2-2	B/C3		LU2-2	B/C3	
F70	MU2	B3,C3,D1,D7	B721	MU2	B3,C3,D1,D7	
	LU3-2	A7		LU6-2	A7	
	LU2-2	B/C3		LU2-2	B/C3	
F71	MU2	B3,C3,D1,D7	B721	MU2	B3,C3,D1,D7	
	LU4-1	B7		LU7-1	B7	
	LU2-3	B/C3		LU2-3	B/C3	
F72	MU2	B3,C3,D1,D7	B721	MU2	B3,C3,D1,D7	
	LU4-1	A7,E7,F3		LU7-1	A7,E5,F5	
	LU2-3	B/C3		LU2-3	B/C3	
F73	MU2	B3,C3,D1,D7	B721	MU2	B3,C3,D1,D7	
	LU4-2	B7		LU7-2	B7	
	LU2-4	B/C3		LU2-4	B/C3	
F74	MU2	B3,C3,D1,D7	B721	MU2	B3,C3,D1,D7	
	LU4-2	A7,E7,F3		LU7-2	A7,E5,F5	
	LU2-4	B/C3		LU2-4	B/C3	
F75	MU2	D1,D5,E1,E3,F5				
F76	LU3-1	B7,D1,D3,D5,E3,E7	B721	LU6-1	B7,D1,D3,D5,E3,E5	
		F3			F5	
	CG1	D7		CG2	D7	H
F77	LU3-1	A7,C3,D1,E3	B721	LU6-1	A7,C3,D1,E3	
F78	LU3-2	B7,D1,D3,D5,E3,E7	B721	LU6-2	B7,D1,D3,D5,E3,E5	
		F3			F5	
F79	LU3-2	A7,C3,D1,E3	B721	LU6-2	A7,C3,D1,E3	
F80	LU4-1	B7,D1,D3,D5,E3	B721	LU7-1	B7,D1,D3,D5,E3	
F81	LU4-1	A7,C3,D1,D5,E3,E7	B721	LU7-1	A7,C3,D1,D5,E3,E5	
		F3			F5	

F82	LU4-2	A7,B7,D1,D3,D5,E3	B721	LU7-2	A7,B7,D1,D3,D5,E3	B
	MU2	B3,C1,D1,D3,E5		MU2	B3,C1,D1,D3,E5	
F83	LU4-2	A7,C3,D1,D5,E3,E7	B721	LU7-2	A7,C3,D1,D5,E3,E5	
		F3			F5	
	LU2-2	F5		LU2-2	F5	
	LU2-1	E1		LU2-1	E1	
	MU3	B5,D1,F3		MU3	B5,D1,F3	
	CG1	B7		CG2	B5	H
F84	LU2-2	D5,F5				
	LU2-1	D5,F5				
	MU5	D5,F7				
F85	MU5	D5,F5,F7				
	LU2-1	D5,F5				
	MU2	A5,B7,D5,F7				
F86	MU3	B5,D1,F3				
F87	LU3-1	D1,D5,E3,E5,E7,F3	B721	LU6-1	D1,D5,E3,E5,E7,F5	
		F7			F7	
F88	LU3-2	D1,D5,E3,E5,E7,F7	B721	LU6-2	D1,D5,E3,E5,E7,F7	
F89	LU4-1	D1,D5,E3,E5,E7,F7	B721	LU7-1	D1,D5,E3,E5,E7,F7	B
						B
F90	LU4-2	D1,D5,E3,E5,E7,F3	B721	LU7-2	D1,D5,E3 E5,E7,F5	B
		F7			F7	
F91	LU3-1	B7,D3	B721	LU6-1	B7,D3	
	MU3	B5,D1,F3		MU3	B5,D1,F3	
F92	LU3-1	A7,C3	B721	LU6-1	A7,C3	
F93	LU3-2	B7,D3	B721	LU6-2	B7,D3	
F94	LU3-2	A7,C3	B721	LU6-2	A7,CO	
F95	LU4-1	B7,D3	B721	LU7-1	B7,D3	
F96	LU4-1	A7,C3	B721	LU7-1	A7-C3	
	LU4-2	A7		LU7-2	A7	B
F97	LU4-2	B7,D3	B721	LU7-2	B7,D3	
F98	LU4-2	A7,C3	B721	LU7-2	A7,C3	
F99	LU2-1	A3,D3,D5,D7,E7				
	MU3	D1,D3,E3				
F100	LU2-1	A3,C7,D3,D5,E7				
	MU3	D1,D3,E3				
F101	LU2-1	A3,A7,D3,D5,E7				
	MU3	D1,D3,E3				
F102	LU2-2	A3,D3,D5,D7,E7				
	MU3	D1,D3,E3				
F103	LU2-2	A3,C7,D3,D5,E7				
	MU3	D1,D3,E3				
F104	LU2-2	A3,A7,D3,D5,E7				
	MU3	D1,D3,E3				
F105	LU2-3	A3,D3,D5,D7,E7				
	MU3	D1,D3,E3				

F106	LU2-3	A3,C7,D3,D5,E7				
	MU3	D1,D3,E3				
F107	LU2-3	A3,A7,D3,D5,E7				
	MU3	D1,D3,E3				
F108	MU3	D1,D3,E3				
	LU2-4	A3,D3,D5,D7,E7				
	MU2	E3,F1,F3				
F109	MU3	D1,D3,E3				
	LU2-4	A3,C7,D3,D5,E7				
	MU2	E3,F1,F3				
F110	MU3	D1,D3,E3				
	LU2-4	A3,A7,D3,D5,E7				
	MU2	E3,F1,F5				
F111	LU3-1	A7,C3,D1,E3,E7,F3	B721	LU6-1	A7,C3,D1,E3,E5,F5	
	MU2	D1		MU2	D1	
F112	MU3	B7,C5,D5,D7,E7,F7				
	MU2	E3,F1,F5				
F113	MU3	A5,B7,C3,C5,D7,E5				
		E7,F7				
F114	MU3	A5,B7,C3,C5,C7,D5				
		D7,E7,F7				
F116	MU4	D5,E7,F3,F5,F7	B721	MU4	D5,E7,F3,F5,F7	
	MU2	B3,F7		MU2	B3,F7	
	MU3	B5,B7,D7,E7		MU3	B5,B7,D7,E7	B
	LU3-1	A7,B7		LU6-1	A7,B7	
	MU1-4	A1,A3		MU6-4	A1,A3	
	LU2-3	F7		LU2-3	F7	B
F117	MU4	D3,D5,D7,E3,F5	B721	MU4	D3,D5,D7,E3,F5	
	LU3-2	A7,B7		LU6-2	A7,B7	
	MU2	F7		MU2	F7	
F118	MU5	E3,E7	B721	MU5	E3,E7	
	LU4-1	A7,B7		LU7-1	A7,B7	
	MU2	F7		MU2	F7	
	MU4	F5		MU4	F5	
F119	MU5	C3,C7	B721	MU5	C3,C7	
	LU4-2	A7,B7		LU4-2	A7,B7	
	MU2	F7		MU2	F7	
F120	LU2-4	D5,F5	B721	LU2-4	D5,F5	
	LU2-1	D5,F5		LU2-1	D5,F5	
	LU3-1	C3		LU6-1	C3	
	MU5	F5		MU5	F5	
F121	LU2-2	E5	B721	LU2-2	E5	
	LU2-4	D5,F5		LU2-4	D5,F5	
	LU3-2	C3		LU6-2	C3	
F122	LU4-1	D3	B721	LU7-1	D3	
	LU2-3	D5,F5		LU2-3	D5,F5	
	LU2-4	D5,F5		LU2-4	D5,F5	
	LU2-1	D5,F5		LU2-1	D5,F5	
	LU2-2	E5		LU2-2	E5	
F123	LU4-2	D3	B721	LU7-2	D3	
	MU3	B7,C1,E3		MU3	B7,C1,E3	
	LU2-4	D5,E5,F5		LU2-4	D5,E5,F5	
	LU2-2	E5		LU2-2	E5	
	LU2-1	D5,F5		LU2-1	D5,F5	
	EO1	C7,E1		EO2	A3,C3	

F124	MU2	B3,C3,D1,D7,E1,E3				
		F5				
	MU5	A7,C3,E3,F7				
F125	MU3	A5,A7,B7,C3,C5,C7				
		D7,E5,F5				
	LU2-4	B/C3,F7				A
	LU2-3	B/C3,F7				A
	LU2-2	B/C3,F7				A
	LU2-1	B/C3,F7				A
F126	LU3-1	F3,F7	B721	LU6-1	E7,F5	
	MU2	F7		MU2	F7	
F127	LU3-2	F3,F7	B721	LU6-2	E7,F5	
	MU2	F7		MU2	F7	
F128	LU4-1	F3,F7	B721	LU7-1	E7,F5	
	MU2	F7		MU2	F7	
F129	LU4-2	F3,F7	B721	LU7-2	E7,F5	
	MU2	F7		MU2	F7	
F130	MU2	A5,B7,D5,F3,F7	B721	MU2	A5,B7,D5,F3,F7	
	CG1	C7		CG2	A1	H
	MU1-4	A5,A7,C3,E1,F1		MU6-4	A5,A7,C3,E1,F1	
F131	LU4-2	A7,F3	B721	LU4-2	A7,F5	
	MU1-3	A5,A7,C3		MU6-3	A5,A7,C3	
F132	LU4-2	B7,F3	B721	LU7-2	B7,F5	
	MU1-3	A5,A7,B3		MU6-3	A5,A7,B3	
F133	LU4-1	A7,C3,D3,F3	B721	LU7-1	A7,C3,D3,F5	
	MU1-2	A5,A7,C3		MU6-2	A5,A7,C3	
	LU2-4	D5,F5		LU2-4	D5,F5	
	LU3-1	C3,D3		LU6-1	C3,D3	
	LU3-2	C3,D3		LU6-2	C3,D3	
	LU4-2	C3,D3		LU7-2	C3,D3	
F134	LU4-1	B7,F3	B721	LU7-1	B7,F5	
	MU1-2	A5,A7,B3		MU6-2	A5,A7,B3	
F135	LU3-2	A7,F3	B721	LU6-2	A7,F5	
						A
						A
F136	LU3-2	B7,F3	B721	LU6-2	B7,F5	A
	MU1-1	A5,A7,B3		MU6-1	A5,A7,B3	
						A
						A
F137	LU3-1	A7,F3	B721	LU6-1	A7,F5	A
	MU1-4	A5,A7,C3		MU6-4	A5,A7,C3	
F138	MU2	D5,F3,F7	B721	MU2	D5,F3,F7	
	LU3-1	C3,D3,E5,E7,F3,F7		LU6-1	C3,D3,E5,E7,F5,F7	
	MU5	F5		MU5	F5	
F139	LU3-1	C3,D3,E5,E7,F3,F7	B721	LU6-1	C3,D3,E5,E7,F5,F7	
	MU2	D5,F3,F7		MU2	D5,F3,F7	
				MIRD	B5,C5	H
F140	LU3-2	C3,D3,E5,E7,F3,F7	B721	LU6-2	C3,D3,E5,E7,F5,F7	
				MIRD	B5,C5,C7,D7	H
F141	LU4-1	C3,D3,E5,E7,F3,F7	B721	LU7-1	C3,D3,E5,E7,F5,F7	
				MIRD	B7,C5,C7,D5,E5	H
F142	LU4-2	C3,D3,E5,E7,F3,F7	B721	LU7-2	C3,D3,E5,E7,F5,F7	
				MIRD	D5,D7,E5	H

F143	MU5	F5,F7				
	LU2-1	D5,E1,F5				
	LU2-2	D5,F5				
	LU2-3	D5,F5				
F144	LU3-1	A7,F3	B721	LU6-1	A7,F5	
	LU4-2	A7,F3		LU7-2	A7,F5	B
	MU3	F3,F7		MU3	F3,F7	
	LU3-2	F3		LU6-2	F5	B
						H
						H
F145	CG1	D7	B721	CG2	D7	H
	MU3	C1,E3,F7		MU3	C1,E3,F7	
				STC	E7,F7	H
F146	LU3-1	E3,F3	B721	LU6-1	E3,F5	
	LU4-2	E3,F3		LU7-2	E3,F5	
						B
						B
F147	MU3	D7,E1,E7,F5	B721	MU3	D7,E1,E7,F5	B
	LU4-2	A7,E3,F3		LU7-2	A7,E3,F5	
						B
						B
F148	MU3	C1,D1,D3,E1,E3,F3	B721	MU3	C1,D1,D3,E1,E3,F3	B
		F7			F7	B
	LU4-2	A7,E7,F3		LU7-2	A7,E5,F5	
F149	LU3-1	D1,D5,E3,E7,F3	B721	LU6-1	D1,D5,E3,E5,F5	
F150	LU3-2	D1,D5,E3,E7,F3	B721	LU6-2	D1,D5,E3,E5,F5	
F151	LU4-1	D1,D5,E3,E7,F3	B721	LU7-1	D1,D5,E3,E5,F5	
F152	LU4-2	D1,D5,E3,E7,F3	B721	LU7-2	D1,D5,E3,E5,F5	
F153	LU2-1	B/C3,D3,D5	B721	LU2-1	B/C3,D3,D5	
	LU3-1	B7,E3,E7,F3		LU6-1	B7,E3,E5,F5	
	MU3	C3,D7,F3		MU3	C3,D7,F3	
	LU4-2	F3		LU7-2	F5	
F154	LU2-1	B/C3,D5,E7,F5				
F155	LU2-2	B/C3,D5,E5,E7,F5				
F156	LU2-3	B/C3,D5,E7,F5				
F157	LU2-4	B/C3,D5,E5,E7,F5				
	MU3	B7				
F158	MU2	B3,C3,D1,D5,D7,E1				
		E3,E5,F1				
F159	MU2	C3,D1,D3,D5				
F160	MU5	F7				
	MU2	B3,C3,D1,D7				
F161	MU2	E1,E3,F1,F5				
F163	MU5	F7				
	MU2	B3,C3,D1,D7,E1,E3				
		F1,F5				
	MU3	C7				
F164	LU4-2	A7,B7,F3	B721	LU7-2	A7,B7,F5	
	MU3	C7		MU3	C7	
	MU2	B3,C3,D1,D7		MU2	B3,C3,D1,D7	
	MU5	A7,C3,C7,E3,E7		MU5	A7,C3,C7,E3,E7	
	LU2-2	B/C3		LU2-2	B/C3	B

F165	LU4-2	A7,F3	B721	LU7-2	A7,F5	
	MU2	C3,D1,D3,E5		MU2	C3,D1,D3,E5	
	LU2-4	B/C3		LU2-4	B/C3	
						A
						A
F166	LU4-1	A7,B7,F3	B721	LU7-1	A7,B7,F5	A
	MU5	A7,C3,C7,E3,E7		MU5	A7,C3,C7,E3,E7	
F168	MU3	A7,C5,C7,D5,F5				
F169	MU3	A7,C5,C7,D5,D7,E7				
	MU2	E3,F1,F5				
F170	LU2-1	A3,B/C3,D3,D5,E5				
		F5				
F171	LU2-2	A3,B/C3,D3,D5,E5				
		F5				
F172	LU2-3	A3,B/C3,D3,D5,E5				
		F5				
F173	LU2-4	A3,B/C3,D3,D5,E5				
		F5				
F174	MU3	A5,A7,C5,C7,D5,D7				
		E5,F5				
	MU2	E3,F1,F5				
F175	MU3	A5,C5,C7,D5,D7,E5				
		E7				
F176	LU3-1	B7,E7,F3	B721	LU6-1	B7,E5,F5	
	LU4-2	B7,E7,F3		LU7-2	B7,E5,F5	
	MU3	F3		MU3	F3	
	LU2-1	B/C3		LU2-1	B/C3	B
F177	MU3	C1,E3,F7				
F178	LU2-4	B/C3	B721	LU2-4	B/C3	
	LU4-2	A7,B7,E7,F3		LU7-2	A7,B7,E5,F5	
	LU3-1	A7,B7,E7,F3		LU6-1	A7,B7,E5,F5	
	LU2-1	B/C3		LU2-1	B/C3	
	MU3	F3		MU3	F3	
F179	MU2	B3,C1,D1,D3,E5				
F180	LU4-2	F3	B721	LU7-2	F5	
F181	LU4-2	A7,B7,F3	B721	LU7-2	A7,B7,F5	
	MU1-3	A5,A7,B3,C3		MU6-3	A5,A7,B3,C3	
F182	LU4-1	A7,B7,F3	B721	LU7-1	A7,B7,F5	
	MU1-2	A5,A7,B3,C3		MU6-2	A5,A7,B3,C3	
F183	LU3-2	A7,B7,F3	B721	LU6-2	A7,B7,F5	
	MU1-1	A5,A7,B3,C3		MU6-1	A5,A7,B3,C3	
F184	LU3-1	A7,B7,F3	B721	LU6-1	A7,B7,F5	
	MU1-4	A5,A7,C3		MU6-4	A5,A7,C3	A
						A
						A
F185	MU1-4	A5,A7,C3,E1,F1	B721	MU6-4	A5,A7,C3,E1,F1	A
	MU2	B3,C1,D1,D3,E5,F7		MU2	B3,C1,D1,D3,E5,F7	
F186	MU3	B5,D1,E1,F3	B721	MU3	B5,D1,E1,F3	
	LU3-1	D1,D5,E3,E5,E7,F3		LU6-1	D1,D5,E3,E5,E7,F5	
		F7			F7	
	MU2	E1,E3,F7		MU2	E1,E3,F7	
	MU5	F5				

F187	MU2	B3,C1,C3,D1,D3,E5					
F188	MU3	C1,E3,F3,F7					
	LU2-2	B/C3					B
	LU2-3	B/C3					B
F189	LU3-1	A7	B721	LU6-1	A7		
	LU2-1	A3,B/C3,D1		LU2-1	A3,B/C3,D1		
F190	LU3-1	B7,E7,F3	B721	LU6-1	B7,E5,F5		
	LU2-1	B/C3,D1,D3		LU2-1	B/C3,D1,D3		
F191	LU3-2	A7	B721	LU6-2	A7		
	LU2-2	A3,B/C3,D1		LU2-2	A3,B/C3,D1		
F192	LU3-2	B7,E7,F3	B721	LU6-2	B7,E5,F5		
	LU2-2	B/C3,D1,D3		LU2-2	B/C3,D1,D3		
F193	LU4-1	A7,E7,F3	B721	LU7-1	A7,E5,F5		
	LU2-3	A3,B/C3,D1		LU2-3	A3,B/C3,D1		
F194	LU4-1	B7	B721	LU7-1	B7		
	LU2-3	B/C3,D1,D3		LU2-3	B/C3,D1,D3		
F195	LU4-2	A7,E7,F3	B721	LU7-2	A7,E5,F5		
	LU2-4	A3,B/C3,D1		LU2-4	A3,B/C3,D1		
F196	LU4-2	B7	B721	LU7-2	B7		
	LU2-4	B/C3,D1,D3		LU2-4	B/C3,D1,D3		
F197	MU2	A5,B3,C3,D1,D5,D7					
F198	MU3	B5,B7,C5,C7,D5,E5					
		F5					H
							H
F199	EO1	A1,A3,A5,B7,C7,D5	B721	EO2	A3,A5,A9,B3,C3		H
		E1			D9		
	MU4	F5		MU4	F5		
	MU3	D7		MU3	D7		
							B
							B
F200	LU2-4	B/C3,D5					B
							A
							A
F201	MU2	A3,A5,B1,B5,C1,C5					A
	MU4	A3,C5,D5					A
	CD1	D7					A
							B
							B
F202	MU2	A3,A7,B1,B5,C1					B
	CD1	D7					B
							A
							A
F203	MU4	B1,C5					A
	CU1	A1,F7					A
							A
							A
F204	MU4	B1,B5,C3,C7					A
	CU1	A5,D1,E7,F7					A
							C
							C
F205	MU4	A5,B7,C3,D5					C
F206	MU4	B5,C3,C5					
F207	MU4	A5,C7					
F208	MU4	A7					

F209	MU1-2	E5,E7	B721	MU6-2	E5,E7	
F210	MU4	A5,B7				
F211	MU1-1	C5,E7	B721	MU6-1	C5,E7	
F212	MU1-3	F7	B721	MU6-3	F7	
F213	MU1-2	F7	B721	MU6-2	F7	
F214	MU1-1	F7	B721	MU6-1	F7	
F215	MU2	A1				
F216	MU1-3	A5,A7	B721	MU6-3	A5,A7	
						H
						H
F217	MU1-4	A5,E7	B721	MU6-4	A5,E7	H
F218	MU4	B5,C3				
F219	MU1-2	B7	B721	MU6-2	B7	
F220	MU1-1	B3,C1	B721	MU6-1	B3,C1	
F221	MU1-1	D7	B721	MU6-1	D7	
						H
						H
F222	MU1-3	F7	B721	MU6-3	F7	H
	MU2	A1		MU2	A1	A
F223	MU4	A5,B5,C7				
F224	MU4	B5,C7				
F225	MU4	A5				
F226	MU1-2	A5	B721	MU6-2	A5	
F227	MU1-3	E3,F5	B721	MU6-3	E3,F5	
F228	MU1-3	A5,E3	B721	MU6-3	A5,E3	
F229	MU2	B1				
F230	MU4	A1				
F231	MU4	A3,B1,B3				
						C
						C
F232	MU1-3	E3	B721	MU6-3	E3	C
	MU4	A3,B3		MU4	A3,B3	A
F233	MU1-3	D5,E3	B721	MU6-3	D5,E3	
F234	MU1-3	C5,E3	B721	MU6-3	C5,E3	
F235	MU1-2	C5,E3	B721	MU6-2	C5,E3	
						H
						H
F236	CU1	B/C3,C7,E3,F3				H
F237	MU1-2	E3	B721	MU6-2	E3	
						H
						H
F238	MU1-1	E3,E5	B721	MU6-1	E3,E5	H
F239	MU1-1	D5,E3	B721	MU6-1	D5,E3	
F240	MU1-1	C5,E3	B721	MU6-1	C5,E3	

F241	MU1-1	E3	B721	MU6-1	E3	A
F242	MU1-1	E3	B721	MU6-1	E3	A
	MU1-4	E3,F5		MU6-1	E3,F5	A
F243	MU1-4	E3,E5	B721	MU6-4	E3,E5	H
F244	MU1-4	E3	B721	MU6-1	E3	B
F245	CU1	A5,B/C3,D1,E3,E7 F3,F7				
F246	MU4	A1,C3				
F247	MU1-3	B3,D1,D5,E7	B721	MU6-3	B3,D1,D5,E7	
F248	MU1-2	E3,F5	B721	MU6-2	E3,F5	H
F249	MU1-2	E3,E5	B721	MU6-2	E3,E5	H
F250	MU1-2	C3,E7,F1,F5	B721	MU6-2	C3,E7,F1,F5	
F251	MU1-1	E7	B721	MU6-1	E7	
F252	MU1-1	C5,D7	B721	MU6-1	C5,D7	
F253	MU1-2	B3,C1,C5,E7	B721	MU6-2	B3,C1,C5,E7	A
F254	MU1-2	E7,F5	B721	MU6-2	E7,F5	A
	MU1-1	C3,E7,F1,F5		MU6-1	C3,E7,F1,F5	A
F255	CU1	B1,F1,F3				F
F256	MU1-1	C3,E1,E5,E7	B721	MU6-1	C3,E1,E5,E7	
F257	MU1-1	B3,D1,D5,E7	B721	MU6-1	B3,D1,D5,E7	
F258	MU1-3	B3,C1	B721	MU6-3	B3,C1	H
F259	MU1-3	C3,E1,E5,E7	B721	MU6-3	C3,E1,E5,E7	H
F260	MU1-1	B3,C1,C5,E7	B721	MU6-1	B3,C1,C5,E7	
F261	MU1-4	C3,E7,F1,F5	B721	MU6-4	C3,E7,F1,F5	
F262	MU1-4	C3,E1,E5,E7	B721	MU6-4	C3,E1,E5,E7	
F263	MU4	A3				H
F264	MU1-4	F7	B721	MU6-4	F7	H
F265	MU1-3	E3,E5	B721	MU6-3	E3,E5	
F266	MU1-3	E7,F5	B721	MU6-3	E7,F5	
F267	MU1-2	D7	B721	MU6-2	D7	
F268	MU1-2	A7	B721	MU6-2	A7	
F269	MU4	B3				
F270	MU4	B1				
F271	MU1-3	A5,C3,D7,F1,F5	B721	MU6-3	A5,C3,D7,F1,F5	
F272	MU1-3	E7	B721	MU6-3	E7	
F273	MU1-3	D7	B721	MU6-3	D7	
F274	MU1-2	D7,F5	B721	MU6-2	D7,F5	
F275	MU1-3	E3	B721	MU6-3	E3	
F276	MU1-2	B3,C5,D7	B721	MU6-2	B3,C5,D7	
F277	MU1-3	C5,D7	B721	MU6-3	C5,D7	
F278	CU1	B/C3				
F279	MU4	B5				
F280	MU4	B1,B5				
F281	MU1-3	D5,D7	B721	MU6-3	D5,D7	
F282	MU1-3	D7,E5	B721	MU6-3	D7,E5	
F283	MU1-3	A5	B721	MU6-3	A5	
F284	MU4	A7,C5				
F285	MU4	B7				
F286	MU4	A5,C3				
F287	MU4	B5,C5,D5				
F288	MU4	C3				H
F289	MU1-3	C3,F9	B721	MU6-3	C3,F9	H
F290	CU1	D1				
F291	MU1-3	E5,E7	B721	MU6-3	E5,E7	
F292	MU1-3	C3,E1,E7	B721	MU6-3	C3,E1,E7	
F293	MU1-3	C5,E7	B721	MU6-3	C5,E7	
F293	MU1-3	C5,E7				
F294	MU4	C5				
F295	MU1-2	C3,E1,E5,E7	B721	MU6-2	C3,E1,E5,E7	
F296	MU1-2	D7,E5	B721	MU6-2	D7,E5	
F297	MU4	D1				
F298	MU1-3	D5,E3	B721	MU6-3	D5,E3	
F299	MU1-2	B3,D1,D5	B721	MU6-2	B3,D1,D5	
F300	MU1-2	D5,E3	B721	MU6-2	D5,E3	
F301	MU1-2	E7	B721	MU6-2	E7	
F302	MU1-3	B3	B721	MU6-3	B3	
F303	MU1-3	C3	B721	MU6-3	C3	
F304	MU1-2	C3	B721	MU6-2	C3	

F305	MU1-1	B3	B721	MU6-1	B3	F340	CU1	D7		H
F306	MU1-4	C3	B721	MU6-4	C3					H
F307	MU1-1	C3	B721	MU6-1	C3	F341	CU1	A5,D5,E5,F3		H
F308	MU1-2	D5,D7	B721	MU6-2	D5,D7	F342	CU1	A1,A5,C1,E1,E3		
F309	MU1-2	B3	B721	MU6-2	B3	F343	CU1	C1,C5,D5		
F310	MU1-2	C1,E7	B721	MU6-2	C1,E7	F344	CU1	A5,B7		
F311	MU1-2	C3,E1,E7	B721	MU6-2	C3,E1,E7	F345	CU1	C1,C7,E7		
F312	MU2	A5					MU2	C3,D5		A
F313	MU1-1	B3,D1,E7	B721	MU6-1	B3,D1,E7		MU3	D7,F3		B
F314	MU1-1	C3,E1,E7	B721	MU6-1	C3,E1,E7	F346	CU1	A1,C1,E1		
F315	MU1-1	C3,E7,F1	B721	MU6-1	C3,E7,F1	F347	CU1	C1,F3		
F316	MU1-2	D5,E7	B721	MU6-2	D5,E7	F348	MU5	A7		
F317	MU1-2	C5,E7	B721	MU6-2	C5,E7	F349	CU1	B5,C5		
F318	MU1-1	E3,F5	B721	MU6-1	E3,F5	F350	CU1	A1,B/C3,B5,C5,E1		B
F319	MU1-1	E7,F5	B721	MU6-1	E7,F5					B
F320	MU1-1	E5,E7	B721	MU6-1	E5,E7	F351	MU5	A7,D5,D7		B
F321	MU1-1	B3,D5,D7	B721	MU6-1	B3,D5,D7	F352	CU1	A1,E1		
F322	MU1-1	C3,D7,E5	B721	MU6-1	C3,D7,E5	F353	CU1	B5		
F323	MU1-1	C3,D7,F5	B721	MU6-1	C3,D7,F5	F354	MU2	A5,D5		
F324	CU1	F3					MU5	A7		B
F325	CU1	E1								H
F326	CU1	B1								H
F327	CU1	F1				F355	CG1	C7	B721 CG2 A1	H
F328	CU1	F7					MU2	B7	MU2 B7	H
F329	CU1	E7				F356	MU2	B7		
F330	CU1	C7				F357	CU1	B/C3,F3		
F331	CU1	E3,F1			H					H
					H	F358	CG1	A7,B1,B7,C7,D1	B721 CG2 A1,A3,B3,B5,B7,E7	H
F332	CU1	C7,D1,D7,F3			H		MU2	B7	MU2 B7	H
F333	CU1	E5				F359	MU5	B7		
F334	CU1	E3				F360	CU1	B/C3,D7,E1		
F335	CU1	D1								H
F336	CU1	C5				F361	MU5	B5,B7,C3		H
F337	CU1	E5,F3,F5								H
F338	CU1	A5,A7,D5,E3,F3								H
F339	CU1	C5,D5,F3				F362	MU5	D5,D7,E3		H
						F363	MU1-2	B7	B721 MU6-2 B7	
						F364	MU1-2	C7	B721 MU6-2 C7	
						F365	MU1-3	B7	B721 MU6-3 B7	
						F366	MU1-3	C7	B721 MU6-3 C7	
						F367	MU2	A3,D5		
						F368	MU5	C3		
						F369	MU5	E3		

F370	MU5	D5				
F371	MU5	B5				
F372	MU5	A7,B7,D7,E5				
F373	MU5	B7,D7				
F374	MU5	D5,D7,E3				
F375	MU5	B5,B7,C3				
F376	SM2	D1,F7	B721	SM4	B3,D1,F7	
F377	SM2	F7	B721	SM4	F7	
F378	MU1-3	A7,B7	B721	MU6-3	A7,B7	
F379	MU1-2	A7,B7	B721	MU6-2	A7,B7	
F380	MU1-1	A5,A7	B721	MU6-1	A5,A7	
F381	MU1-1	A5	B721	MU6-1	A5	
F382	MU1-1	B7	B721	MU6-1	B7	
F383	MU1-4	E5	B721	MU6-4	E5	
F384	MU1-4	F5	B721	MU6-4	F5	
F385	MU1-1	D5	B721	MU6-1	D5	
F386	MU1-2	D5	B721	MU6-2	D5	
F387	MU1-2	C5	B721	MU6-2	C5	
F388	MU1-2	F5	B721	MU6-2	F5	
F389	MU1-1	C5	B721	MU6-1	C5	
F390	MU1-3	E5	B721	MU6-3	E5	
F391	MU1-3	D5	B721	MU6-3	D5	
F392	MU1-3	D7,F5	B721	MU6-3	D7,F5	
F393	NM4	A7	B721	NM14	A7	
F394	NM4	B7	B721	NM14	B7	
F395	NM5	A7	B721	NM15	A7	
F396	NM5	B7	B721	NM15	B7	
F397	CU1	B/C3,C7,D1,E3,F1 F3				
F398	NM4	A7,B7	B721	NM14	A7,B7	
F399	CU1	B/C3,C7,E5,F3				

F400	NM4 NM5	B7 B7	B721	NM14 NM15	B7 B7	
F401	MU1-2	E5	B721	MU6-2	E5	
F404	MU5	A7,D7				
F500	CG1	D7	B721	CG2	D7	
F501	LU2-3 LU2-2 LU3-2 LU4-1	B/C3 B/C3 A7,B7,E7,F3 A7,B7,E7,F3	B721	LU2-3 LU2-2 LU6-2 LU7-1	B/C3 B/C3 A7,B7,E5,F5 A7,B7,E5,F5	
F502	LU2-4 LU2-3 LU2-2 LU2-1	B/C3 B/C3 B/C3 B/C3				
F503	MU3	E1				
F504	LU2-4 LU2-2 LU2-1 MU5 MU2 LU4-1	D5,F5 F5 D5,F5 D5,F5,F7 A5,B7,D5,F7 D1,D5,E3,E5,E7,F7	B721	LU2-4 LU2-2 LU2-1 MU5 MU2 LU7-1	D5,F5 F5 D5,F5 D5,F5,F7 A5,B7,D5,F7 D1,D5,E3,E5,E7,F7	
F505	MU5 LU2-1 LU2-2 MU2	D5,F5,F7 D5,F5 F5 A5,B7,D5,F7				
F506	MU3 LU2-1	E1 D5,F5				
F507	LU3-1 LU2-1	B7,E7,F3 B/C3	B721	LU6-1 LU2-1	B7,E5,F5 B/C3	
F508	LU3-1 LU2-1	A7 B/C3	B721	LU6-1 LU2-1	A7 B/C3	
F509	LU3-2 LU2-2	B7,E7,F3 B/C3	B721	LU6-2 LU2-2	B7,E5,F5 B/C3	
F510	LU3-2 LU2-2	A7 B/C3	B721	LU6-2 LU2-2	A7 B/C3	
F511	LU4-1 LU2-3	B7 B/C3	B721	LU7-1 LU2-3	B7 B/C3	
F512	LU4-1 LU2-3	A7,E7,F3 B/C3	B721	LU7-1 LU2-3	A7,E5,F5 C/C3	
F513	LU4-1 LU2-4	B7 B/C3	B721	LU7-1 LU2-4	B7 B/C3	

F514	LU4-1	A7	B721	LU7-1	A7	G
	LU2-4	B/C3		LU2-4	B/C3	G
						G
						G
F515	MU2	A5,B3,C3,D1,D5,D7	B721	MU2	A5,B3,C3,D1,D5,D7	G
	LU4-2	A7,C3		LU7-2	A7,C3	G
						G
						G
F516	CU1	A3,B1,B/C3				G
	LU2-1	B/C3				G
	LU2-2	B/C3				G
	LU2-3	B/C3				G
	LU2-4	B/C3				G
						G
						G
F517	MU4	D3,E7,F5				G
	MU2	F7				G
						G
						G
F518	MU4	D7,F5,F7				G
	MU2	F7				G
						G
						G
F519	MU4	A7,B7,C7,D7,E7				G
						H
						H
F520			B721	STC	B5,B7,C5	H
						H
						H
F521			B721	STC	A5,A7,B7,E7,F5,F7	H
						H
						H
F522	CU1	C7,D7,F1,F3,F5				H

BSWMTR BARREL SWITCH B 711, B 711-1, B 720, AND B 771 PROCESSORS

```
PROGRAM-ID  BSWMTR.
 *
 *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
 *   *                                                                   *
 *   *   PLACE  MTR/MEM  SWITCH  IN  MTR  POSITION                       *
 *   *   PLACE  IRQ/EXT  SWITCH  IN  CENTER  POSITION                    *
 *   *   LOAD  BSWMTR  TAPE  1448   6955                                 *
 *   *   PLACE  LOAD  SWITCH  TO  NORMAL -  PRESS  CLEAR                 *
 *   *                                                                   *
 *   *                          NOTE                                     *
 *   *                                                                   *
 *   *                                                                   *
 *   *   ANY  DISAGREEMENT  WITH  INSTRUCTIONS  -  SEE                   *
 *   *   INCREMENTER  ADDRESS  FOR  FURTHER  ACTIONS                     *
 *   *                                                                   *
 *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *

 *
 *                  OPERATOR  INSTRUCTIONS
 *
 *
 *   PROG  STEP   INCR     OPERATOR  ACTION
 *
 *      1         0155     END  OF  BSWMTR                                 A
 *                                  NOTE
 *
 *                         TEST  CAN  BE  LOOPED
 *                                  BY  PRESSING  FST
```

PROGRAM LISTING

```
                    START.
0000   8262               CPCR  =  PARERR  -  1.                                          A
                    *
                    *                       BARREL  SWITCH  TEST
                    *
                    BSWTST.                 1'S  THRU  BSW
0001   C000               LIT  = 0  SAR  = 0.
0002   F0CA               LCTR.
0003   F076               B  =  B111.
0004   E0FF               LIT  =  @FF@.
0005   F0FE               Z  EQV  B.
0006   F0B5               IF  NOT  ABT  SKIP.
0007   400B               MPCR  =  CBSWTST  -  1.
0008   F0BD               IF  NOT  IRQ  SKIP.               REPEAT  FAILED  TEST
                    *                                       IF  IRQ  =  1
0009   4002               MPCR  =  BSWTST  +  1.
000A   F0EF               MIR  =  Z.
000B   F000               WAIT.                           ERROR  E1
                    *                                       MIR  -  ALL  1,S  THRU  BSW
                    CBSWTST.
000C   DF00               SAR  =  15.                       SAR  OUTPUT  GATING  TEST
000D   F076               B  =  B111.
000E   F05F               B.
000F   F0FE               Z  EQV  B.
0010   F0B5               IF  NOT  ABT  SKIP.
0011   4015               MPCR  =  CBSWTST2  -  1.
0012   F0BD               IF  NOT  IRQ  SKIP.               REPEAT  FAILED  TEST
                    *                                       IF  IRQ  =  1
0013   400B               MPCR  =  CBSWTST  -  1.
0014   F0EF               MIR  =  Z.
0015   F000               WAIT.                           ERROR  E2
                    *                                       SAR  BITS  NOT  GATED  OFF
                    *                                       MIR  -  ALL  1,S  THRU  BSW
                    CBSWTST2.               0'S  THRU  BSW
0016   F0CA               LCTR.
0017   E0FF               LIT  =  @FF@.
0018   F07B               B  =  B000.
0019   E000               LIT  =  0.
001A   F0FE               Z  EQV  B.
001B   F0B5               IF  NOT  ABT  SKIP.
001C   4020               MPCR  =  CBSWTST3  -  1.
001D   F0BD               IF  NOT  IRQ  SKIP.               REPEAT  FAILED  TEST
                    *                                       IF  IRQ  =  1
001E   4015               MPCR  =  CBSWTST2  -  1.
001F   F0EF               MIR  =  Z.
0020   F000               WAIT.                           ERROR  E3
                    *                                       MIR  -  ALL  0,S  THRU  BSW
                    CBSWTST3.
0021   F076               B  =  B111.
0022   F07D               B  =  B  C.
0023   F0E1               MIR  =  B.
0024   F0B5               IF  NOT  ABT  SKIP.
0025   4028               MPCR  =  BSWC0  -  1.
0026   F0BD               IF  NOT  IRQ  SKIP.               REPEAT  FAILED  TEST
                    *                                       IF  IRQ  =  1
0027   4020               MPCR  =  CBSWTST3  -  1.
0028   F000               WAIT.                           ERROR  E4
                    *                                       ALL  1,S  THRU  BSW  FAILS  ON
                    *                                       CIRCULAR  SHIFT  OF  15
                    *                                       MIR  CONTAINS  RESULT
                    *
                    BSWC0.
                    *                       BSW  CIRCULAR  0  TEST
                    *
0029   8176               CPCR  =  PGENB1  -  1.            SET  INPUT  &  OUTPUT  TO
```

```
-               *                           BIT  1  ONLY
002A  F0CE          LMAR.
002B  C002          LIT  = 2  SAR  = 0.         LOOP  RETURN  ADD  = -  2
002C  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E10
                *
                *          BSW  CIRCULAR  5  TEST
                *
002D  8176          CPCR  = PGENB1  -  1.       INPUT  BIT  1
002E  F0CE          LMAR.
002F  C503          LIT  = 3  SAR  = 5.         LOOP  RETURN  ADD  = -  3
0030  81BB          CPCR  = PGENB6  -  2.       OUTPUT  BIT  6
0031  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E26
0032  8184          CPCR  = PGENB2  -  1.       INPUT  BIT  2
0033  81C9          CPCR  = PGENB7  -  2.       OUTPUT  BIT  7
0034  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E27
0035  8192          CPCR  = PGENB3  -  1.       INPUT  BIT  3
0036  81D7          CPCR  = PGENB8  -  2.       OUTPUT  BIT  8
0037  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E28
0038  81A0          CPCR  = PGENB4  -  1.       INPUT  BIT  4
0039  81E5          CPCR  = PGENB9  -  2.       OUTPUT  BIT  9
003A  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E29
003B  81AE          CPCR  = PGENB5  -  1.       INPUT  BIT  5
003C  81F3          CPCR  = PGENB10  -  2.      OUTPUT  BIT  10
003D  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E30
003E  81BC          CPCR  = PGENB6  -  1.       INPUT  BIT  6
003F  8201          CPCR  = PGENB11  -  2.      OUTPUT  BIT  11
0040  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E31
0041  81CA          CPCR  = PGENB7  -  1.       INPUT  BIT  7
0042  820F          CPCR  = PGENB12  -  2.      OUTPUT  BIT  12
0043  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E32
0044  81D8          CPCR  = PGENB8  -  1.       INPUT  BIT  8
0045  821D          CPCR  = PGENB13  -  2.      OUTPUT  BIT  13
0046  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E33
0047  81E6          CPCR  = PGENB9  -  1.       INPUT  BIT  9
0048  822B          CPCR  = PGENB14  -  2.      OUTPUT  BIT  14
0049  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E34
004A  81F4          CPCR  = PGENB10  -  1.      INPUT  BIT  10
004B  8239          CPCR  = PGENB15  -  2.      OUTPUT  BIT  15
004C  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E35
004D  8202          CPCR  = PGENB11  -  1.      INPUT  BIT  11
004E  8247          CPCR  = PGENB16  -  2.      OUTPUT  BIT  16
004F  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E36
0050  8210          CPCR  = PGENB12  -  1.      INPUT  BIT  12
0051  8175          CPCR  = PGENB1  -  2.       OUTPUT  BIT  1
0052  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E37
0053  821E          CPCR  = PGENB13  -  1.      INPUT  BIT  13
0054  8183          CPCR  = PGENB2  -  2.       OUTPUT  BIT  2
0055  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E38
0056  822C          CPCR  = PGENB14  -  1.      INPUT  BIT  14
0057  8191          CPCR  = PGENB3  -  2.       OUTPUT  BIT  3
0058  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E39
0059  823A          CPCR  = PGENB15  -  1.      INPUT  BIT  15
005A  819F          CPCR  = PGENB4  -  2.       OUTPUT  BIT  4
005B  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E40
005C  8248          CPCR  = PGENB16  -  1.      INPUT  BIT  16
005D  81AD          CPCR  = PGENB5  -  2.       OUTPUT  BIT  5
005E  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E41
                *
                *          BSW  CIRCULAR  10  TEST
                *
005F  DA00          SAR  = 10.
0060  8176          CPCR  = PGENB1  -  1.       INPUT  BIT  1
0061  8201          CPCR  = PGENB11  -  2.      OUTPUT  BIT  11
0062  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E42
0063  8184          CPCR  = PGENB2  -  1.       INPUT  BIT  2
0064  820F          CPCR  = PGENB12  -  2.      OUTPUT  BIT  12
0065  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E43
0066  8192          CPCR  = PGENB3  -  1.       INPUT  BIT  3
0067  821D          CPCR  = PGENB13  -  2.      OUTPUT  BIT  13
0068  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E44
0069  81A0          CPCR  = PGENB4  -  1.       INPUT  BIT  4
006A  822B          CPCR  = PGENB14  -  2.      OUTPUT  BIT  14
006B  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E45
006C  81AE          CPCR  = PGENB5  -  1.       INPUT  BIT  5
006D  8239          CPCR  = PGENB15  -  2.      OUTPUT  BIT  15
006E  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E46
006F  81BC          CPCR  = PGENB6  -  1.       INPUT  BIT  6
0070  8247          CPCR  = PGENB16  -  2.      OUTPUT  BIT  16
0071  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E47
0072  81CA          CPCR  = PGENB7  -  1.       INPUT  BIT  7
0073  8175          CPCR  = PGENB1  -  2.       OUTPUT  BIT  1
0074  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E48
0075  81D8          CPCR  = PGENB8  -  1.       INPUT  BIT  8
0076  8183          CPCR  = PGENB2  -  2.       OUTPUT  BIT  2
0077  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E49
0078  81E6          CPCR  = PGENB9  -  1.       INPUT  BIT  9
0079  8191          CPCR  = PGENB3  -  2.       OUTPUT  BIT  3
007A  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E50
007B  81F4          CPCR  = PGENB10  -  1.      INPUT  BIT  10
007C  819F          CPCR  = PGENB4  -  2.       OUTPUT  BIT  4
007D  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E51
007E  8202          CPCR  = PGENB11  -  1.      INPUT  BIT  11
007F  81AD          CPCR  = PGENB5  -  2.       OUTPUT  BIT  5
0080  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E52
0081  8210          CPCR  = PGENB12  -  1.      INPUT  BIT  12
0082  81BB          CPCR  = PGENB6  -  2.       OUTPUT  BIT  6
0083  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E53
0084  821E          CPCR  = PGENB13  -  1.      INPUT  BIT  13
0085  81C9          CPCR  = PGENB7  -  2.       OUTPUT  BIT  7
0086  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E54
0087  822C          CPCR  = PGENB14  -  1.      INPUT  BIT  14
0088  81D7          CPCR  = PGENB8  -  2.       OUTPUT  BIT  8
0089  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E55
008A  823A          CPCR  = PGENB15  -  1.      INPUT  BIT  15
008B  81E5          CPCR  = PGENB9  -  2.       OUTPUT  BIT  9
008C  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E56
008D  8248          CPCR  = PGENB16  -  1.      INPUT  BIT  16
008E  81F3          CPCR  = PGENB10  -  2.      OUTPUT  BIT  10
008F  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E57
                *
                *          BSW  CIRCULAR  15  TEST
                *
0090  DF00          SAR  = 15.
0091  8176          CPCR  = PGENB1  -  1.       INPUT  BIT  1
0092  8247          CPCR  = PGENB16  -  2.      OUTPUT  BIT  16
0093  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E58
0094  8184          CPCR  = PGENB2  -  1.       INPUT  BIT  2
0095  8175          CPCR  = PGENB1  -  2.       OUTPUT  BIT  1
0096  815B          CPCR  = PBSWCEQ  -  1.      ERROR  E59
                *
                *          BSW  RIGHT  END  OFF  TEST
                *
0097  E005          LIT  = 5.                   LOOP  RETURN  ADD  = -  5
0098  F0CE          LMAR.
0099  F076          B  = B111.                  INPUT  = ALL  ONE'S
009A  F033          A2  = B.
009B  F0CA          LCTR.
009C  C000          LIT  = 0  SAR  = 0.         RIGHT  = 0
009D  F08A          B  = Z.
009E  E0FF          LIT  = @FF@.                OUTPUT  = FFFF
009F  8157          CPCR  = PBSWREQ  -  1.      ERROR  E74
00A0  F0CA          LCTR.
00A1  C180          LIT  = @80@  SAR  = 1.      RIGHT  1
00A2  F08A          B  = Z.
00A3  E0FF          LIT  = @FF@.                OUTPUT  = 7FFF
00A4  8157          CPCR  = PBSWREQ  -  1.      ERROR  E75
00A5  F0CA          LCTR.
00A6  C2C0          LIT  = @C0@  SAR  = 2.
00A7  F08A          B  = Z.
00A8  E0FF          LIT  = @FF@.                OUTPUT  = 3FFF
00A9  8157          CPCR  = PBSWREQ  -  1.      ERROR  E76
```

```
00AA  F0CA        LCTR.
00AB  C3E0        LIT  = @E0@  SAR  = 3.          RIGHT  3
00AC  F08A        B  = Z.
00AD  E0FF        LIT  = @FF@.                    OUTPUT  = 1FFF
00AE  8157        CPCR  = PBSWREQ  -  1.      ERROR  E77
00AF  F0CA        LCTR.
00B0  C4F0        LIT  = @F0@  SAR  = 4.          RIGHT  4
00B1  F08A        B  = Z.
00B2  E0FF        LIT  = @FF@.                    OUTPUT  = 0FFF
00B3  8157        CPCR  = PBSWREQ  -  1.      ERROR  E78
00B4  F0CA        LCTR.
00B5  C8FF        LIT  = @FF@  SAR  = 8.          RIGHT  8
00B6  F08A        B  = Z.
00B7  E0FF        LIT  = @FF@.                    OUTPUT  = 00FF
00B8  8157        CPCR  = PBSWREQ  -  1.      ERROR  E82
00B9  F0CE        LMAR.
00BA  E003        LIT  = 3.                       LOOP  RETURN  ADD  = -  3
00BB  F08A        B  = Z.                         RIGHT  12
00BC  CC0F        LIT  = @0F@  SAR  = 12.         OUTPUT  = 000F
00BD  8157        CPCR  = PBSWREQ  -  1.      ERROR  E86
                  *
                  *                       BSW  LEFT  END  OFF  TEST
                  *
00BE  F0CA        LCTR.
00BF  E000        LIT  = 0.
00C0  F08A        B  = Z.                         LEFT  15
00C1  CFFE        LIT  = @FE@  SAR  = 15.         OUTPUT  = FFFE
00C2  8159        CPCR  = PBSWLEQ  -  1.      ERROR  E90
00C3  F08A        B  = Z.                         LEFT  14
00C4  CEFC        LIT  = @FC@  SAR  = 14.         OUTPUT  = FFFC
00C5  8159        CPCR  = PBSWLEQ  -  1.      ERROR  E91
00C6  F08A        B  = Z.                         LEFT  13
00C7  CDF8        LIT  = @F8@  SAR  = 13.         OUTPUT  = FFF8
00C8  8159        CPCR  = PBSWLEQ  -  1.      ERROR  E92
00C9  F08A        B  = Z.                         LEFT  12
00CA  CCF0        LIT  = @F0@  SAR  = 12.         OUTPUT  = FFF0
00CB  8159        CPCR  = PBSWLEQ  -  1.      ERROR  E93
00CC  F08A        B  = Z.                         LEFT  11
00CD  CBE0        LIT  = @E0@  SAR  = 11.         OUTPUT  = FFE0
00CE  8159        CPCR  = PBSWLEQ  -  1.      ERROR  E94
00CF  F0CE        LMAR.
00D0  E005        LIT  = 5.                       LOOP  RETURN  ADD  = -  5
00D1  F0CA        LCTR.
00D2  C701        LIT  = @01@  SAR  = 7.          LEFT  7
00D3  F08A        B  = Z.
00D4  E000        LIT  = 0.                       OUTPUT  = FE00
00D5  8159        CPCR  = PBSWLEQ  -  1.      ERROR  E98
00D6  F0CA        LCTR.
00D7  C31F        LIT  = @1F@  SAR  = 3.          LEFT  3
00D8  F08A        B  = Z.
00D9  E000        LIT  = 0.                       OUTPUT  = E000
00DA  8159        CPCR  = PBSWLEQ  -  1.      ERROR  E102
                  *
                  *                       BSW  COMPLIMENT  SAR  TEST
                  *
00DB  8176        CPCR  = PGENB1  -  1.           INPUT  BIT1
00DC  D100        SAR  = 1.
00DD  F092        CSAR.
00DE  8247        CPCR  = PGENB16  -  2.          OUTPUT  BIT  16
00DF  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E106
00E0  D200        SAR  = 2.
00E1  F092        CSAR.
00E2  8239        CPCR  = PGENB15  -  2.          OUTPUT  BIT  15
00E3  F05F        B.                              FILLER  FOR  LOOP  RETURN
00E4  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E107
00E5  D000        SAR  = 0.
00E6  F092        CSAR.
00E7  8175        CPCR  = PGENB1  -  2.           OUTPUT  BIT  1
00E8  F05F        B.                              FILLER  FOR  LOOP  RETURN
00E9  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E108
00EA  F092        CSAR.
00EB  DF00        SAR  = 15.
00EC  F05F        B.                              FILLER  FOR  LOOP  RETURN
00ED  8183        CPCR  = PGENB2  -  2.           OUTPUT  BIT  2
00EE  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E109
00EF  D200        SAR  = 2.
00F0  F092        CSAR.
00F1  F092        CSAR.
00F2  8191        CPCR  = PGENB3  -  2.           OUTPUT  BIT  3
00F3  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E110
                  *
                  *                       BSW  TO  SAR  TEST
                  *
00F4  F0CE        LMAR.
00F5  F089        B  = LIT.
00F6  CF00        LIT  = 0  SAR  = 15.
00F7  F0F4        SAR  = B.
00F8  8176        CPCR  = PGENB1  -  1.           INPUT  &  OUTPUT  BIT  1
00F9  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E111
00FA  F089        B  = LIT.
00FB  C005        LIT  = 5  SAR  = 0.
00FC  F0F4        SAR  = B.
00FD  81BB        CPCR  = PGENB6  -  2.           OUTPUT  BIT  6
00FE  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E112
00FF  F089        B  = LIT.
0100  C00A        LIT  = 10  SAR  = 0.
0101  F0F4        SAR  = B.
0102  8201        CPCR  = PGENB11  -  2.          OUTPUT  BIT  11
0103  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E113
0104  F07B        B  = B000.                      VERIFY  BSW  LOADS  UNUSED
                  *                               SAR  BITS  4  &  5  TO  ZERO
0105  F0F4        SAR  = B.
0106  F092        CSAR.
0107  8175        CPCR  = PGENB1  -  2.           OUTPUT  BIT  1
0108  815B        CPCR  = PBSWCEQ  -  1.      ERROR  E114
                  *
                  *                       SHIFT  STORE  CONTROL  TEST
                  *
                SSFT1.
0109  DF00        SAR  = 15.
010A  F076        B  = B111.
010B  F033        A2  = B.                        INPUT  ALL  ONES
010C  F13E        SSC  A3  = A2  L.
010D  F02A        A2  = A2  F0DE          MIR  = A3. GATE  A3  TO  ADDER FOR TEST
0110  F0B2        IF  LST  SKIP.
0111  8255        CPCR  = ERRSSF  -  1.       ERROR  E115
                  *                               LSBCCTL  NOT  GENERATE  LSB
0112  0108        AMPCR  = SSFT1  -  1.           LOOP  RETURN  ADD
0113  F13E        SSC  A3  = A2  L.               GATE  SSF  TO  LSB
0114  F0DE        MIR  = A3.                      GATE  A3  TO  ADDER  FOR  TST
0115  F0C3        IF  NOT  LST  SKIP.
0116  8255        CPCR  = ERRSSF  -  1.       ERROR  E116
                  *                               SSF  NOT  RESET  BY  MSB
0117  0108        AMPCR  = SSFT1  -  1.           LOOP  RETURN  ADD
                SSFT2.
0118  F033        A2  = B.                        INPUT  = ALL  ONES
0119  F13F        SSC  A3  = A2  R.               SET  SSF  WITH  LSB
011A  F02A        A2  = A2  + B001.               INPUT  = ALL  0'S
011B  F13F        SSC  A3  = A2  R.               GATE  SSF  TO  MSB
                  *                               RESET  SSF  WITH  LSB
011C  F0DE        MIR  = A3.                      GATE  A3  TO  ADDER  FOR  TST
011D  F0B3        IF  MST  SKIP.
011E  8255        CPCR  = ERRSSF  -  1.       ERROR  E117
                  *                               LSB  NOT  GENERATE  MSBCCTL
011F  0117        AMPCR  = SSFT2  -  1.           LOOP  RETURN  ADD
0120  F13F        SSC  A3  = A2  R.               GATE  SSF  TO  MSB
0121  F0DE        MIR  = A3.                      GATE  A3  TO  ADDER  FOR  TST
0122  F0C4        IF  NOT  MST  SKIP.
0123  8255        CPCR  = ERRSSF  -  1.       ERROR  E118
                  *                               SSF  NOT  RESET  BY  LSB
0124  0117        AMPCR  = SSFT2  -  1.           LOOP  RETURN  ADD
```

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                SSFT3.
0125  F140           SSC  A3 = LIT  + B.          SET  SSF  WITH  AOV
0126  E001           LIT  = 1.
0127  F033           A2 = B.                      INPUT  = ALL  ONES
0128  F13E           SSC  A3 = A2  L.             GATE  SSF  TO  LSB
                *                                SET  SSF  WITH  MSB
0129  F0DE           MIR = A3.                    GATE  A3  TO  ADDER  FOR  TST
012A  F0B2           IF  LST  SKIP.
012B  8255           CPCR = ERRSSF - 1.       ERROR  E119
                *                                SSF  NOT  SET  BY  AOV
012C  0124           AMPCR = SSFT3 - 1.           LOOP  RETURN  ADD
012D  F140           SSC  A3 = LIT  + B.          RESET  SSF  WITH  AOV
012E  E000           LIT  = 0.
012F  F13E           SSC  A3 = A2  L.             GATE  SSF  TO  LSB
0130  F0DE           MIR = A3.                    GATE  A3  TO  ADDER  FOR  TST
0131  F0C3           IF  NOT  LST  SKIP.
0132  8255           CPCR = ERRSSF - 1.       ERROR  E120
                *                                SSF  NOT  RESET  BY  AOV
0133  0124           AMPCR = SSFT3 - 1.           LOOP  RETURN  ADD
                BCLKCH.
0134  DF00           SAR = 15.
0135  F076           B = B111.
0136  F017           A1 = B.
0137  F033           A2 = B.
0138  F051           A3 = B.
0139  F07F           B = B R.
013A  E000           LIT  = 0.
013B  F09D           IF  ABT  SKIP.
013C  8255           CPCR = ERRSSF - 1.       ERROR  E137
013D  0133           AMPCR = BCLKCH - 1.
013E  F00D           A1 = A1  R.
013F  E000           LIT  = 0.
0140  F09D           IF  ABT  SKIP.
0141  8255           CPCR = ERRSSF - 1.       ERROR  E138
0142  0133           AMPCR = BCLKCH - 1.
0143  F027           A2 = A2  R.
0144  E000           LIT  = 0.
0145  F09D           IF  ABT  SKIP.
0146  8255           CPCR = ERRSSF - 1.       ERROR  E139
0147  0133           AMPCR = BCLKCH - 1.
0148  F046           A3 = A3  R.
0149  E000           LIT  = 0.
014A  F09D           IF  ABT  SKIP.
014B  8255           CPCR = ERRSSF - 1.       ERROR  E140
014C  0133           AMPCR = BCLKCH - 1.
                BSWTOSAR.
014D  F076           B = B111.                                                A
014E  D000           SAR = 0.                     LOAD  0,S  TO  SAR          A
                *                                WHILE  BSW  IS  1,S         A
014F  F07F           B = B R.                                                 A
0150  F05F           B.                                                       A
0151  F09D           IF  ABT  SKIP.                                           A
0152  8255           CPCR = ERRSSF - 1.           FAILURE  F158               A
                *                                BSW  TO  SAR  = 1           A
0153  014C           AMPCR = BSWTOSAR - 1.
0154  F008           IF  GC1  SKIP.
0155  F000           WAIT.                        NO  ERRORS
                *                                FORCE  STEP  TO  LOOP
                *                                ENTIRE  MTR
0156  F006           SET  GC1.
0157  7FFF           MPCR = @3FFF@.               GO  TO  START
                *                                END  OF  BSW  TEST
                *                    BSW  PROCEDURES
                *
                PBSWREQ.             BSW  R  SHIFT  WITH  RESULT  COMPARISON
                *
0158  F12F           A3 = A2  R.
0159  F0F7           SKIP.
                *
                PBSWLEQ.             BSW  L  SHIFT  WITH  RESULT  COMPARISON
                *
015A  F12E           A3 = A2  L.
015B  F0F7           SKIP.
                *
                PBSWCEQ.             BSW  C  SHIFT  WITH  RESULT  COMPARISON
                *
015C  F12D           A3 = A2  C.
015D  F03C           A3  EQV  B.
015E  F09C           IF  ABT  JUMP.               EXIT  IF  COMPARE
                ERR.
015F  F0DA           MIR = AMPCR.                 STORE  EXIT  ADD
0160  F05F           B.                           COMPLETE  LAST  INSTRUCTION
0161  F0BD           IF  NOT  IRQ  SKIP.
0162  416E           MPCR = ERRLOOP - 1.          LOOP  ON  FAILURE
                *                                IF  FE  LOOP  SW  IS  SET
0163  F08C           BMI  MIR = B.                EXIT  ADD  TO  B
                *                                EXPECTED  RESULT  TO  B
0164  F05B           AMPCR = B.                   EXIT  ADD  TO  AMPCR
0165  F08D           BMI.                         EXPTD  RESULT  BACK  TO  B
0166  F0DA           MIR = AMPCR.
0167  F000           WAIT.                        DISPLAY  ERROR  ADDRESS
                *                                REFER  TO  E5  FOR
                *                                INSTRUCTIONS
0168  F0DE           MIR = A3.
0169  F000           WAIT.                        DISPLAY  BSW  ACTL  OUTPUT
016A  F0DD           MIR = A2.
016B  F000           WAIT.                        DISPLAY  BSW  INPUT
016C  F0E1           MIR = B.
016D  F000           WAIT.                        DISPLAY  BSW  EXPTD  OUTPUT
016E  F0C9           JUMP.                        ERROR  OVER-RIDE
                *                                RESUME  TEST
                ERRLOOP.
016F  F08D           BMI.                         EXIT  ADD  TO  B
0170  F051           A3 = B.                      EXIT  ADD  TO  A3
0171  F080           B = BMAR.                    GET  LOOP  RETURN  AMOUNT
0172  F070           B = A3 - B.                  SUBT  LOOP  RETURN  AMOUNT
                *                                FROM  EXIT  ADD
0173  F05B           AMPCR = B.
0174  F05F           B.                           COMPLETE  LAST  INST
0175  F0C9           JUMP.                        REPEAT  FAILED  TEST
                *
                *                                GENERATE  SINGLE  BIT  IN  B
                *                                AND/OR  A2
                *
0176  F018           SET  LC1.
                *
                PGENB1.                          GEN  B  BIT  1
                *
0177  F0CA           LCTR.
0178  E07F           LIT  = @7F@.
0179  F08A           B = Z.
017A  E000           LIT  = 0.
017B  F014           IF  LC1  SKIP.
017C  F033           A2 = B.
017D  F0FE           Z  EQV  B.                   TST  FR  NO  SHIFT  THRU  BSW
017E  F09C           IF  ABT  JUMP.               EXIT  IF  TEST  PASSES
017F  F0BD           IF  NOT  IRQ  SKIP.          REPEAT  FAILED  TEST
                *                                IF  IRQ  = 1
0180  4176           MPCR = PGENB1 - 1.
0181  F0EF           MIR = Z.                     DISP  SING  BIT  ERR  RESULT
0182  F000           WAIT.                    ERROR  E121
                *                                BIT  IS  ALTERED  BY  BSW
                *                                MIR  CONTAINS  RESULT
0183  F0C9           JUMP.                        FORCE  STEP  FOR  ERR  OVRID
0184  F018           SET  LC1.
                *
                PGENB2.                          GEN  B  BIT  2
                *
0185  F0CA           LCTR.
0186  E0BF           LIT  = @BF@.
```

```
0187  F08A        B = Z.
0188  E000        LIT = 0.
0189  F014        IF LC1 SKIP.
018A  F033        A2 = B.
018B  F0FE        Z EQV B.                    TST FR NO SHIFT THRU BSW
018C  F09C        IF ABT JUMP.                EXIT IF TEST PASSES
018D  F0BD        IF NOT IRQ SKIP.            REPEAT FAILED TEST
                  *                           IF IRQ =1
018E  4184        MPCR = PGENB2 - 1.
018F  F0EF        MIR = Z.                    DISP SING BIT ERR RESULT
0190  F000        WAIT.                     ERROR E122
                  *                           BIT IS ALTERED BY BSW
                  *                           MIR CONTAINS RESULT
0191  F0C9        JUMP.                       FORCE STEP FOR ERR OVRID
0192  F018        SET LC1.
                  *
                  PGENB3.                     GENB BIT 3
                  *
0193  F0CA        LCTR.
0194  E0DF        LIT = @DF@.
0195  F08A        B = Z.
0196  E000        LIT = 0.
0197  F014        IF LC1 SKIP.
0198  F033        A2 = B.
0199  F0FE        Z EQV B.                    TST FR NO SHIFT THRU BSW
019A  F09C        IF ABT JUMP.                EXIT IF TEST PASSES
019B  F0BD        IF NOT IRQ SKIP.            REPEAT FAILED TEST
                  *                           IF IRQ = 1
019C  4192        MPCR = PGENB3 - 1.
019D  F0EF        MIR = Z.                    DISP SING BIT ERR RESULT
019E  F000        WAIT.                     ERROR E123
                  *                           BIT IS ALTERED BY BSW
                  *                           MIR CONTAINS RESULT
019F  F0C9        JUMP.                       FORCE STEP FOR ERR OVRID
01A0  F018        SET LC1.
                  *
                  PGENB4.                     GEN B BIT 4
                  *
01A1  F0CA        LCTR.
01A2  E0EF        LIT = @EF@.
01A3  F08A        B = Z.
01A4  E000        LIT = 0.
01A5  F014        IF LC1 SKIP.
01A6  F033        A2 = B.
01A7  F0FE        Z EQV B.                    TST FR NO SHIFT THRU BSW
01A8  F09C        IF ABT JUMP.                EXIT IF TEST PASSES
01A9  F0BD        IF NOT IRQ SKIP.            REPEAT FAILED TEST
                  *                           IF IRQ = 1
01AA  41A0        MPCR = PGENB4 - 1.
01AB  F0EF        MIR = Z.                    DISP SING BIT ERR RESULT
01AC  F000        WAIT.                     ERROR E124
                  *                           BIT IS ALTERED BY BSW
                  *                           MIR CONTAINS RESULT
01AD  F0C9        JUMP.                       FORCE STEP FOR ERR OVRID
01AE  F018        SET LC1.
                  *
                  PGENB5.                     GEN B BIT 5
                  *
01AF  F0CA        LCTR.
01B0  E0F7        LIT = @F7@.
01B1  F08A        B = Z.
01B2  E000        LIT = 0.
01B3  F014        IF LC1 SKIP.
01B4  F033        A2 = B.
01B5  F0FE        Z EQV B.                    TST FR NO SHIFT THRU BSW
01B6  F09C        IF ABT JUMP.                EXIT IF TEST PASSES
01B7  F0BD        IF NOT IRQ SKIP.            REPEAT FAILED TEST
                  *                           IF IRQ = 1
01B8  41AE        MPCR = PGENB5 - 1.
01B9  F0EF        MIR = Z.                    DISP SING BIT ERR RESULT
01BA  F000        WAIT.                     ERROR E125
                  *                           BIT IS ALTERED BY BSW
                  *                           MIR CONTAINS RESULT
01BB  F0C9        JUMP.                       FORCE STEP FOR ERR OVRID
01BC  F018        SET LC1.
                  *
                  PGENB6.                     GEN B BIT 6
                  *
01BD  F0CA        LCTR.
01BE  E0FB        LIT = @FB@.
01BF  F08A        B = Z.
01C0  E000        LIT = 0.
01C1  F014        IF LC1 SKIP.
01C2  F033        A2 = B.
01C3  F0FE        Z EQV B.                    TST FR NO SHIFT THRU BSW
01C4  F09C        IF ABT JUMP.                EXIT IF TEST PASSES
01C5  F0BD        IF NOT IRQ SKIP.            REPEAT FAILED TEST
                  *                           IF IRQ = 1
01C6  41BC        MPCR = PGENB6 - 1.
01C7  F0EF        MIR = Z.                    DISP SING BIT ERR RESULT
01C8  F000        WAIT.                     ERROR E126
                  *                           BIT IS ALTERED BY BSW
                  *                           MIR CONTAINS RESULT
01C9  F0C9        JUMP.                       FORCE STEP FOR ERR OVRID
01CA  F018        SET LC1.
                  *
                  PGENB7.                     GEN B BIT 7
                  *
01CB  F0CA        LCTR.
01CC  E0FD        LIT = @FD@.
01CD  F08A        B = Z.
01CE  E000        LIT = 0.
01CF  F014        IF LC1 SKIP.
01D0  F033        A2 = B.
01D1  F0FE        Z EQV B.                    TST FR NO SHIFT THRU BSW
01D2  F09C        IF ABT JUMP.                EXIT IF TEST PASSES
01D3  F0BD        IF NOT IRQ SKIP.            REPEAT FAILED TEST
                  *                           IF IRQ = 1
01D4  41CA        MPCR = PGENB7 - 1.
01D5  F0EF        MIR = Z.                    DISP SING BIT ERR RESULT
01D6  F000        WAIT.                     ERROR E127
                  *                           BIT IS ALTERED BY BSW
                  *                           MIR CONTAINS RESULT
01D7  F0C9        JUMP.                       FORCE STEP FOR ERR OVRID
01D8  F018        SET LC1.
                  *
                  PGENB8.                     GEN B BIT 8
                  *
01D9  F0CA        LCTR.
01DA  E0FE        LIT = @FE@.
01DB  F08A        B = Z.
01DC  E000        LIT = 0.
01DD  F014        IF LC1 SKIP.
01DE  F033        A2 = B.
01DF  F0FE        Z EQV B.                    TST FR NO SHIFT THRU BSW
01E0  F09C        IF ABT JUMP.                EXIT IF TEST PASSES
01E1  F0BD        IF NOT IRQ SKIP.            REPEAT FAILED TEST
                  *                           IF IRQ = 1
01E2  41D8        MPCR = PGENB8 - 1.
01E3  F0EF        MIR = Z.                    DISP SING BIT ERR RESULT
01E4  F000        WAIT.                     ERROR E128
                  *                           BIT IS ALTERED BY BSW
                  *                           MIR CONTAINS RESULT
01E5  F0C9        JUMP.                       FORCE STEP FOR ERR OVRID
01E6  F018        SET LC1.
                  *
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```
                PGENB9.                          GENB BIT 9
                *
01E7  F0CA      LCTR.
01E8  E0FF      LIT = @FF@.
01E9  F08A      B = Z.
01EA  E080      LIT = @80@.
01EB  F014      IF LC1 SKIP.
01EC  F033      A2 = B.
01ED  F0FE      Z EQV B.                         TST FR NO SHIFT THRU BSW
01EE  F09C      IF ABT JUMP.                     EXIT IF TEST PASSES
01EF  F0BD      IF NOT IRQ SKIP.                 REPEAT FAILED TEST
                *                                IF IRQ = 1
01F0  41E6      MPCR = PGENB9 - 1.
01F1  F0EF      MIR = Z.                         DISP SING BIT ERR RESULT
01F2  F000      WAIT.                          ERROR E129
                *                                BIT IS ALTERED BY BSW
                *                                MIR CONTAINS RESULT
01F3  F0C9      JUMP.                            FORCE STEP FOR ERR OVRID
01F4  F018      SET LC1.
                *
                PGENB10.                         GEN B BIT 10
                *
01F5  F0CA      LCTR.
01F6  E0FF      LIT = @FF@.
01F7  F08A      B = Z.
01F8  E040      LIT = @40@.
01F9  F014      IF LC1 SKIP.
01FA  F033      A2 = B.
01FB  F0FE      Z EQV B.                         TST FR NO SHIFT THRU BSW
01FC  F09C      IF ABT JUMP.                     EXIT IF TEST PASSES
01FD  F0BD      IF NOT IRQ SKIP.                 REPEAT FAILED TEST
                *                                IF IRQ = 1
01FE  41F4      MPCR = PGENB10 - 1.
01FF  F0EF      MIR = Z.                         DISP SING BIT ERR RESULT
0200  F000      WAIT.                          ERROR E130
                *                                BIT IS ALTERED BY BSW
                *                                MIR CONTAINS RESULT
0201  F0C9      JUMP.                            FORCE STEP FOR ERR OVRD
0202  F018      SET LC1.
                *
                PGENB11.                         GEN B BIT 11
                *
0203  F0CA      LCTR.
0204  E0FF      LIT = @FF@.
0205  F08A      B = Z.
0206  E020      LIT = @20@.
0207  F014      IF LC1 SKIP.
0208  F033      A2 = B.
0209  F0FE      Z EQV B.                         TST FR NO SHIFT THRU BSW
020A  F09C      IF ABT JUMP.                     EXIT IF TEST PASSES
020B  F0BD      IF NOT IRQ SKIP.                 REPEAT FAILED TEST
                *                                IF IRQ = 1
020C  4202      MPCR = PGENB11 - 1.
020D  F0EF      MIR = Z.                         DISP SING BIT ERR RESULT
020E  F000      WAIT.                          ERROR E131
                *                                BIT IS ALTERED BY BSW
                *                                MIR CONTAINS RESULT
020F  F0C9      JUMP.                            FORCE STEP FOR ERR OVRID
0210  F018      SET LC1.
                *
                PGENB12.                         GEN B BIT 12
                *
0211  F0CA      LCTR.
0212  E0FF      LIT = @FF@.
0213  F08A      B = Z.
0214  E010      LIT = @10@.
0215  F014      IF LC1 SKIP.
0216  F033      A2 = B.
0217  F0FE      Z EQV B.                         TST FR NO SHIFT THRU BSW
0218  F09C      IF ABT JUMP.                     EXIT IF TEST PASSES
0219  F0BD      IF NOT IRQ SKIP.                 REPEAT FAILED TEST
                *                                IF IRQ = 1
021A  4210      MPCR = PGENB12 - 1.
021B  F0EF      MIR = Z.                         DISP SING BIT ERR RESULT
021C  F000      WAIT.                          ERROR E132
                *                                BIT IS ALTERED BY BSW
                *                                MIR CONTAINS RESULT
021D  F0C9      JUMP.                            FORCE STEP FOR ERR OVRID
021E  F018      SET LC1.
                *
                PGENB13.                         GEN B BIT 13
                *
021F  F0CA      LCTR.
0220  E0FF      LIT = @FF@.
0221  F08A      B = Z.
0222  E008      LIT = @08@.
0223  F014      IF LC1 SKIP.
0224  F033      A2 = B.
0225  F0FE      Z EQV B.                         TST FR NO SHIFT THRU BSW
0226  F09C      IF ABT JUMP.                     EXIT IF TEST PASSES
0227  F0BD      IF NOT IRQ SKIP.                 REPEAT FAILED TEST
                *                                IF IRQ = 1
0228  421E      MPCR = PGENB13 - 1.
0229  F0EF      MIR = Z.                         DISP SING BIT ERR RESULT
022A  F000      WAIT.                          ERROR E133
                *                                BIT IS ALTERED BY BSW
                *                                MIR CONTAINS RESULT
022B  F0C9      JUMP.                            FORCE STEP FOR ERR OVRID
022C  F018      SET LC1.
                *
                PGENB14.                         GEN B BIT 14
                *
022D  F0CA      LCTR.
022E  E0FF      LIT = @FF@.
022F  F08A      B = Z.
0230  E004      LIT = @04@.
0231  F014      IF LC1 SKIP.
0232  F033      A2 = B.
0233  F0FE      Z EQV B.                         TST FR NO SHIFT THRU BSW
0234  F09C      IF ABT JUMP.                     EXIT IF TEST PASSES
0235  F0BD      IF NOT IRQ SKIP.                 REPEAT FAILED TEST
                *                                IF IRQ = 1
0236  422C      MPCR = PGENB14 - 1.
0237  F0EF      MIR = Z.                         DISP SING BIT ERR RESULT
0238  F000      WAIT.                          ERROR E134
                *                                BIT IS ALTERED BY BSW
                *                                MIR CONTAINS RESULT
0239  F0C9      JUMP.                            FORCE STEP FOR ERR OVRID
023A  F018      SET LC1.
                *
                PGENB15.                         GEN B BIT 15
                *
023B  F0CA      LCTR.
023C  E0FF      LIT = @FF@.
023D  F08A      B = Z.
023E  E002      LIT = @02@.
023F  F014      IF LC1 SKIP.
0240  F033      A2 = B.
0241  F0FE      Z EQV B.                         TST FR NO SHIFT THRU BSW
0242  F09C      IF ABT JUMP.                     EXIT IF TEST PASSES
0243  F0BD      IF NOT IRQ SKIP.                 REPEAT FAILED TEST
                *                                IF IRQ = 1
0244  423A      MPCR = PGENB15 - 1.
0245  F0EF      MIR = Z.                         DISP SING BIT ERR RESULT
0246  F000      WAIT.                          ERROR E135
                *                                BIT IS ALTERED BY BSW
                *                                MIR CONTAINS RESULT
0247  F0C9      JUMP.                            FORCE STEP FOR ERR OVRID
0248  F018      SET LC1.
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          PGENB16.                              GEN  B  BIT  16
         *
0249  F0CA       LCTR.
024A  E0FF       LIT   =  @FF@.
024B  F08A       B  =  Z.
024C  E001       LIT   =  @01@.
024D  F014       IF  LC1  SKIP.
024E  F033       A2  =  B.
024F  F0FE       Z  EQV  B.                     TST  FR  NO SHIFT  THRU  BSW
0250  F09C       IF  ABT  JUMP.                 EXIT  IF  TEST  PASSES
0251  F0BD       IF  NOT  IRQ  SKIP.            REPEAT  FAILED  TEST
         *                                      IF  IRQ  =  1
0252  4248       MPCR  =  PGENB16  -  1.
0253  F0EF       MIR  =  Z.                     DISP  SING  BIT  ERR  RESULT
0254  F000       WAIT.                        ERROR  E136
         *                                      BIT  IS  ALTERED  BY  BSW
         *                                      MIR  CONTAINS  RESULT
0255  F0C9       JUMP.                          FORCE  STEP  FOR  ERR  OVRID
         *
          ERRSSF.              SHIFT   STORE   CONTROL  ERROR
         *
0256  F0A3       IF  IRQ  EXEC.                 REPEAT  FAILING  TEST        A
         *                                      IF  IRQ  SWITCH  SET         A
0257  F0A4       IF  IRQ  JUMP.                                              A
0258  F0DA       MIR  =  AMPCR.
0259  F000       WAIT.                          DISPLAY  ERROR  ADDRESS
025A  F0DE       MIR  =  A3.
025B  F000       WAIT.                          DISPLAY  SSC  SHIFT  RESULT
025C  F0DD       MIR  =  A2.
025D  F000       WAIT.
025E  F0DB       MIR  =  A1.
025F  F000       WAIT.
0260  F0E1       MIR  =  B.
0261  F000       WAIT.                          FORCE  STEP  FOR  ERR  OVRIDE
0262  F0C9       JUMP.
          PARERR.                                                            A
0263  F0F9       WHEN  RDC  BEX.                                             A
0264  F0FF       0  EQV  B.                                                  A
0265  F09C       IF  ABT  JUMP.                                              A
0266  815E       CPCR  =  ERR  -  1.          ERROR  E141                    A
         *                                      PARITY  ERROR                A
0267  4000       CNST  =  @4000@.             STOP  CODE
          FINISH.
```

MANUAL PROCEDURES

E1

		AGREE	DISAGREE
1	OBSERVE MIR & RECORD VALUE PRESS CLEAR		
2	OBSERVE MIR FOR SAME VALUE	STEP 3	F30
3	NOT ALL 1'S IN A ONLY	TABLE 1	STEP 4
4	NOT ALL 1'S IN B ONLY	TABLE 2	STEP 5
5	NOT ALL 1'S IN C ONLY	TABLE 3	STEP 6
6	NOT ALL 1'S IN D ONLY	TABLE 4	STEP 7
7	NOT ALL 1'S IN A,B ONLY	TABLE 5	STEP 8
8	NOT ALL 1'S IN B,C ONLY	TABLE 6	STEP 9
9	NOT ALL 1'S IN A,D ONLY	TABLE 7	STEP 10
10	NOT ALL 1'S IN A,B,C ONLY	TABLE 8	STEP 11
11	NOT ALL 1'S IN A,B,C,D	TABLE 9	F32

TABLE 1	MIR	FAILURE
	7FFF	F1
	3FFF	F2
	1FFF	F3
	0FFF	F4
	BFFF	F5
	DFFF	F6
	EFFF	F7
	NONE OF ABOVE	F1

TABLE 2	MIR	FAILURE
	FEFF	F8
	FDFF	F9
	FBFF	F10
	F7FF	F11
	F0FF	F12
	NONE OF ABOVE	F13

TABLE 3	MIR	FAILURE
	FFEF	F14
	FFDF	F15
	FFBF	F16
	FF7F	F17
	FF0F	F12
	NONE OF ABOVE	F18

TABLE 4	MIR	FAILURE
	FFFE	F19
	FFFD	F20
	FFFB	F21
	FFF7	F22
	FFF3	F23
	FFF1	F3
	FFF9	F3
	NONE OF ABOVE	F19

TABLE 5	MIR	FAILURE
	00FF	F24
	NONE OF ABOVE	F24

TABLE 6	MIR	FAILURE
	F00F	F12
	NONE OF ABOVE	F12

TABLE 7	MIR	FAILURE
	DFF7	F25
	7FFE	F26
	3FFD	F27
NONE OF ABOVE		F28

TABLE 8	MIR	FAILURE
	000F	F29
NONE OF ABOVE		F29

TABLE 9	MIR	FAILURE
	0003	F30
	0000	F31
NONE OF ABOVE		F32

E2 OBSERVE MIR

MIR	FAILURE
7FFF	F33
3FFF	F30
0FFF	F30
00FF	F30

E3	OBSERVE MIR	AGREE	DISAGREE
1	NOT ALL 0'S IN A ONLY	TABLE 10	STEP 2
2	NOT ALL 0'S IN B ONLY	TABLE 11	STEP 3
3	NOT ALL 0'S ON C ONLY	TABLE 12	STEP 4
4	NOT ALL 0'S IN D ONLY	TABLE 13	STEP 5
5	NOT ALL 0'S IN AD,AB,BC,CD	TABLE 14	F64

TABLE 10	MIR	FAILURE
	C000	F35
	8000	F36
	6000	F37
	4000	F38
	3000	F39
	2000	F40
	1000	F7
NONE OF ABOVE		F41

TABLE 11	MIR	FAILURE
	0C00	F42
	0800	F11
	0600	F43
	0400	F44
	0300	F45
	0200	F9
	0100	F8
NONE OF ABOVE		F47

TABLE 12	MIR	FAILURE
	00C0	F48
	0080	F49
	0060	F50
	0040	F51
	0030	F52
	0020	F15
	0010	F14
NONE OF ABOVE		F53

TABLE 13	MIR	FAILURE
	000C	F54
	0008	F55
	0006	F56
	0004	F56
	0003	F57
	0002	F58
	0001	F59
NONE OF ABOVE		F60

TABLE 14	MIR	FAILURE
	8001	F61
	1800	F62
	0180	F63
	0018	F64

E4	OBSERVE MIR	AGREE	DISAGREE
1	NOT ALL 1'S IN A ONLY	TABLE 15	STEP 2
2	NOT ALL 1'S IN B ONLY	TABLE 16	STEP 3
3	NOT ALL 1'S IN C ONLY	TABLE 17	STEP 4
4	NOT ALL 1'S IN D ONLY	TABLE 18	STEP 5
5	NOT ALL 1'S IN AB,ABCD	TABLE 19	F30

TABLE 15	MIR	FAILURE
	EFFF	F65
	DFFF	F66
	BFFF	F66
	7FFF	F67
	1FFF	F68
NONE OF ABOVE		F69

TABLE 16	MIR	FAILURE
	FEFF	F70
	FDFF	F71
	FBFF	F71
	F7FF	F65
NONE OF ABOVE		F72

TABLE 17	MIR	FAILURE
	FFEF	F73
	FFDF	F74
	FFBF	F74
	FF7F	F70
NONE OF ABOVE		F75

TABLE 18	MIR	FAILURE
	FFFE	F76
	FFFD	F77
	FFFB	F77
	FFF7	F73
NONE OF ABOVE		F78

TABLE 19	MIR	FAILURE
	01FF	F30
	E001	F79
	0001	F80
	0000	F81
NONE OF ABOVE		F120

E5 OBSERVE MIR - DISPLAY IS MICRO ADDRESS OF E#
LOCATE E# AND FORCE STEP ONCE FOR HEX DISPLAY
LOCATE HEX DISPLAY IN MIR LIST FOR E# FAILURE
INSTRUCTION APPLIES TO E10 - E136

E10	OBSERVE	MIR	MIR	FAILURE
			9000	F62
			8001	F82
			4000	F83
			2000	F84
			0800	F85
			0080	F86
			0008	F87
			0002	F88
			0001	F89
			0000	F90
E26	OBSERVE	MIR	MIR	FAILURE
			8400	F91
			8000	F92
			4400	F38
			4000	F93
			2400	F38
			1400	F7
			0C00	F7
			0800	F94
			0600	F44
			0500	F8
			0480	F8
			0440	F16
			0420	F16
			0410	F14
			0408	F14
			0404	F95
			0402	F95
			0401	F96
			0010	F31
			0000	F44
E27	OBSERVE	MIR	MIR	FAILURE
			0600	F43
			0300	F42
			0000	F44
E28	OBSERVE	MIR	MIR	FAILURE
			1100	F39
			0000	F8
E29	OBSERVE	MIR	MIR	FAILURE
			0000	F3
E30	OBSERVE	MIR	MIR	FAILURE
			0000	F16
E31	OBSERVE	MIR	MIR	FAILURE
			0000	F97
E32	OBSERVE	MIR	MIR	FAILURE
			0000	F14
E33	OBSERVE	MIR	MIR	FAILURE
			0000	F14
E34	OBSERVE	MIR	MIR	FAILURE
			0000	F95
E35	OBSERVE	MIR	MIR	FAILURE
			0000	F95
E36	OBSERVE	MIR	MIR	FAILURE
			0000	F98

E37	OBSERVE	MIR	MIR	FAILURE
			8001	F99
			0000	F100
E38	OBSERVE	MIR	MIR	FAILURE
			C000	F101
			0000	F38
E39	OBSERVE	MIR	MIR	FAILURE
			0000	F38
E40	OBSERVE	MIR	MIR	FAILURE
			0000	F7
E41	OBSERVE	MIR	MIR	FAILURE
			0000	F7
E42	OBSERVE	MIR	MIR	FAILURE
			8020	F91
			4020	F66
			2020	F38
			2000	F93
			1020	F65
			0820	F7
			0420	F71
			0220	F44
			0120	F70
			00A0	F8
			0080	F102
			0060	F74
			0030	F73
			0028	F14
			0024	F77
			0022	F95
			0021	F103
			0000	F16
E43	OBSERVE	MIR	MIR	FAILURE
			0030	F16
			0000	F64
E44	OBSERVE	MIR	MIR	FAILURE
			0808	F39
			0000	F14
E45	OBSERVE	MIR	MIR	FAILURE
			0000	F77
E46	OBSERVE	MIR	MIR	FAILURE
			0202	F42
			0000	F95
E47	OBSERVE	MIR	MIR	FAILURE
			0000	F104
E48	OBSERVE	MIR	MIR	FAILURE
			8080	F45
			0000	F105
E49	OBSERVE	MIR	MIR	FAILURE
			0000	F66
E50	OBSERVE	MIR	MIR	FAILURE
			0000	F38

E51	OBSERVE	MIR	MIR	FAILURE
			0000	F65
E52	OBSERVE	MIR	MIR	FAILURE
			0000	F7
E53	OBSERVE	MIR	MIR	FAILURE
			0000	F71
E54	OBSERVE	MIR	MIR	FAILURE
			0000	F44
E55	OBSERVE	MIR	MIR	FAILURE
			0000	F70
E56	OBSERVE	MIR	MIR	FAILURE
			0000	F8
E57	OBSERVE	MIR	MIR	FAILURE
			0000	F74
E58	OBSERVE	MIR	MIR	FAILURE
			8001	F106
			4001	F66
			2001	F66
			1001	F65
			0801	F65
			0401	F71
			0201	F71
			0101	F70
			0081	F70
			0041	F74
			0021	F74
			0011	F73
			0009	F73
			0005	F77
			0003	F77
E59	OBSERVE	MIR	MIR	FAILURE
			8001	F103
E75	OBSERVE	MIR	MIR	FAILURE
			FFFF	F107
E76	OBSERVE	MIR	MIR	FAILURE
			FFFF	F3
			BFFF	F23
			7FFF	F108
E77	OBSERVE	MIR	MIR	FAILURE
			FFFF	F109
			9FFF	F23
			7FFF	F37
			5FFF	F23
			3FFF	F110
E78	OBSERVE	MIR	MIR	FAILURE
			FFFF	F111
			8FFF	F35
			4FFF	F35
			3FFF	F39
			2FFF	F39
			1FFF	F39

E82	OBSERVE	MIR	MIR	FAILURE
			FFFF	F29
			F0FF	F112
			0FFF	F12
			08FF	F42
			04FF	F42
			03FF	F45
			02FF	F45
			01FF	F45
E86	OBSERVE	MIR	MIR	FAILURE
			FFFF	F29
			F00F	F112
			0F0F	F12
			00FF	F12
			00CF	F48
			008F	F48
			004F	F48
			003F	F52
			002F	F52
			001F	F52
E90	OBSERVE	MIR	MIR	FAILURE
			FFFF	F113
			1FFE	F3
			E000	F29
			0000	F114
E91	OBSERVE	MIR	MIR	FAILURE
			FFFE	F115
E92	OBSERVE	MIR	MIR	FAILURE
			FFFE	F3
			FFFC	F116
			FFFA	F23
E93	OBSERVE	MIR	MIR	FAILURE
			FFFE	F3
			FFF8	F117
			FFF4	F118
			FFF2	F23
E94	OBSERVE	MIR	MIR	FAILURE
			FFFE	F119
E98	OBSERVE	MIR	MIR	FAILURE
			FFFE	F29
			FFE0	F12
			FE1E	F12
E102	OBSERVE	MIR	MIR	FAILURE
			FE00	F112
			E1E0	F12
			E01E	F12
E106	OBSERVE	MIR	MIR	FAILURE
			8000	F121
			4000	F122
			1000	F123
			0100	F124
			0080	F125
			0010	F126

			0004	F127
			0002	F128
E107	OBSERVE	MIR	MIR	FAILURE
			8000	F129
			0008	F130
			0001	F131
E108	OBSERVE	MIR	MIR	FAILURE
			2000	F132
			0800	F133
			0080	F133
			0002	F123
E109	OBSERVE	MIR	MIR	FAILURE
			8000	F134
			0400	F129
			0040	F129
E110	OBSERVE	MIR	MIR	FAILURE
			8000	F135
E111	OBSERVE	MIR	MIR	FAILURE
			4000	F136
			2000	F137
			0800	F87
			0080	F138
			0001	F139
E112	OBSERVE	MIR	MIR	FAILURE
			8000	F125
			4000	F87
			0800	F136
E113	OBSERVE	MIR	MIR	FAILURE
			2000	F87
			0080	F137
E114	OBSERVE	MIR	MIR	FAILURE
			0002	F140
E115				F141
E116				F142
E117				F143
E118				F144
E119				F145
E120				F144
E121	OBSERVE	MIR	MIR	FAILURE
			C000	F37
			A000	F37
			8800	F42
			8080	F48
			1000	F146
			0008	F147
			0000	F148
E122	OBSERVE	MIR	MIR	FAILURE
			5000	F62
E123	OBSERVE	MIR	MIR	FAILURE
			3000	F62
			2200	F45
			2020	F52
			0000	F39
E124	OBSERVE	MIR	MIR	FAILURE
			1400	F43
E125	OBSERVE	MIR	MIR	FAILURE
			0C00	F43
			0880	F48
			0808	F54
			0000	F42
E126	OBSERVE	MIR	MIR	FAILURE
			0500	F63
E127	OBSERVE	MIR	MIR	FAILURE
			0300	F63
			0220	F52
			0202	F57
			0000	F45
E128	OBSERVE	MIR	MIR	FAILURE
			0140	F50
E129	OBSERVE	MIR	MIR	FAILURE
			00C0	F50
			0088	F54
E130	OBSERVE	MIR	MIR	FAILURE
			0050	F64
E131	OBSERVE	MIR	MIR	FAILURE
			0030	F64
			0022	F57
E132	OBSERVE	MIR	MIR	FAILURE
			0014	F56
E133	OBSERVE	MIR	MIR	FAILURE
			000C	F56
			0009	F149
E134	OBSERVE	MIR	MIR	FAILURE
			8004	F101
			0005	F99
E135	OBSERVE	MIR	MIR	FAILURE
			8002	F101
			0003	F99
E136	OBSERVE	MIR	MIR	FAILURE
			8001	F101

E137	OPERATOR ACTION	MACHINE ACTION	FAILURE	
	FORCE STEP 4 TIMES (DISPLAY B)			
	OBSERVE MIR FOR ALL ONES	DIGIT A NOT 1,S	F150	
		DIGIT B NOT 1,S	F151	
		DIGIT C NOT 1,S	F152	
		DIGIT D NOT 1,S	F153	
E138	OPERATOR ACTION	MACHINE ACTION		
	FORCE STEP 3 TIMES (DISPLAY A1)		E140-1	
E139	OPERATOR ACTION	MACHINE ACTION		
	FORCE STEP 2 TIMES (DISPLAY A2)		E140-1	
E140	OPERATOR ACTION	MACHINE ACTION	FAILURE	
	FORCE STEP (DISPLAY A3)			
1	OBSERVE MIR FOR ALL ONES	DIGIT A NOT 1,S	F154	B
		DIGIT B NOT 1,S	F155	B
		DIGIT D NOT 1,S	F156	
		DIGIT D NOT 1,S	F157	

E141	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	B711 OBSERVE CONSOLE D IND	D8 ON	2	3	B
	B771 METER PADQ3W (EOERRIND)	100%	2	3	B
2	PARITY ERROR-GO TO FEMT MTR				B
3	EXT BUSS ERROR-PRESS FST TO CONTINUE BSW MTR,EXT BUSS ERROR WILL BE DIAGNOSED IN MCUMTR				B

FAILURE DICTIONARY

F NO.	B711/B771	BOARD LOCATION AND CHIPS	BOARD TYPE
F1	PAFQ3	A5,A3,B5,C5,C3,D5,D3,F5	LU1
	PAFQ6	B3	LU5
	PAFP7	E5	CU2
F2	PAFQ3	A5,A3	LU1
	PAFP7	F5	CU2
F3	PAFQ3	A3	LU1
F4	PAFQ6	F7,F3,F1	LU5
	PAFP7	F5	CU2
F5	PAFQ3	A7,B5	LU1
	PAFQ6	B3	LU5
F6	PAFQ3	A7,C3	LU1
	PAFQ6	D3	LU5
F7	PAFQ3	B7	LU1
	PAFQ6	D3	LU5
F8	PAFQ3	D7	LU1
	PAFQ6	D7	LU5
F9	PAFQ3	C7	LU1
	PAFQ6	D7	LU5
F10	PAFQ3	C7	LU1
	PAFQ6	B7	LU5
F11	PAFQ3	B7	LU1
	PAFQ6	B7	LU5
F12	PAFQ6	F5	LU5
F13	PAFQ3	B7,C7,D7	LU1
	PAFQ6	B7,D7,F5	LU5
F14	PAFQ3	F7	LU1
	PAFQ6	E7	LU5
F15	PAFQ3	E7	LU1
	PAFQ6	E7	LU5

F NO.	B711/B771	BOARD LOCATION AND CHIPS	BOARD TYPE
F16	PAFQ3	E7	LU1
	PAFQ6	C7	LU5
F17	PAFQ3	D7	LU1
	PAFQ6	C7	LU5
F18	PAFQ3	D7,E7,F7	LU1
	PAFQ6	C7,E7	LU5
F19	PAFQ3	C5,D3,E5,E3	LU1
	PAFQ6	E3	LU5
F20	PAFQ3	A3,B5,F3	LU1
	PAFQ6	E3	LU5
F21	PAFQ3	C5,F3	LU1
	PAFQ6	C7,C3	LU5
F22	PAFQ3	C3,F7	LU1
	PAFQ6	C3	LU5
F23	PAFQ3	B5	LU1
F24	PAFQ6	F7,F3	LU5
	PAFP7	F5	CU2
F25	PAFQ3	C3	LU1
F26	PAFQ3	D3	LU1
F27	PAFQ3	B5	LU1
F28	PAFQ3	B5,C3,D3	LU1
F29	PAFQ6	F3	LU5
F30	PAFP7	F5	CU2
F31	PAFP7	C7	CU2
F32	PAFP7	C7,C5	CU2
F33	PAFP7	E5	CU2

F NO.	B711/B771	BOARD LOCATION AND CHIPS	BOARD TYPE
F34	PAFP7	E5,F5	CU2
F35	PAFQ6	B3	LU5
F36	PAFQ3	C5,D5,F5	LU1
	PAFP7	A7	CU2
F37	PAFQ3	A7	LU1
F38	PAFQ3	A7	LU1
	PAFQ6	B3	LU5
F39	PAFQ6	D3	LU5
F40	PAFQ3	A7	LU1
	PAFQ6	D3	LU5
F41	PAFQ3	A7,B7,C5,D5,F5	LU1
	PAFQ6	B3,D3	LU5
	PAFP7	A7	CU2
F42	PAFQ6	B7	LU5
F43	PAFQ3	C7	LU1
F44	PAFQ3	C7	LU1
	PAFQ6	B7	LU5
F45	PAFQ6	D7	LU5
F47	PAFQ3	B7,C7,D7	LU1
	PAFQ6	B7,D7	LU5
F48	PAFQ6	C7	LU5
F49	PAFQ3	D7	LU1
	PAFQ6	C7	LU5
F50	PAFQ3	E7	LU1
F51	PAFQ3	E7	LU1
	PAFQ6	C7,C3	LU5

F NO.	B711/B771	BOARD LOCATION AND CHIPS	BOARD TYPE
F52	PAFQ6	E7	LU5
F53	PAFQ3	D7,E7,F7	LU1
	PAFQ6	C7,C3,E7	LU5
F54	PAFQ6	C3	LU5
F55	PAFQ3	F7	LU1
	PAFQ6	C3	LU5

F NO.	B711/B771	BOARD LOCATION AND CHIPS	BOARD TYPE
F56	PAFQ3	F3	LU1
F57	PAFQ6	E3	LU5
F58	PAFQ3	F3	LU1
	PAFQ6	E3	LU5
F59	PAFQ3	C5,E5,F5	LU1
	PAFQ6	E3	LU5
	PAFP7	A7,C7	CU2
F60	PAFQ3	C5,E5,F7,F5,F3	LU1
	PAFQ6	C3,E3	LU5
	PAFP7	A7,C7	CU2
F61	PAFQ3	C5	LU1
	PAFP7	A7	CU2
F62	PAFQ3	B7	LU1
F63	PAFQ3	D7	LU1
F64	PAFQ3	F7	LU1
F65	PAFQ3	B7	LU1
	PAFQ6	B3	LU5
F66	PAFQ3	A7	LU1
	PAFQ6	E3	LU5
F67	PAFQ3	C3,D5,D3	LU1
	PAFQ6	C3	LU5
	PAFP7	E5	CU2
F68	PAFQ3	A5	LU1
	PAFQ6	F5	LU5
F69	PAFQ3	A7,A5,B7,C3,D5,D3	LU1
	PAFQ6	B3,C3,E3	LU5
	PAFP7	E5,F5	CU2
F70	PAFQ3	D7	LU1
	PAFQ6	B7	LU5
F71	PAFQ3	C7	LU1
	PAFQ6	D3	LU5
F72	PAFQ3	B7,C7,D7	LU1
	PAFQ6	B7,B5,D3	LU5
F73	PAFQ3	F7	LU1
	PAFQ6	C7	LU5
F74	PAFQ3	E7	LU1
	PAFQ6	D7	LU5
F75	PAFQ3	D7,E7,F7	LU1
	PAFQ6	B7,C7,D7	LU5
F76	PAFQ3	A5,C5,D3,E5,E3	LU1
	PAFQ6	C3	LU5
	PAFP7	B5,B1	CU2
F77	PAFQ3	F3	LU1
	PAFQ6	E7	LU5
F78	PAFQ3	A5,C5,D3,E5,E3,F7,F3	LU1
	PAFQ6	C7,C3,E7	LU5
	PAFP7	B5,B1	CU2
F79	PAFQ3	F7	LU1
F80	PAFP7	C7,C5,F5	CU2
F81	PAFP7	B5,B1	CU2
F82	PAFP7	A7	CU2

F NO.	B711/B771	BOARD LOCATION AND CHIPS	BOARD TYPE
F83	PAFP7	B3,E5,F7	CU2
	PAFP1	A3	MU2
F84	PAFP7	C3,D7,F5	CU2
F85	PAFP7	C3,E7,F5	CU2
F86	PAFP7	A3,C3,E7,F5	CU2
	PAFP1	A3	MU2
F87	PAFP7	E7	CU2
F88	PAFP7	A3,C3	CU2
F89	PAFP7	A3	CU2
F90	PAFQ6	F7,F3	LU5
	PAFP7	C3	CU2
F91	PAFQ3	D5	LU1
	PAFQ6	E3	LU5

F NO.	B711/B771 BOARD LOCATION AND CHIPS	BOARD TYPE
F92	PAFP7 A7,A5,C7,C5	CU2
F93	PAFQ6 F7	LU5
	PAFP7 C3,E7,F5	CU2
F94	PAFQ3 A5	LU1
	PAFP7 B3,E5,F7	CU2
F95	PAFQ3 F3	LU1
	PAFQ6 C3	LU5
F96	PAFQ3 E5	LU1
	PAFQ6 E3	LU5
F97	PAFQ3 E7,F7	LU1
	PAFQ6 C7	LU5
F98	PAFQ3 D3,E5,E3	LU1
	PAFQ6 E3	LU5
F99	PAFQ3 E3	LU1
F100	PAFQ3 C3,D5,D3	LU1
	PAFQ6 E3	LU5
F101	PAFQ3 C3,D5	LU1
F102	PAFQ3 A5	LU1
	PAFP7 C3,D7,F5	CU2
F103	PAFQ3 E5	LU1
	PAFQ6 C3	LU5
F104	PAFQ3 D3,E5,E3	LU1
	PAFQ6 C3	LU5
F105	PAFQ3 D5,D3	LU1
	PAFQ6 E3	LU5
F106	PAFQ3 D5	LU1
	PAFQ6 C3	LU5
F107	PAFQ3 A5,A3,B5,D3	LU1
	PAFP7 A7,B1,C5	CU2
F108	PAFQ3 A7,B5	LU1
F109	PAFQ3 A3	LU1
	PAFP7 C5	CU2
F110	PAFQ3 A7,C3	LU1
F111	PAFQ3 F7,F3,F1	LU1
F112	PAFQ6 F1	LU5
F113	PAFQ3 A5,C5,D3,E3	LU1
	PAFP7 B1	CU2
F114	PAFP7 B1	CU2
F115	PAFQ3 A3,B5,F3	LU1
F116	PAFQ3 C5,F3	LU1
F117	PAFQ3 C3,F7	LU1
F118	PAFQ3 C5	LU1
F119	PAFQ6 F7,F5,F3	LU5
F120	PAFQ3 F7	LU1
	PAFP7 B5,B1,C7,C5,F5	CU2
F121	PAFP7 B3,C1	CU2
F122	PAFP7 A3,A1,C7,C1,D3	CU2
F123	PAFP7 D3	CU2
F124	PAFP7 C1,D3,E7	CU2
F125	PAFP7 A3,C5	CU2
F126	PAFP7 C1,E7	CU2
F127	PAFP7 C1,D7,D3	CU2
F128	PAFP7 A5,C1,E3,F7	CU2
F129	PAFP7 C1,D3	CU2
F130	PAFP7 A1,B3,C3,C1,D7,D3,F7	CU2
F131	PAFP7 E3,F7	CU2
F132	PAFP7 D7,D3	CU2

F NO.	B711/B771	BOARD LOCATION AND CHIPS	BOARD TYPE
F133	PAFP7	D3,E7	CU2
F134	PAFP7	C5	CU2
F135	PAFP7	A5,D7,E3,F7	CU2
F136	PAFP7	F7	CU2
F137	PAFP7	D7	CU2
F138	PAFP7	C5,E7	CU2
F139	PAFP7	A3,C7	CU2
F140	PAFP7	D7,F7	CU2
F141	PAFP7	A7,B5,C7,D5,E1	CU2
	PAFQ3	C5,F5	LU1
F142	PAFP7	A7,A5,B5,B1,D5,E1	CU2
F143	PAFQ3	C5,F5	LU1
	PAFP7	A7,D5	CU2
F144	PAFP7	D5	CU2
F145	PAFP7	B5,B1,C7,D5	CU2
F146	PAFQ3	A5	LU1
F147	PAFQ6	F7	LU5
F148	PAFQ3	D3	LU1
	PAFQ6	B3	LU5
	PAFP7	A5	CU2
F149	PAFQ3	E5,E3	LU1
F150	PAFR8	E7	LU2-1
F151	PAFR5	E7	LU2-2
F152	PAFR2	E7	LU2-3
F153	PAFQ9	E7	LU2-4
F154	PAFS1	F3 (B721 LU6-1 F5)	LU3-1
F155	PAFS4	F3 (B721 LU6-2 F5)	LU3-2
F156	PAFS7	F3 (B721 LU7-1 F5)	LU4-1
F157	PAFT0	F3 (B721 LU7-2 F5)	LU4-2
F158	PAFP7	D7,E7,F7	CU2

MCUMTR MEMORY CONTROL UNIT
B 711, B 771 PROCESSOR

```
PROGRAM-ID   MCUMTR.
START.
*
*
*   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*   *                                                          *
*   *    PLACE  MTR/MEM SWITCH  IN  MTR POSITION               *
*   *    PLACE  IRQ/EXT   SWITCH  IN  CENTER  POSITION         *
*   *    LOAD  MCUMTR PROGRAM 1448   6963                      *
*   *    PLACE  LOAD SWITCH  TO NORMAL -  PRESS   CLEAR        *
*   *                                                          *
*   *                          NOTE                            *
*   *                                                          *
*   *    SEE  NOTE ON PAGE  1-014    FOR  B711/B771     DIFFERENCE*
*   *    IF  PROG  GOES  FROM  CLEAR  TO  STEP  2  GO  TO  F66 *
*   *    IF  PROG  GOES  FROM  STEP  1  TO  STEP  3  GO  TO  F60 *
*   *    IF  PROG  FAILS   TO  GO FROM STEP  2  TO  3  GO  TO  E25 *
*   *    ANY  DISAGREEMENT   WITH  INSTRUCTIONS   -  SEE       *
*   *    INCREMENTER   ADDRESS  FOR  FURTHER  ACTIONS          *
*   *                                                          *
*   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*                    OPERATOR  INSTRUCTIONS
*
*  PROG  STEP    INCR       OPERATOR  ACTION
*
*       1        0035       VERIFY  MIR  CONTAINS  CORRECT
*                           MEMORY LIMIT  SETTING
*
*   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*   *                                                          *
*   *              MEM SIZE          MIR  (MEM  LIMIT)         *
*   *                                                          *
*   *                 8K                  2000                 *
*   *                10K                  2800                 *
*   *                12K                  3000                 *
*   *                14K                  3800                 *
*   *                16K                  4000                 *
*   *                18K                  4800                 *
*   *                20K                  5000                 *
*   *                22K                  5800                 *
*   *                24K                  6000                 *
*   *                                                          *
*   *    IF  INCORRECT   -  F72                                *
*   *    IF  DISPLAY  IS  CORRECT                              *
*   *    OBSERVE  D INDICATORS      D = 80    PRESS  FST  ONCE *
*   *                               D = 04    F80              *
*   *                               D = 00    F75              *
*   *                                                          *
*   *                          NOTE                            *
*   *                                                          *
*   *    IF  ANY D INDICATORS   ARE  ON CONTINUOUSLY           *
*   *    CONTINUE  MCUMTR WITHOUT  D IND  VERIFICATION         *
*   *    THEN  REPEAT  MCUMTR AFTER  CONSMTR  IS  RUN          *
*   *                                                          *
*   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*
*       2        00D6       PRESS  RER  THEN  FST
*                           IF  STEP  3  DOESN,T   OCCUR  GO  TO  E25
*
*       3        00D8       VERIFY   FEAC  =  001B
*                               IF  YES  PRESS   FST   ONCE
*                               IF  NO  GO  TO  E25
*
*       4        00DD       VERIFY   CONSOLE  D  INDICATORS   =  84
*                           IF  YES  PRESS   CLEAR-GO   TO  STEP  5
*                           IF  IND  =  04    F75
*                           IF  IND  =  80    E39
*
*       5        0035       CONNECT  A  JUMPER  FROM
*                           PABJ3C   (SMDTM16)    TO
*                           PABJ4C   (LI3DTM17)
*                           PRESS   FST  ONCE
*                           VERIFY   CONSOLE  D  INDICATORS   =  82
*                           IF  YES  PRESS   CLEAR-GO   TO  STEP  6
*                           IF  NO   GO  TO  E40
*
*       6                   REMOVE  JUMPER  FROM  PABJ3C/4C
*                           CONNECT  A  JUMPER  FROM
*                           PADI7Y   (MPM17)    TO  GRD
*                           PRESS   CLEAR
*                           VERIFY   CONSOLE  D  INDICATORS   =  81
*                           IF  YES  GO  TO  STEP  7
*                           IF  NO  GO  TO  E41
*
*       7                   MOVE  JUMPER  FROM  PADI7Y   TO
*                           PAFK2S   (NMN56)    TO  GRD
*                           PRESS   CLEAR
*                           VERIFY   CONSOLE  D  INDICATORS   =  83
*                           IF  YES  REMOVE  JUMPER-END   OF  MCUMT
*                           IF  NO  F98
```

PROGRAM LISTING

```
0000  801B        CPCR = PERTST - 1.          UNIQUE DATA FOR ADDRESS 0
                  *                           GENERATE NANOS TO BE USED
                  *                           BY MU HIGH BITS TEST
0001  2FF8        AMPCR = @2FF8@.
0002  F0C9        JUMP. SA = +1
0003  F0F7        SKIP.
0004  F000        WAIT.
0005  F0F5        SAVE.
0006  F1E7        RETN. SA = +1
0007  3000        AMPCR = @3000@.
0008  F0F7        SKIP.
0009  F05F        B.
000A  F1E7        RETN. SA = +1, +2, +5
000B  6FF6        MPCR = @2FF6@.
000C  0000        AMPCR = 0.
000D  AFFE        CPCR = @2FFE@.
000E  F000        WAIT.
000F  7005        MPCR = @3005@.
0010  F0F7        SKIP.
0011  F000        WAIT.
0012  3009        AMPCR = @3009@.
0013  F0C9        JUMP.
0014  002E        AMPCR = SGC1 - 1.
0015  F09A        EXEC.
0016  F189        IF GC1 STEP ELSE WAIT.
0017  F00C        RESET GC1.
0018  B00E        CPCR = @300E@.
0019  40D7        MPCR = ADRERR - 1.
                  **********
                  DCYCTST.
001A  0102        AMPCR = DPMERR - 1.         FOR MR DATA CYCLE TEST
                  **********
                  QUIT.
001B  CFFF        LIT = @FF@ SAR = 15.        PRESET ADDRESS A TO CFFF
                  **********
                  PERTST.              TEST FOR PARITY OR ADDRESS ERROR
001C  F0F9        WHEN RDC BEX.               ERROR# E34
001D  F0BC        IF NOT GC2 SKIP.            ERROR# E34
                  *                             IF GC2 TEST FOR
                  *                             ILLEGAL ADDRESS
001E  402F        MPCR = ILLADRS - 1.
001F  F05F        B.                 FAILURE  F3
0020  F0FF        0 EQV B.                    ERROR# E33
0021  F0B5        IF NOT ABT SKIP.
0022  404C        MPCR = EXTTST - 1.
0023  F0E1        MIR = B.
0024  F000        WAIT.                       ERROR# E24
                  *                             PAR OR ADDRESS ERROR
                  *                             MIR CONTAINS ERROR CODE
0025  F0E9        MIR = BMAR.
0026  F000        WAIT.                         DISPLAY DPM ERROR ADDRESS
0027  F0DA        MIR = AMPCR.
0028  F000        WAIT.                         DISPLAY MPM ERROR ADDRESS
                  *                             FORCE STEP FOR ERR OVERRIDE
0029  F007        A1 = AMPCR.
002A  F07B        B = 0.                        TEST FOR FIRST PASS THRU
002B  F003        A1 EQV B.
002C  F09D        IF ABT SKIP.
002D  F0C9        JUMP.
002E  406D        MPCR = READ0 - 1.
                  **********
                  SGC1.
002F  F006        SET GC1.                    INST TO BE DONE BY EXEC
                  **********
                  ILLADRS.
0030  F0CB        LIT EQV B.                  ERROR# E36
0031  E004        LIT = 4.
0032  F09D        IF ABT SKIP.
0033  8102        CPCR = DPMERR - 1.          ERROR# E28
                  *                             ILL ADDRS BEX NOT 4
0034  F0E9        MIR = BMAR.
0035  F000        WAIT. PROG STEP 1             OBSERVE MIR FOR MEMORY
                  *                             LIMIT SETTING
                  *                             CHECK FOR CORRECT VALUE
                  *                             PER MEMORY SIZE
0036  F080        B = BMAR. DECODE
0037  F07F        B = B R.
0038  DB00        SAR = 11.
0039  F0CC        LIT - B.
003A  E004        LIT = 4.                      WAS ADR GTR THEN 8K
003B  F0B7        IF NOT AOV SKIP.              SKIP IF YES
003C  40F1        MPCR = SBADJ - 1.             MEMORY IS 8K
003D  F0CC        LIT - B.
003E  C20C        LIT = 12 SAR = 2.             WAS ADR GTR THAN 24K
003F  F09E        IF AOV SKIP.                  IF NO SKIP
0040  F000        WAIT.                         COCKPIT ERROR - START OVER
0041  80E6        CPCR = TSTADRBIT - 1.         TEST 8K ADR BIT
0042  F0CC        LIT - B.
0043  C108        LIT = 8 SAR = 1.              WAS ADR GTR THAN 16K
0044  F0B7        IF NOT AOV SKIP.              IF YES SKIP
0045  4047        MPCR = CONDEC - 1.
0046  80E7        CPCR = TSTADRBIT.             TEST 16K ADR BIT
0047  4095        MPCR = RDTYP2 - 1.
                  **********
                  CONDEC.
0048  F0CC        LIT - B.
0049  E006        LIT = 6.                      WAS ADR GTR THAN 12K
004A  F0B7        IF NOT AOV SKIP.              IF YES SKIP
004B  F018        SET LC1.                      SET BASE ADJ FLAG
                  *                             MEMORY IS 10 OR 12K
004C  4095        MPCR = RDTYP2 - 1.
                  *                   TEST 125 MILLI-SECOND TIMER (EXT)
                  **********
                  EXTTST.
004D  F054        A3 = 0.
004E  0000        AMPCR = 0.                    CLR AMPCR BEFORE SAVE
004F  F0BB        IF NOT GC1 SKIP.              SKIP EXT CLR TST IF LOOPING
0050  4057        MPCR = CEXTTST - 1.
0051  F0A0        IF EXT SKIP.
0052  4057        MPCR = CEXTTST - 1.
0053  F0BA        IF NOT EXT SKIP.
0054  8102        CPCR = DPMERR - 1.          ERROR# E6 EXT = 1
0055  0050        AMPCR = EXTTST + 3.           LOOP RETURN ADDRESS
0056  8102        CPCR = DPMERR - 1.          ERROR# E8 EXT NOT CLEARED
0057  0105        AMPCR = DPMERR + 2.           LOOP RETURN ADDRESS
                  **********
                  CEXTTST.
0058  80DF        CPCR = TIMER - 1.             WAIT FOR 130 MSEC
0059  F0A0        IF EXT SKIP.
005A  8102        CPCR = DPMERR - 1.          ERROR# E12 EXT = 0
005B  0058        AMPCR = CEXTTST.              LOOP RETURN ADDRESS
005C  F0BA        IF NOT EXT SKIP.
005D  8102        CPCR = DPMERR - 1.          ERROR# E14
                  *                             EXT NOT RESET BY TEST
005E  005B        AMPCR = CEXTTST + 3.          LOOP RETURN ADDRESS
                  **********
                  WFNEXT.
005F  F0A0        IF EXT SKIP.
0060  405E        MPCR = WFNEXT - 1.
0061  F0CA        LCTR.
0062  E0F4        LIT = @F4@.                   0B INVERTED
0063  F05A        A3 = Z.
0064  E0E3        LIT = @E3@.
0065  F05F        B.
```

```
0066  80DF        CPCR = TIMER - 1.
0067  F0BA        IF NOT EXT SKIP.
0068  8102        CPCR = DPMERR - 1.      ERROR# E16  EXT EARLY
0069  005E        AMPCR = WFNEXT - 1.
006A  F05F        B.                      FILLER
006B  F0A0        IF EXT SKIP.
006C  8102        CPCR = DPMERR - 1.      ERROR# E20  EXT LATE
006D  005E        AMPCR = WFNEXT - 1.
              READ0.              READ MPM LOCATION 0 & VERIFY CONTENT
006E  F0CA        LCTR.
006F  E07F        LIT = @7F@.
0070  F05A        A3 = Z.                 SET A3 = ADDRESS 0
0071  E01B        LIT = @1B@.             DATA = 801B
0072  F07B        B = B000.               SET MAR = 0
0073  F0D5        MAR1 = B.
0074  F0F1        MR1.                    READ MEM
0075  F0F9        WHEN RDC BEX.
0076  F03C        A3 EQV B.
0077  F09D        IF ABT SKIP.
0078  8102        CPCR = DPMERR - 1.      ERROR# E2 READ ADDRESS 0
              *                           B CONTAINS READ RESULTS
0079  006D        AMPCR = READ0 - 1.      LOOP RETURN ADDRESS
              *                     DATA  MEMORY ADDRESS TEST
              *                           DO 13 READS WITH 1 ADDRESS
              *                           BIT SET. VERIFY ADDRESS 0
              *                           IS NOT ACCESSED
007A  F0CA        LCTR.
007B  C1EF        LIT = @EF@ SAR = 1.     START AT 4K BIT
007C  F115        A1 = Z.
007D  E000        LIT = 0.
              **********
              MARTEST.
007E  F0D0        MAR1 = A1.
007F  F0F1        MR1.                    READ MEM
0080  F0F9        WHEN RDC BEX.
0081  F03C        A3 EQV B.
0082  F0B5        IF NOT ABT SKIP.
0083  8102        CPCR = DPMERR - 1.      ERROR# E4 MEM ADDRESS BIT= 0
0084  0079        AMPCR = MARTEST - 5.    LOOP RETURN ADDRESS
0085  F00D        A1 = A1 R.              CHANGE ADDR TO NXT LOW BIT
0086  F066        B = A1.
0087  F0FF        0 EQV B.
0088  F09D        IF ABT SKIP.
0089  407D        MPCR = MARTEST - 1.
008A  F0F6        SET GC2.        TEST FOR ILLEGAL ADDRESS DETECTION
008B  F077        B = B001.
008C  F07C        B = B L.
008D  D500        SAR = 5.                START AT 2K
008E  F033        A2 = B.                 INCR VALUE 2K
008F  F0F5        SAVE.
0090  F0D5        MAR1 = B.               ERROR# E37
0091  F0F1        MR1.
0092  F06B        B = A2 + B.             ADD 2K TO ADDR
0093  F0B6        IF NOT AOV JUMP.        ERROR# E38
0094  8102        CPCR = DPMERR - 1.      ERROR# E30
              *                           NO ILLEGAL ADDRESS
0095  008A        AMPCR = RDTYP2 - 12.
              **********
              RDTYP2.
0096  F0CF        MAR1 = AMPCR.           READ ADDR OF TYP2 INSTRUCT
0097  001A        AMPCR = DCYCTST.        TEST INST IS NOT EXECUTED
0098  F0F1        MR1.
0099  009C        AMPCR = PARTST - 3.
009A  F0F9        WHEN RDC BEX.
009B  F091        CALL.                   ERROR# E10
              *                           NO TYPE 1 CODE ON DATACYCL
009C  0095        AMPCR = RDTYP2 - 1.     LOOP RETURN ADDRESS
              *                   PARITY GENERATION TEST
009D  F0CF        MAR1 = AMPCR.
009E  001B        AMPCR = QUIT.
              **********
              PARTST.             WRITE ALL DATA PATTERNS IN MEMORY
009F  F07B        B = B000.
00A0  F0E1        MIR = B.
00A1  F0F3        MW1.
00A2  F051        A3 = B.                 COMPLETE LAST INSTRUCTION
00A3  F0F1        MR1.
00A4  F0F1        MR1.
00A5  F0F9        WHEN RDC BEX.
00A6  F03C        A3 EQV B.
00A7  F09D        IF ABT SKIP.
00A8  8102        CPCR = DPMERR - 1.      ERROR# E22 MEM RD/WRT ERROR
              *                           A3 CONTAINS EXPECTED DATA
              *                           B CONTAINS INCORRECT DATA
00A9  009F        AMPCR = PARTST.         LOOP RETURN ADDRESS
00AA  F149        B = A3 + 1.
00AB  F0FF        0 EQV B.
00AC  F09D        IF ABT SKIP.
00AD  409F        MPCR = PARTST.
00AE  F0F1        MR1.          MEMORY DEVICE TEST
00AF  F08F        BR2 = LIT L.
00B0  C80F        LIT = @0F@ SAR = 8.
00B1  00B2        AMPCR = CMDTST - 2.                                   B
00B2  F1B1        IF SRQ DW2 JUMP.
00B3  E098        LIT = @98@.             CALL DW2 NANO
              **********
              CMDTST.
00B4  F0F9        WHEN RDC BEX.
00B5  F0FF        0 EQV B.
00B6  F0B5        IF NOT ABT SKIP.
00B7  8102        CPCR = DPMERR - 1.      ERROR# E26  EXTOP = 1
00B8  00AD        AMPCR = CMDTST - 7.     LOOP RETN ADDRESS             B
00B9  4113        MPCR = MEMSTRBTST - 1.                                B
00BA  E0E0        LIT = @E0@.
00BB  F0A8        IF LC1 SET LC1 SKIP.
00BC  E0D0        LIT = @D0@.
00BD  F0CA        LCTR.
00BE  F128        A2 = Z.
00BF  E0F6        LIT = @F6@.
              *                 WRITE INSTRUCTIONS INTO HIGH ADDRSES
              *                       READ 25 INSTRUCTION FROM MEM    B
              *                       STARTING AT ADDRESS 0001        B
              *                       WRITE THEM AT STARTING ADDRS    B
              *                       ACCORDING TO MEM SIZE           B
              *                           IF 8K          0FF7         B
              *                           IF 10 OR 12K   1FF7         B
              *                           IF 14K OR GTR  2FF7         B
00C0  F10F        A1 = 0.
00C1  F0CA        LCTR.
00C2  E01A        LIT = @1A@.             DO 25 READ/WRITES
              **********
              MEMWRT.
00C3  F012        A1 = A1 + 1.
00C4  F02A        A2 = A2 + 1.
00C5  F030        INC.
00C6  F0B8        IF NOT COV SKIP.
00C7  40D0        MPCR = PHALT - 6.
00C8  F0D0        MAR1 = A1.
00C9  F0F1        MR1.
00CA  F0F9        WHEN RDC BEX.
00CB  F0A7        IF LC1 SET LC1 ELSE SKIP.
00CC  80F4        CPCR = BASADJ - 1.
00CD  F0E1        MIR = B.
00CE  F0D1        MAR1 = A2.
00CF  F0F3        MW1.
00D0  40C2        MPCR = MEMWRT - 1.
00D1  0FFF        AMPCR = @0FFF@.
00D2  F015        IF LC2 SKIP.
```

```
00D3  1FFF          AMPCR = @1FFF@.
00D4  F014          IF  LC1  SKIP.
00D5  2FFF          AMPCR = @2FFF@.
                  **********
                   PHALT.
00D6  F000          WAIT.                          PROG STEP  2                    B
                  *                                FE ACTION  REQUIRED
                  *                                PRESS  RER TO RESET
                  *                                CLOCK  COUNT (FEAC)
                  *                                THEN FORCE  STEP
                  *                                IF  INCR  DOES  NOT GO TO 00D8  B
                  *                                RE-RUN  MTR -  WHEN 2ND  WAIT
                  *                                (PROG  STEP  2)  OCCURS GO      B
                  *                                TO SINGLE  CLOCK  &  SINGLE
                  *                                STEP  THROUGH PROGRAM.
                  *                                CHECK  INCR  AGAINST  NORMAL
                  *                                INSTRUCTION  SEQUENCE
                  *                                OBSERVE  SEQUENCE  ERROR  THEN
                  *                                FIND  IT  IN  FAILURE  DICTION
                  *                                SEE  E25
00D7  F0C9          JUMP.
                  *                  GO TO 'TEST  HIGH  ORDER  MU BITS'
                  *                                NEXT ADDRESS  DEPENDS  ON
                  *                                MEMORY SIZE
                  *                        8K      1000
                  *                  10/12K        2000
                  *              14K  OR  GTR      3000
                  *
                  *
                  *
                  *
                  **********
                   ADRERR.              GENERATE  2ND  ADDR  ERROR
00D8  F000          WAIT.                          PROG STEP  3                    B
                  *                                PROGRAM HALT
                  *                                FE ACTION  REQUIRED
                  *                                VERIFY  FE  ADDRESS  CTR
                  *                                FEAC  =  001B
                  *
                  *                                IF  YES  FORCE  STEP
                  *                                IF  NO GO TO  E25               B
00D9  F153          B = B101.
00DA  F0D5          MAR1 = B.
00DB  F0F1          MR1.
00DC  F05F          B.
00DD  F05F          B.                             END OF  MCUMTR -  NO ERRORS
                  *                                NOTE -  CONSOLE  D INDIC  = 84
                  *                                IF  ERROR IND  NOT ON F75
00DE  F000          WAIT.                          ERROR
                  *                                (CLOCK  NOT STOPPED)  F87
00DF  F0C9          JUMP.
                  **********
                   TIMER.
00E0  F0DA          MIR = AMPCR.
00E1  F0F5          SAVE.
00E2  F04C          A3  =  A3  +  1.
00E3  F0B4          IF  NOT ABT  JUMP.
00E4  F08D          BMI.
00E5  F05B          AMPCR = B.
00E6  F0C9          JUMP.
                  **********
                   TSTADRBIT.
00E7  F0E1          MIR = B.                       SAVE  ILLEGAL  ADDRESS
00E8  F153          B = B101.
00E9  F1C2          MAR1 = B  R.
00EA  F05F          B.                                                             F
00EB  F0F1          MR1.
00EC  F0F9          WHEN RDC  BEX.
00ED  F03C          A3  EQV  B.                ERROR       F108
                  *                                (8  OR  16K  BIT  GIVES  AD  ER)
```

```
00EE  F0B5          IF  NOT ABT  SKIP.
00EF  8102          CPCR = DPMERR -  1.      ERROR       F69
                  *                                (8K  OR  16  K ADDRS BIT  =0)
00F0  F08D          BMI.                           RESTORE  ILLEGAL  ADDRESS
00F1  F0C9          JUMP.
                   SBADJ.
00F2  F019          SET  LC2.                      SUBT  8K
00F3  FQ18          SET  LC1.                      DO BASE  ADJ
00F4  4095          MPCR = RDTYP2  -  1.
                  **********
                   BASADJ.
00F5  F053          A3  =  B  R.
00F6  CD07          LIT  =  7  SAR  =  13.
00F7  F03B          A3.                      IF  BIT  3=0  SKIP  BASE  ADJUST
00F8  F0C2          IF  NOT LST  JUMP.
00F9  F03E          A3  EQV  LIT.                  TEST  FOR TYPE  1
00FA  F09C          IF  ABT  JUMP.
00FB  F051          A3  =  B.
00FC  F153          B  =  B101.
00FD  D200          SAR  =  2.                     SUBT  8K
00FE  F0AC          IF  LC2  SET  LC2  SKIP.
00FF  D300          SAR  =  3.                     SUBT  4K
0100  F07F          B  =  B  R.
0101  F070          B  =  A3  -  B.
0102  F0C9          JUMP.
                  **********
                   DPMERR.
0103  F18E          IF  IRQ  SKIP.                 REPEAT  FAILED  TEST
                  *                                IF  IRQ  =  1
0104  4106          MPCR = DPMERR  +  3.
0105  F09A          EXEC.
0106  F0C9          JUMP.
0107  F0DA          MIR = AMPCR.
0108  F000          WAIT.                          DISPLAY  ERROR  ADDRESS
                  *                                OBSERVE  MIR -  MICRO  ADDRES
                  *                                OF  E#.
0109  F0E1          MIR = B.                       DISPLAY  B
                  *                                SEE  ERROR  ADDRESS  FOR
                  *                                CONTENTS  OF  B
010A  F000          WAIT.
010B  F0DE          MIR = A3.                      DISPLAY  EXPECTED
                  *                                MEMORY READ  DATA
010C  F000          WAIT.
010D  F0DD          MIR = A2.                      DISPLAY  MPCR VALUE  OF
                  *                                PARITY  ERROR  OR  ADDRESS
                  *                                ERROR
                  *                      NOTE:IF  ERROR WAS NOT PARITY
                  *                                ERROR  OR  ADDRESS  ERROR
                  *                                IGNORE  A2
010E  F000          WAIT.
010F  F0DB          MIR = A1.                      DISPLAY  DATA MEMORY ADDRES
                  *                                OF  PARITY  ERROR  OR  ADDRESE
                  *                                ERROR
0110  F000          WAIT.
0111  F0E9          MIR = BMAR.                                                    B
0112  F000          WAIT.                          DISPLAY  ADDRS  OF  PE          B
0113  F0C9          JUMP.                          ERROR  OVER-RIDE
                   MEMSTRBTST.                                                    B
0114  F0F9          WHEN RDC  BEX.     2ND  BEX  SHOULD  NOT CAUSE  EOMDSB         B
0115  F0FF          0  EQV  B.                                                     B
0116  F09D          IF  ABT  SKIP.                                                 B
0117  8102          CPCR = DPMERR -  1.            FAILURE  F118  STROBE  NOT      B
                  *                                                RESET  BY BEX  B
0118  00AD          AMPCR = CMDTST  -  7.          LOOP  RETN  ADDRESS             B
0119  F0F1          MR1.                                                           B
011A  F05F          B.                                                             B
011B  F05E          ASR.                 ASR  SHOULD  RESET  STROBE                B
011C  F0F9          WHEN RDC  BEX.                                                 B
011D  F05F          B.                                                             B
011E  F0B5          IF  NOT ABT  SKIP.                                             B
011F  8102          CPCR = DPMERR -  1.            FAILURE  F115  STROBE  NOT      B
```

```
          *                                              RESET   BY  N51        B
0120  0118       AMPCR  =  MEMSTRBTST   + 4.    LOOP  RETN  ADDRESS             B
0121  F0E8       MIR  =  B111.                                                  B
0122  F0F3       MW1.                                                           B
0123  F05E       ASR.       RESET  NB52                                         B
0124  F0F9       WHEN RDC  BEX.                                                 B
0125  F0FF       0  EQV  B.                                                     B
0126  F09D       IF  ABT  SKIP.                                                 B
0127  8102       CPCR  =  DPMERR  -  1.        FAILURE  F117   STRB  ON WRITE   B
0128  0118       AMPCR  =  MEMSTRBTST   + 4.    LOOP  RETN  ADDRESS             B
0129  E0F0       LIT   =  @F0@.                                                 B
012A  F0AC       IF  LC2  SET  LC2  SKIP.                                       B
012B  40B9       MPCR  =  CMDTST  +  5.                                         B
012C  40BA       MPCR  =  CMDTST  +  6.                                         B
          *                     TEST   HIGH  ORDER  MU BITS   FOR  1'S
          *
          *  NORMAL INSTRUCTION   SEQUENCE  (MEM  IS   8K  )
          *    00D7  -  1000  -  1001  -  0FF7  -  0FF8  -  0FF9  -  0FFB
          *    0FFC  -  0FFD  -  0FFE  -  1000  -  1002  -  1003  -  0FFF
          *    1000  -  1005  -  1006  -  1008  -  1009  -  100A  -  100B
          *    002F  -  100C  -  100D  -  100E  -  100F  -  00D8
          *
          *MICRO    MICRO
          *ADDRS    CODE
          *
          *0FF7     0FF8          AMPCR  =  @0FF8@.    TEST   AMPCR  HIGH  BITS
          *0FF8     F0C9          JUMP.     SA  =  +1  TEST   A  +  1  HIGH  BITS
          *0FF9     F0F7          SKIP.                TEST   M  +  2  HIGH  BITS
          *0FFA     F000          WAIT.                FILLER
          *0FFB     F0F5          SAVE.                TEST   SAVE  HIGH  BITS
          *0FFC     F1E7          RETN.     SA  =  +1  TEST   A  +  2  HIGH  BITS
          *0FFD     1000          AMPCR  =  @1000@.
          *0FFE     F0F7          SKIP.                TEST   M  +  2  CARRIES
          *0FFF     F05F          B.                   TEST   M  +  1  CARRIES
          *1000     F1E7          RETN.     SA  =  +1,  +2,   +5
          *                                            TEST   A  +  2  CARRIES
          *1001     4FF6          MPCR  =  @0FF6@.     TEST   MPCR  HIGH  BITS
          *1002     0000          AMPCR  =  0.
          *1003     8FFE          CPCR  =  @0FFE@.     SAVE   BIT   0
          *1004     F000          WAIT.                FILLER
          *1005     5005          MPCR  =  @1005@.     TEST   MPCR  BIT   0
          *1006     F0F7          SKIP.                TEST   M  +  2
          *1008     1009          AMPCR  =  @1009@.
          *1007     F000          WAIT.
          *1009     F0C9          JUMP.                TEST   A  +  1
          *100A     002E          AMPCR  =  SGC1  -  1.
          *100B     F09A          EXEC.
          *100C     F189          IF  GC 1  STEP  ELSE  WAIT.
          *100D     F00C          RESET  GC1.          PREP  FOR  NANO  OOE
          *100E     900F          CPCR  =  @100E@.     TEST   TYPE  2  DECODE
          *100F     40D7          MPCR  =  ADRERR  -  1.
          *
          *  NORMAL INSTRUCTION   SEQUENCE  (MEM  IS   10K  OR  12K)
          *    00D7  -  2000  -  2001  -  1FF7  -  1FF8  -  1FF9  -  1FFB
          *    1FFC  -  1FFD  -  1FFE  -  2000  -  2002  -  2003  -  1FFF
          *    2000  -  2005  -  2006  -  2008  -  2009  -  200A  -  200B
          *    002F  -  200C  -  200D  -  200E  -  200F  -  00D8
          *
          *MICRO    MICRO
          *ADDRS    CODE
          *
          *1FF7     1FF8          AMPCR  =  @1FF8@.    TEST   AMPCR  HIGH  BITS
          *1FF8     F0C9          JUMP.     SA  =  +1  TEST   A  +  1  HIGH  BITS
          *1FF9     F0F7          SKIP.                TEST   M  +  2  HIGH  BITS
          *1FFA     F000          WAIT.                FILLER
          *1FFB     F0F5          SAVE.                TEST   SAVE  HIGH  BITS
          *1FFC     F1E7          RETN.     SA  =  +1  TEST   A  +  2  HIGH  BITS
          *1FFD     2000          AMPCR  =  @2000@.
          *1FFE     F0F7          SKIP.                TEST   M  +  2  CARRIES
          *1FFF     F05F          B.                   TEST   M  +  1  CARRIES
          *2000     F1E7          RETN.     SA  =  +1,  +2  +5
```

```
*                                               TEST   A  +  2  CARRIES
*2001     5FF6          MPCR  =  @1FF6@.        TEST   MPCR  HIGH  BITS
*2002     0000          AMPCR  =  0.
*2003     9FFE          CPCR  =  @1FFE@.        SAVE   BIT   X
*2004     F000          WAIT.                   FILLER
*2005     A005          MPCR  =  @2005@.        TEST   MPCR  BIT   X
*2006     F0F7          SKIP.                   TEST   M  +  2
*2007     F000          WAIT.
*2008     2009          AMPCR  =  @2009@.
*2009     F0C9          JUMP.                   TEST   A  +  1
*200A     002E          AMPCR  =  SGC1  -  1.
*200B     F09A          EXEC.
*200C     F189          IF  GC1  STEP   ELSE  WAIT.
*200D     F00C          RESET  GC1.             PREP   FOR  NANO  00E
*200E     A00E          CPCR  =  @200E@         TEST   TYPE  2  DECODE
*200F     40D7          MPCR  =  ADRERR  -  1.
*
*  NORMAL INSTRUCTION   SEQUENCE  (MEM  IS  14K  OR  MORE)
*    00D7  -  3000  -  3001  -  2FF7  -  2FF8  -  2FF9  -  2FFB
*    2FFC  -  2FFD  -  2FFE  -  3000  -  3002  -  3003  -  2FFF
*    3000  -  3005  -  3006  -  3008  -  3009  -  300A  -  300B
*    002F  -  300C  -  300D  -  300E  -  300F  -  00D8
*
*MICRO    MICRO
*ADDRS    CODE
*
*2FF7     2FF8          AMPCR  =  @2FF8@.       TEST   AMPCR  HIGH  BITS
*2FF8     F0C9          JUMP.     SA  =  +1     TEST   A  +  1  HIGH  BITS
*2FF9     F0F7          SKIP.                   TEST   M  +  2  HIGH  BITS
*2FFA     F000          WAIT.                   FILLER
*2FFB     F0F5          SAVE.                   TEST   SAVE  HIGH  BITS
*2FFC     F1E7          RETN.     SA  =  +1     TEST   A  +  2  HIGH  BITS
*2FFD     3000          AMPCR  =  @3000@.
*2FFE     F0F7          SKIP.                   TEST   7  +  2  CARRIES
*2FFF     F05F          B.                      TEST   M  +  1  CARRIES
*3000     F1E7          RETN.     SA  =  +1,    +2,   +5
*                                               TEST   A  +  2  CARRIES
*3001     6FF6          MPCR  =  @2FF6@.        TEST   MPCR  HIGH  BITS
*3002     0000          AMPCR  =  0.
*3003     AFFE          CPCR  =  @2FFE@.        SAVE   BIT   X  &  0
*3004     F000          WAIT.                   FILLER
*3005     7005          MPCR  =  @3005@.        TEST   MPCR  BIT   X  &  0
*3006     F0F7          SKIP.                   TEST   M  +  2
*3007     F000          WAIT.
*3008     3009          AMPCR  =  @3009@.
*3009     F0C9          JUMP.                   TEST   A  +  1
*300A     002E          AMPCR  =  SGC1  -  1.
*300B     F09A          EXEC.
*300C     F189          IF  GC1  STEP   ELSE  WAIT.
*300D     F00C          RESET  GC1.             PREP   FOR  NANO  00E
*300E     B00E          CPCR  =  @300E@.        TEST   TYPE  2  DECODE
*300F     40D7          MPCR  =  ADRERR  -  1.
*
*
*
*
*****
*  NOTE  FOR  B771
*      WHEN REFERENCE  IS  MADE TO CONSOLE  D INDICATORS
*      THE VALUE GIVEN  FOR THE LEAST  SIGNIFICANT    DIGIT
*      APPLIES   TO THE SPO  ERROR INDICATORS
*      ( UPPER  IND  IS  MSB )
*      THE VALUE GIVEN  FOR THE MOST SIGNIFICANT    DIGIT
*      SHALL  REFER  TO THE STATE  OF TERM PADQ3W  (EOERRIND)
*      (WHICH  IS  CONSOLE  ERROR  D8  IND)
*      WHICH  MUST BE CHECKED  BY  METER  OR SCOPE.
*      FOR  A  VALUE  OF  '0'   (IND   OFF)   PADQ3W  =  LOW  (0%)
*      FOR  A  VALUE  OF  '8'   (IND   ON)    PADQ3W  =  HIGH  (100%)
```

MANUAL PROCEDURES

	OPERATOR ACTION	MACHINE ACTION	A	D	
E2	SET IRQ/EXT SW TO IRQ PRESS CLEAR				D
1	METER PADJ3B (CDSCLKA)	1.5-3.0 %	1A	F1	D
1A	METER PADQ4E (EOB51)	0%	2	F113	B
2	METER PADI8W (SMDATCY)	4-8%	4	2A	B
2A	METER PADQ4M (EODATCY)	4-8%	F121	3	B
3	METER FPPADQ4B(FRONT PLANE)	95 - 99 %	F2	F3	F
4	METER PADQ4Q (EOWRITE/)	100 %	6	5	F
5	METER PADQ3H (EOB52)	0 %	F64	F65	F
6	METER PADQ3Q (EOINHSP/)	93 - 97 %	7	F4	F
7	METER PADQ3P (EOFORT2/)	93 - 97 %	8	F4	E
8	METER PADQ4L (EOMDSB)	12 - 14 %	9	F5	E
9	SET NORM/SGL SW TO SGL ; PRESSING SGL PUSHBUTTON ADVANCE INCREMENT UNTIL WAIT LIGHT IS ON		10		E
10	METER PADI8T (SMADR16/)	100 %	11	F66	
11	METER PADI7U (SMADR15/)	100 %	12	F66	
12	METER PADI7V (SMADR14/)	100 %	13	F66	
13	METER PADI8U (SMADR13/)	100 %	14	F66	
14	METER PADI7E (SMADR12/)	100 %	15	F67	
15	METER PADI8E (SMADR11/)	100 %	16	F67	
16	METER PADI8D (SMADR10/)	100 %	17	F67	
17	METER PADI8F (SMADR09/)	100 %	18	F67	
18	METER PADI5V (SMADR08/)	100 %	19	F68	
19	METER PADI4W (SMADR07/)	100 %	20	F68	
20	METER PADI5R (SMADR06/)	100 %	21	F68	
21	METER PADI5Q (SMADR05/)	100 %	22	F68	B
22	METER PADQ4Q (SMADR04/)	100 %	23	F69	B
23	METER PADI5P (SMADR03/)	100 %	24	F69	B
24	METER PADI5H (SMADR02/)	100 %	25	F69	B
25	METER PADI4N (SMADR01)	0 %	26	F69	B
26	METER PADI4H (SMADR01/)	100 %	27	F69	
27	SET NORM/SGL SW TO NORM RETURN IRQ/EXT SW TO CENTER PRESS CLEAR FORCE STEP - OBSERVE & NOTE MIR				
28	A NOT 8		F6 F13	29	A
29	B NOT 0		F8 F11	30	A
30	C NOT 1		F10 F9	F12 F13	A

	OPERATOR ACTION	MACHINE ACTION	A	D	
E4					
1	FORCE STEP 4 TIMES & OBSERVE MIR				
2	A NOT 0		F69	3	
3	B NOT 0		F68	4	
4	C NOT 0		F67	F66	
E6	SET IRQ SWITCH TO IRQ PRESS CLEAR METER PADI5C (CUREXT/)	82 - 85 %	F30 F32 F52	F35	
E8		F33			
E10		F63			

	OPERATOR ACTION	MACHINE ACTION	A	D	
E12					
1	SET IRQ SWITCH TO IRQ PRESS CLEAR METER PADI4B (CDSCLKA)	3 - 5 %	2	F76	
2	METER PADI5C (CUREXT/)	5 - 40%	3	F35	
3	SCOPE PADI4C (SMEXT/)	NEG 2-6 US:125 MS PER	F32	F34	
E14		F33 F35			B B
E16		F36			B
E20		F37			

	OPERATOR ACTION	MACHINE ACTION	A	D	
E22					
1	SET IRQ SWITCH TO IRQ PRESS CLEAR PRESS FST ONCE METER PADQ4L (EOMDSB)	4 - 6 %	2	F20	
2	METER PADQ4Q (EOWRITE/)	93 - 97 %	3	F21	D
3	SET IRQ SWITCH TO CENTER THEN PRESS FST		4	4	D
4	ALL 1,S IN MIR		F29	5	D

5	NOTE MIR (ACTUAL MEMORY DATA) THEN PRESS FST				5	5	D D D D D D
6	NOTE MIR (EXCEPTED MEMORY DATA)				7	7	D
7	DIFFERENCE BETWEEN STEP 5 & STEP 6 IN	BIT	16	F22 F100	8		
8		BIT	15	F23 F100	9		
9		BIT	14	F23 F101	10		
10		BIT	13	F23 F101	11		
11		BIT	12	F24 F102	12		
12		BIT	11	F24 F102	13		
13		BIT	10	F24 F103	14		
14		BIT	9	F24 F103	15		
15		BIT	8	F25 F104 F26	16		
16		BIT	7	F25 F26 F104	17		
17		BIT	6	F25 F26 F105	18		
18		BIT	5	F25 F26 F105	19		
19		BIT	4	F27 F106	20		
20		BIT	3	F27 F106	21		
21		BIT	2	F27 F107	22		
22		BIT	1	F27 F107	F28		

E24

1	B711 OBSERVE CONSOLE D8 IND B771 METER PADQ3W (EOERRIND)	IND ON 100%		2 2	3A 3A	D D D D D D
2	OBSERVE MIR	MIR = 0001 MIR = 0003 MIR = 0004	OR 0002	3 4 F108		D

3	MEMORY PARITY ERROR,GO TO FEMT MTR				D D D
3A	REMOVE SC1 CARD AT PAFK5 (IF SC1 NOT USED GO TO STEP 5) THEN RE-RUN MTR	ERROR RECURS	3B	F120	D D D D
3B	RE-INSTALL SC1 CARD : GO TO STEP 5				D
4	NPM PARITY ERROR GO TO FEMT MTR				
5	OBSERVE MIR	MORE THAN 1 BIT SET	F5	6	
6	OBSERVE MIR	BIT 1 OR 2 SET BIT 3 OR 4 SET BIT 5 OR 6 SET BIT 7 OR 8 SET BIT 9 OR 10 SET BIT 11 OR 12 SET BIT 13 OR 14 SET BIT 15 OR 16 SET		F107-F109 F106-F109 F105-F110 F104-F110 F103-F111 F102-F111 F101-F112 F100-F112	

E25

	NOTE-IF CONSOLE INDICATORS INDICATE MPM OR NANO PARITY ERROR GO TO FEMT MTR & TEST UPPER MODULE	B B B
1	RESTART MTR	
2	WHEN PROGRAM HALT 2 OCCURS SET SGL SWITCH TO SGL HOLDING FST,PRESS SGL PUSHBUTTON	
3	PRESSING SGL PUSHBUTTON SINGLE STEP THRU PROGRAM CHECKING INCR AGAINST NORMAL INSTRUCTION SEQUENCE IN PROG LISTING OBSERVE SEQUENCE ERROR	
4	FIND SEQUENCE ERROR IN FOLLOWING LIST * * * VALUES LISTED UNDER 'INCR' & * 'SEQUENCE ERROR' ARE FOR 14K * OR 16K MEMORY * FOR 8K - CHANGE MOST SIG DIG * FROM 2 TO 0 * FROM 3 TO 1 * * FOR 10K OR 12K * FROM 2 TO 1 * FROM 3 TO 2	

INCR	SEQUENCE ERROR	FAILURE NO.
002F	002F/000D	F70
00D7	00D7/0000	F58
	00D7/1000	F39
	00D7/2000	F40 F41
2FF7	2FF7/0FF8	F46
2FF8	2FF8/3FF9	F56

2FF9	2FF9/0FFB	F47
2FFC	2FFC/0FFD	F77
2FFC	2FFC/3FFD	F48 F44
2FFE	2FFE/0000	F49 F53
	2FFE/1000	F49
	2FFE/2000	F49 F53 F54
2FFF	2FFF/0000	F55
	2FFF/1000	F55
	2FFF/2000	F55 F57

INCR	SEQUENCE ERROR	FAILURE NO.
3000	3000/0001	F42
	3000/0005	F61
	3000/1001	F43
	3000/1004	F61
	3000/2001	F44 F48
	3000/2002	F50
	3000/2003	F51
3001	3001/0FF7	F62
	3001/3FF7	F45
	3002/2003	F78 F54
3002	3002/2005	F78
3005	HALTED	F99
3005	3005/2006	F45
3006	3006/3008	F49
3009	3009/300A	F38
300B	300B/102F	F54
	300B/202F	F60
300C	WAIT	F61
300E	300E/002F	F99
300E	300E/302F	F99

*

E26	OPERATOR ACTION	MACHINE ACTION	A	D	B B B B
1	PRESS CLEAR AND SCOPE PADQ3G (CUEXTOP)	PULSES	2	F114	B B B B B
	NOTE SIGNALS ARE PRESENT FROM RELEASE OF CLEAR UNTIL PROG STEP 1 ONLY REPEAT AS REQUIRED				B B B B B B B B B
2	SCOPE PADP8Q (PSSRQ/)	HIGH LEVEL	F31	3	B B B B
3	ERROR-SRQ IS SET SET IRQ SWITCH TO CENTER PRESS FST 6 TIMES TO OVER-RIDE ERROR & RESUME MTR SRQ ERROR DIAGNOSIS WILL BE DONE BY CONS MTR				B B B B B B B B B B
E28	OPERATOR ACTION	MACHINE ACTION	A	D	B B B
1	PRESS FST & OBSERVE MIR	MIR = 0002 MIR = FFFF MIR = OTHER	2 F116 F71		B B B
2	MEM CONTAINS PARITY ERROR GO TO FEMTMTR				A
E30	OPERATOR ACTION (NO ILLEGAL ADDRESS)	MACHINE ACTION	A	D	
1	SET IRQ SWITCH TO IRQ PRESS CLEAR OBSERVE INCR	CYCLING	2	F67	
2	METER PADQ4X (SMAEF/)	85 - 87 %	F73	F72	
E32		F74			
E33		F80			
E34	SET SGL SWITCH TO SGL PRESSING SGL PUSHBUTTON OBSERVE INCR	NO CHANGE	F81	F82	
E36		F83			
E37		F84			
E38	OPERATOR ACTION	MACHINE ACTION	A	D	D D
1	B711 OBSERVE CONSOLE D8 IND B771 METER PADQ3W (EOERRIND)	IND ON 100%	F86 F86	F85 F85	D D
E39	OPERATOR ACTION	MACHINE ACTION	A	D	D D
1	B711 METER PADL2S (CCI27/) B771	0%	F89 F119	F88	D D
E40	OPERATOR ACTION	MACHINE ACTION	A	D	

1	OBSERVE WAIT IND	IND ON	F90	2
2	B711 OBSERVE CONSOLE D IND B771 PADQ3W = 100% & SPO ERR	D = 80 IND = 0	3 3	F91 F91
3	METER PADQ3T (EOIND2)	100%	5	F92
4	METER PADL2T (CCI26/)	0%	F93	F94
5	SYSTEM IS A B771		F119	4

E41	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE WAIT IND	IND ON	F95	2
2	B711 OBSERVE CONSOLE D IND B771 PADQ3W = 100% & SPO ERR	D = 80 IND = 0	3 3	F91 F91
3	METER PADQ4P (EOIND1)	100%	5	F96
4	METER PADLIT (CCI25/)	0%	F97	F94
5	SYSTEM IS A B771		F119	4

FAILURE DICTIONARY

FAILURE	SUSPECT CHIP OR PROCEDURE
F1	PADQ0 A7,D3
F2	PADQ3 A3,B7,B3,C7
F3	PADQ3 A3,B7,C7 E1
F4	PADQ3 D7
F5	PADQ3 A3 A5 A7 C1 C3 C5 D3 PAFN8 C1
F6	PADJ0 A3,C7,D7,A7
F7	PAFT0 C3,D3
F8	PADJ0 B7,B5
F9	PAFS7 C3,D3
F10	PADJ3 A3,C7,D7,A7
F11	PAFS4 C3,D3
F12	PADJ3 B7,B5
F13	PAFS1 C3,D3
F20	PADQ3 A5,A3,B7,C5,C3,D3
F21	PADQ3 B1,D5,D3
F22	PADJ3 A3,B7,B5,F7
F23	PADJ3 B7,B5,F7
F24	PADJ3 C7,D7,E7
F25	PADQ3 B5
F26	PADJ0 B7,B5,F7
F27	PADJ0 C7,D7,E7
F28	PADJ0 B7,C7,D7
F29	PADQ3 A3,B1,D5,D3
F30	PADI4 A7,B5,C5,F3
F31	PADQ3 B7,C7
F32	PAFP4 B/C3,D3
F33	PADI4 A7,B5
F34	PADI4 A7,A3,B7,B5,B3,C5,C3,D3,F3
F35	PAFP4 A5,B7
F36	PADI4 A3,B3,B5,B7,C3,C5,D3,E3
F37	PADI4 A7,A5,A3,B3,C3,D3

F38	PAFM0 E7	
F39	PAFM0 A7,A5,B1,C3,E7,E5	
F40	PAFM0 E7,F5	
F41	PAFM9 E7	
F42	PAFM0 D7	
F43	PAFM0 D7,E5	
F44	PAFM9 D7	
F45	PAFM0 F7	
F46	PAFM0 B7,C3,F7	
F47	PAFM0 E5,E3	
F48	PAFM0 D7,F5	
F49	PAFM0 E3	
F50	PAFM0 A7,C3,D7,F1	
F51	PAFM0 A5,C3,F1	
F52	EXT/IRQ SW ON FE4	
F53	PAFM9 E3	
F54	PAFM0 F5	
F55	PAFM0 D3	
F56	PAFM0 B1	
F57	PAFM9 D3	
F58	PAFM0 A7,A5,B7,B1,C3,E7	
F59	PAFM0 C3,D3,F7,F5	
F60	PAFM0 E5	
F61	PAFM0 A5	
F62	PAFM0 D3,E5,F7	
F63	PADI4 F7,F5	
F64	PADQ3 D3	
F65	PADQ3 B1	
F66	PADI7 D7	
F67	PADI7 C7	
F68	PADI4 E7	
F69	PADI4 D7	
F70	PAFM0 B7	
F71	PADQ3 D1 E1 E7 F1	
F72	PADI4 A5,B7,C7,C5,D1	
F73	PADQ3 A7,D1,E1,E3,F1,F5,F7	B
F74	PADQ3 A5 E7 F7,F1	
F75	PADQ3 E5 F1 F7	B B
F76	PADQ0 A7	B
F77	PAFM0 A5,C3	
F78	PAFM0 C3	
F80	PADQ3 D1,F1	
F81	PADQ3 D1,F7	
F82	PADQ3 A5,E7,F7	
F83	PADQ3 A5	
F84	PADI4 D1,F7	
F85	PADQ3 A5,F7	
F86	PADQ3 F7	
F87	PADQ3 F7,F1	
F88	PADL1 A1 E7 F5	
F89	PADL7 A5 TRANSISTOR B7D4 LAMP D3	
F90	PADQ3 D1 E1 E3 F1 F3	
F91	PADQ3 C3 E1 E3 E5 F3 F5	
F92	PADQ3 E5	E E
F93	PADL7 F5 TRANSISTOR E4C8 LAMP D2	E
F94	PADL1 E7 E5 F7	
F95	PADQ3 C3 E1 E3 E5 F1	
F96	PADQ3 C3	
F97	PADL7 F5 TRANSISTOR E4C4 LAMP D1	
F98	PADQ3 E3 F1 F3	
F99	PAFP1 B1	
F100	PAFT0 D3	
F101	PAFT0 C3	
F102	PAFS7 D3	
F103	PAFS7 C3	
F104	PAFS4 C3	
F105	PAFS4 D3	

F106	PAFS1	C3	
F107	PAFS1	D3	
F108	PADI4	C7	
F109	PADJ0	D7	
F110	PADJ0	B5	
F111	PADJ3	D7	
F112	PADJ3	B5	
F113	PADQ3	B1,B5,D5	B B B B B
F114	PAFP4	D7	B B B B B
F115	PADQ3	C5	B B B B B
F116	PADQ3	A3,C3,D5,D3	B B B B B
F117	PADQ3	A3,B1	B B B B B
F118	PADQ3	B7,C5	B D D D D
F119	PAFW3	(SPO1) C7 OR SPO ERR IND	D D D D E
F120	PAFK5	(CON1) A5 A7 C7 D5 F5 F7	E E E
F121	PADI7	C5,F7	

SMCUMTR SEMICONDUCTOR MEMORY UNIT B 720 PROCESSOR

PROGRAM-ID SMCUMTR.
START.

PLACE MTR/MEM SWITCH INMTR POSITION
LOAD SMCU MTR PROGRAM 2602 9694
SET BOTH EO2 SWITCHES TO NORM.
SET IRQ SWITCH TO CENTER (SEE NOTE).
PLACE LOAD SWITCH TO NORMAL - PRESS CLEAR

NOTE

IF PROG GOES FROM CLEAR TO PROG STEP 2
(SKIPPING PROG STEP 1) GO TO FAILURE F66.
(DISREGARD IF IRQ SWITCH SET TO IRQ FOR
LOOPING ON ERROR.)

ANY DISAGREEMENT WITH INSTRUCTIONS - SEE
INCREMENTER ADDRESS FOR FURTHER ACTIONS

IF IRQ SWITCH IS IN IRQ PROGRAM WILL
LOOP ON ANY TEST DETECTING AN ERROR.

OPERATOR INSTRUCTIONS

PROG STEP	INCR	OPERATOR ACTION
1	0052	VERIFY MIR CONTAINS CORRECT MEMORY LIMIT VALUE (SEE CHART) IF INCORRECT GO TO F72 IF CORRECT PRESS FST

MEMSIZE (WORDS)	MEMLIMIT (MIR)
8K	2000
10K	2800
12K	3000
14K	3800
16K	4000
18K	4800
20K	5000
22K	5800
24K	6000
28K	7000
32K	8000
36K	9000
40K	A000
44K	B000
48K	C000

2	019B	VERIFY MIR CONTAINS CORRECT SYSTEM CONFIGURATION IF NO GO TO ERROR # E57 IF YES PRESS RER THEN FST IF PROG DOES NOT ADVANCE TO PROG STEP 3 GO TO E25
3	01A7	VERIFY FEAC = 001B IF YES PRESS FST IF NO GO TO E25 SEE INCR FOR OPTIONAL TEST MODES
4	01CC	VERIFY EO2 IND = B & HALT IND ON (ALSO CONSOLE HALT/ERROR IND ON) IF NO GO TO ERROR E71 IF YES REMOVE MPA-2 CARD & RE-RUN MTR.
	NOTE	SET SGL SWITCH TO SGL TO REMOVE OR INSERT ANY CARD WITH POWER ON
		VERIFY ERROR E64 OCCURS IF NO (ANY OTHER) GO TO ERROR E59 IF YES PRESS FST THEN VERIFY MIR = 000A (DPM PARITY ERROR). IF NO GO TO FAILURE F59 IF YES END OF SMCU MTR INSERT MPA - 2 CARD GO TO MTR FOR SYSTEM CONTROLLER DEVICE

PROGRAM LISTING

```
0000  801D        CPCR = PERTST - 1.          UNIQUE DATA FOR ADDRESS 0
                  *  THE NEXT 29  INSTRUCTIONS WILL BE RELOCATED IN MEMORY
                  *  TO TEST  FUNCTIONS AT HIGH INCR  ADDRESSES
                  ******
                  *                                        **   INSTRUCTIONS TO TEST
0001  F0F1        MR1.                                     **   ERROR RESET AT HIGH
0002  41D3        MPCR = ERRSTERROR2 - 1.                  **   INCR ADDRESS
0003  41D3        MPCR = ERRSTERROR2 - 1.
0004  41D3        MPCR = ERRSTERROR2 - 1.
                  ******
                  *                                        INSTRUCTIONS TO BE USED
                  *                                        BY MU HIGH BITS  TEST
0005  2FF8        AMPCR = @2FF8@.
0006  F0C9        JUMP.  SA = +1
0007  F0F7        SKIP.
0008  F000        WAIT.
0009  F0F5        SAVE.
000A  F1E7        RETN.  SA = +1
000B  3000        AMPCR = @3000@.
000C  F0F7        SKIP.
000D  F05F        B.
000E  F1E7        RETN.  SA = +1,  +2,  +5
000F  6FF6        MPCR = @2FF6@.
0010  0001        AMPCR = @0001@.
0011  AFFE        CPCR = @2FFE@.
0012  F000        WAIT.
0013  7005        MPCR = @3005@.
0014  F0F7        SKIP.
0015  F000        WAIT.
0016  3009        AMPCR = @3009@.
0017  F0C9        JUMP.
0018  002E        AMPCR = SGC1 - 1.
0019  F09A        EXEC.
001A  F189        IF GC1 STEP ELSE WAIT.
001B  F00C        RESET GC1.
001C  B00E        CPCR = @300E@.
001D  41A6        MPCR = ADRERR - 1.
                  **********
                  PERTST.                 TEST FOR PARITY OR ADDRESS ERROR
001E  F0C1        IF NOT LC3 SKIP.        ERROR E29
001F  403B        MPCR = TESTGC2 - 1.
0020  F0F9        WHENRDC BEX.                ERROR# E34
0021  F0E1        MIR = B.
0022  F17D        DLD.
0023  F0F9        WHENRDC BEX.
0024  F060        B = AMPCR.
0025  F0FF        0 EQV B.
0026  F0B5        IF NOT ABT SKIP.
0027  407B        MPCR = EXTTST - 1.
0028  F0BC        IF NOT GC2 SKIP.
0029  402F        MPCR = PLANNEDERR - 1.
002A  F000        WAIT.  ERROR#E24    PARITY OR ADDRESS ERROR
                  *                                MIR = ERROR CODE
002B  F0DA        MIR = AMPCR.
002C  F000        WAIT.                            MIR = MPMADDRESS
                  *                          FORCE STEP FOR DPM ADDRESS
002D  4200        MPCR = DISPLAYDPMADDR - 1.
002E  F05F        B.          FILLER
                  SGC1.
002F  F006        SET GC1.    INST TO BE DONE BY EXEC
                  PLANNEDERR.
0030  F116        A2 EQV B.                CHECK FOR S CLOCK INHIBIT
0031  F0B5        IF NOT ABT SKIP.         BY HALT
0032  81F2        CPCR = DPMERR- 1.   ERROR #E70   NO HALT CLK INHIBIT
0033  0106        AMPCR = NAETEST - 1.       LOOP RETN ADDRESS
0034  F102        AMPCR = A2.       GET ERROR RETURN ADDRESS FROM A2
0035  F08D        BMI.              RESTORE ERROR CODE TO B
0036  F0C9        JUMP.
                  **********
                  DCYCTST.
0037  01F2        AMPCR = DPMERR- 1.          FOR MR DATA CYCLE TEST
                  **********
                  QUIT.              ADDRESS FOR WRITE ALL PATTERNS TEST
0038  CFFF        CNST = @CFFF@.          PRESET IT  TO CFFF
                  **********
                  NAETESTWORD.  ADDRESS OF A NANO ABOVE 512
0039  FC5F        CNST = @FC5F@.          ERROR E49    EOANYER = 0
                  *        PROG HALT OCCURS HERE IF  INH SWITCH IS  IN  INH
003A  41D1        MPCR = ERRSTERROR1 - 1.
003B  41D1        MPCR = ERRSTERROR1 - 1.
                  **********
                  TESTGC2.                TEST PLANNED ERROR FLAG
003C  F0A2        IF GC2 SKIP.
003D  401F        MPCR = PERTST + 1.
003E  41C5        MPCR = CONT2NDERR- 1.
                  MARTESTERRTN.              CHECK FOR ADDRESS OR PARITY ERR
003F  F0E1        MIR = B.
0040  F0B3        IF MST SKIP.    CHECK EXCEPTION BIT
0041  81F2        CPCR = DPMERR- 1.  ERROR# E18   EXCEPTION BIT = 0
0042  00DD        AMPCR = SMARTEST - 1.    LOOP RETN ADDR
0043  F078        B = B0TT.
0044  F075        B = BTT0.
0045  F0CB        LIT EQV B.
0046  E00A        LIT = 10.
0047  F0B5        IF NOT ABT SKIP.
0048  40ED        MPCR = CMARTEST- 1.
0049  F08D        BMI.
004A  81F2        CPCR = DPMERR- 1.  ERROR #E78  NON AE/PE ERROR
004B  00DD        AMPCR = SMARTEST - 1.    LOOP RETN ADDR
004C  40ED        MPCR = CMARTEST- 1.      ERROR OVER RIDE
                  DAERRTN.
004D  8062        CPCR = TSTERRCODE - 1.  ERROR #72    NON AE/PE ERROR
004E  00F1        AMPCR = DAERTEST - 1.    LOOP RETN ADDR
004F  F01C        A1 = BMAR.    SAVE MEMLIMIT VALUE
0050  F0E9        MIR = BMAR.
0051  F18E        IF IRQ SKIP.   OMIT WAIT IF LOOPING
0052  F189        IF GC1 STEP ELSE WAIT.
                  ****              PROG STEP 1 **  OBSERVE MIR FOR MEMORY LIMI
                  *                                 SETTING-VERIFY  CORRECT
                  *                                 IF YES FORCE STEP
                  *                                 IF NO GO TO FAILURE F72
0053  F023        A2 = AMPCR.
0054  0055        AMPCR = DAERRTN2 - 1.
0055  F0F7        SKIP.
                  DAERRTN2.
0056  82D1        CPCR = ERRCODECHK - 2.  ERROR #E73   NON ADDR ERR
0057  005C        AMPCR = LOOPDAER - 1.    LOOP RETN ADDR
                  *              TEST THAT ALL ADDRESSES ABOVE MEMLIMIT
                  *              CAUSE ADDRESS ERROR
0058  F080        B = BMAR.
0059  F06E        B = A3 + B.
005A  F0B7        IF NOT AOV SKIP.
005B  406B        MPCR = MEMLIMITCHK - 1.
005C  F0D5        MAR1 = B.
                  LOOPDAER.
005D  01D1        AMPCR = ERRSTERROR1 - 1.
005E  F0F1        MR1.
005F  81F2        CPCR = DPMERR- 1.        ERROR #E68   NO MAER FOR ADDR
                  *                                     NOWIN B
0060  005C        AMPCR = LOOPDAER - 1.    LOOP RETN ADDR
0061  41D3        MPCR = ERRSTERROR2 - 1.
0062  406B        MPCR = MEMLIMITCHK - 1.    ERROR OVER-RIDE
                  TSTERRCODE.
0063  F078        B = B0TT.       RESET EXCEPTION BIT
0064  F0CB        LIT EQV B.
0065  E00B        LIT = @0B@.       DO JUMP IF  ADDRESS ERROR
0066  F09C        IF ABT JUMP.
0067  F0CB        LIT EQV B.
0068  E00A        LIT = @0A@.
0069  F0B5        IF NOT ABT SKIP.
```

```
006A 4101        MPCR = CDAERTEST - 1.   CONTINUE DPM ADDR ERR TEST
006B 41F2        MPCR = DPMERR- 1.
              MEMLIMITCHK.
006C F066        B = A1.
006D F07F        B = B R.
006E DB00        SAR = 11.
006F F0CC        LIT - B.
0070 E004        LIT = 4.                WAS ADDR OVER 8K
0071 F0B7        IF NOT AOV SKIP.        SKIP IF YES
0072 41DD        MPCR = SBADJ - 1.       MEMORY IS 8K
0073 F0CC        LIT - B.
0074 C218        LIT = @18@ SAR = 2.     WAS ADR GTR THAN 48K
0075 F09E        IF AOV SKIP.            IF NO SKIP
0076 F000        WAIT.    MEMLIMIT MORE THAN 48K-START OVER
0077 F0CC        LIT - B.
0078 E006        LIT = 6.                WAS ADR GTR THAN 12K
0079 F0B7        IF NOT AOV SKIP.        IF YES SKIP
007A F018        SET LC1.                SET BASE ADJ FLAG
              *                          MEMORY IS 10 OR 12K
007B 4106        MPCR = NAETEST - 1.  GO TO NANO ADDR ERR TEST
              *                  TEST 125 MILLI-SECOND TIMER (EXT)
              **********
              EXTTST.
007C F08D        BMI.
007D F0FF        0 EQV B.
007E F09D        IF ABT SKIP.  TEST EXT BUSS FOR 0
007F 81F2        CPCR = DPMERR- 1.  ERROR #E23   EXT BUSS FAULT
0080 001F        AMPCR = PERTST + 1.   LOOP RETN ADDR
0081 F054        A3 = 0.
0082 F0BB        IF NOT GC1 SKIP.        SKIP EXT CLR TST IF LOOPING
0083 408A        MPCR = CEXTTST - 1.
0084 F0A0        IF EXT SKIP.
0085 408A        MPCR = CEXTTST - 1.
0086 F0BA        IF NOT EXT SKIP.
0087 81F2        CPCR = DPMERR- 1.    ERROR# E6 EXT = 1
0088 007F        AMPCR = EXTTST + 3.    LOOP RETURN ADDRESS
0089 81F2        CPCR = DPMERR- 1.    ERROR# E8 EXT NOT CLEARED
008A 01F5        AMPCR = DPMERR + 2.    LOOP RETURN ADDRESS
              **********
              CEXTTST.
008B 81D6        CPCR = TIMER - 1.       WAIT FOR 130 MSEC
008C F0A0        IF EXT SKIP.
008D 81F2        CPCR = DPMERR- 1.    ERROR# E12 EXT = 0
008E 008B        AMPCR = CEXTTST.       LOOP RETURN ADDRESS
008F F0BA        IF NOT EXT SKIP.
0090 81F2        CPCR = DPMERR- 1.    ERROR# E14
              *                          EXT NOT RESET BY TEST
0091 008E        AMPCR = CEXTTST + 3.   LOOP RETURN ADDRESS
              **********
              WFNEXT.
0092 F0A0        IF EXT SKIP.
0093 4091        MPCR = WFNEXT- 1.
0094 F0CA        LCTR.
0095 E0F4        LIT = @F4@.             0B INVERTED
0096 F05A        A3 = Z.
0097 E0E3        LIT = @E3@.
0098 81D6        CPCR = TIMER - 1.
0099 F0BA        IF NOT EXT SKIP.
009A 81F2        CPCR = DPMERR- 1.    ERROR# E16 EXT EARLY
009B 0091        AMPCR = WFNEXT- 1.
009C F05F        B.                      FILLER
009D F0A0        IF EXT SKIP.
009E 81F2        CPCR = DPMERR- 1.    ERROR# E20 EXT LATE
009F 0091        AMPCR = WFNEXT- 1.
              **********
              DLDRST.
00A0 F0F9        WHENRDC BEX.
00A1 F0FF        0 EQV B.
00A2 F09D        IF ABT SKIP.
00A3 81F2        CPCR = DPMERR- 1.       ERROR #E53 DLD NOT RESET
00A4 009F        AMPCR = DLDRST - 1.     LOOP RETN ADDR
```

```
              READ0.                  READ MPM LOCATION 0 & VERIFY CONTENT
00A5 F060        B = AMPCR.              BUILD VALUE OF INST IN
00A6 001D        AMPCR = PERTST - 1.  ADDRESS ZERO
00A7 F07A        B = BITT.
00A8 F051        A3 = B.
00A9 F017        A1 = B.    INSURE A1 DOES NOT EQUAL LIT
00AA F07B        B = B000.                  SET MAR = 0
00AB F0D5        MAR1 = B.
00AC F16F        BR2 = BITT.  SET BR2 TO DIFFER FROM BR1
00AD F0DE        MIR = A3.   PUT ADDR 0 VALUE IN MIR IN CASE
              *                  WRITE OCCURS ON READ
00AE F0F1        MR1.                    READ MEM
00AF 40B1        MPCR = CREAD0 - 1.
00B0 81F2        CPCR = DPMERR- 1.  ERROR# E3 NO DATA CYC INHSTP
00B1 00A4        AMPCR = READ0 - 1.      LOOP RETN ADDR
              CREAD0.
00B2 F111        A1 EQV LIT.   A1 = LIT NANO IS ACCESSED ON DATA CYC
00B3 F0B5        IF NOT ABT SKIP.  TEST IT WAS NOT EXECUTED
00B4 81F2        CPCR = DPMERR- 1.  ERROR# E5 NO DATA CYC FORT2
00B5 00A4        AMPCR = READ0 - 1.      LOOP RETN ADDR
00B6 F0F9        WHENRDC BEX.
00B7 F03C        A3 EQV B.
00B8 F09D        IF ABT SKIP.
00B9 81F2        CPCR = DPMERR- 1.    ERROR# E2 READ ADDRESS 0
              *                          B CONTAINS READ RESULTS
00BA 00A4        AMPCR = READ0 - 1.      LOOP RETURN ADDRESS
              EOMDSBTEST.
00BB F0F1        MR1.
00BC F05E        ASR.
00BD F0F9        WHENRDC BEX.
00BE F03C        A3 EQV B.
00BF F0B5        IF NOT ABT SKIP.
00C0 81F2        CPCR = DPMERR- 1.  ERROR E7 NO EOMDSB RESET BY ASR
00C1 00BA        AMPCR = EOMDSBTEST - 1.      LOOP RETN ADDR
00C2 F0F1        MR1.
00C3 0108        AMPCR = @0108@.  CALL 'ASR BEX' NANO WITH TYPE 2
00C4 F0F9        WHENRDC BEX.
00C5 F03C        A3 EQV B.
00C6 F09D        IF ABT SKIP.
00C7 81F2        CPCR = DPMERR- 1.  ERROR# E9 MDSB RESET BY TYPE 2
00C8 00BA        AMPCR = EOMDSBTEST - 1.      LOOP RETN ADDR
00C9 E05D        LIT = @5D@.  CALL 'ASE'  NANO WITH TYPE 2
00CA F080        B = BMAR.
00CB F05F        B.
00CC F0C4        IF NOT MST SKIP.
00CD 81F2        CPCR = DPMERR- 1.  ERROR# E11 NB54 SET BY TYPE 2
00CE 00BA        AMPCR = EOMDSBTEST - 1.      LOOP RETN ADDR
              WRTONREADTEST. VERIFY NO WRITE OCCURS ON A READ.
00CF F073        B = A3 L.     CHG MIR DIGIT A TO 4 SO THAT
00D0 DF00        SAR = 15.     IF WRITE OCCURS ON READ LOC 0 WILL
00D1 F07A        B = BITT.     BE CHGD FROM 801D TO 401D.
00D2 F0E2        MIR = B C.
00D3 F0F1        MR1.
              *                  IF FAULT EXISTS FIRST READ WILL WRITE
00D4 F0F1        MR1.
00D5 F0F9        WHENRDC BEX.
00D6 F03C        A3 EQV B.
00D7 00DD        AMPCR = SMARTEST - 1.
00D8 F09C        IF ABT JUMP.
00D9 F0DE        MIR = A3.
00DA F0F3        MW1.
00DB 81F2        CPCR = DPMERR- 1.  ERROR# E15   WRT ON READ
00DC 00CE        AMPCR = WRTONREADTEST - 1.     LOOP RETN ADDR
00DD F05F        B.     FILLER
              *                  DATA MEMORY ADDRESS TEST
              *                       DO READS WITH 1 ADR BIT SET
              *                       UNTIL MEMLIMIT (ADR ERR) I
              *                       REACHED. VERIFY ADR 0 IS NO
              *                       READ TO TEST EACH ADR BIT S
              *                       PARITY ERR WILL ALSO VERIFY
              *                       ADR BIT SET.
```

```
                SMARTEST.
00DE  F10F          A1 = 0.                 START AT '1'  BIT
00DF  F012          A1 = A1 + 1.
00E0  F023          A2 = AMPCR.                     SET ERROR RETURN ADDRESS
00E1  003E          AMPCR = MARTESTERRTN - 1.  IN A2
00E2  F0F6          SET GC2.        SET PLANNED ERROR FLAG
                    **********
                MARTEST.
00E3  01D1          AMPCR = ERRSTERROR1 - 1.
00E4  F0D0          MAR1 = A1.
00E5  F0F1          MR1.                            READ MEM
00E6  40E8          MPCR = CMAR - 1.  ERROR# E21  HALT ON 1ST  ERROR
                *       PROG HALT OCCURS HERE IF  ERS SWITCH IS  IN  ERS
00E7  41D3          MPCR = ERRSTERROR2 - 1.
00E8  41D3          MPCR = ERRSTERROR2 - 1.
                CMAR.
00E9  F0F9          WHENRDC BEX.
00EA  F03C          A3 EQV B.
00EB  F0B5          IF  NOT ABT SKIP.
00EC  81F2          CPCR = DPMERR - 1.      ERROR# E4  MEM ADDRESS BIT= 0
00ED  00E2          AMPCR = MARTEST - 1.      LOOP RETN ADDRESS
                CMARTEST.
00EE  F00B          A1 = A1 L.                      SET  NEXT HIGHER ADR BIT
00EF  DF00          SAR = 15.
00F0  F0B3          IF  MST SKIP.
00F1  40E2          MPCR = MARTEST - 1.
                DAERTEST.     MEM ADDRESS ERROR-READ  TEST
00F2  F023          A2 = AMPCR.             SET  ERROR RETN ADDRESS IN  A2
00F3  004C          AMPCR = DAERRTN - 1.
00F4  F060          B = AMPCR.              READ MEM-LOOK FOR MEM LIMIT
00F5  0800          AMPCR = @0800@.         START AT 2K - INC BY 2K
00F6  F051          A3 = B.
                DAERLOOP.
00F7  01D1          AMPCR = ERRSTERROR1 - 1.
00F8  F0D5          MAR1 = B.
00F9  F0F1          MR1.
00FA  4101          MPCR = CDAERTEST - 1.  ERROR# E21  HALT ON 1ST  ERR
                *       PROG HALT OCCURS HERE IF  ERS SWITCH IS  IN  ERS
00FB  41D3          MPCR = ERRSTERROR2 - 1.
00FC  41D3          MPCR = ERRSTERROR2 - 1.
                *   PROG WAIT TO PERMIT TESTING FOR MEMORY DATA DECAY
                *   WHEN ADDRESS LINES ARE CONSTANT.
                *   FORCE STEP TO BEGIN READ PASS.
                *   TIME OF WAIT IS OPTIONAL-USUALLY 2-3 SECONDS
                *   IS SUFFICIENT TO CAUSE ANY DEFECTIVE CHIP TO
                *   LOSE ITS DATA.
00FD  F05F          B.  FILLER FOR WAITS AND FOR INCR 0200  NON TYP2 JMP
                EVENWAIT.
00FE  F000          WAIT.  READ DELAY-SEE  ABOVE INSTRUCTIONS
00FF  F0C9          JUMP.
                ODDWAIT.
0100  F000          WAIT.  READ DELAY-SEE  ABOVE INSTRUCTIONS
0101  F0C9          JUMP.
                *   ODD & EVEN WAITS SHOULD BE AT INCR ADDRESSES
                *   DIFFERING IN LEAST 5 BITS (MEM ROW SELECT) AND
                *   ALSO IN NEXT 5 BITS (MEM COLUMN SELECT) TO INSURE
                *   NO MEM ADDRESS IS  ALWAYS SELECTED DURING WAITS.
                CDAERTEST.
0102  F080          B = BMAR.
0103  F06E          B = A3 + B.             ADD 2K TO ADDR
0104  F0B7          IF  NOT AOV SKIP.
0105  42D6          MPCR = DAEDIAG - 1.     GO TO ADDR ERR DIAGNOSTIC
                *                               NO ILLEGAL  ADDRESS
0106  40F6          MPCR = DAERLOOP - 1.
                    **********
                NAETEST.     TEST  FOR NANO ADR ERROR DETECTION
0107  F023          A2 = AMPCR.                     SET  ERROR RETURN ADDRESS
0108  010D          AMPCR = NAECODECHK - 1.     IN  A2
0109  F05F          B.
010A  0038          AMPCR = NAETESTWORD - 1.
010B  F09A          EXEC.           EXECUTE TYPE 1  WITH MPM6  SET
010C  81F2          CPCR = DPMERR - 1.  ERROR #  E45    NO NAE
010D  0106          AMPCR = NAETEST - 1.      LOOP RETN ADDR
                NAECODECHK.
010E  E005          LIT = 5.
010F  82D2          CPCR = ERRCODECHK - 1.  ERROR# E52    NAE CODE NOT 5
0110  0106          AMPCR = NAETEST - 1.      LOOP RETN ADDR
                DAEWTEST.          DPM ADDRESS ERROR-WRITE TEST
0111  F076          B = B111.
0112  F023          A2 = AMPCR.                     SET  ERROR RETURN ADDRESS
0113  0119          AMPCR = DAEWCODECHK -1.   INA2
0114  F0D5          MAR1 = B.
0115  01D1          AMPCR = ERRSTERROR1 - 1.
0116  F0F3          MW1.
0117  81F2          CPCR = DPMERR - 1.    ERROR# E54    NO WRT ADR ERR
0118  0110          AMPCR = DAEWTEST - 1.     LOOP RETN ADDR
0119  41D3          MPCR = ERRSTERROR2 - 1.
                DAEWCODECHK.
011A  E009          LIT = 9.
011B  82D2          CPCR = ERRCODECHK - 1.  ERROR #E55   DAEW CODE NOT 9
011C  0110          AMPCR = DAEWTEST - 1.
                ERRCODERESET.          CHECK THAT ERROR BITS  DO NOT
011D  F0F9          WHENRDC BEX.      REMAIN ON EXT BUSS AFTER BEX
011E  F0FF          0 EQV B.
011F  F09D          IF  ABT SKIP.
0120  81F2          CPCR = DPMERR - 1.  ERROR E19  NO ERR CODE RESET
0121  011C          AMPCR = ERRCODERESET - 1.    LOOP RETN ADDR
                WRTERRTEST.  TEST THAT WRITE DOES NOT CONTINUE
                *               AFTER DATA CYCLE.
0122  F023          A2 = AMPCR.             IF  WRITE CONTINUES PAST  DATA
0123  012E          AMPCR = WRTERRTN - 1.  CYCLE NANO PARITY  ERROR MAY
                *                           OCCUR BECAUSE OF WRITING
                *                           ON SAME CYCLE AS NANO ACCESS.
0124  F0CF          MAR1 = AMPCR.
0125  02EB          AMPCR = FINISH.
0126  F041          A3 = AMPCR.
0127  05EF          AMPCR = @05EF@.     BUILD F05E (ASR)  IN  A3
0128  F044          A3 = A3 C.
0129  C493          SAR = 4  LIT  = @93@.  93  FOR CHANGING ASR TO MR1
012A  F0DE          MIR = A3.
012B  F0F3          MW1.
                WRTERRADDR.  THIS  ADDR WILL BE OVER-WRITTEN WITH F05E
                *               (ASR)  IF  WRITE CONTINUES PAST  DATA CYCLE.
                *
012C  F0F1          MR1.  IF  REFERRED HERE BY ERROR E24  GO TO ERROR E31
                    *****
                *                   THE NEXT 2  B'S  ARE TO INSURE A2  ERRTN
                *                   VALUE WILL  NEVER EQUAL AN MPCR VALUE
                *                   AT TIME OF A PLANNED ERROR.
                    *****
012D  F05F          B.  IF  REFERRED HERE BY ERROR E24  GO TO ERROR E32
012E  F05F          B.
                WRTERRTN.
                *
                *               WHEN ASR IS  EXECUTED NB52  WILL  RESET,
                *               TERMINATING WRITE.  F0F1  (MR1)  IS  THEN
                *               RESTORED INTO 'WRTERRADDR'.
012F  F0CF          MAR1 = AMPCR.
0130  012C          AMPCR = WRTERRADDR.
0131  F0F1          MR1.
0132  F0F9          WHENRDC BEX.
0133  F03C          A3 EQV B.           IF  'WRTERRADDR' CONTAINS F05E
0134  F09D          IF  ABT SKIP.       WRITE CONTINUED PAST  DATA CYCLE.
0135  413D          MPCR = RDTYP2 - 1.
0136  F0ED          MIR = LIT + B.  SET MIR TO F0F1  (LIT  HAS @93#)
0137  F023          A2 = AMPCR.             IN CASE NANO PE  OCCURS
0138  0139          AMPCR = WRTERRTN1 - 1.  DURING RESTORE
0139  F0F3          MW1.                RESTORE 'WRTERRADDR' TO F0F1
                WRTERRTN1.
013A  F0F1          MR1.  THIS  ADDRESS WILL ALSO BE OVER-WRITTEN
                *       BUT WITH SAME VALUE.
013B  81F2          CPCR = DPMERR - 1.  ERROR E28  CONTINUOUS WRITE
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013C  0121        AMPCR = WRTERRTEST - 1.    LOOP RETN ADDR
                WRTERROVERRIDE.
013D  413C        MPCR = WRTERROVERRIDE - 1.   NO ERROR OVER-RIDE
                **********
                RDTYP2.
013E  F0CF        MAR1 = AMPCR.       READ TYPE 2'S   & TEST THEY ARE
013F  014D        AMPCR = FTYP2TEST.NOT  EXECUTED
0140  F007        A1 = AMPCR.
0141  014F        AMPCR = FTYP2TEST + 2.
0142  F023        A2 = AMPCR.
0143  0037        AMPCR = DCYCTST.
0144  F01F        RESET GC2.
0145  014F        AMPCR = PARTST - 3.
0146  F0F1        MR1.                        READ 'CPCR'
0147  F0D0        MAR1 = A1.
0148  F0F1        MR1.                        READ 'MPCR'
0149  F0D1        MAR1 = A2.
014A  F0F1        MR1.                        READ 'AMPCR'
014B  F091        CALL.     ERROR E10  AMPCR LOADED ON DATA CYCLE
014C  013D        AMPCR = RDTYP2 - 1.    LOOP RETN ADDR
                FTYP2TEST.
014D  81F2        CPCR = DPMERR- 1.  ERROR E13  TYP2 JMP ON DATA CYC
014E  013D        AMPCR = RDTYP2 - 1.    LOOP RETN ADDR
014F  414C        MPCR = FTYP2TEST - 1.
                *                  PARITY GENERATION TEST
0150  F0CF        MAR1 = AMPCR.
0151  0038        AMPCR = QUIT.
                **********
                PARTST.              WRITE ALL DATA PATTERNS IN MEMORY
0152  CC05        LIT = 5 SAR = 12.  PRESET VALUES TO BE CHECKED
                *                        AFTER READING ALL PATTERNS
0153  F054        A3 = 0.
0154  F0DE        MIR = A3.
0155  F0F3        MW1.
0156  F0F1        MR1. IF REFERRED HERE BY ERROR E24  GO TO ERROR E30
0157  F0F9        WHENRDC BEX.  IF REFERRED HERE BY E24  GO TO E32
0158  F03C        A3 EQV B.
0159  F09D        IF ABT SKIP.
015A  81F2        CPCR = DPMERR- 1.     ERROR# E22  MEMRD/WRT ERROR
                *                          A3 CONTAINS EXPECTED DATA
                *                          B CONTAINS INCORRECT DATA
015B  0153        AMPCR = PARTST + 1.       LOOP RETN ADDR
015C  F04C        A3 = A3 + 1.
015D  F09E        IF AOV SKIP.
015E  4153        MPCR = PARTST + 1.
015F  F082        B = LIT L.
0160  F0CB        LIT EQV B.            VERIFY LIT AND SAR WERE NOT
0161  E050        LIT = @50@.           CHANGEDBY DATA CYCLES
0162  F09D        IF ABT SKIP.
0163  81F2        CPCR = DPMERR- 1.    ERROR #E56
                *                        LIT/SAR LOADED ON DATA CYCLE
0164  0151        AMPCR = PARTST - 1.          LOOP RETN ADDRS
0165  F0F1        MR1.              MEMORY DEVICE TEST
0166  F08F        BR2 = LIT L.
0167  C80F        LIT = @0F@ SAR = 8.
0168  0169        AMPCR = CMDTST - 2.
0169  F1B1        IF SRQ DW2 JUMP.
016A  E098        LIT = @98@.                 CALL DW2 NANO
                **********
                CMDTST.
016B  F0F9        WHENRDC BEX.
016C  F0FF        0 EQV B.
016D  F0B5        IF NOT ABT SKIP.
016E  81F2        CPCR = DPMERR- 1.     ERROR# E26   EXTOP = 1
016F  0164        AMPCR = CMDTST - 7.       LOOP RETN ADDR
0170  4205        MPCR = MEMSTRBTST- 1.
                *****
                HIBITSTEST.
0171  0FF2        AMPCR = @0FF2@.           SET MEMWRITE START ADDRESS
0172  F0AC        IF LC2 SET LC2 SKIP.      PER MEMLIMIT
0173  1FF2        AMPCR = @1FF2@.           8K IF LC1 = LC2 = 1
0174  F0A8        IF LC1 SET LC1 SKIP.      10/12K  IF LC1 = 1,LC2 = 0
0175  2FF2        AMPCR = @2FF2@.           14/16K  IF LC1 = LC2 = 0
0176  F023        A2 = AMPCR.
                *                          READ 29 INSTRUCTIONS FROM MEM
                *                          STARTING AT ADDRESS 0001
                *                          WRITE THEM AT STARTING ADDRESS
                *                          ACCORDING TO MEMORY SIZE
                *                             IF 8K              0FF3
                *                             IF 10 OR 12K       1FF3
                *                             IF 14K OR GRTR     2FF3
0177  F10F        A1 = 0.
0178  E01C        LIT = 28.     DO 29 RELOCATES
0179  F0CA        LCTR.
                *  RELOCATE INSTRUCTIONS INTO HIGH MEMADDRESSES
                **********
                MEMWRT.
017A  F012        A1 = A1 + 1.
017B  F02A        A2 = A2 + 1.
017C  F1B8        INC IF NOT COV SKIP.
017D  4186        MPCR = CONTMEMWRT - 1.
017E  F0D0        MAR1 = A1.
017F  F0F1        MR1.
0180  F0F9        WHENRDC BEX.
0181  F0A7        IF LC1 SET LC1 ELSE SKIP.
0182  81E4        CPCR = BASADJ - 1.
0183  F0E1        MIR = B.
0184  F0D1        MAR1 = A2.
0185  F0F3        MW1.
0186  4179        MPCR = MEMWRT -1.
                CONTMEMWRT.
0187  F0C1        IF NOT LC3 SKIP.
0188  418E        MPCR = SETAMPCR - 1.
0189  F10F        A1 = 0.
018A  F023        A2 = AMPCR.
018B  100F        AMPCR = @100F@.
018C  F01A        SET LC3.              SECOND WRITE PASS
018D  E003        LIT = 3.       DO 4 RELOCATES
                *                READ FROM 0001   THRU 0004
                *                WRITE INTO 1010  THRU 1013
018E  4178        MPCR = MEMWRT -2.
                SETAMPCR.
018F  F0BD        IF NOT IRQ SKIP.              IF IN LOOP ON ERROR MODE
0190  81A0        CPCR = WAITFORIRQOFF - 1.  WAIT FOR IRQ SWITCH TO
                *                                BE TURNED OFF.
0191  0FFF        AMPCR = @0FFF@.
0192  F0AC        IF LC2 SET LC2 SKIP.
0193  1FFF        AMPCR = @1FFF@.
0194  F0A8        IF LC1 SET LC1 SKIP.
0195  2FFF        AMPCR = @2FFF@.
                **********
0196  F17D        DLD.
0197  F0F9        WHENRDC BEX.
0198  F0E1        MIR = B.
                PHALT.
0199  F0BB        IF NOT GC1 SKIP.
019A  4080        MPCR = EXTTST + 4.  IF LOOPING PROG,START OVER
019B  F000        WAIT.                  PROG STEP 2
                *****   VERIFY MIR = SYSTEM CONFIGURATION
                *       IF NO GO TO ERROR #E57
                *       IF YES  PRESS RER (ON FE3)  TO RESET FEAC
                *                       (FEAC COUNTS INSTRUCTIONS)
                *               THEN FORCE STEP
                *       IF INCR GOES TO  PROG STEP 3 CONTINUE
                *       IF NOT GO TO E25
                *****
019C  F1AC        IF NOT IRQ JUMP.
                *                GO TO 'TEST HIGH ORDER MU BITS'
                *                          NEXT ADDRESS DEPENDS ON
                *                          MEMORY SIZE
                *                8K        1000
                *             10/12K       2000
                *          14K OR GTR      3000
```

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                *
                 DLDLOOP.
019D  F17D       DLD.                    LOOP FOR DLD SIGNAL TRACING
019E  F0F9       WHENRDC BEX.
019F  F0E1       MIR = B.
01A0  419C       MPCR = DLDLOOP - 1.  LOOP IF  IRQ SWITCH IS  SET
                *
                 WAITFORIRQOFF.
01A1  F060       B = AMPCR.
01A2  F0F5       SAVE.
01A3  F0A4       IF  IRQ JUMP.   SET  IRQ SWITCH TO CENTER
01A4  F05B       AMPCR = B.
01A5  F05F       B.
01A6  F0C9       JUMP.
                *
                **********
                 ADRERR.
01A7  F000       WAIT.                       PROG STEP 3
                *                            VERIFY FE ADDRESS CTR
                *                            FEAC = 001B
                *
                *                            IF  YES FORCE STEP
                *                            IF  NO GO TO ERROR E25
                *          NOTE  PROGRAM CAN BE LOOPED BY SETTING IRQ
                *                SWITCH TO IRQ,  PRESS FST,  THEN SET
                *                IRQ SWITCH TO CENTER.
                *
                *                MEMORY READS ARE DELAYED TO INSURE DATA
                *                DOES NOT DECAY.
                *                MEMORY READ DELAY IS INCREASED WHEN PROG
                *                IS LOOPED.SEE LABEL 'READDELAY' FOR TIME.
                *                      A PROGRAM 'WAIT' PRIOR TO START
                *                OF EACH READ PASS CAN BE CAUSED BY
                *                SETTING THE EXT SWITCH TO EXT BEFORE
                *                PRESSING FST AT PROG STEP 1.  A FORCE
                *                STEP IS THEN REQUIRED TO BEGIN EACH READ
                *                PASS.  TIME OF THIS DELAY IS OPTIONAL.
                *                EXT SWITCH MUST BE IN CENTER TO START MTR
                *
01A8  F18E       IF  IRQ SKIP.
01A9  41AD       MPCR = ERRSTTEST - 1.
01AA  F006       SET GC1.                SET PROG LOOP FLAG
01AB  81A0       CPCR = WAITFORIRQOFF - 1.
01AC  F01F       RESET GC2.    RESET PLANNED ERROR FLAG
01AD  4080       MPCR = EXTTST + 4.  START OVER
                 ERRSTTEST.   VERIFY ALL SMADR BITS  ARE TURNED OFF
                *             BY ERROR RESET
01AE  F0F6       SET GC2.
01AF  F023       A2 = AMPCR.                 SET ERROR RETN ADDR IN A2
01B0  01BA       AMPCR = ERRSTTESTERRTN - 1.
01B1  F041       A3 = AMPCR.
01B2  01D1       AMPCR = ERRSTERROR1 - 1.
01B3  F076       B = B111.
01B4  F0D5       MAR1 = B.      SET MAX ADDR
01B5  0FF2       AMPCR = @0FF2@.     SET AMPCR PER MEMLIMIT
01B6  F015       IF  LC2 SKIP.
01B7  1FF2       AMPCR = @1FF2@.
01B8  F014       IF  LC1 SKIP.
01B9  2FF2       AMPCR = @2FF2@.
01BA  41BE       MPCR = JUMPTOA3 - 1.
                 ERRSTTESTERRTN.          TEST SMADR BIT 4 FOR ERRST
01BB  F023       A2 = AMPCR.
01BC  01C0       AMPCR = SECONDERR - 1.
01BD  F05F       B.
01BE  100F       AMPCR = @100F@.
                 JUMPTOA3.
01BF  F101       AMPCR = A3.
01C0  F0C9       JUMP.
                 SECONDERR.
01C1  F041       A3 = AMPCR.
01C2  01CE       AMPCR = NB41ERR - 2.
01C3  F01A       SET LC3.    INHIBIT  ERROR RECOVERY SUBROUTINE
01C4  F101       AMPCR = A3.
01C5  FFFF       CNST = @FFFF@.      CAUSE A NANO ADDRESS ERROR
                 CONT2NDERR.
01C6  F1E7       RETN.    TEST CONTENTS OF AMPCR
01C7  F023       A2 = AMPCR.       SET ERR RETN ADDR INTO A2
01C8  01CC       AMPCR = NO2NDERR - 1.
01C9  F0E6       MIR = 0.  FOR DW1
01CA  F099       DW1.   TEST FOR DW1 CAUSING DLD
01CB  F0F1       MR1.      CAUSE 2ND ERROR
01CC  F05F       B.     PROG STEP 4
                *            VERIFY EO2 IND = B WITH HALT IND ON
                *            IF  YES END SMCU MTR -  IF  NO ERROR E71
                 NO2NDERR.
01CD  81F2       CPCR = DPMERR - 1.    ERROR# E48     NO 2ND ERROR
01CE  01C0       AMPCR = SECONDERR - 1.          LOOP RETN ADDR
01CF  41CC       MPCR = NO2NDERR - 1.      NO ERROR OVER-RIDE
                 NB41ERR.
01D0  81F2       CPCR = DPMERR - 1.    ERROR# E66  NO NB41  ERRST CLEAR
01D1  81F2       CPCR = DPMERR - 1.    NO ERR OVER-RIDE  OR LOOP
                 ERRSTERROR1.
01D2  81F2       CPCR = DPMERR - 1.  ERROR #E50(A)    NO ERRST
01D3  81F2       CPCR = DPMERR - 1.  ERROR #E50(B)    NO ERRST
                 ERRSTERROR2.
01D4  81F2       CPCR = DPMERR - 1.  ERROR #E50(C)    NO ERRST
01D5  81F2       CPCR = DPMERR - 1.  ERROR #E50(D)    NO ERRST
01D6  41D5       MPCR = ERRSTERROR2 + 1.  NO ERROR OVER-RIDE
                **********
                 TIMER.
01D7  F0DA       MIR = AMPCR.
01D8  F0F5       SAVE.
01D9  F04C       A3 = A3 + 1.
01DA  F0B4       IF  NOT ABT JUMP.
01DB  F08D       BM1.
01DC  F05B       AMPCR = B.
01DD  F0C9       JUMP.
                 SBADJ.
01DE  F019       SET LC2.                SUBT 8K
01DF  F018       SET LC1.                DO BASE ADJ
01E0  F0CB       LIT EQV B.
01E1  F0B5       IF  NOT ABT SKIP.
01E2  4106       MPCR = NAETEST - 1.
01E3  F000       WAIT.    MEMLIMIT  VALUE IS  LESS  THAN 8K
                *      START OVER
01E4  40F1       MPCR = DAERTEST - 1.
                **********
                 BASADJ.
01E5  F053       A3 = B R.
01E6  CD07       LIT = 7 SAR = 13.
01E7  F03B       A3.                     IF  BIT 3=0 SKIP  BASE ADJUST
01E8  F0C2       IF  NOT LST JUMP.
01E9  F03E       A3 EQV LIT.             TEST FOR TYPE 1
01EA  F09C       IF  ABT JUMP.
01EB  F051       A3 = B.
01EC  F153       B = B101.
01ED  D200       SAR = 2.                SUBT 8K
01EE  F0AC       IF  LC2 SET LC2 SKIP.
01EF  D300       SAR = 3.                SUBT 4K
01F0  F07F       B = B R.
01F1  F070       B = A3 - B.
01F2  F0C9       JUMP.
                **********
                 DPMERR.
01F3  F18E       IF  IRQ SKIP.           REPEAT FAILED TEST
                *                        IF  IRQ = 1
01F4  41F6       MPCR = DPMERR + 3.
01F5  F09A       EXEC.
01F6  F0C9       JUMP.
                *      NO LOOP ON THIS  FAILURE
01F7  F0DA       MIR = AMPCR.
01F8  F000       WAIT.                   DISPLAY  ERROR ADDRESS
                *                        OBSERVE MIR -  MICRO ADDRES
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                *                                   OF E#.
01F9  F0E1          MIR = B.                        DISPLAY B
                *                                   SEE ERROR ADDRESS FOR
                *                                   CONTENTS OF B,A1,A2,A3
01FA  F000          WAIT.               DISPLAY B REG
01FB  F0DE          MIR = A3.
01FC  F000          WAIT.               DISPLAY A3 REG
01FD  F0DD          MIR = A2.
01FE  F000          WAIT.               DISPLAY A2 REG
01FF  F0DB          MIR = A1.
0200  F000          WAIT.               DISPLAY A1 REG
              DISPLAYDPMADDR.
0201  F0E9          MIR = BMAR.
0202  F000          WAIT.                           DISPLAY DATA MEMADDRESS
0203  F0EF          MIR = Z.
0204  F000          WAIT.               DISPLAY CTR & LIT
                *           PRESS FST IF ERROR OVER-RIDE IS DESIRED
0205  F0C9          JUMP.                           ERROR OVER-RIDE
              MEMSTRBTST.
0206  F0F9          WHENRDC BEX.  2ND BEX SHOULD NOT CAUSE EOMDSB
0207  F0FF          0 EQV B.
0208  F09D          IF ABT SKIP.
0209  81F2          CPCR = DPMERR- 1.  FAILURE F118  NO BEX STRB RESET
020A  0164          AMPCR = CMDTST - 7.       LOOP RETN ADDR
020B  F0F1          MR1.
020C  F05F          B.
020D  F05E          ASR.      SHOULD RESET STROBE
020E  F0F9          WHENRDC BEX.
020F  F05F          B.
0210  F0B5          IF NOT ABT SKIP.
0211  81F2          CPCR = DPMERR- 1.  FAILURE F115  NO N51 STRB RESET
0212  020A          AMPCR = MEMSTRBTST+ 4.        LOOP RETNADDR
0213  F0E8          MIR = B111.
0214  F0F3          MW1.
0215  F0F9          WHENRDC BEX.
0216  F0FF          0 EQV B.
0217  F09D          IF ABT SKIP.
0218  81F2          CPCR = DPMERR- 1.  FAILURE F117  STROBE ON WRITE
0219  020A          AMPCR = MEMSTRBTST+ 4.        LOOP RETN ADDR
              ADDRBITTEST.  TEST FOR 8,16,32K     ADDR BITS  = 0
021A  F0F6          SET GC2.   SET PLANNED ERROR FLAG
021B  F023          A2 = AMPCR.
021C  022A          AMPCR = ADDRBITERRTN - 1.
021D  F060          B = AMPCR.
021E  0233          AMPCR = ADDRBITERR - 1.MAKE CPCR = ADDRBITERR - 1
021F  F07A          B = B1TT.                       WHICH WILL BE WRITTEN INTO
0220  F051          A3 = B.                         LOC 0 IF AN ADDR BIT = 0.
0221  F079          B = B100.
0222  F07F          B = B R.      SET 8K ADDR BIT
0223  D200          SAR = 2.
              LPADDRBITTEST.
0224  F0DE          MIR = A3.
0225  F0D5          MAR1 = B.
0226  01D1          AMPCR = ERRSTERROR1 - 1.
0227  F0F3          MW1.
0228  422C          MPCR = CADDRBITTEST - 1.
0229  41D3          MPCR = ERRSTERROR2 - 1.
022A  41D3          MPCR = ERRSTERROR2 - 1.
              ADDRBITERRTN.
022B  E009          LIT = 9.
022C  82D2          CPCR = ERRCODECHK - 1.  ERROR #E58  ERR CODE NOT 9
              CADDRBITTEST.
022D  F080          B = BMAR.
022E  F07C          B = B L.       SET NEXT HIGHER ADDR BIT
022F  DF00          SAR = 15.
0230  F0FF          0 EQV B.
0231  F09D          IF ABT SKIP.
0232  4223          MPCR = LPADDRBITTEST - 1.
0233  423D          MPCR = MEMORYTEST - 1.
              ADDRBITERR.         HI ADDR BIT = 0
0234  F060          B = AMPCR.
0235  001D          AMPCR = PERTST - 1.  MAKECPCR = PERTST - 1
0236  F07A          B = B1TT.                 AND RESTORE LOC 0
0237  F0E1          MIR = B.
0238  F01C          A1 = BMAR.    SAVE ADDR
0239  F07B          B = 0.
023A  F0D5          MAR1 = B.
023B  F0F3          MW1.
023C  81F2          CPCR = DPMERR- 1.  ERROR #E69  HI ADDR BIT = 0
                *                                   A1 = BIT NO
023D  4219          MPCR = ADDRBITTEST - 1.   NO ERROR OVER-RIDE
              MEMORYTEST.
                *     THIS TEST WRITES ALL OF MEMORY FROM END OF PROG TO
                *     LIMIT THEN READS ALL OF MEMORY IN 14 WRITE/READ
                *     PASSES PER FOLLOWING TABLE.
                *           UNDER THE DATA COLUMN THE HEX CHAR TO THE L T
                *     OF / IS WRITTEN INTO ALL ADDRESSES OF SUB-MOD OF
                *     MEMORY EXCEPT THE UNIQUE ADDRESS FOR THAT SUB-MOD
                *     WHERETHE CHAR TO THE RIGHT OF / IS WRITTEN.
                *     THE UNIQUE ADDRESS IS THE MAX OR MIN ADDRESS OF A
                *     CHIP AND OF THE SUB-MOD DEPENDING ON PASS NO.
                *
                *     EXAMPLE MAX ADDR OF 1K SUB-MOD (1 CHIP) IS 03FF
                *               07FF,0FFF  ETC,  OF 2K IS 07FF,0FFF  ETC.
                *               MIN ADDR OF 1K IS 0400,0800,0C00     ETC.
                *     FOR A GIVEN PASS NO THE PATTERN IS REPEATED UNTIL
                *     MEMORY IS COMPLETELY WRITTEN AND IS PERIODIC WITH
                *     RESPECT TO UNIQUE ADDRESS.
                *
                * PATTERN  PASS  SUB-MOD    DATA        UNIQUE ADD  Z DISP
                *    0       1       1K   FFFF/0000        MIN      F2XX
                *    0       2       1K   0000/FFFF        MIN      F3XX
                *
                *    1       3       1K   0001/0000        MIN      F4XX
                *    1       4       1K   0000/0001        MIN      F5XX
                *
                *    2       5       1K   FFFF/0000        MAX      F6XX
                *    2       6       1K   0000/FFFF        MAX      F7XX
                *
                *    3       7       1K   0001/0000        MAX      F8XX
                *    3       8       1K   0000/0001        MAX      F9XX
                *
                *    4       9       2K   FFFF/0000        MAX      FAXX
                *    4       10      2K   0000/FFFF        MAX      FBXX
                *
                *    5       11      3K   FFFF/0000        MAX      FCXX
                *    5       12      3K   0000/FFFF        MAX      FDXX
                *
                *    6       13      4K   FFFF/0000        MAX      FEXX
                *    6       14      4K   0000/FFFF        MAX      FFXX
                *
023E  F10F          A1 = 0.    CLEAR TEST PATTERN COUNTER
023F  F0CA          LCTR.
0240  E00D          LIT = 13.     SET PASS COUNTER FOR 14 PASSES
              WRTMEMPASS2.      COMP
0241  F023          A2 = AMPCR.
0242  024C          AMPCR = WRTMEMERRTN - 1.
0243  F0CF          MAR1 = AMPCR.
0244  02EA          AMPCR = FINISH - 1.
              WRTMEM.
0245  F0FB          WHENRMI MAR1 = BMAR + 1.
0246  8271          CPCR = TSTFORTOPADDR - 1.
0247  82A5          CPCR = CHGMIRIFPATRN4 - 1.
0248  01D1          AMPCR =  ERRSTERROR1 - 1.
0249  F0F3          MW1.
024A  4244          MPCR = WRTMEM -1.
024B  41D3          MPCR = ERRSTERROR2 - 1.
024C  41D3          MPCR = ERRSTERROR2 - 1.
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                WRTMEMERRTN.
024D  E009          LIT  = 9.
024E  82D2          CPCR = ERRCODECHK - 1.  ERROR #E58    ERR CODE NOT 9
024F  0242          AMPCR = WRTMEM -3.
0250  F0BD          IF  NOT IRQ SKIP.          NO READ DELAY IF  LOOPING
0251  425C          MPCR = BEGINREAD - 1.    ON AN ERROR (IRQ  SWITCH ON)
0252  C21E          LIT  = 30  SAR = 2.      30  X 32.768    MS = 988.04    MS
                *       READ DELAY TIME  FOR NORM  PROG  MODE
                *
0253  F0BB          IF  NOT GC1 SKIP.
0254  C23D          LIT  = 61  SAR = 2.      61  X 32.768    MS = 1.998    SEC
                *       READ DELAY TIME  FOR LOOPING MODE
                *
0255  F038          A2  = LIT.
                READDELAY.
0256  F138          A3  = B111  L.
0257  81D6          CPCR = TIMER - 1.
0258  F02B          A2  = A2 - 1.
0259  F0B7          IF  NOT AOV SKIP.
025A  4255          MPCR = READDELAY- 1.
025B  82E1          CPCR = TESTEXTSWITCH - 1.
025C  82E6          CPCR = READWAIT - 1.
                BEGINREAD.
025D  F023          A2  = AMPCR.                    SET  ERROR RETN ADDRESS
025E  0293          AMPCR = RDMEMERRTN - 1.  IN  A2
025F  F0CF          MAR1 = AMPCR.
0260  02EA          AMPCR = FINISH  - 1.
                RDMEM.
0261  F0FB          WHENRMI MAR1 = BMAR + 1.
0262  01D1          AMPCR = ERRSTERROR1 - 1.
0263  F0F1          MR1.
0264  4266          MPCR = CRDMEM  - 1.
0265  41D3          MPCR = ERRSTERROR2 - 1.
0266  41D3          MPCR = ERRSTERROR2 - 1.
                CRDMEM.
0267  8271          CPCR = TSTFORTOPADDR - 1.
0268  82A5          CPCR = CHGMIRIFPATRN4 - 1.
0269  F08D          BMI.       EXPECTED DATA IS  IN  MIR
026A  F051          A3  = B.
026B  F0F9          WHENRDC BEX.
026C  F03C          A3  EQV B.
026D  F0B5          IF  NOT ABT SKIP.
026E  4260          MPCR = RDMEM  - 1.
026F  81F2          CPCR = DPMERR-  1.  ERROR# E60  MEM DATA OR ADDR ERR
                *                                   B  = ACTUAL DATA
                *                                   A3  = EXPECTED DATA
                *                               Z (CTR)  = COMPLIMENT PASS  NO
                *                                   A1  = PATTERN COUNT
                *                                   BMAR = ADDRESS
0270  0240          AMPCR = WRTMEMPASS2 - 1.     LOOP RETN ADDR
0271  4260          MPCR = RDMEM  - 1.
                TSTFORTOPADDR.    SET  MIR TO 1,S   OR 0,S   PER ADDRESS
                *                 AND PASS  NO.
                *                 TOP ADDR = MAX OR MIN OF SUB-MOD
                *                 DEPENDING ON PASS  NO.
                *                 UNCONDITIONAL OF HIGHER ADDR BITS
0272  F080          B  = BMAR.
0273  F109          A1 - LIT - 1.       IF  PATTERN COUNT IS  0  OR 1
0274  CA01          LIT  = 1 SAR = 10.  TEST IS  FOR MIN ADDR, IF  NOT
0275  F0B7          IF  NOT AOV SKIP.   TEST IS  FOR MAX ADDR
0276  F07E          B  = B + 1.
0277  F07C          B  = B L.
0278  F0FF          0  EQV B.
0279  F09D          IF  ABT SKIP.
027A  428C          MPCR = SETMIR-NOTTOP - 1.
027B  F060          B  = AMPCR.
027C  F100          AMPCR = A1 + AMPCR.
027D  029E          AMPCR = TOPADDRTABLE- 1.
027E  F05B          AMPCR = B.
027F  F09A          EXEC.  SET  LIT  & SAR PER TOP ADDR TABLE
0280  F080          B  = BMAR.
0281  F07C          B  = B L .
0282  F07F          B  = B R.      CLEAR 4  HIGHEST  ADDR BITS
0283  F0CB          LIT  EQV B.
0284  F09D          IF  ABT SKIP.
0285  428C          MPCR = SETMIR-NOTTOP - 1.
                SETMIR-TOP.              ADDRESS IS  TOP  OF SUB-MODULE
0286  F0E8          MIR = B111.          SET  MIR TO 1'S  IF  EVEN PASS
0287  F081          B  = NOT CTR R.      SET  MIR TO 0'S  IF  ODD PASS
0288  D800          SAR = 8.
0289  F05F          B.
028A  F0C2          IF  NOT LST JUMP.
028B  F0E6          MIR = 0.
028C  F0C9          JUMP.
                SETMIR-NOTTOP.    ADDRESS IS  NOT TOP  OF SUB-MODULE
028D  F0E8          MIR = B111.    SET  MIR TO 1'S  IF  ODD PASS
                *                  SET  MIR TO 0'S  IF  EVEN PASS
028E  F081          B  = NOT CTR R.
028F  D800          SAR = 8.
0290  F05F          B.
0291  F0B1          IF  LST JUMP.
0292  F0E6          MIR = 0.
0293  F0C9          JUMP.
                RDMEMERRTN.
0294  82D1          CPCR = ERRCODECHK - 2.  ERROR E64  DPM PARITY ERROR
                *                  NOTE-ERROR OVER-RIDE  WONT CONTINUE
                *                       READ PASS  BUT ADVANCE TO NEXT
                *                       WRITE PASS
0295  0240          AMPCR = WRTMEMPASS2 - 1.      LOOP RETN ADDR
0296  F030          INC.
0297  F0B8          IF  NOT COV SKIP.
0298  42AD          MPCR = SEQTESTWRT - 1.
0299  828C          CPCR = SETMIR-NOTTOP - 1.
029A  F08D          BMI.
029B  F05F          B.
029C  F0B5          IF  NOT ABT SKIP.
029D  F012          A1 = A1 + 1.       INC  TEST  PATTERN COUNTER
029E  4240          MPCR = WRTMEMPASS2 - 1.
                TOPADDRTABLE.     TOP  OF SUB-MODULE ADDRESSES
029F  C000          LIT  = 0 SAR = 0.       PASS 1-2    PATTERN 0
02A0  C000          LIT  = 0 SAR = 0.       PASS 3-4    PATTERN 1
02A1  C000          LIT  = 0 SAR = 0.       PASS 5-6    PATTERN 2
02A2  C000          LIT  = 0 SAR = 0.       PASS 6-7    PATTERN 3
02A3  CB1F          LIT  = @1F@ SAR = 11.   2K
02A4  CC0B          LIT  = @0B@ SAR = 12.   3K
02A5  CC0F          LIT  = @0F@ SAR = 12.   4K
                CHGMIRIFPATRN4.
02A6  F08D          BMI.      GET TEST  DATA WORD
02A7  F042          A3  = A1.
02A8  F0C2          IF  NOT LST JUMP.   IF  PATTERN COUNT IS  1  OR 3
02A9  F12C          A3 - LIT.           SHIFT  DATA TO MAKE PARITY
02AA  CF04          LIT  = 4 SAR = 15.  BIT  TEST  WORDS
02AB  F183          IF  AOV JUMP.
02AC  F0E5          MIR = B R.
02AD  F0C9          JUMP.
                SEQTESTWRT.  WRITE ADDRESS INTO EACH LOCATION
02AE  F023          A2  = AMPCR.
02AF  02B8          AMPCR = SEQTESTWRTERRTN - 1.
02B0  F0CF          MAR1 = AMPCR.
02B1  02EA          AMPCR = FINISH  - 1.
                CSEQTESTWRT.
02B2  F0FB          WHENRMI MAR1 = BMAR + 1.
02B3  F0E9          MIR = BMAR.
02B4  01D1          AMPCR = ERRSTERROR1 - 1.
02B5  F0F3          MW1.
02B6  42B1          MPCR = CSEQTESTWRT - 1.
02B7  41D3          MPCR = ERRSTERROR2 - 1.
02B8  41D3          MPCR = ERRSTERROR2 - 1.
                SEQTESTWRTERRTN.
02B9  E009          LIT  = 9.
02BA  82D2          CPCR = ERRCODECHK - 1.  ERROR# E58  NON ADDR HRD ERR
02BB  02AD          AMPCR = SEQTESTWRT - 1.            LOOP RETN ADDRESS
```

```
02BC  F023        A2 = AMPCR.
02BD  02CD        AMPCR = SEQTESTRDERRTN- 1.
02BE  F0CF        MAR1 = AMPCR.
02BF  02EA        AMPCR = FINISH - 1.
02C0  F05F        B.
              SEQTESTRD.
02C1  01D1        AMPCR = ERRSTERROR1 - 1.
02C2  F0FB        WHENRM1 MAR1 = BMAR + 1.
02C3  F0F1        MR1.
02C4  42C6        MPCR = CSEQTESTRD - 1.
02C5  41D3        MPCR = ERRSTERROR2 - 1.
02C6  41D3        MPCR = ERRSTERROR2 - 1.
              CSEQTESTRD.
02C7  F056        A3 = BMAR.
02C8  F0F9        WHENRDC BEX.
02C9  F03C        A3 EQV B.
02CA  F09D        IF ABT SKIP.
02CB  81F2        CPCR = DPMERR- 1.  ERROR# E80  DATA NOT = ADDRESS
              *                A3 = EXPECTED DATA & ADDRESS
              *                 B = ACTUAL DATA
02CC  02AD        AMPCR = SEQTESTWRT - 1.        LOOP RETN ADDRESS
02CD  42C0        MPCR = SEQTESTRD - 1.
              SEQTESTRDERRTN.
02CE  82D1        CPCR = ERRCODECHK - 2.  ERROR E82  SEQ PATTERN PE
02CF  02AD        AMPCR = SEQTESTWRT - 1.        LOOP RETN ADDRESS
02D0  F01F        RESET GC2.
02D1  4170        MPCR = HIBITSTEST - 1.
02D2  E00B        LIT = @0B@.
              ERRCODECHK.
02D3  F078        B = B0TT.       RESET EXCEPTION BIT
02D4  F0CB        LIT EQV B.
02D5  F09C        IF ABT JUMP.
02D6  41F2        MPCR = DPMERR- 1.
              DAEDIAG.  DPM ADR ERR DIAGNOSTIC
02D7  F023        A2 = AMPCR.                SET ERROR RETN ADDR
02D8  02DE        AMPCR = NODAE - 1.         IN A2
02D9  F05F        B.
02DA  0038        AMPCR = NAETESTWORD - 1.       CHECK FOR NANOADDR ER
02DB  F09A        EXEC.
02DC  81F2        CPCR = DPMERR- 1.  ERROR #E74  NO DAE & NO NAE
02DD  00F1        AMPCR = DAERTEST - 1.      LOOP RETN ADDR
02DE  80F1        CPCR = DAERTEST - 1.       NO ERROR OVER-RIDE
              NODAE.
02DF  81F2        CPCR = DPMERR- 1.    ERROR #E76    NO DAE
02E0  00F1        AMPCR = DAERTEST - 1.      LOOP RETN ADDR
02E1  80F1        CPCR = DAERTEST - 1.       NO ERROR OVER-RIDE
              TESTEXTSWITCH.
02E2  F0A0        IF EXT SKIP.          JUMP IF EXT SWITCH IS SET
02E3  F1E7        RETN.                 RETN IF NOT
02E4  F0A0        IF EXT SKIP.
02E5  F1E7        RETN.
02E6  F0C9        JUMP.
              READWAIT.
02E7  F001        A1.
02E8  F0B2        IF LST SKIP.    CHECK PATTERN COUNT FOR ODD/EVEN
02E9  40FD        MPCR = EVENWAIT - 1.
02EA  40FF        MPCR = ODDWAIT - 1.
              FINISH.
              *
```

```
*  NORMAL INSTRUCTION SEQUENCE (MEM IS8K )
*   019C - 1000 - 1001 - 0FF7 - 0FF8 - 0FF9 - 0FFB
*   0FFC - 0FFD - 0FFE - 1000 - 1002 - 1003 - 0FFF
*   1000 - 1005 - 1006 - 1008 - 1009 - 100A - 100B
*   002F - 100C - 100D - 100E - 100F - 01A7
*
*MICRO  MICRO
*ADDRS  CODE
*
*0FF3   F0F1      MR1.          TO TEST HIGH ADDRESS ERRST
*0FF4   41D3      MPCR = ERRSTERROR2 - 1.
*0FF5   41D3      MPCR = ERRSTERROR2 - 1.
*0FF6   41D3      MPCR = ERRSTERROR2 - 1.
*0FF7   0FF8      AMPCR = @0FF8@.  TEST AMPCR HIGH BITS
*0FF8   F0C9      JUMP.  SA = +1   TEST A + 1 HIGH BITS
*0FF9   F0F7      SKIP.            TEST M + 2 HIGH BITS
*0FFA   F000      WAIT.            FILLER
*0FFB   F0F5      SAVE.            TEST SAVE HIGH BITS
*0FFC   F1E7      RETN.  SA = +1   TEST A + 2 HIGH BITS
*0FFD   1000      AMPCR = @1000@.
*0FFE   F0F7      SKIP.            TEST M + 2 CARRIES
*0FFF   F05F      B.               TEST M + 1 CARRIES
*1000   F1E7      RETN.  SA = +1,  +2,  +5
*                                  TEST A + 2 CARRIES
*1001   4FF6      MPCR = @0FF6@.   TEST MPCR HIGH BITS
*1002   0001      AMPCR = 1.
*1003   8FFE      CPCR = @0FFE@.   SAVE BIT 0
*1004   F000      WAIT.            FILLER
*1005   5005      MPCR = @1005@.   TEST MPCR BIT 0
*1006   F0F7      SKIP.            TEST M + 2
*1008   1009      AMPCR = @1009@.
*1007   F000      WAIT.
*1009   F0C9      JUMP.            TEST A + 1
*100A   002E      AMPCR = SGC1 - 1.
*100B   F09A      EXEC.
*100C   F189      IF GC 1 STEP ELSE WAIT.
*100D   F00C      RESET GC1.       PREP FOR NANOOOE
*100E   900F      CPCR = @100E@.   TEST TYPE 2 DECODE
*100F   41A6      MPCR = ADRERR - 1.
*1010   F0F1      MR1.    TO TEST HIGH ADDRESS ERRST
*1011   41D3      MPCR = ERRSTERROR2 - 1.
*1012   41D3      MPCR = ERRSTERROR2 - 1.
*1013   41D3      MPCR = ERRSTERROR2 - 1.
*
*  NORMAL INSTRUCTION SEQUENCE (MEM IS10K OR 12K)
*   019C - 2000 - 2001 - 1FF7 - 1FF8 - 1FF9 - 1FFB
*   1FFC - 1FFD - 1FFE - 2000 - 2002 - 2003 - 1FFF
*   2000 - 2005 - 2006 - 2008 - 2009 - 200A - 200B
*   002F - 200C - 200D - 200E - 200F - 01A7
*
*MICRO  MICRO
*ADDRS  CODE
*
*1FF3   F0F1      MR1. TO TEST HIGH ADDRESS ERRST
*1FF4   41D3      MPCR = ERRSTERROR2 - 1.
*1FF5   41D3      MPCR = ERRSTERROR2 - 1.
*1FF6   41D3      MPCR = ERRSTERROR2 - 1.
*1FF7   1FF8      AMPCR = @1FF8@.  TEST AMPCR HIGH BITS
*1FF8   F0C9      JUMP.  SA = +1   TEST A + 1 HIGH BITS
*1FF9   F0F7      SKIP.            TEST M + 2 HIGH BITS
*1FFA   F000      WAIT.            FILLER
```

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*1FFB   F0F5        SAVE.               TEST SAVE HIGH BITS
*1FFC   F1E7        RETN.  SA = +1      TEST A + 2 HIGH BITS
*1FFD   2000        AMPCR = @2000@.
*1FFE   F0F7        SKIP.               TEST M + 2 CARRIES
*1FFF   F05F        B.                  TEST M + 1 CARRIES
*2000   F1E7        RETN.  SA = +1,     +2 +5
*                                       TEST A + 2 CARRIES
*2001   5FF6        MPCR = @1FF6@.      TEST MPCR HIGH BITS
*2002   0001        AMPCR = 1.
*2003   9FFE        CPCR = @1FFE@.      SAVE BIT X
*2004   F000        WAIT.               FILLER
*2005   A005        MPCR = @2005@.      TEST MPCR BIT X
*2006   F0F7        SKIP.               TEST M + 2
*2007   F000        WAIT.
*2008   2009        AMPCR = @2009@.
*2009   F0C9        JUMP.               TEST A + 1
*200A   002E        AMPCR = SGC1 - 1.
*200B   F09A        EXEC.
*200C   F189        IF GC1 STEP ELSE WAIT.
*200D   F00C        RESET GC1.          PREP FOR NANO 00E
*200E   A00E        CPCR = @200E@       TEST TYPE 2 DECODE
*200F   41A6        MPCR = ADRERR - 1.
*
*  NORMAL INSTRUCTION SEQUENCE (MEM IS 14K OR MORE)
*    019C - 3000 - 3001 - 2FF7 - 2FF8 - 2FF9 - 2FFB
*    2FFC - 2FFD - 2FFE - 3000 - 3002 - 3003 - 2FFF
*    3000 - 3005 - 3006 - 3008 - 3009 - 300A - 300B
*    002F - 300C - 300D - 300E - 300F - 01A7
*
*MICRO  MICRO
*ADDRS  CODE
*
*2FF3   F0F1        MR1. TO TEST HIGH ADDRESS ERRST
*2FF4   41D3        MPCR = ERRSTERROR2 - 1.
*2FF5   41D3        MPCR = ERRSTERROR2 - 1.
*2FF6   41D3        MPCR = ERRSTERROR2 - 1.
*2FF7   2FF8        AMPCR = @2FF8@.     TEST AMPCR HIGH BITS
*2FF8   F0C9        JUMP.  SA = +1      TEST A + 1 HIGH BITS
*2FF9   F0F7        SKIP.               TEST M + 2 HIGH BITS
*2FFA   F000        WAIT.               FILLER
*2FFB   F0F5        SAVE.               TEST SAVE HIGH BITS
*2FFC   F1E7        RETN.  SA = +1      TEST A + 2 HIGH BITS
*2FFD   3000        AMPCR = @3000@.
*2FFE   F0F7        SKIP.               TEST 7 + 2 CARRIES
*2FFF   F05F        B.                  TEST M + 1 CARRIES
*3000   F1E7        RETN.  SA = +1,     +2, +5
*                                       TEST A + 2 CARRIES
*3001   6FF6        MPCR = @2FF6@.      TEST MPCR HIGH BITS
*3002   0001        AMPCR = 1.
*3003   AFFE        CPCR = @2FFE@.      SAVE BIT X & 0
*3004   F000        WAIT.               FILLER
*3005   7005        MPCR = @3005@.      TEST MPCR BIT X & 0
*3006   F0F7        SKIP.               TEST M + 2
*3007   F000        WAIT.
*3008   3009        AMPCR = @3009@.
*3009   F0C9        JUMP.               TEST A + 1
*300A   002E        AMPCR = SGC1 - 1.
*300B   F09A        EXEC.
*300C   F189        IF GC1 STEP ELSE WAIT.
*300D   F00C        RESET GC1.          PREP FOR NANO 00E
*300E   B00E        CPCR = @300E@.      TEST TYPE 2 DECODE
*300F   41A6        MPCR = ADRERR - 1.
```

MANUAL PROCEDURES

E2	OPERATOR ACTION (READ LOC 0 FAILS) SET IRQ SWITCH TO IRQ THEN PRESS SYSTEM CLEAR	RESPONSE PROG WILL LOOP ON READ 0	YES	NO
	1.METER SM7-1B (CDSCLKB)	1.5 - 3.0 %	2	F1
	2.METER EO2-2G (EOB51)	0 %	3	F113
	3.METER EO2-2V (EODATCY)	1 - 8 %	4	F2
	4.METER EO2-1R (EOWRITE)	0 %	6	5
	5.METER EO2-1I (EOB52)	0 %	F64	F65
	6.METER EO2-2Q (EOMDSB)	1 - 8 %	7	F7
	7.SET SGL SWITCH TO SGL PRESS SGL PB UNTIL WAIT IND IS ON (INDICATING DATA CYCLE) THEN METER THE FOLLOWING SMADR'N'/ SIGNALS			
	A. SM5 2T 1U 1V 2U	ALL 100 %	7B	F66
	B. SM5 1E 2E 2D 2F	ALL 100 %	7C	F67
	C. SM4 2V 1W 2R 2Q	ALL 100 %	7D	F68
	D. SM4 1Q 2P 2H 1H	ALL 100 %	8	F69
	8.SET IRQ SWITCH TO CENTER SET SGL SWITCH TO NORM WHEN ERROR E2 RECURS PRESS FORCE STEP OBSERVE MIR	DIGIT A = 8	9	F6
	9.OBSERVE MIR	DIGIT B = 0	10	F8
	10.OBSERVE MIR	DIGIT C = 1	F10	F9
E3	F11			
E4	OPERATOR ACTION (DPM ADDRESS BIT = 0)	RESPONSE	YES	NO
	1.PRESS FST 5 TIMES & OBSERVE MIR (DPM ADDRESS). FIND NEXT STEP ACCORDING TO DIGIT WITH BIT(S) ON.	DIGIT A 2 B F68 C F67 D F66		
	2.SET SGL SWITCH TO SGL REMOVE STC,DMC & DDC CARDS (L&M BKPLN) SET SGL SWITCH TO NORM PRESS CLEAR	ERROR E4 RECURS 3	F151	

NOTE IF CARD REMOVED WAS CAUSING E4, THE SMCU PROG WILL NO LONGER BE ACCESSABLE. A HALT CONDITION WILL OCCUR DUE TO UNDEFINED MEMORY CONTENT.

3.SET SGL SWITCH TO SGL
REMOVECLB & CLC CARDS FROM I PMLC
SET SGL SWITCH TO NORM
PRESS CLEAR ERROR E4 RECURS 4 5

NOTE IF NO PMLC IN SYSTEM
USE FAILURE F79

4.CLB & CLC CARDS OF ALL
PMLC'S REMOVED F79 3

5.SIGNAL SMADR01/, 02/, OR 03/ AT
FAULT IN PMLC - INSTALL ALL CARDS
AND GO TO M1 OF PMLCMTR.

E5 F11

E6 F12

E7 F18

E8 F33

E9 F14

E10 F63

E11 F14

E12	OPERATOR ACTION (EXT = 0)	RESPONSE	YES	NO
	SET IRQ SWITCH TO IRQ THEN PRESS SYSTEM CLEAR.	(PROG WILL LOOP ON EXT TEST)		
	1.METER SM4-1B (CDSCLKA)	3 - 5 %	2	F1
	2.METER SM4-2C (CUREXT/)	SEE NOTE 1	3	F35
	3 SCOPE SM4-1C (SMEXT/)	NEG 2-6 US,125 MS PER	F32	F34
	NOTE 1 CONSIDER 0% OR 100% AS INCORRECT ANY OTHER READING AS CORRECT			
E14	OPERATOR ACTION (EXT NOT RESET BY TEST)	RESPONSE	YES	NO
	SET IRQ SWITCH TO IRQ THEN PRESS SYSTEM CLEAR.	(PROG WILL LOOP ON EXT TEST)		
	1.METER SM4-2C (CUREXT/)	SEE NOTE 1	F33	F35

E15 F15

E16 F36

E17 NOT USED

E18	OPERATOR ACTION	RESPONSE	YES	NO
	1.PRESS FST & OBSERVE MIR	MIR = 0	F29	F16
E19	OPERATOR ACTION	RESPONSE	YES	NO
	1.PRESS FST & FIND FAILURE PER CONTENTS OF MIR DIGIT D	MIR D / FAILURE: 0 F73; 4 F76; 5 F74; 9 F75		

E20 F37

E21	OPERATOR ACTION	RESPONSE	YES	NO
	1.OBSERVE WAIT INDICATOR	ON	F119	2
	2.SET SGL SWITCH TO SGL THEN PRESSING SGL PB OBSERVE MPM	ALTERNATING ON 2 PATTERNS	3	F122
	3.METER EO2-1M (EOASPRST)	100%	F116	F115
E22	OPERATOR ACTION (WRITE/READ ERROR)	RESPONSE	YES	NO
	SET IRQ SWITCH TO IRQ THEN PRESS SYSTEM CLEAR	(PROG WILL LOOP ON WRITE/READ TEST)		
	1.METER EO2-2Q (EOMDSB)	4 - 10 %	2	F20
	2.METER EO2-IR (EOWRITE)	4 - 10 %	3	2A
	A.METER EO2-11 (EOB52)	4 - 10 %	F21	F3
	3.METER CON1-2K (ECON TEST PT)	0 %	4	F19

4.SET IRQ SWITCH TO CENTER (PROG WILL STOP AT E22)
PRESS FST & NOTE MIR (ACTUAL DATA)

5.PRESS FST & NOTE MIR (EXPECTED DATA)

6.COMPARING EXPECTED & ACTUAL DATA
DETERMINE BIT NO. (1-16) IN ERROR.

7.METER THE SMDTM(N) SIGNAL HAVING SAME
BIT NO. AS THAT FROM STEP 6.
(100% IF BIT WAS ON IN STEP 5 ELSE 0 %)

FAILING BIT NO.				YES	NO
01	SM7-1I	(SMDTM01)	CORRECT	F107	8
02	SM7-1G	(SMDTM02)	CORRECT	F107	8
03	SM7-1H	(SMDTM03)	CORRECT	F106	8
04	SM7-2G	(SMDTM04)	CORRECT	F106	8
05	SM7-2M	(SMDTM05)	CORRECT	F152	8
06	SM7-1N	(SMDTM06)	CORRECT	F153	8
07	SM7-2N	(SMDTM07)	CORRECT	F154	8
08	SM7-2L	(SMDTM08)	CORRECT	F154	8
09	SM6-1I	(SMDTM09)	CORRECT	F103	8
10	SM6-1G	(SMDTM10)	CORRECT	F103	8
11	SM6-1H	(SMDTM11)	CORRECT	F102	8
12	SM6-2G	(SMDTM12)	CORRECT	F102	8
13	SM6-2M	(SMDTM13)	CORRECT	F101	8
14	SM6-1N	(SMDTM14)	CORRECT	F101	8
15	SM6-2N	(SMDTM15)	CORRECT	F100	8
16	SM6-2L	(SMDTM16)	CORRECT	F100	8

8.METER THE MIRD SIGNAL HAVING SAME
BIT NO. AS THAT FROM STEP 6.
(0% IF BIT WAS ON IN STEP 5 ELSE 100 %)

FAILING BIT NO.				YES	NO
01	MIRD-2B	(MIRD01/)	CORRECT	F27	F22
02	2C	(MIRD02/)	CORRECT	F27	F22
03	2D	(MIRD03/)	CORRECT	F27	F22
04	2E	(MIRD04/)	CORRECT	F27	F22
05	2F	(MIRD05/)	CORRECT	F26	F22
06	2G	(MIRD06/)	CORRECT	F26	F22
07	2H	(MIRD07/)	CORRECT	F26	F22
08	2I	(MIRD08/)	CORRECT	F26	F22
09	2J	(MIRD09/)	CORRECT	F24	F22
10	2K	(MIRD10/)	CORRECT	F24	F22

11	2L (MIRD11/)	CORRECT	F24	F22
12	2M (MIRD12/)	CORRECT	F24	F22
13	2N (MIRD13/)	CORRECT	F23	F22
14	2T (MIRD14/)	CORRECT	F23	F22
15	2S (MIRD15/)	CORRECT	F23	F22
16	2R (MIRD16/)	CORRECT	F23	F22

E23 OPERATOR ACTION — RESPONSE — YES — NO

(EXT BUSS FAULT)

1.PRESS FST & NOTE MIR, THEN SET IRQ SWITCH TO IRQ THEN PRESS SYSTEM CLEAR. (PROG WILL LOOP ON EXT BUSS TEST)

2.METER EO2-2Q (EOMDSB) — 0% — 3 — F5

3.METER CON1-2K (ECON TEST PT) — 0% — 4 — F121

4.USING MIR VALUE FROM STEP 1 FIND F# PER BITS SET IN MIR

MIR BIT ON	FAILURE
1 OR 2	F107 & F109
3 OR 4	F106 & F109
5 OR 6	F105 & F110
7 OR 8	F104 & F110
9 OR 10	F103 & F111
11 OR 12	F102 & F111
13 OR 14	F101 & F112
15 OR 16	F100 & F112

E24 OPERATOR ACTION (PARITY OR ADDRESS ERROR) — RESPONSE — YES — NO

1.NOTE VALUE OF MIR DIGIT D

2.PRESS FST & OBSERVE MIR & FIND SAME VALUE IN INCR COLUMN OF PROG LISTING FOR NEXT STEP. IF NO REF TO E24 IS FOUND THERE, GO TO E24 STEP 3

3.REF MIR DIGIT D FROM STEP 1 (ERROR CODE) FOR NEXT STEP — DIGIT D

4	5
6	4

4.EXCHANGE MPA-1 & MPB-1 WITH ANY OTHER SET OF MPA/MPB CARDS THEN RELOAD SMCU MTR.

5.GO TO FEMT MTR. (NANO PARITY ERROR)

E25

1 RESTART MTR

2 WHEN PROGRAM HALT 2 OCCURS SET SGL SWITCH TO SGL HOLDING FST, PRESS SGL PB — WAIT IND OFF — 3 — 2

3 PRESSING SGL PUSHBUTTON SINGLE STEP THRU PROGRAM CHECKING INCR AGAINST NORMAL INSTRUCTION SEQUENCE IN PROG LISTING OBSERVE SEQUENCE ERROR

4 FIND SEQUENCE ERROR IN FOLLOWING LIST

*
*
* VALUES LISTED UNDER 'INCR' &
* 'SEQUENCE ERROR' ARE FOR 14K
* OR MORE MEMORY WORDS
* FOR 8K - CHANGE MOST SIG DIG
* FROM 2 TO 0
* FROM 3 TO 1
*
* FOR 10K OR 12K
* FROM 2 TO 1
* FROM 3 TO 2

INCR	SEQUENCE ERROR	FAILURE NO.
002F	002F/000D	F70
00D7	0197/0000	F58
	0197/1000	F39
	0197/2000	F40 F41
2FF7	2FF7/0FF8	F46
2FF8	2FF8/3FF9	F56
2FF9	2FF9/0FFB	F47
2FFC	2FFC/0FFD	F77
2FFC	2FFC/3FFD	F48 F44
2FFE	2FFE/0000	F49 F53
	2FFE/1000	F49
	2FFE/2000	F49 F53 F54
2FFF	2FFF/0000	F55
	2FFF/1000	F55
	2FFF/2000	F55 F57

INCR	SEQUENCE ERROR	FAILURE NO.
3000	3000/0001	F42
	3000/0005	F61
	3000/1001	F43
	3000/1004	F61
	3000/2001	F44 F48
	3000/2002	F50
	3000/2003	F51
3001	3001/0FF7	F62
	3001/3FF7	F45
3002	3002/2005	F78
	3002/2003	F78 F54

3005	HALTED	F99
3005	3005/2006	F45
3006	3006/3008	F49
3009	3009/300A	F38
300B	300B/102F	F54
	300B/202F	F60
300C	WAIT	F61
300E	300E/002F	F99
300E	300E/302F	F99

*

E26 OPERATOR ACTION — RESPONSE — YES — NO

1.METER CU1-2P (PSSRQ/) — 100% — F114 — 2
2.SRQ (DATA INTERRUPT) IS SET. THIS ERROR WILL BE DIAGNOSED BY SYSTEM CONTROLLER DEVICE MTR. PRESS FST 7 TIMES TO OVERRIDE & CONTINUE SMCU.

E28 F21

E29 F82

E30 PARITY CHECK OCCURRING ON WRITE. GO TO FAILURE F30.

E31 PARITY CHECK OCCURRING ON WRITE. GO TO FAILURE F30.

E32 INCORRECT PARITY GENERATION ON WRITE. GO TO FAILURE F97.

E34 F3

E45 F83

E48 OPERATOR ACTION — RESPONSE — YES — NO

1.SET ERS SWITCH TO ERS THEN PRESS SYSTEM CLEAR — ERROR E21 OCCURS — F84 — F85

E49 DID E49 OCCUR PRIOR TO PROG STEP 1 — F85 — F87

E50 OPERATOR ACTION — RESPONSE — YES — NO

1.DID E50 OCCUR PRIOR TO PROG STEP 1 — F86 — 2

2.DID E50 OCCUR PRIOR TO PROG STEP 3 — F87 — F88

E52 OPERATOR ACTION — RESPONSE — YES — NO

1.PRESS FST & FIND FAILURE PER CONTENTS OF MIR

MIR	
0000	F89
0001	F90
0004	F91
0007	F92

E53 OPERATOR ACTION — RESPONSE — YES — NO

1.SET IRQ SWITCH TO IRQ THEN PRESS SYSTEM CLEAR.
METER CON1-1K (ECON TEST PT) — 0 % — F93 — F123

E54 F94

E55 OPERATOR ACTION — RESPONSE — YES — NO

1.SET IRQ SWITCH TO IRQ & PRESS SYSTEM CLEAR (PROG LOOPS)
METER EO2-1R (EOWRITE) — 1 - 5 % — 2 — F21

2.METER EO2-1I (EOB52) — 1 - 5 % — F96 — F95

E56 F124

E57 OPERATOR ACTION — RESPONSE — YES — NO

1. OBSERVE MIR — MIR = 0 — 3 — 2

2. CHECK JUMPERS ON CON1 CARD. IF CORRECT FIND F# PER DIGIT OF CONFIGURATION IN ERROR.

DIGIT	
A	F125
B	F126
C	F127
D	F128

3. SET IRQ SWITCH TO IRQ, PRESS FST
METER CON1-2K (ECON TEST PT) — 20 - 30 % — 2 — 4

4. METER CON1-1Y (CG3CLKB) — 1 - 4 % — F80 — F81

E58 OPERATOR ACTION (UNEXPECTED HARD ERROR CODE) — RESPONSE — YES — NO

1.REMOVE UCDD DDP - RE-RUN SMCU — ERROR RECURS — 2 — 3

2.RE-INSERT DDP - GO TO M1 OF UCDD MTR (DO NOT LOAD UCDD MTR)

3.REMOVE CLB & CLC CARDS FROM PMLC RE-RUN SMCU — ERROR RECURS — 5 — 4

4.RE-INSERT CARDS - GO TO M1 OF PMLC MTR (DO NOT LOAD PMLC MTR)

5.REPEAT STEP 3 IF MORE THAN ONE PMLC

E59 OPERATOR ACTION (NO MPMPE (E64) WITH MPA-2 REMOVED) — RESPONSE — YES — NO

1.FIND FAILURE NO. PER ERROR THAT DID OCCUR

E60	F108	
E78	F31	

E60 (DPM DATA OR ADDRESS ERROR)

1.PRESS FST & RECORD MIR (B REG = ACTUAL DATA)

2.PRESS FST & RECORD MIR (A3 REG = EXPECTED DATA)

3.PRESS FST 3 TIMES &
RECORD MIR (BMAR = MEM ADDRESS)
ADD 1 TO THE HEX VALUE OF DIGIT A.
THE RESULT (IN DECIMAL) IS THE DASH NO OF FAULTY MPA OR MPB CARD.(EX DIGIT A = 9, DASH NO = 10)
SUBSTITUTE DASH NO FOR (*) IN FAILURE.
ALSO NOTE VALUE OF DIGIT B BITS 8 & 4 (GROUP SELECT)

4.COMPARE ACTUAL DATA WITH EXPECTED AND DETERMINE BIT NO OF BIT(S) IN ERROR.
FIND NEXT STEP PER NO OF BIT(S) IN ERROR.

BITS 1 THRU 16 ALL INCORRECT	5
BITS 1 THRU 9 ALL INCORRECT	F129
BITS 10 THRU 16 ALL INCORRECT	F130
OTHER	7

NOTE-DIGIT A BITS 8,4,2,1
EQUAL MPM BITS 1,2,3,4 ETC

5.SET IRQ SWITCH TO IRQ THEN PRESS
SYSTEM CLEAR.(PROG WILL LOOP) PERIODIC SWINGS
METER EO2-2Q (EOMDSB) OF APPROX 1-3% 6 F71
(ANY SWITCHING OK)

6.METER THE MACS(*) SIGNAL WHERE(*)
IS DASH NO FROM STEP 3.
READING SHOULD BE PERIODIC
DEFLECTIONS OF APPROX 1 %
(CONSIDER ANY SWITCHING CORRECT)

SIGNAL	TERM	YES	NO
MACS01	MADD1-1U	F135	F131
MACS02	MADD1-2X	F135	F131
MACS03	MADD1-1V	F135	F131
MACS04	MADD1-2U	F135	F131
MACS05	MADD1-2V	F135	F132
MACS06	MADD1-1W	F135	F132
MACS07	MADD1-2W	F135	F132
MACS08	MADD1-1X	F135	F132
MACS09	MADD2-1U	F136	F133
MACS10	MADD2-2X	F136	F133
MACS11	MADD2-1V	F136	F133
MACS12	MADD2-2U	F136	F133

NOTE IF READING IS 0% (GRD)
USE BOTH YES & NO FAILURES

7.IS ERROR DUE TO PICKED BIT(S) 8 10

8.DID ERROR E64 PRECEED E60 10 9

9.REMOVE ALL PS1 CARDS INCLUDING
I/O BACK PLANE.
RE-RUN MTR ERROR RECURS 10 F113

10.IS ERROR SINGLE BIT 12 11

11.ARE FAILING BITS BETWEEN 1 AND 9 F137 F138

12.GO TO FEMT MTR M30 TO ISOLATE
FAILURE USING VALUES RECORDED
IN STEPS 1,2 & 3.

E64 (DPM PARITY ERROR)

1.PRESS FST 5 TIMES & NOTE MIR FOR
ADDRESS OF PARITY ERROR.

2.TO DETERMINE DATA CONTENT SET
IDP/ERS SWITCH TO IDP & RE-RUN MTR.
DPM PARITY ERROR IS NOWINHIBITED.

E60 (DATA ERROR) SHOULD OCCUR AND
CAN BE USED TO DIAGNOSE FAILURE.

IF MTR NOWRUNS WITHOUT ERROR THE
PARITY BIT (MPM 17) IS FAULTY.
USING ADDRESS FROM STEP 1 GO TO FEMT MTR M30.

NOTE IF E64 CONTINUES AFTER IDP
SWITCH IS SET TO IDP GO TO FAILURE F120

E66 F134

E68 F13

E69 F139

E70 F140

E71 F141

E76 OPERATOR ACTION RESPONSE YES NO

1.SET IRQ SWITCH TO IRQ
PRESS SYSTEM CLEAR (PROG LOOPS)

METER SM4-2G (SMAEF/) 95 - 99 % F142 F72

E78 OPERATOR ACTION RESPONSE YES NO

1.PRESS FST & OBSERVE MIR
FOR FAILURE NO.

MIR	
8000	F148
8001	F143
8003	F145
8007	F146
8009	F147
800F	F144
OTHER	F149

E80 (MEM DATA NOT = ADDRESS)

1.PRESS FST AND OBSERVE MIR.
(ACTUAL DATA)

2.PRESS FST AND OBSERVE MIR.
(MEM ADDRESS & EXPECTED DATA)
ADD 1 TO HEX VALUE OF DIGIT A.
THE RESULT (IN DECIMAL) IS THE DASH
NO. OF FAULTY MPA OR MPB CARD.

3.IF ACTUAL & EXPECTED DATA DIFFER IN
BITS 1 THRU 9 FAULT IS ON AN MPA CARD.
IF DIFFERENCE IS IN BITS 10 THRU 16
FAULT IS ON AN MPB CARD.
USE FAILURE F135 OR F136 RESPECTIVELY.
ALSO USE FAILURE F150

E82 (SEQ PATTERN DPM PARITY ERROR)

1.PRESS FST TWICE & OBSERVE MIR
FOR ADDRESS OF ERROR.
ADD 1 TO HEX VALUE OF DIGIT A.
THE RESULT (IN DECIMAL) IS THE DASH
NO. OF FAULTY MPA OR MPB CARD.

2.SET IDP SWITCH TO IDP THEN
RE-RUN MTR. E80 SHOULD OCCUR & WILL
DIAGNOSE FAILURE. IF MTR NOWRUNS
WITHOUT ERROR THE PARITY BIT (MPM 17)
IS FAULTY. USING DASH NO. FROM STEP 1
GO TO FEMT MTR M30.

FAILURE DICTIONARY

		SOURCE REF
F1	CD1 A7 C3 D3	2
F2	EO2 A3 A7 B3 B5 C3 F9	2
F3	EO2 A3 A7 B3 C3	34
F4	EO2 G5	2
F5	EO2 C9 D9	23
F6	SM7 A3 A7 C7 D7 LU6-1 C3 D3	2
F7	EO2 A9 A9 B3 B7 C7 C9 D9 G7 MU3 C1	2
F8	SM7 B5 B7 LU6-2 C3 D3	2
F9	SM6 A3 A7 C7 D7 LU7-1 C3 D3	2
F10	SM6 B5 B7 LU7-2 C3 D3	2
F11	EO2 B5 G5	3
F12	SM4 A7 B5 B7 F3 CU1 BC3 D3 FE4 EXT SWITCH	6
F13	SM4 C7	69
F14	EO2 A3 A9 B3 B7 CU1 D7	9,11
F15	EO2 A7 B5 D3 F5	15
F16	EO2 F7 G7	18
F17	EO2 B3 B9 D7	19
F18	EO2 B7	7
F19	CON1 C7 D5	22
F20	EO2 C7 D9	22
F21	EO2 F5 22 28	55
F22	USE LINE NO. CORRESPONDINGTO FAILING BIT NO. SM6 OR 7 CHIPS APPLY ONLY IF MIRD(N) SIGNAL WAS 0% (GRD).	22

MIRD BIT #

01	MIRD A5 B5 B7	SM7 E7
02	MIRD A5 B5 B7	SM7 E7
03	MIRD A7 B5 B7	SM7 E7
04	MIRD A5 B5 B7	SM7 E7
05	MIRD A5 B5 B7	SM7 F7
06	MIRD A7 B5 B7	SM7 F7
07	MIRD A7 C7 D7	SM7 F7
08	MIRD A7 C7 D7	SM7 F7
09	MIRD C7 E5 F7	SM6 E7
10	MIRD C7 E5 F5	SM6 E7
11	MIRD E5 E7 F7	SM6 E7
12	MIRD E5 E7 F7	SM6 E7
13	MIRD E5 E7 F7	SM6 F7
14	MIRD D7 E7 F5	SM6 F7
15	MIRD D7 E7 F5	SM6 F7
16	MIRD E5 E7 F5	SM6 F7

F23	SM6 B5 B7 F7	22
F24	SM6 C7 D7 E7	24
F25	EO2 G5	5
F26	SM7 B5 B7 F7	24
F27	SM7 C7 D7 E7	24
F28	EO2 A7 A9 B3 B7	7
F29	EO2 D3 D7	18
F30	SM5 D5	30,31
F31	EO2 F3	59
F32	CU1 BC3 D3	12
F33	SM4 A7 B7	14
F34	SM4 A3 A5 A7 B3 B5 B7 C3 D3 F3	12
F35	CU1 A5 B7	12,14
F36	SM4 A3 B3 B5 B7 C3 D3 E3	16
F37	SM4 A3 A5 A7 B3 C3 D3	20
F38	MU6-4 E7	25
F39	MU6-4 A5 A7 B1 C3 E5 E7	25
F40	MU6-4 E7 F5	25
F41	MU6-1 E7	25
F42	MU6-4 D7	25
F43	MU6-4 D7 E5	25
F44	MU6-1 D7	25
F45	MU6-4 F7	25
F46	MU6-4 B7 C3 F7	25
F47	MU6-4 E3 E5	25
F48	MU6-4 D7 F5	25
F49	MU6-4 E3	25
F50	MU6-4 A7 C3 D7 F1	25
F51	MU6-4 A5 C3 F1	25
F52	NOT USED	25
F53	MU6-1 E3	25
F54	MU6-4 F5	25
F55	MU6-4 D3	25
F56	MU6-4 B1	25
F57	MU6-1 D3	25
F58	MU6-4 A5 A7 B1 B7 C3 E7	25

F59	EO2 B7 C9	P
F60	MU6-4 E5	25
F61	MU6-4 A5	25
F62	MU6-4 D3 E5 F7	25
F63	SM4 A5 B3 D1 F7	10
F64	EO2 F5	2
F65	EO2 A7 B5 D3	2
F66	SM5 D7	2,P
F67	SM5 C7	2
F68	SM4 E7	2
F69	SM4 D7	2 4
F70	MU6-4 B7	25
F71	EO2 A9 B7	60
F72	SM4 A5 C5 C7 D1 F3	P 76
F73	EO2 F7	19
F74	EO2 A3 E5 E9	19
F75	EO2 C3 E3 E9	19
F76	EO2 B3 B9 D7	19
F77	MU6-4 A5 C3	25
F78	MU6-4 C3	25
F79	SM4 D7 MADD-1 D7 E7 MADD-2 D7 E7	4
F80	CON1 C5 C7 D3 D5 D7	
F81	CG2 B5	57
F82	EO2 B9	29
F83	LI8 F7	45
F84	EO2 A7 B3 C5 D3	48
F85	CG2 D5	48,49
F86	SM5 C7 D7	50
F87	SM4 D7 E7 F5	50
F88	SM4 D7	50
F89	EO2 A3 E5 E9	52
F90	EO2 C3 D9 E3 F3 F5 F7 G7 G9	52
F91	EO2 A9 C3 E3 E9	52
F92	EO2 C7 E9	52
F93	EO2 C9 D7 D9	53
F94	EO2 E5 F9	54
F95	EO2 A7 B5 D3	55
F96	EO2 E3 E5 F7 G7	55
F97	SM6 D5 F3 SM7 D5 F3 STC E7 F5	32
F98	NOT USED	
F99	MU2 B1	25
F100	LU7-2 D3	22 23
F101	LU7-2 C3	22 23
F102	LU7-1 D3	22 23
F103	LU7-1 C3	22 23
F102	LU7-1 D3	23
F104	LU6-2 C3	23
F105	LU6-2 D3	23
F106	LU6-1 C3	22 23
F107	LU6-1 D3	22 23
F108	EO2 C7 F5 F9 SM5 E5	59
F109	SM7 D7	23
F110	SM7 B5	23
F111	SM6 D7	23
F112	SM6 B5	23
F113	EO2 B3 C9	2,60
F114	CU1 D7	26
F115	EO2 A7 B3 B9 C5 D3 G3 IDP/ERS SWITCH	21
F116	CG2 A1 A5 D5	21
F117	EO2 C7 D9	P
F118	EO2 B7	P
F119	EO2 B5 B9 D9 CG2 C7	21
F120	EO2 C7 F5 IDP SWITCH SM5 D5 E5	64
F121	CON1 C7 D7	23
F122	SM5 B5	21
F123	CON1 C7 D7 MU3 C1	53
F124	SM4 F7	56
F125	CON1 C5 D5 A7	57
F126	CON1 A5 C5 D5	57
F127	CON1 C5 D5 F5	57
F128	CON1 C5 D5 F7	57
F129	MPA-(*) B9 C9 D9 H9 I9	60

F130	MPB-(*) B9 C9 D9 H9 I9	60
F131	MADD-1 E7 F5	60
F132	MADD-1 E7 F7	60
F133	MADD-2 E7 F5	60
F134	MU2 C5 F7	66
F135	MPA-(*) A9 C9 E9 I9	60 80
F136	MPB-(*) A9 C9 E9	60
F137	MPA-(*) C9 G9 I9	60
F138	MPB-(*) C9 G9 I9	60
F139	MADD-1 E7	69
F140	CG2 B7	70
F141	EO2 E3 OR INDICATORS	71
F142	EO2 A9 C7 E9 G9	76
F143	EO2 E5 F3 F9	78
F144	EO2 A3 F5 F7 F9	78
F145	EO2 E3 E5 F3 G9	78
F146	EO2 F5 F7 G9	78
F147	EO2 E3 E5 F7 G7 G9	78
F148	EO2 E9	78
F149	EO2 B7 C9	78
F150	MADD-1 E7 F5 F7 MADD-2 E7 F5 F7	80
F151	DMC A5	4
F152	LU6-2 D3 STC F5	22
F153	LU6-2 D3 STC E7	22
F154	LU6-2 C3 STC E7	22
F155	NOT USED	
F156	NOT USED	
F157	NOT USED	
F158	NOT USED	
F159	NOT USED	
F160	NOT USED	

CONSMTR CONSOLE
9343 (64-CHAR.) CONSOLE

PLACE MTR/MEM SWITCH IN MTR POSITION
PLACE IRQ/EXT SWITCH IN CENTER POSITION
INSURE THAT PLATENS ARE NOT LOCKED TOGETHER
INSURE THAT CARRIER IS AT LEFT MARGIN
LOAD CONSMTR TAPE 1448 6997
PLACE LOAD SWITCH TO NORMAL - PRESS CLEAR

NOTE

ANY DISAGREEMENT WITH INSTRUCTIONS - SEE INCREMENTER ADDRESS FOR FURTHER ACTIONS

PROGRAM LISTING

```
                START.
0000  8442          CPCR = BUSSB - 1.        TEST EXT BUSS
0001  F000          WAIT.
```

OPERATOR INSTRUCTIONS

PROG STEP	INCR	OPERATOR ACTION
1	0001	PRESS FORCE STEP

NOTES

ERROR NOTED ON INITIAL SET-UP - ERROR #E20

IF SYSTEM POWERS OFF DURING ANY TEST OTHER THAN POWER OFF TEST - FAILURE #F389

IN A FEW ERROR CONDITIONS THE PROGRAM WILL BE LOOPING AND THE INCREMENTER INDICATORS WILL APPEAR AS A FALSE ERROR ADDRESS. TO PREVENT THIS PROBLEM, WHENEVER THE INCREMENTER APPEARS TO HAVE STOPPED ON AN ERROR, THE OPERATOR SHOULD PUT THE SGL/NOR SWITCH TO SGL AND PRESS AND RELEASE SGL PUSHBUTTON UNTIL EITHER IT IS DETERMINED THAT THE INCREMENTER VALUE IS NOT CHANGING, OR THAT THE HIGHEST INCREMENTER VALUE IS OBTAINED FROM THE LOOP. RETURN SGL/NOR SWITCH TO NOR

2	0013	PRESS READY BUTTON ON CONSOLE
3	002A	26 INCH CARRIAGE / FORCE STEP 15 INCH CARRIAGE - PRESS READY FORCE STEP
4	002E	FORCE STEP

NOTE

WHEN THIS STEP HAS BEEN SATISFACTORILY RUN IN PROPER MTR SEQUENCE, THE OPERATOR MAY CHOOSE TO PERFORM ANY TEST FROM THE TEST SELECTOR ROUTINE BY PRESSING THE READY BUTTON AND DOING A FORCE STEP.

5	0035	PRESS PK01 ON CONSOLE
6	0055	ALL INDICATORS OFF - FORCE STEP
7	0058	ALL 'A' INDICATORS ON AND ALL OTHER INDICATORS OFF - FORCE STEP
8	0067	ALL 'B' INDICATORS ON AND ALL OTHER INDICATORS OFF - FORCE STEP
9	0071	ALL 'C' INDICATORS ON - FORCE STEP
10	007B	ALL 'D' INDICATORS ON - FORCE STEP

11	0085	ALL 'S' INDICATORS ON - FORCE STEP
12	0088	PRESS READY BUTTON
13	009B	PRESS PK01
14	00CE	PORT SELECT CARD ENABLE STATUS GATING TEST

TO VERIFY THAT ONLY THE DEVICE GENERATING AN INTERRUPT IS ADDRESSED BY ASR, METER THE FOLLOWING SIGNALS. PORT #8 SHOULD READ 0% AND ALL OTHER PORTS SHOULD READ 100%

SIGNAL		PORT	PSI-
PADP5B	(PSENST1/)	1	1
PADP4K	(PSENST2/)	2	1
PADP4J	(PSENST3/)	3	1
PADP5J	(PSENST4/)	4	1
PADP8B	(PSENST5/)	5	2
PADP7K	(PSENST6/)	6	2
PADP7J	(PSENST7/)	7	2
PADP8J	(PSENST8/)	8	2

FORCE STEP

15	00DA	PRESS PK01 - FORCE STEP
16	0128	FORMS TEST PLATEN SHOULD HAVE OPENED AND CLOSED TWICE AND ALARM SOUNDED TWICE - FORCE STEP
17	0152	CARRIER AT RIGHT MARGIN - FORCE STEP
18	01B7	CARRIER TEST PRINTOUT - NORMAL - SEE FIG. # 1 NO INDICATORS ON - FORCE STEP
19	0237	PLATEN ADVANCE TEST PRINTOUT - NORMAL - SEE FIG. # 2 CARRIER OPERATION NORMAL - FORCE STEP
20	028B	PRINTER ESCAPE TEST PRINTOUT - NORMAL - SEE FIG. # 4 NO INDICATORS ON AND CARRIER OPERATION NORMAL - FORCE STEP
21	02A0	TEST KEYBOARD

1 ENTER PK01 THRU PK16 (OR PK24)

2 ENTER ALL ALPHA NUMERIC KEYS LEFT TO RIGHT

3 HOLD SHIFT AND ENTER ALL ALPHA NUMERIC KEYS LEFT TO RIGHT

4 KEY SPACE BAR

5 ENTER ALL NUMERIC KEYS TOP TO BOTTOM

22	02E5	KEYBOARD TEST PRINTOUT - NORMAL - SEE FIG. # 7 FORCE STEP
23	0464	TEST SELECT ROUTINE

IF NUMERIC INDICATOR IS ON PERFORM TESTS 6 THRU 10 IN ORDER OR SEE BELOW

NUMERIC '0' WILL RETURN TO START
DIAGNOSIS CAN BE DONE ONLY IF THE TESTS ARE PERFORMED IN ORDER, HOWEVER THEY MAY BE EXECUTED IN ANY ORDER OR REPEATED

NUMERIC '00' FOR DEBUG USE ONLY
EXECUTES AN 'AA55' DATA PATTERN TO THE PRINTER DECODER WITH NO PRINT OR ESCAPE BITS SET

NUMERIC '000' FOR DEBUG USE ONLY
EXECUTES AN 'AA55' DATA PATTERN TO THE PRINTER DECODER WITH THE PRINT BIT SET, BUT NO ESCAPE BIT SET

1 PRESS NUMERIC 1 FORMS TEST

2 PRESS NUMERIC 2 CARRIER TEST

3 PRESS NUMERIC 3 PLATEN ADVANCE TEST

4 PRESS NUMERIC 4 PRINTER ESCAPE TEST

5 PRESS NUMERIC 5 KEYBOARD TEST

6 PRESS NUMERIC 6 CARRIER EXHAUSTIVE TEST

7 PRESS NUMERIC 7 TILT - ROTATE TEST

8 PRESS NUMERIC 8 PRINT ALL CHARACTERS TEST

9 PRESS NUMERIC 9 OVERSPEED TEST

10 PRESS NUMERIC C POWER OFF TEST

24	037F	CARRIER EXHAUSTIVE TEST PRINTOUT - NORMAL - SEE FIG. # 3 CARRIER OPERATION - NORMAL - FORCE STEP
25	0464	SEE PROG STEP 23
26	03D9	TILT - ROTATE TEST PRINTOUT - NORMAL - SEE FIG. # 5 FORCE STEP
27	0464	SEE PROG STEP 23
28	0413	PRINT ALL CHARACTERS TEST PRINTOUT - NORMAL - SEE FIG. # 6 FORCE STEP
29	0464	SEE PROG STEP 23

```
                *
                *       30          0423        OVERSPEED  TEST
                *                               INSTALL  JUMPER  FROM  BACKPLANE
                *                               PIN  (PADN9Y)   TO  GROUND  AND
                *                               FORCE  STEP
                *
                *       31          0438        REMOVE  JUMPER  AND  FORCE  STEP
                *
                *       32          0464        POWER  OFF  TEST
                *                               END  OF  CONSMTR
                *
                *
0002    F00C            RESET  GC1.
0003    F01F            RESET  GC2.
0004    F08F            BR2  = LIT  L.
0005    C807            SAR  = 8  LIT  = @07@.
0006    F16C            BR1  = LIT  L.
0007    E087            LIT  = @87@.
0008    F0BD            IF  NOT IRQ  SKIP.              INTERUPT  CHECK
0009    F0F7            SKIP.
000A    400E            MPCR = TSTIRQ1  - 1.
000B    F000            WAIT.                           INTERRUPT  DETECTED
                ************ERROR          # E2
000C    F108            ASR  BEX.
000D    F0E1            MIR  = B.
000E    F000            WAIT.
                ************ERROR          # E3
                 TSTIRQ1.
000F    F1AD            IF  NOT SRQ  SKIP.                                      A
0010    F000            WAIT.                                                   A
                *********ERROR        # E 77                                    A
0011    F1AE            IF  NOT URQ  SKIP.                                      A
0012    F000            WAIT.                                                   A
                *********ERROR        # E 78                                    A
0013    F0F8            WHEN IRQ  STEP.
                ************PRESS          READY  BUTTON  ON  CONSOLE
                *************IF          INCR  DOES  NOT STEP  -  ERROR  # E4
0014    8449            CPCR  = BUSSC  - 1.             TEST  EXT  BUSS
                 TSTIRQ1A.
0015    F108            ASR  BEX.
0016    F0CA            LCTR.
0017    E0F8            LIT  = @F8@.
0018    F115            A1  = Z.
0019    E008            LIT  = @08@.
001A    F003            A1  EQV  B.                     CHECK  DEVICE  ADDR & RDY BIT
001B    F0B5            IF  NOT ABT  SKIP.
001C    801F            CPCR  = TSTKBDI  - 1.
001D    F0E1            MIR  = B.                       MIR  = STAT  &  DEV  ADDR
001E    F000            WAIT.                           DEVICE  ADDR OR STATUS
                *                                       ERROR  MIR  = 0708
                ************ERROR          # E5
001F    4015            MPCR  = TSTIRQ1A.
                 TSTKBDI.                               TEST  KBD  DINT
0020    F0BD            IF  NOT IRQ  SKIP.
0021    F000            WAIT.                           STINT  NOT RESET  BY  ASR
                ************ERROR          # E6
0022    F07B            B  = B000.
0023    F05F            B.
0024    F18D            IF  IRQ  ASR  BEX  JUMP.
0025    F0FF            0  EQV  B.
0026    F09D            IF  ABT  SKIP.
0027    F000            WAIT.
                *************DEVICE          OPERATION  SUCC  FAILURE
                ************ERROR          # E 66
0028    F05F            B.
0029    F05F            B.
002A    F000            WAIT.                                                   A
                *********IF        CONSOLE  HAS  A  26  INCH  CARRIAGE  FORCE  STEP  A
                *********IF        CONSOLE  HAS  A  15  INCH  CARRIAGE  PRESS        A
                *********READY       BUTTON  AND  FORCE  STEP                      A
```

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002B    F0BD            IF  NOT IRQ  SKIP.                                      A
002C    F0F6            SET  GC2.                       SET  15  INCH  FLAG     A
002D    F108            ASR  BEX.                       RESET  STINT            A
002E    F000            WAIT.
                ************IF          PERFORMING  MTR IN  PROPER  SEQUENCE
                ************FORCE          STEP.
                ************FOR          OUT  OF  SEQUENCE  TEST  SELECTOR  PRESS
                ************READY          BUTTON  AND  FORCE  STEP.
002F    F0BD            IF  NOT IRQ  SKIP.
0030    444E            MPCR = TSELR  - 1.
0031    F0CA            LCTR.
0032    E06F            LIT  = @6F@.
0033    F128            A2  = Z.                        A2  = IND  A  DATA  WORD
0034    E0FF            LIT  = @FF@.
0035    F0F8            WHEN IRQ  STEP.
                ************PRESS          PK01  ON  CONSOLE
                ************IF          INCR  DOES  NOT STEP  -  ERROR  # 7
0036    8449            CPCR  = BUSSC  - 1.             TEST  EXT  BUSS
0037    F108            ASR  BEX.
0038    F0CA            LCTR.
0039    E078            LIT  = @78@.
003A    F115            A1  = Z.
003B    E010            LIT  = @10@.
003C    F003            A1  EQV  B.                     CHECK  DEV  ADDR  &  KDI
003D    F0B5            IF  NOT ABT  SKIP.
003E    8040            CPCR  = INHTST  - 1.
003F    F0E1            MIR  = B.
0040    F000            WAIT.                           DINT  OR KBD  RDY BIT  NOT SET
                ************ERROR          # E8
                 INHTST.
0041    F097            DR2  BEX.                       RESET  KBD  DINT
0042    F08F            BR2  = LIT  L.
0043    C88F            SAR  = 8  LIT  = @8F@.
0044    F098            DW2.                            UNSELECT  CONSOLE
0045    F08F            BR2  = LIT  L.
0046    E007            LIT  = @07@.
0047    F18E            IF  IRQ  SKIP.
0048    404A            MPCR = INHTST1A  - 1.
0049    F000            WAIT.                           INTERRUPT  NOT RESET
                ************ERROR          # E12
004A    4040            MPCR = INHTST  - 1.
                 INHTST1A.
004B    F07B            B  = B000.                                              A
004C    F108            ASR  BEX.                       ASR  WHILE  IRQ  NOT SET
004D    F0FF            0  EQV  B.                                              A
004E    F09D            IF  ABT  SKIP.                                          A
004F    F000            WAIT.                           ASR  RETURNED  DATA     A
                *********ERROR        # E 76                                    A
0050    F0CA            LCTR.
0051    E060            LIT  = @60@.
0052    F0EF            MIR  = Z.
0053    E000            LIT  = 0.
0054    F098            DW2.
0055    F000            WAIT.
                *************IF          ALL  INDICATORS  ARE OFF  FORCE  STEP
                *************IF          DISAGREE  -  ERROR  # E11
0056    F0DD            MIR  = A2.
0057    F098            DW2.
0058    F000            WAIT.                           OBSERVE  INDICATORS
                *************IF          ALL  A  INDICATORS  ARE ON AND ALL  OTHER
                ************INDICATORS          ARE OFF,  FORCE  STEP
                *************IF          DISAGREE  -  ERROR  # E13
0059    F098            DW2.
005A    F0CA            LCTR.
005B    E06F            LIT  = @6F@.
005C    F0EF            MIR  = Z.
005D    E000            LIT  = @00@.
005E    F098            DW2.
005F    F05F            B.
0060    F0CA            LCTR.
0061    E077            LIT  = @77@.
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0062   F0EF        MIR  =  Z.
0063   E0FF        LIT  =  @FF@.
0064   F098        DW2.
0065   F0EF        MIR  =  Z.                                              A
0066   E099        LIT  =  @99@.                                           A
0067   F000        WAIT.
            *************IF        ALL  B  INDICATORS   ARE  ON  AND  ALL  OTHER
            *************INDICATORS        ARE  OFF,   FORCE  STEP
            *************IF        DISAGREE   -   ERROR  #  E14
0068   E000        LIT  =  @00@.
0069   F0EF        MIR  =  Z.
006A   F098        DW2.
006B   F05F        B.
006C   F0CA        LCTR.
006D   E07B        LIT  =  @7B@.
006E   F0EF        MIR  =  Z.
006F   E0FF        LIT  =  @FF@.
0070   F098        DW2.
0071   F000        WAIT.
            *************IF        ALL  C  INDICATORS   ARE  ON  FORCE  STEP
            *************IF        DISAGREE   -   ERROR  #  E15
0072   E000        LIT  =  @00@.
0073   F0EF        MIR  =  Z.
0074   F098        DW2.
0075   F05F        B.
0076   F0CA        LCTR.
0077   E07D        LIT  =  @7D@.
0078   F0EF        MIR  =  Z.
0079   E0FF        LIT  =  @FF@.
007A   F098        DW2.
007B   F000        WAIT.
            *************IF        ALL  D  INDICATORS   ARE  ON  FORCE  STEP
            *************IF        DISAGREE   -   ERROR  #  E16
007C   E000        LIT  =  @00@.
007D   F0EF        MIR  =  Z.
007E   F098        DW2.
007F   F05F        B.
0080   F0CA        LCTR.
0081   E07E        LIT  =  @7E@.
0082   F0EF        MIR  =  Z.
0083   E00F        LIT  =  @0F@.
0084   F098        DW2.
0085   F000        WAIT.
            *************IF        ALL  S  INDICATORS   ARE  ON  FORCE  STEP
            ************      IF   DISAGREE   -   ERROR  #  17
0086   F05F        B.
0087   F05F        B.
0088   F0FD        WHEN  URQ  STEP.
            *************PRESS         READY  BUTTON
            *************IF        INCR  DOES  NOT  STEP   -   ERROR  #  E18
0089   F096        DR1  BEX.
008A   F01D        A1  =  LIT.
008B   E008        LIT  =  @08@.
008C   F003        A1  EQV  B.
008D   F0B5        IF  NOT  ABT  SKIP.
008E   8090        CPCR  =  SRQTST  -  1.
008F   F0E1        MIR  =  B.
0090   F000        WAIT.                           RDY  BIT  NOT  IN  STAT  WORD
            *************ERROR            #  E19
              SRQTST.
0091   F0CA        LCTR.
0092   E060        LIT  =  @60@.
0093   F0EF        MIR  =  Z.
0094   E000        LIT  =  0.
0095   F098        DW2.                            TURN  OFF  ALL  INDICATORS
0096   F0CA        LCTR.
0097   E06F        LIT  =  @6F@.
0098   F0EF        MIR  =  Z.
0099   E001        LIT  =  @01@.
009A   F098        DW2.                            LIGHT  IND  A1
009B   F0FC        WHEN  SRQ  STEP.
```

```
            *************PRESS          PK01
            *************IF        INCR  DOES  NOT  STEP  -  ERROR  #  E21
009C   F096        DR1  BEX.                       GET  STATUS  WORD
009D   F033        A2  =  B.
009E   F1AD        IF  NOT  SRQ  SKIP.                                     A
009F   F0F7        SKIP.                                                   A
00A0   F000        WAIT.                           DINT  RESET  BY  STATUS  READ   A
            *********ERROR        #  E  71                                 A
00A1   F16C        BR1  =  LIT  L.                                         A
00A2   C807        SAR  =  8  LIT  =  @07@.                                A
00A3   F039        A2  =  LIT  L.                                          A
00A4   F0F1        MR1.                                                    A
00A5   F05F        B.                                                      A
00A6   F1AD        IF  NOT  SRQ  SKIP.                                     A
00A7   F0F7        SKIP.                                                   A
00A8   F000        WAIT.                           MEMORY  READ  DESELECTED  A
            *********ERROR        #  E  72         OR  CAUSED  DATA  READ  A
          MRDDST.                                                          A
00A9   F07B        B  =  B000.                                             A
00AA   F0D5        MAR1  =  B.                     START  PORT             A
00AB   F0E6        MIR  =  B000.                                           A
00AC   F099        DW1.                            DESELECT  WITH  WRITE   A
00AD   F05F        B.                                                      A
          MRDDSL.                                                          A
00AE   F096        DR1  BEX.                       READ  OTHER  PORT       A
00AF   F080        B  =  BMAR.                                             A
00B0   F07D        B  =  B  C.                                             A
00B1   F07E        B  =  B  +  1.                                          A
00B2   F0CB        LIT  EQV  B.                                            A
00B3   E010        LIT  =  @10@.                                           A
00B4   F0B5        IF  NOT  ABT  SKIP.                                     A
00B5   40BB        MPCR  =  MRDDSLA  -  1.                                 A
00B6   F07D        B  =  B  C.                                             A
00B7   F0D5        MAR1  =  B.                                             A
00B8   F116        A2  EQV  B.                     PORT  UNDER  TEST       A
00B9   F09D        IF  ABT  SKIP.                                          A
00BA   40AD        MPCR  =  MRDDSL  -  1.                                  A
00BB   40AE        MPCR  =  MRDDSL.                                        A
          MRDDSLA.
00BC   F16C        BR1  =  LIT  L.                                         A
00BD   E087        LIT  =  @87@.                   RESTORE  PORT           A
00BE   F096        DR1  BEX.                       RESELECT                A
00BF   F05F        B.                                                      A
00C0   F1AD        IF  NOT  SRQ  SKIP.                                     A
00C1   40C4        MPCR  =  MRDDSLB  -  1.                                 A
00C2   F0BD        IF  NOT  IRQ  SKIP.
00C3   F000        WAIT.                                                   A
            *********READ        DID  NOT  SELECT
            *********ERROR        #  73                                    A
00C4   F000        WAIT.                                                   A
            *********DINT        RESET  BY  READ  TO  ANOTHER  PORT        A
            *********ERROR        #  E  74                                 A
          MRDDSLB.                                                         A
00C5   F108        ASR  BEX.                                               A
00C6   F05F        B.                                                      A
00C7   F1AD        IF  NOT  SRQ  SKIP.                                     A
00C8   F0F7        SKIP.                                                   A
00C9   F000        WAIT.                           ASR  DESELECTED         A
            *********ERROR        #  E  75                                 A
00CA   F16C        BR1  =  LIT  L.                                         A
00CB   E00F        LIT  =  @0F@.
00CC   F099        DW1.                            DESELECT                A
00CD   F05E        ASR.                                                    A
00CE   F000        WAIT.                                                   A
            *********PORT        SELECT  CARD  ENABLE  STATUS  GATING  TEST.   A
            *********TO        VERIFY  ONLY  THE  DEVICE  GENERATING  AN   A
            *********INTERRUPT        IS  ADDRESSED  BY  ASR,  METER  THE  A
            *********FOLLOWING        SIGNALS.  CONSOLE  PORT  #  8  SHOULD  A
            *********READ       0%  -  ALL  OTHERS  SHOULD  READ  100%     A
            *********                          PORT        PS1-            A
            *          *PADP5B    (PSENST1/)        1            1         A
```

```
                *          *PADP4K    (PSENST2/)        2          1                A
                *          *PADP4J    (PSENST3/)        3          1                A
                *          *PADP5J    (PSENST4/)        4          1                A
                *          *                                                        A
                *          *PADP8B    (PSENST5/)        5          2                A
                *          *PADP7K    (PSENST6/)        6          2                A
                *          *PADP7J    (PSENST7/)        7          2                A
                *          *PADP8J    (PSENST8/)        8          2                A
                *********IF       AGREE  FORCE  STEP                               A
                *********IF       DISAGREE  -  ERROR  #E80                         A
00CF  F16C            BR1  =  LIT  L.                                              A
00D0  E087            LIT  =  @87@.                                                A
00D1  F05F            B.                                                           A
00D2  E090            LIT  =  @90@.
00D3  F0EE            MIR  =  LIT  L.
00D4  D800            SAR  =  8.
00D5  F098            DW2.                          TURN  OFF  IND  A1
00D6  F0CA            LCTR.
00D7  E07F            LIT  =  @7F@.
00D8  F115            A1  =  Z.
00D9  E010            LIT  =  @10@.
00DA  F000            WAIT.
                ************PRESS          PK01   THEN  FORCE  STEP  -  FST
00DB  F1AE            IF  NOT  URQ  SKIP.
00DC  F0F7            SKIP.
00DD  F000            WAIT.
                ************ERROR          #  E9
                ************INT          NOT  HONORED  DOES  NOT  CAUSE  STINT
00DE  8449            CPCR  =  BUSSC  -  1.         TEST  EXT  BUSS
00DF  F108            ASR  BEX.                                                    A
00E0  F05F            B.                                                           A
00E1  F1B5            IF  URQ  SKIP.                TEST  STINT                    A
00E2  F000            WAIT.                         ASR  DID  STATUS  READ         A
                *********ERROR       #  E 79                                       A
00E3  F096            DR1  BEX.
00E4  F0CA            LCTR.
00E5  E07F            LIT  =  @7F@.
00E6  F115            A1  =  Z.
00E7  E014            LIT  =  @14@.
00E8  F003            A1  EQV  B.
00E9  F0B5            IF  NOT  ABT  SKIP.
00EA  80EC            CPCR  =  INDTST  -  1.
00EB  F0E1            MIR  =  B.
00EC  F000            WAIT.                         KBD  DINT  NOT  HONORED  BIT
                *                                   NOT  SET  IN  STATUS  WORD
                ************ERROR          #  E10
                 INDTST.
00ED  F097            DR2  BEX.                     RESET  KBD  DINT
00EE  F05F            B.
                 ENABFMS.
00EF  F0EA            MIR  =  LIT.
00F0  E008            LIT  =  @08@.
00F1  F099            DW1.                          ENABLE  FORMS
00F2  F05F            B.
00F3  F0FC            WHEN SRQ  STEP.               DINT  NOT  SET  BY  FORMS  READY
                ************ERROR          #  E23
00F4  8449            CPCR  =  BUSSC  -  1.         TEST  EXT  BUSS
00F5  F096            DR1  BEX.
00F6  F0CA            LCTR.
00F7  E07F            LIT  =  @7F@.
00F8  F115            A1  =  Z.
00F9  E040            LIT  =  @40@.
00FA  F018            SET  LC1.
00FB  F003            A1  EQV  B.
00FC  F0B5            IF  NOT  ABT  SKIP.
00FD  80FF            CPCR  =  OCPLAT  -  1.
00FE  F0E1            MIR  =  B.
00FF  F000            WAIT.                         FORMS  READY  BIT
                *                                   NOT  IN  STATUS  WORD
                ************ERROR          #  E24
                 OCPLAT.
0100  F0CA            LCTR.
0101  E03F            LIT  =  @3F@.
0102  D800            SAR  =  8.
0103  F01D            A1  =  LIT.
0104  E0C0            LIT  =  @C0@.
0105  F10B            A1  =  A1  C.
0106  F0EF            MIR  =  Z.
0107  E009            LIT  =  @09@.
0108  F098            DW2.                          OPEN  PLATEN  SOUND  ALARM
0109  F05F            B.
010A  F1AD            IF  NOT  SRQ  SKIP.
010B  F000            WAIT.                         FORMS  DINT  NOT  RESET
                ************ERROR          #  E22
010C  F0DB            MIR  =  A1.
010D  E004            LIT  =  @04@.
010E  F0CA            LCTR.
010F  F0F5            SAVE.
0110  F0FC            WHEN SRQ  STEP.
                ************DINT          NOT  SET  WHEN FORMS  READY
                ************ERROR          #  E25
0111  F098            DW2.                          RESET  DINT  WITH  DUMMY FORMS
0112  F030            INC.
0113  F0B9            IF  NOT  COV  JUMP.           NUMBER  OF  DINTS  =  4
0114  F0CA            LCTR.
0115  E03F            LIT  =  @3F@.
0116  F0EF            MIR  =  Z.
0117  E004            LIT  =  @04@.
0118  F0CA            LCTR.
0119  F0FC            WHEN SRQ  STEP.
011A  F098            DW2.                          CLOSE  PLATEN
011B  E0C0            LIT  =  @C0@.
011C  F0EE            MIR  =  LIT  L.
011D  F0F5            SAVE.
011E  F0FC            WHEN SRQ  STEP.
011F  F098            DW2.                          RESET  DINT  WITH  DUMMY FORMS
0120  F030            INC.
0121  F0B9            IF  NOT  COV  JUMP.           NUMBER  OF  DINTS  =  4
0122  F0BF            IF  NOT  LC1  SKIP.
0123  80FF            CPCR  =  OCPLAT  -  1.
0124  F0BA            IF  NOT  EXT  SKIP.
0125  F0A0            IF  EXT  SKIP.
0126  F0F7            SKIP.
0127  40FF            MPCR  =  OCPLAT  -  1.
0128  F000            WAIT.
                ************PLATEN          SHOULD  HAVE  OPENED  AND  CLOSED
                ************TWICE          AND  ALARM  SOUNDED  TWICE
                ************IF          NORMAL  FORCE  STEP
                ************IF          DISAGREE  ERROR  #  E 27
0129  F0BA            IF  NOT  EXT  SKIP.
012A  F0A0            IF  EXT  SKIP.
012B  F0F7            SKIP.
012C  40FF            MPCR  =  OCPLAT  -  1.
012D  F0BB            IF  NOT  GC1  SKIP.
012E  444E            MPCR  =  TSELR  -  1.
                 CARRTST.                           CARRIER  TEST
012F  F01D            A1  =  LIT.
0130  E010            LIT  =  @10@.
0131  F0EA            MIR  =  LIT.
0132  F099            DW1.                          ENABLE  CARRIER
0133  F0CA            LCTR.
0134  E07F            LIT  =  @7F@.
0135  F115            A1  =  Z.
0136  E080            LIT  =  @80@.
0137  F0FC            WHEN SRQ  STEP.
                ************DINT          NOT  SET  WHEN CARRIER  RDY
                ************ERROR          #  E 28
0138  8449            CPCR  =  BUSSC  -  1.         TEST  EXT  BUSS
0139  F096            DR1  BEX.                     READ  STATUS  WORD
013A  F003            A1  EQV  B.
013B  F0B5            IF  NOT  ABT  SKIP.
```

```
013C  413E        MPCR = NTRCARTST - 1.
013D  F0E1        MIR = B.
013E  F000        WAIT.                          CARRIER ENABLE BIT NOT SET
                  **********ERROR      # E 29
                   NTRCARTST.
013F  D800        SAR = 8.
0140  E002        LIT = @02@.
0141  F0EE        MIR = LIT L.
0142  F098        DW2.                           INITIALIZE     RIGHT
0143  F05F        B.
0144  F1AD        IF NOT SRQ SKIP.
0145  F000        WAIT.                          CARRIER DINT NOT RESET
                  **********ERROR      # E 30
0146  F0F5        SAVE.
0147  F1AE        IF NOT URQ SKIP.
0148  843F        CPCR = CARERR3 - 1.
0149  F0BA        IF NOT EXT SKIP.
014A  F0A0        IF EXT SKIP.
014B  F0F7        SKIP.
014C  413E        MPCR = NTRCARTST - 1.
014D  F1AD        IF NOT SRQ SKIP.
014E  F0F7        SKIP.
014F  F0C9        JUMP.
                  **********DINT       NOT SET AFTER CARRIER INITIALIZED
                  **********ERROR      # E 31
0150  F05F        B.
0151  F05F        B.
0152  F000        WAIT.
                  **********CARRIER        AT RIGHT MARGIN IF AGREE FORCE STP
                  **********IF       DISAGREE  ERROR # E59
0153  F0BA        IF NOT EXT SKIP.
0154  F0A0        IF EXT SKIP.
0155  F0F7        SKIP.
0156  413E        MPCR = NTRCARTST - 1.
0157  F0EA        MIR = LIT.
0158  E004        LIT = @04@.
0159  F099        DW1.                           ENABLE PRINTER
015A  F05F        B.
015B  F0FC        WHEN SRQ STEP.
                  **********DINT       NOT SET WHEN PRINTER READY
                  **********ERROR      E 32
015C  8449        CPCR = BUSSC - 1.              TEST EXT BUSS
015D  F096        DR1 BEX.                       READ STATUS WORD
015E  F0CA        LCTR.
015F  E07F        LIT = @7F@.
0160  F115        A1 = Z.
0161  E020        LIT = @20@.
0162  F003        A1 EQV B.                      CHECK PRINTER RDY BIT
0163  F0B5        IF NOT ABT SKIP.
0164  8166        CPCR = PRTRTMG - 1.
0165  F0E1        MIR = B.
0166  F000        WAIT.                          PRNTR RDY BIT NOT IN STATUS
                  **********ERROR      E 52
                   PRTRTMG.
0167  F0CA        LCTR.
0168  E0BE        LIT = @BE@.
0169  F128        A2 = Z.                        A2 = PRTR DATA WORD
016A  E041        LIT = @41@.
016B  F0EF        MIR = Z.
016C  F098        DW2.                           PRINT A AT RIGHT MARGIN
016D  F05F        B.
016E  F1AD        IF NOT SRQ SKIP.
016F  F000        WAIT.                          PRINTER DINT NOT RESET
                  **********ERROR      # E51
0170  F0EA        MIR = LIT.
0171  E010        LIT = @10@.
0172  F0FC        WHEN SRQ STEP.
                  **********DINT       NOT SET WITH PRINT COMPLETE
                  **********ERROR      # E 33
0173  F099        DW1.                           ENABLE CARRIER
0174  F0EA        MIR = LIT.
0175  E004        LIT = 4.
0176  F0FC        WHEN SRQ STEP.
                  **********ERROR      # 70
                  **********PRINTER          CLEAR INHIBITING     CARRIER DINT
0177  F098        DW2.                           STALL CARRIER
0178  F05F        B.
0179  F1AD        IF NOT SRQ SKIP.
017A  F000        WAIT.                          CARRIER DINT NOT RESET
                  **********ERROR      # E55
017B  F0FD        WHEN URQ STEP.
                  **********STALL          FLAG NOT SETTING STINT
                  **********ERROR      # E56
017C  8449        CPCR = BUSSC - 1.              TEST EXT BUSS
017D  F096        DR1 BEX.
017E  F05F        B.
017F  F0C3        IF NOT LST SKIP.
0180  4182        MPCR = PRTRTMGA - 1.
0181  F0E1        MIR = B.
0182  F000        WAIT.
                  **********STALL          FLAG NOT SET IN STATUS.
                  **********ERROR      # E57
                   PRTRTMGA.
0183  F1AE        IF NOT URQ SKIP.
0184  F000        WAIT.
                  **********STALL          FLAG NOT RESETTING
                  **********ERROR      # E64
                   PRTRTMGA2.
0185  F0CA        LCTR.
0186  E0FE        LIT = @FE@.
0187  F05F        B.                                                        A
0188  E095        LIT = @95@.                                               A
0189  F0A2        IF GC2 SKIP.                   TEST 15 INCH FLAG          A
018A  E0FF        LIT = @FF@.
018B  F0EF        MIR = Z.
018C  F0FC        WHEN SRQ STEP.
                  **********ERROR      # E68
018D  F098        DW2.                           MOVE CARR 256 POSITIONS
018E  F0F5        SAVE.
018F  F0BA        IF NOT EXT SKIP.
0190  F0A0        IF EXT SKIP.
0191  F0F7        SKIP.
0192  4184        MPCR = PRTRTMGA2 - 1.
0193  F1AE        IF NOT URQ SKIP.
0194  41A1        MPCR = CARERR5 - 1.
0195  F1AD        IF NOT SRQ SKIP.
0196  F0F7        SKIP.
0197  F0C9        JUMP.
                  **********DINT       NOT SET WHEN CARR AT LEFT MARGIN
                  **********ERROR      E 34
0198  F096        DR1 BEX.                       READ DEVICE STATUS
0199  F0CA        LCTR.
019A  E07F        LIT = @7F@.
019B  F115        A1 = Z.
019C  E080        LIT = @80@.
019D  F003        A1 EQV B.
019E  F0B5        IF NOT ABT SKIP.
019F  81A5        CPCR = PRTLTMG - 1.
01A0  F0E1        MIR = B.
01A1  F000        WAIT.                          STATUS FAILURE
                  **********ERROR      # E58
                   CARERR5.
01A2  F096        DR1 BEX.
01A3  F0E1        MIR = B.
01A4  F000        WAIT.
                  **********STINT          DETECTED POSITIONING LEFT
                  **********ERROR      # E65
01A5  4184        MPCR = PRTRTMGA2 - 1.
                   PRTLTMG.
01A6  F0EA        MIR = LIT.
01A7  E004        LIT = @04@.
01A8  F099        DW1.                           ENABLE PRINTER
```

```
01A9  F05F          B.
01AA  F0DD          MIR = A2.
01AB  F0FC          WHEN SRQ STEP.
01AC  F098          DW2.                        PRINT A AT LEFT MARGIN
01AD  F0EA          MIR = LIT.
01AE  E008          LIT = @08@.
01AF  F0FC          WHEN SRQ STEP.
01B0  F099          DW1.                        ENABLE FORMS
01B1  F0CA          LCTR.
01B2  E03F          LIT = @3F@.
01B3  F0EF          MIR = Z.
01B4  E050          LIT = @50@.
01B5  F0FC          WHEN SRQ STEP.
01B6  F098          DW2.
01B7  F000          WAIT.                       OBSERVE PRINTOUT
                  **********IF       PRINTOUT IS NORMAL AND NO INDICATORS
                  **********ARE        ON, FORCE STEP
                  **********SEE        FIGURE 1.
                  **********IF       DISAGREE = ERROR # E 35
01B8  F0BA          IF NOT EXT SKIP.
01B9  F0A0          IF EXT SKIP.
01BA  F0F7          SKIP.
01BB  F0F7          SKIP.
01BC  F0BB          IF NOT GC1 SKIP.
01BD  444E          MPCR = TSELR - 1.
                PLATADV.
01BE  F0EA          MIR = LIT.
01BF  E004          LIT = @04@.
01C0  F099          DW1.                        ENABLE PRINTER
01C1  F0CA          LCTR.
01C2  E0BE          LIT = @BE@.
01C3  F128          A2 = Z.
01C4  E041          LIT = @41@.
01C5  F0EF          MIR = Z.
01C6  F0FC          WHEN SRQ STEP.
01C7  F098          DW2.                        PRINT A AT LEFT MARGIN
01C8  F0EA          MIR = LIT.
01C9  E008          LIT = @08@.
01CA  F099          DW1.                        ENABLE FORMS
01CB  F0CA          LCTR.
01CC  E03F          LIT = @3F@.
01CD  F0EF          MIR = Z.
01CE  E050          LIT = @50@.
01CF  F05F          B.
                LOOPE.
01D0  E005          LIT = @05@.
01D1  F0CA          LCTR.
01D2  F0F5          SAVE.
01D3  F0FC          WHEN SRQ STEP.
01D4  F098          DW2.                        ADVANCE BOTH PLATENS
01D5  F030          INC.
01D6  F0B9          IF NOT COV JUMP.            # OF PLATEN ADVANCES = 5
01D7  F0BA          IF NOT EXT SKIP.
01D8  F0A0          IF EXT SKIP.
01D9  F0F7          SKIP.
01DA  41CF          MPCR = LOOPE - 1.
01DB  F0EA          MIR = LIT.
01DC  E004          LIT = @04@.
01DD  F0FC          WHEN SRQ STEP.
01DE  F099          DW1.                        ENABLE PRINTER
01DF  F0CA          LCTR.
01E0  E0BE          LIT = @BE@.
01E1  F128          A2 = Z.
01E2  E041          LIT = @41@.
01E3  F0DD          MIR = A2.
01E4  F0FC          WHEN SRQ STEP.
01E5  F098          DW2.                        PRINT A AT LEFT MARGIN
01E6  F0EA          MIR = LIT.
01E7  E010          LIT = @10@.
01E8  F0FC          WHEN SRQ STEP.
01E9  F099          DW1.                        ENABLE CARRIER
```

```
01EA  F05F          B.                                                    A
01EB  E095          LIT = @95@.                                           A
01EC  F0A2          IF GC2 SKIP.                TEST 15 INCH FLAG         A
01ED  E0FF          LIT = @FF@.
01EE  F0EA          MIR = LIT.
01EF  F0FC          WHEN SRQ STEP.
01F0  F098          DW2.                        CARR MOVE 256 POS RIGHT
01F1  F0F5          SAVE.
01F2  F1AE          IF NOT URQ SKIP.
01F3  843C          CPCR = CARERR2 - 1.
01F4  F1AD          IF NOT SRQ SKIP.
01F5  F0F7          SKIP.
01F6  F0C9          JUMP.
01F7  F0EA          MIR = LIT.
01F8  E004          LIT = @04@.
01F9  F099          DW1.                        ENABLE PRINTER
01FA  F0DD          MIR = A2.
01FB  F0FC          WHEN SRQ STEP.
01FC  F098          DW2.                        PRINT A AT RIGHT MARGIN
01FD  F0EA          MIR = LIT.
01FE  E008          LIT = @08@.
01FF  F0FC          WHEN SRQ STEP.
0200  F099          DW1.                        ENABLE FORMS
0201  F0CA          LCTR.
0202  E03F          LIT = @3F@.
0203  F0EF          MIR = Z.
0204  E050          LIT = @50@.
0205  F05F          B.
0206  E005          LIT = @05@.
0207  F0CA          LCTR.
0208  F0F5          SAVE.
0209  F0FC          WHEN SRQ STEP.
020A  F098          DW2.                        ADVANCE BOTH PLATENS
020B  F030          INC.
020C  F0B9          IF NOT COV JUMP.            # OF PLATEN ADVANCES = 5
020D  F0EA          MIR = LIT.
020E  E004          LIT = @04@.
020F  F0FC          WHEN SRQ STEP.
0210  F099          DW1.                        ENABLE PRINTER
0211  F0DD          MIR = A2.
0212  F0FC          WHEN SRQ STEP.
0213  F098          DW2.                        PRINT A AT RIGHT MARGIN
0214  F0EA          MIR = LIT.
0215  E010          LIT = @10@.
0216  F0FC          WHEN SRQ STEP.
0217  F099          DW1.                        ENABLE CARRIER
0218  F0CA          LCTR.
0219  E0FE          LIT = @FE@.
021A  F05F          B.                                                    A
021B  E095          LIT = @95@.                                           A
021C  F0A2          IF GC2 SKIP.                TEST 15 INCH FLAG         A
021D  E0FF          LIT = @FF@.
021E  F0EF          MIR = Z.
021F  F0FC          WHEN SRQ STEP.
0220  F098          DW2.                        CARR LEFT 256 POSITIONS
0221  F0F5          SAVE.
0222  F1AE          IF NOT URQ SKIP.
0223  8439          CPCR = CARERR1 - 1.
0224  F1AD          IF NOT SRQ SKIP.
0225  F0F7          SKIP.
0226  F0C9          JUMP.
0227  F0EA          MIR = LIT.
0228  E004          LIT = @04@.
0229  F099          DW1.                        ENABLE PRINTER
022A  F0DD          MIR = A2.
022B  F0FC          WHEN SRQ STEP.
022C  F098          DW2.                        PRINT A AT LEFT MARGIN
022D  F0EA          MIR = LIT.
022E  E008          LIT = @08@.
022F  F0FC          WHEN SRQ STEP.
0230  F099          DW1.                        ENABLE FORMS
```

```
0231  F0CA        LCTR.
0232  E03F        LIT  = @3F@.
0233  F0EF        MIR  = Z.
0234  E051        LIT  = @51@.
0235  F0FC        WHEN SRQ  STEP.
0236  F098        DW2.                          ADV BOTH PLATENS  & SND ALM.
0237  F000        WAIT.                         OBSERVE  PRINTOUT
                  **********IF         PRINTOUT  GOOD AND CARRIER  OPERATION
                  **********NORMAL,          FORCE  STEP
                  **********SEE          FIGURE  2.
                  **********IF          DISAGREE  = ERROR  #  E  37
0238  F0BA        IF  NOT  EXT  SKIP.
0239  F0A0        IF  EXT  SKIP.
023A  F0F7        SKIP.
023B  F0F7        SKIP.
023C  F0BB        IF  NOT  GC1  SKIP.
023D  444E        MPCR  = TSELR  -  1.
                  PRTESCTST.                    PRINTER  ESCAPE  TEST
023E  D800        SAR  = 8.
023F  F0EA        MIR  = LIT.
0240  E010        LIT  = @10@.
0241  F099        DW1.                          ENABLE  CARRIER
0242  F0EE        MIR  = LIT  L.
0243  E003        LIT  = @03@.
0244  F0FC        WHEN SRQ  STEP.
0245  F098        DW2.                          INITIALIZE     LEFT
0246  F0EA        MIR  = LIT.
0247  E004        LIT  = @04@.
0248  F0FC        WHEN SRQ  STEP.
0249  F099        DW1.                          ENABLE  PRINTER
024A  F0CA        LCTR.
024B  E0BE        LIT  = @BE@.
024C  F0EF        MIR  = Z.
024D  E05A        LIT  = @5A@.
024E  F0CA        LCTR.
024F  E0B6        LIT  = @B6@.
0250  F115        A1  = Z.
0251  E05A        LIT  = @5A@.
0252  F0FC        WHEN SRQ  STEP.
0253  F098        DW2.                          PRINT  Z  IN  PLACE  BLACK
0254  F05F        B.                                                          A
0255  E094        LIT  = @94@.                                                A
0256  F0A2        IF  GC2  SKIP.                TEST  15  INCH  FLAG          A
0257  E0FE        LIT  = @FE@.
0258  F0CA        LCTR.
0259  F0DB        MIR  = A1.
                  PRBR.
025A  F0FC        WHEN SRQ  STEP.
025B  F098        DW2.                          PRINT  Z  ESCAPE  RIGHT  -  BLAC
025C  F030        INC.
                  LOOPBE.
025D  F1AD        IF  NOT  SRQ  SKIP.
025E  425C        MPCR  = LOOPBE  -  1.
                  **********DINT          NOT  RESET  ON RIGHT  EXCAPE
                  **********ERROR          #  60
025F  F02E        IF  COV  SKIP.
0260  4259        MPCR  = PRBR  -  1.
0261  F0EE        MIR  = LIT  L.
0262  E040        LIT  = @40@.
0263  F0FC        WHEN SRQ  STEP.
0264  F098        DW2.                          COUNT  1  DINT  = DUMMY PRINT
0265  F0CA        LCTR.
0266  E0BC        LIT  = @BC@.
0267  F0EF        MIR  = Z.
0268  E05A        LIT  = @5A@.
0269  F0CA        LCTR.
026A  E0B8        LIT  = @B8@.
026B  F115        A1  = Z.
026C  E05A        LIT  = @5A@.
026D  F0FC        WHEN SRQ  STEP.
026E  F098        DW2.                          PRINT  Z  IN  PLACE  -  RED
026F  F05F        B.                                                          A
0270  E094        LIT  = @94@.                                                A
0271  F0A2        IF  GC2  SKIP.                TEST  15  INCH  FLAG          A
0272  E0FE        LIT  = @FE@.
0273  F0CA        LCTR.
0274  F0DB        MIR  = A1.
                  PRRR.
0275  F0FC        WHEN SRQ  STEP.
0276  F098        DW2.                          PRINT  Z  ESCAPE  LEFT  = RED
0277  F030        INC.
                  LOOPRE.
0278  F1AD        IF  NOT  SRQ  SKIP.
0279  4277        MPCR  = LOOPRE  -  1.
                  **********DINT          NOT  RESET  ON LEFT  ESCAPE
                  **********ERROR          #  61
027A  F02E        IF  COV  SKIP.
027B  4274        MPCR  = PRRR  -  1.
027C  F0EA        MIR  = LIT.
027D  E008        LIT  = @08@.
027E  F018        SET  LC1.
027F  F0FC        WHEN SRQ  STEP.
0280  F099        DW1.                          ENABLE  FORMS
0281  F0CA        LCTR.
0282  E03F        LIT  = @3F@.
0283  F05F        B.
0284  E050        LIT  = @50@.
0285  F0EF        MIR  = Z.
0286  F0F5        SAVE.
0287  F0FC        WHEN SRQ  STEP.
0288  F098        DW2.                          ADVANCE  BOTH  PLATENS
0289  F05F        B.
028A  F0A6        IF  LC1  JUMP.
028B  F000        WAIT.                         OBSERVE  PRINTOUT
                  **********AND          CARRIER  OPERATION  NORMAL,  FORCE  STEP
                  **********IF          PRINTOUT  GOOD,  NO INDICATORS  ARE  ON
                  **********SEE          FIGURE  4.
                  **********IF          DISAGREE  = ERROR  #  E  39
028C  F0BA        IF  NOT  EXT  SKIP.
028D  F0A0        IF  EXT  SKIP.
028E  F0F7        SKIP.
028F  F0F7        SKIP.
0290  F0BB        IF  NOT  GC1  SKIP.
0291  444E        MPCR  = TSELR  -  1.
                  KBDTST.                       KEYBOARD  TEST
0292  F0EA        MIR  = LIT.
0293  E002        LIT  = @02@.
0294  F099        DW1.                          ENABLE  KEYBOARD
0295  04D1        AMPCR  = KBDTBL  -  1.
0296  F058        A3  = LIT.                    A3  = END CHAR CODE
0297  E04E        LIT  = @4E@.
0298  F007        A1  = AMPCR.
0299  F00F        A1  = A1  -  1.
029A  F05F        B.
                  CODECHK.                      KBD CODE CHECK  ROUTINE
029B  F012        A1  = A1  +  1.
029C  F05C        AMPCR  = A1.
029D  F05F        B.
029E  F09A        EXEC.
029F  F038        A2  = LIT.
                  ERRRTN.
02A0  F0FC        WHEN SRQ  STEP.
                  **********1ENTER          PK01  THRU  PK16  OR  24
                  **********2ENTER          ALL  ALPHA  NUMERIC  KEYS  LEFT
                  **********          TO  RIGHT.
                  **********3HOLD          SHIFT  AND ENTER  ALL  ALPHA  NUMERIC
                  **********          KEYS  LEFT  TO RIGHT.
                  **********4KEY          SPACE  BAR.
                  **********5ENTER          ALL  NUMERIC  KEYS  TOP  TO BOTTOM
```

```
02A1  8449          CPCR = BUSSC - 1.          TEST EXT BUSS
02A2  F097          DR2 BEX.
02A3  F116          A2 EQV B.
02A4  F09D          IF ABT SKIP.
02A5  42E6          MPCR = KBDERR - 1.
02A6  F03C          A3 EQV B.
02A7  F09D          IF ABT SKIP.
02A8  429A          MPCR = CODECHK - 1.
02A9  F0EA          MIR = LIT.
02AA  E008          LIT = @08@.
02AB  F099          DW1.                       ENABLE FORMS
02AC  F0CA          LCTR.
02AD  E03F          LIT = @3F@.
02AE  F0EF          MIR = Z.
02AF  E050          LIT = @50@.
02B0  F0FC          WHEN SRQ STEP.
02B1  F098          DW2.                       ADVANCE BOTH PLATENS
02B2  F0EA          MIR = LIT.
02B3  E004          LIT = @04@.
02B4  F0FC          WHEN SRQ STEP.
02B5  F099          DW1.                       ENABLE PRINTER
02B6  F01D          A1 = LIT.                  A1 = ESC NO PRINT
02B7  C848          SAR = 8 LIT = @48@.
02B8  F00B          A1 = A1 L.
02B9  F057          A3 = LIT L.                A3 = ESC AND PRINT
02BA  E049          LIT = @49@.
02BB  F0CA          LCTR.
02BC  E00D          LIT = @0D@.
02BD  04B3          AMPCR = ENDTBL1 - 1.
02BE  F0C0          IF NOT LC2 SKIP.           TEST FOR 16 PK FLAG   A
02BF  04C2          AMPCR = ENDTBL2 - 1.
02C0  F023          A2 = AMPCR.
                KBPRTR.
02C1  F102          AMPCR = A2.
02C2  F05F          B.
02C3  F09A          EXEC.                      GET NEXT CHAR
02C4  F089          B = LIT.
02C5  F0FF          0 EQV B.                   TEST FOR SPACE CODE
02C6  F0B5          IF NOT ABT SKIP.
02C7  F018          SET LC1.
02C8  F0DF          MIR = A3 OR B.
02C9  F0BF          IF NOT LC1 SKIP.
02CA  F0DC          MIR = A1 + B.
02CB  F05F          B.
02CC  F0FC          WHEN SRQ STEP.
02CD  F098          DW2.                       PRINT CHAR
02CE  F02A          A2 = A2 + 1.
02CF  F0C8          INC, IF COV SKIP.
02D0  42C0          MPCR = KBPRTR - 1.
02D1  F0EA          MIR = LIT.
02D2  E010          LIT = @10@.
02D3  F0FC          WHEN SRQ STEP.
02D4  F099          DW1.                       ENABLE CARRIER
02D5  F0CA          LCTR.
02D6  E0FE          LIT = @FE@.
02D7  F0EF          MIR = Z.
02D8  E00F          LIT = @0F@.
02D9  F0FC          WHEN SRQ STEP.
02DA  F098          DW2.                       MOVE CARR LEFT
02DB  F0EA          MIR = LIT.
02DC  E008          LIT = @08@.
02DD  F0FC          WHEN SRQ STEP.
02DE  F099          DW1.                       ENABLE FORMS
02DF  F0CA          LCTR.
02E0  E03F          LIT = @3F@.
02E1  F0EF          MIR = Z.
02E2  E051          LIT = @51@.
02E3  F0FC          WHEN SRQ STEP.
02E4  F098          DW2.                       ADV BOTH PLAT & SND ALARM
02E5  F000          WAIT.
            ************IF PRINTOUT IS NORMAL FORCE STEP
            ************SEE FIGURE # 7
            ************IF DISAGREE = ERROR # 69
02E6  444E          MPCR = TSELR - 1.
                KBDERR.                        KBD ERROR ROUTINE
02E7  E06C          LIT = @6C@.
02E8  F117          A2 EQV LIT.
02E9  F09D          IF ABT SKIP.
02EA  42F3          MPCR = KBDERR1 - 1.
02EB  F05F          B.
02EC  E011          LIT = @11@.
02ED  F0CB          LIT EQV B.
02EE  F09D          IF ABT SKIP.
02EF  42F3          MPCR = KBDERR1 - 1.
02F0  F019          SET LC2.                                              A
02F1  E008          LIT = @08@.
02F2  F011          A1 = A1 + LIT.
02F3  429A          MPCR = CODECHK - 1.
                KBDERR1.
02F4  F0EA          MIR = LIT.
02F5  E008          LIT = @08@.
02F6  F099          DW1.                       ENABLE FORMS
02F7  F0CA          LCTR.
02F8  E03F          LIT = @3F@.
02F9  F0EF          MIR = Z.
02FA  E001          LIT = @01@.
02FB  F0FC          WHEN SRQ STEP.
02FC  F098          DW2.                       SOUND ALARM
                KBDERR2.
02FD  C890          SAR = 8 LIT = @90@.
02FE  F07D          B = B C.
02FF  F087          B = LIT OR B.
0300  F07D          B = B C.
0301  F0E1          MIR = B.
0302  F098          DW2.                       ERROR CHAR TO INDICATORS
0303  F0EA          MIR = LIT.
0304  E002          LIT = @02@.
0305  F099          DW1.                       ENABLE KYBD
0306  F07C          B = B L.
0307  F06C          B = A2 OR B.
0308  F0E1          MIR = B.
0309  F0BA          IF NOT EXT SKIP.
030A  F0A0          IF EXT SKIP.               TEST FOR LOOPING
030B  F0F7          SKIP.
030C  429F          MPCR = ERRRTN - 1.
                KBDERR3.
030D  F1AE          IF NOT URQ SKIP.
030E  4316          MPCR = KBDERR4 - 1.
030F  F1AD          IF NOT SRQ SKIP.
0310  F0F7          SKIP.
0311  430C          MPCR = KBDERR3 - 1.
            ************KEYBOARD CHARACTER ERROR
            ************MIR AB BITS = BAD CHARACTERS
            ************MIR CD BITS = GOOD CHARACTERS
            ************FOR POSSIBLE OPERATOR ERROR PRESS READY
            ************BUTTON RE-ENTER CHARACTER
            ************CONSISTANT FAILURE GO TO ERROR NUMBER
            ************ERROR # E 44
            *********FOR MAKING KEYBOARD ADJUSTMENTS ON
            *********INTERMITTANT KEYS DO NOT PRESS READY AND REKEY
            *********CHARACTER AS DESIRED. THE A INDICATOR DISPLAY
            *********WILL REFLECT EACH KEY DEPRESSION AND ALARM
            *********WILL SOUND ONLY ON A DISAGREE WITH ORIGINAL
            *********EXPECTED CHARACTER
0312  F097          DR2 BEX.
0313  F116          A2 EQV B.
0314  F09D          IF ABT SKIP.
0315  42F3          MPCR = KBDERR1 - 1.
0316  42FC          MPCR = KBDERR2 - 1.
                KBDERR4.
0317  F096          DR1 BEX.
0318  F0EE          MIR = LIT L.
0319  E090          LIT = @90@.
```

```
031A  F098        DW2.                          TURN OFF INDICATORS
031B  F05F        B.
031C  429F        MPCR = ERRRTN - 1.
                CAREXHTST.                      CARRIER EXHAUSTIVE TEST
031D  F0CA        LCTR.
031E  E0BE        LIT = @BE@.
031F  F115        A1 = Z.                       A1 = PRINTER DATA WORD
0320  E045        LIT = @45@.
0321  F0CA        LCTR.
0322  E0FE        LIT = @FE@.
0323  F05F        B.                                                        A
0324  E095        LIT = @95@.                                               A
0325  F0A2        IF GC2 SKIP.                  TEST 15 INCH FLAG           A
0326  E0FF        LIT = @FF@.
0327  F05A        A3 = Z.                       A3 = CARR POS LEFT DATA WD.
0328  F05F        B.                                                        A
0329  E095        LIT = @95@.                                               A
032A  F0A2        IF GC2 SKIP.                  TEST 15 INCH FLAG           A
032B  E0FF        LIT = @FF@.
032C  F038        A2 = LIT.                     A2 = CARR POS RT DATA WD.
                NTRCET.
032D  F0EA        MIR = LIT.
032E  E004        LIT = @04@.
032F  F099        DW1.                          ENABLE PRINTER
0330  F05F        B.
0331  F0DB        MIR = A1.
0332  F0FC        WHEN SRQ STEP.
0333  F098        DW2.                          PRINT E IN PLACE
0334  F0EA        MIR = LIT.
0335  E010        LIT = @10@.
0336  F0FC        WHEN SRQ STEP.
0337  F099        DW1.                          ENABLE CARRIER
0338  F05F        B.
0339  F0DD        MIR = A2.
033A  F0FC        WHEN SRQ STEP.
033B  F098        DW2.                          POSITION CARRIER RIGHT
033C  F02B        A2 = A2 - 1.
033D  F04B        A3 = A3 - 1.
033E  E004        LIT = @04@.
033F  F0EA        MIR = LIT.
0340  F0F5        SAVE.
0341  F1AE        IF NOT URQ SKIP.
0342  843C        CPCR = CARERR2 - 1.
0343  F1AD        IF NOT SRQ SKIP.
0344  F0F7        SKIP.
0345  F0C9        JUMP.
0346  F099        DW1.                          ENABLE PRINTER
0347  F05F        B.
0348  F0DB        MIR = A1.
0349  F0FC        WHEN SRQ STEP.
034A  F098        DW2.                          PRINT E IN PLACE
034B  F022        A2 EQV B000.
034C  F0B5        IF NOT ABT SKIP.
034D  4362        MPCR = ENDEXHTST - 1.
034E  F0EA        MIR = LIT.
034F  E010        LIT = @10@.
0350  F0FC        WHEN SRQ STEP.
0351  F099        DW1.                          ENABLE CARRIER
0352  F05F        B.
0353  F0DE        MIR = A3.
0354  F0FC        WHEN SRQ STEP.
0355  F098        DW2.                          CARRIER POSITION LEFT
0356  F02B        A2 = A2 - 1.
0357  F04B        A3 = A3 - 1.
0358  E004        LIT = @04@.
0359  F0EA        MIR = LIT.
035A  F0F5        SAVE.
035B  F1AE        IF NOT URQ SKIP.
035C  8439        CPCR = CARERR1 - 1.
035D  F1AD        IF NOT SRQ SKIP.
035E  F0F7        SKIP.
035F  F0C9        JUMP.
0360  F022        A2 EQV B000.
0361  F09D        IF ABT SKIP.
0362  432C        MPCR = NTRCET - 1.
                ENDEXHTST.
0363  F0EA        MIR = LIT.
0364  E010        LIT = @10@.
0365  F099        DW1.                          ENABLE CARRIER
0366  F05F        B.                                                        A
0367  E04B        LIT = @4B@.                                               A
0368  F0A2        IF GC2 SKIP.                  TEST 15 INCH FLAG           A
0369  E080        LIT = @80@.
036A  F0E0        MIR = A3 OR LIT.
036B  F0FC        WHEN SRQ STEP.
036C  F098        DW2.                          CARR 128 POSITIONS
036D  F0F5        SAVE.
036E  F1AE        IF NOT URQ SKIP.
036F  8439        CPCR = CARERR1 - 1.
0370  F1AD        IF NOT SRQ SKIP.
0371  F0F7        SKIP.
0372  F0C9        JUMP.
0373  F018        SET LC1.
0374  F0EA        MIR = LIT.
0375  E008        LIT = @08@.
0376  F099        DW1.                          ENABLE FORMS
0377  E03F        LIT = @3F@.
0378  F0CA        LCTR.
0379  F0F5        SAVE.
037A  F0EF        MIR = Z.
037B  E050        LIT = @50@.
037C  F0FC        WHEN SRQ STEP.
037D  F098        DW2.                          ADVANCE BOTH PLATENS
037E  F0A6        IF LC1 JUMP.
037F  F000        WAIT.                         OBSERVE PRINTOUT
                **********IF PRINTOUT IS NORMAL AND CARRIER
                **********OPERATION IS NORMAL FORCE STEP
                **********SEE FIGURE 3.
                **********IF DISAGREE = ERROR # E 38
0380  444E        MPCR = TSELR - 1.
                TLTROTTST.
0381  D800        SAR = 8.
0382  F0EA        MIR = LIT.
0383  E010        LIT = @10@.
0384  F099        DW1.                          ENABLE CARRIER
0385  F0EE        MIR = LIT L.
0386  E003        LIT = @03@.
0387  F0FC        WHEN SRQ STEP.
0388  F098        DW2.                          INITIALIZE LEFT
0389  F0EA        MIR = LIT.
038A  E004        LIT = @04@.
038B  F0FC        WHEN SRQ STEP.
038C  F099        DW1.                          ENABLE PRINTER
038D  F0CA        LCTR.
038E  E0B6        LIT = @B6@.
038F  F115        A1 = Z.                       A1 = UR MOST BLACK RIGHT
0390  E003        LIT = @03@.
0391  F128        A2 = Z.                       A2 = LL MOST BLACK RIGHT
0392  E05C        LIT = @5C@.
0393  F05A        A3 = Z.                       A3 = LR MOST BLACK RIGHT
0394  E00C        LIT = @0C@.
0395  F08A        B = Z.                        B = UL MOST BLACK RIGHT
0396  E050        LIT = @50@.
0397  F0CA        LCTR.
0398  E0BE        LIT = @BE@.
0399  F0EF        MIR = Z.
039A  E003        LIT = @03@.
039B  F0FC        WHEN SRQ STEP.
039C  F098        DW2.                          PRINT UR MOST BLCK IN PLACE
039D  F05F        B.                                                        A
039E  E024        LIT = @24@.                                               A
039F  F0A2        IF GC2 SKIP.                  TEST 15 INCH FLAG           A
03A0  E03F        LIT = @3F@.
```

```
03A1  F0CA          LCTR.
03A2  F018          SET  LC1.
03A3  43A6          MPCR = NTRWCTR - 1.
                  PRTWCTR.
03A4  F0DB          MIR  = A1.
03A5  F0FC          WHEN SRQ  STEP.
03A6  F098          DW2.                        PRINT  UPPER  RIGHT  MOST  CHAR
                  NTRWCTR.
03A7  F05F          B.
03A8  F0DD          MIR  = A2.
03A9  F0FC          WHEN SRQ  STEP.
03AA  F098          DW2.                        PRINT  LOWER  LEFT  MOST  CHAR
03AB  F05F          B.
03AC  F0DE          MIR  = A3.
03AD  F0FC          WHEN SRQ  STEP.
03AE  F098          DW2.                        PRINT  LOWER  RIGHT  MOST  CHAR
03AF  F05F          B.
03B0  F0E1          MIR  = B.
03B1  F0FC          WHEN SRQ  STEP.
03B2  F098          DW2.                        PRINT  UPPER  LEFT  MOST  CHAR
03B3  F030          INC.
03B4  F02E          IF  COV  SKIP.
03B5  43A3          MPCR = PRTWCTR - 1.
03B6  F014          IF  LC1  SKIP.
03B7  43CE          MPCR = ENDWCTR - 1.
03B8  F0CA          LCTR.
03B9  E0B8          LIT  = @B8@.
03BA  F115          A1   = Z.                   A1  =  UL  MOST  RED  LEFT
03BB  E050          LIT  = @50@.
03BC  F128          A2   = Z.                   A2  =  LR  MOST  RED  LEFT
03BD  E00C          LIT  = @0C@.
03BE  F05A          A3   = Z.                   A3  =  LL  MOST  RED  LEFT
                  *                           LT  RED
03BF  E05C          LIT  = @5C@.
03C0  F08A          B    = Z.                   B  =  UR  MOST  RED  LEFT
03C1  E003          LIT  = @03@.
03C2  F0CA          LCTR.
03C3  E0BC          LIT  = @BC@.
03C4  F0EF          MIR  = Z.
03C5  E050          LIT  = @50@.
03C6  F0FC          WHEN SRQ  STEP.
03C7  F098          DW2.                        PRINT  UL  MOST  RED  IN  PLACE
03C8  F05F          B.                                                          A
03C9  E024          LIT  = @24@.                                                A
03CA  F0A2          IF  GC2  SKIP.              TEST  15  INCH  FLAG            A
03CB  E03F          LIT  = @3F@.
03CC  F0CA          LCTR.
03CD  F05F          B.
03CE  83A6          CPCR = NTRWCTR - 1.
                  ENDWCTR.
03CF  F0EA          MIR  = LIT.
03D0  E008          LIT  = @08@.
03D1  F0FC          WHEN SRQ  STEP.
03D2  F099          DW1.                        ENABLE  FORMS
03D3  F0CA          LCTR.
03D4  E03F          LIT  = @3F@.
03D5  F0EF          MIR  = Z.
03D6  E050          LIT  = @50@.
03D7  F0FC          WHEN SRQ  STEP.
03D8  F098          DW2.                        ADVANCE  BOTH  PLATENS
03D9  F000          WAIT.                       OBSERVE  PRINTOUT
                  **********IF        PRINTOUT  IS  NORMAL  FORCE  STEP
                  **********SEE         FIGURE  5.
                  **********IF        DISAGREE  = ERROR  #  E  43
03DA  444E          MPCR = TSELR - 1.
                  PWROFF.
03DB  F0EA          MIR  = LIT.
03DC  E008          LIT  = @08@.
03DD  F099          DW1.                        ENABLE  FORMS
03DE  F0CA          LCTR.
03DF  E03F          LIT  = @3F@.
03E0  F0EF          MIR  = Z.
```

```
03E1  E002          LIT  = @02@.
03E2  F0FC          WHEN SRQ  STEP.
03E3  F098          DW2.                        POWER  OFF
03E4  F000          WAIT.                       PWR  OFF  NOT  EXECUTED
                  **********ERROR       #  E  46
                  PRTALCHAR.                    PRINT  ALL  CHARTRS  ROUTINE
03E5  F0CA          LCTR.
03E6  E0B6          LIT  = @B6@.
03E7  F115          A1   = Z.                   A1  =  PRINT  FIRST  CHARACTOR
03E8  E020          LIT  = @20@.
03E9  F08A          B    = Z.                   B  =  LAST  CHARACTED  PRINTED
03EA  E060          LIT  = @60@.
03EB  F018          SET  LC1.
                  NTRPAC.                       ENTER  PRINT  ALL  CHAR  ROUTIN
03EC  F0EA          MIR  = LIT.
03ED  E008          LIT  = @08@.
03EE  F099          DW1.                        ENABLE  FORMS
03EF  F0CA          LCTR.
03F0  E03F          LIT  = @3F@.
03F1  F0EF          MIR  = Z.
03F2  E050          LIT  = @50@.
03F3  F0FC          WHEN SRQ  STEP.
03F4  F098          DW2.                        ADVANCE  BOTH  PLATENS
03F5  F0EA          MIR  = LIT.
03F6  E004          LIT  = @04@.
03F7  F0FC          WHEN SRQ  STEP.
03F8  F099          DW1.                        ENABLE  PRINTER
03F9  F0F5          SAVE.
03FA  F0DB          MIR  = A1.
03FB  F0FC          WHEN SRQ  STEP.
03FC  F098          DW2.                        PRINT  NEXT  CHAR  FROM  A1
03FD  F012          A1   = A1  + 1.
03FE  F003          A1   EQV  B.
03FF  F0B4          IF  NOT  ABT  JUMP.
0400  F014          IF  LC1  SKIP.
0401  4408          MPCR = ENDPAC - 1.
0402  F0CA          LCTR.
0403  E0B8          LIT  = @B8@.
0404  F115          A1   = Z.                   A1  =  PRINT  FIRST  CHARACTOR
                  *                           DATA  WORD
0405  E020          LIT  = @20@.
0406  F08A          B    = Z.                   B  =  PRINT  LAST  CHAR  DATA  WD
0407  E060          LIT  = @60@.
0408  83EB          CPCR = NTRPAC - 1.
                  ENDPAC.
0409  F0EA          MIR  = LIT.
040A  E008          LIT  = @08@.
040B  F0FC          WHEN SRQ  STEP.
040C  F099          DW1.                        ENABLE  FORMS
040D  F0CA          LCTR.
040E  E03F          LIT  = @3F@.
040F  F0EF          MIR  = Z.
0410  E050          LIT  = @50@.
0411  F0FC          WHEN SRQ  STEP.
0412  F098          DW2.                        ADVANCE  BOTH  PLATENS
0413  F000          WAIT.                       OBSERVE  PRINTOUT
                  **********IF        PRINTOUT  IS  NORMAL  FORCE  STEP
                  **********SEE         FIGURE  6.
                  **********IF        DISAGREE  = ERROR  #  E  41
0414  444E          MPCR = TSELR - 1.
                  OVSPTST.
0415  F0EA          MIR  = LIT.
0416  E010          LIT  = @10@.
0417  F099          DW1.
0418  F0EE          MIR  = LIT  L.
0419  C801          SAR  = 8  LIT  = 1.
041A  F0FC          WHEN SRQ  STEP.
041B  F098          DW2.
041C  F05F          B.
041D  F1AD          IF  NOT  SRQ  SKIP.
041E  4422          MPCR = OVSPA - 1.
041F  F000          WAIT.
```

```
                *********CARRIER        DINT  RESET  WITH  ZERO  SPACE  DATA  WORD
                *********ERROR      #  E  47
0420  F096            DR1  BEX.
0421  F0E1            MIR  =  B.
0422  F000            WAIT.
                 OVSPA.
0423  F000            WAIT.
                *********INSTALL        A  JUMPER  FROM  BACKPLANE  PIN
                *********PROTOTYPE       SYSTEM   -   LFDW4Y
                *********PRODUCTION       SYSTEM   -   PADN9Y
                *********TO       GROUND  AND  FORCE  STEP  -  FST
0424  F0EA            MIR  =  LIT.
0425  E00F            LIT  =  @0F@.
0426  F098            DW2.
0427  F0FD            WHEN URQ  STEP.
                *********STINT        NOT  SET  FOR  OVERSPEED
                *********ERROR      #  E  48
0428  F096            DR1  BEX.
0429  F0CA            LCTR.
042A  E07F            LIT  =  @7F@.
042B  F0FE            Z  EQV  B.
042C  E082            LIT  =  @82@.
042D  F0B5            IF  NOT  ABT  SKIP.
042E  4430            MPCR  =  OVSPA1   -   1.
042F  F0E1            MIR  =  B.
0430  F000            WAIT.
                *********OVERSPEED        STATUS  FAILURE
                *********ERROR      #  E  49
                 OVSPA1.
0431  F1AE            IF  NOT  URQ  SKIP.
0432  F000            WAIT.
                *********STINT        FAILED  TO  RESET
                *********ERROR      #  E  45
0433  F0EE            MIR  =  LIT  L.
0434  E003            LIT  =  3.
0435  F098            DW2.
0436  F05F            B.
0437  F0FC            WHEN SRQ  STEP.
0438  F000            WAIT.
                *********REMOVE       JUMPER  AND  FORCE  STEP  -  FST
0439  444E            MPCR  =  TSELR  -  1.
                 CARERR1.
043A  F096            DR1  BEX.
043B  F0E1            MIR  =  B.
043C  F000            WAIT.                          STINT  DETECTED  WHILE
                *                                    POSITIONING    LEFT
                *************ERROR          #  E  42
                 CARERR2.
043D  F096            DR1  BEX.
043E  F0E1            MIR  =  B.
043F  F000            WAIT.
                *                                    STINT  DETECTED  WHILE
                *                                    POSITIONING    RIGHT
                *************ERROR          #  E62
                 CARERR3.
0440  F096            DR1  BEX.
0441  F0E1            MIR  =  B.
0442  F000            WAIT.
                *************STINT          DETECTED  INITIALIZING      RIGHT
                *************ERROR          #  50
                 BUSSB.
0443  F0F9            WHEN RDC  BEX.
0444  F0FF            0  EQV  B.
0445  F09C            IF  ABT  JUMP.
0446  F0E1            MIR  =  B.
0447  F000            WAIT.
                *************EXT         BUSS  FAILURE  OR  PARITY  ERROR
                *************ERROR          #  E  1
0448  F0DA            MIR  =  AMPCR.
0449  F000            WAIT.
                 BUSSC.
044A  F0F9            WHEN RDC  BEX.
044B  F0FF            0  EQV  B.
044C  F09C            IF  ABT  JUMP.
044D  F0E1            MIR  =  B.
044E  F000            WAIT.
                *************EXTERNAL          BUSS  FAILURE
                *************ERROR          #  E  67
                 TSELR.                                 TEST  SELECT  ROUTINE
044F  F096            DR1  BEX.
0450  F006            SET  GC1.
0451  F0EA            MIR  =  LIT.
0452  E008            LIT  =  @08@.
0453  F099            DW1.                               ENABLE  FORMS
0454  F0CA            LCTR.
0455  E03F            LIT  =  @3F@.
0456  F0EF            MIR  =  Z.
0457  E004            LIT  =  @04@.
0458  F0FC            WHEN SRQ  STEP.
0459  F098            DW2.                               CLOSE  PLATENS
045A  F0CA            LCTR.
045B  E07E            LIT  =  @7E@.
045C  F0EF            MIR  =  Z.
045D  E008            LIT  =  @08@.
045E  F098            DW2.                               LIGHT  NUMERIC  INDICATOR
045F  F0EA            MIR  =  LIT.
0460  E002            LIT  =  @02@.
0461  F099            DW1.                               ENABLE  KEYBOARD
0462  F038            A2  =  LIT.
0463  E02D            LIT  =  @2D@.
0464  F0FC            WHEN SRQ  STEP.
                *************IF          NUMERIC  INDICATOR  IS  ON  PERFORM
                *************TESTS          6  THRU  10  IN  ORDER  OR  SEE  NOTE  BELOW
                *************1.          PRESS  NUMERIC  1  -  FORMS  TEST
                *************2.          PRESS  NUMERIC  2  -  CARRIER  TEST
                *************3.          PRESS  NUMERIC  3  -  PLATEN  ADVANCE  TEST
                *************4.          PRESS  NUMERIC  4  -  PRTR  ESCAPE  TEST
                *************5.          PRESS  NUMERIC  5  -  KEYBOARD  TEST
                *************6.          PRESS  NUMERIC  6  -  CARRIER  EXH.  TEST
                *************7.          PRESS  NUMERIC  7  -  TILT  -  ROTATE  TEST
                ****_********8.          PRESS  NUMERIC  8  -  PRINT  ALL  CHARACTERS
                *************9.          PRESS  NUMERIC  9  -  OVERSPEED  TEST
                ****_********10.         PRESS  NUMERIC  C  -  POWER  OFF  TEST
                *************NUMERIC          0  WILL  RETURN  TO  START
                *************DIAGNOSIS          CAN  BE  DONE  ONLY  IF  THE  TESTS
                *************ARE          PERFORMED  IN  ORDER,  HOWEVER  THEY  MAY
                *************BE          EXECUTED  IN  ANY  ORDER  OR  REPEATED
                *************NUMERIC          KEY  00  AND  000  ARE  FOR  DEBUG  USE
                *************ONLY.
                *************KEY          00  EXECUTES  AN  AA  55  DATA  PATTERN  TO
                *************THE          PRINTER  DECODER  WITH  NO  PRINT  OR
                *************ESCAPE          BITS  SET.
                *************KEY          000  EXECUTES  SAME  AA  55  DATA  PATTERN
                *************BUT          WITH  THE  PRINT  BIT  SET  AND  NO  ESCAPE
                *************BIT          SET.
0465  F097            DR2  BEX.                          READ  KBD  DATA
0466  F017            A1  =  B.
0467  F0CA            LCTR.
0468  E07E            LIT  =  @7E@.
0469  F0EF            MIR  =  Z.
046A  E000            LIT  =  @00@.
046B  F098            DW2.                               TURN  OUT  NUMERIC  INDICATOR
046C  F05F            B.
046D  E020            LIT  =  @20@.
046E  F089            B  =  LIT.
046F  F0F5            SAVE.
0470  F003            A1  EQV  B.
0471  F0B5            IF  NOT  ABT  SKIP.
0472  4490            MPCR  =  NTRTSR  -  1.
0473  F116            A2  EQV  B.
0474  F0B5            IF  NOT  ABT  SKIP.
0475  4477            MPCR  =  TSERROR  -  1.
0476  F07E            B  =  B  +  1.
0477  F0C9            JUMP.
```

```
                TSERROR.                        TEST  SELECT  ERROR
0478  F0EA          MIR  = LIT.
0479  E008          LIT  = @08@.
047A  F099          DW1.                        ENABLE  FORMS
047B  F0CA          LCTR.
047C  E03F          LIT  = @3F@.
047D  F0EF          MIR  = Z.
047E  E001          LIT  = @01@.
047F  F0FC          WHEN SRQ  STEP.
0480  F098          DW2.                        SOUND  ALARM
0481  F05F          B.
0482  444E          MPCR = TSELR  - 1.
                TESTSEL.
0483  449B          MPCR = RESTART  - 1.            NUM KEY  0
0484  40EE          MPCR = ENABFMS  - 1.            NUM KEY  1
0485  412E          MPCR = CARRTST  - 1.            NUM KEY  2
0486  41BD          MPCR = PLATADV  - 1.            NUM KEY  3
0487  423D          MPCR = PRTESCTST  - 1.          NUM KEY  4
0488  4291          MPCR = KBDTST  - 1.             NUM KEY  5
0489  431C          MPCR = CAREXHTST  - 1.          NUM KEY  6
048A  4380          MPCR = TLTROTTST  - 1.          NUM KEY  7
048B  43E4          MPCR = PRTALCHAR  - 1.          NUM KEY  8
048C  4414          MPCR = OVSPTST  - 1.            NUM KEY  9
048D  44A4          MPCR = PRTEXC  - 1.             NUM KEY  00
048E  44A1          MPCR = PRTEXCA  - 1.            NUM KEY  000
048F  43DA          MPCR = PWROFF  - 1.             NUM KEY  C
0490  4561          MPCR = INDSH  - 1.              NUM KEY  RE
                NTRTSR.
0491  0482          AMPCR = TESTSEL  - 1.
0492  F007          A1 = AMPCR.
0493  F123          A2 = B C.
0494  D400          SAR = 4.
0495  F069          B = A2 R.
0496  DC00          SAR = 12.
0497  F010          A1 = A1 + B.
0498  F05F          B.
0499  F05C          AMPCR = A1.
049A  F05F          B.
049B  F0C9          JUMP.
                RESTART.
049C  D800          SAR = 8.
049D  F16C          BR1 = LIT  L.
049E  E08F          LIT = @8F@.
049F  F099          DW1.                        DESELECT  CONSOLE
04A0  F05F          B.
04A1  7FFF          MPCR = START  - 1.
                PRTEXCA.
04A2  F089          B = LIT.
04A3  C841          SAR = 8  LIT  = @41@.
04A4  44A6          MPCR = LOOPF  - 1.
                PRTEXC.
04A5  F089          B = LIT.
04A6  C840          SAR = 8  LIT  = @40@.
                LOOPF.
04A7  F07D          B = B C.
04A8  F087          B = LIT  OR  B.
04A9  E055          LIT = @55@.
04AA  F0EA          MIR = LIT.
04AB  E004          LIT = @04@.
04AC  F099          DW1.                        ENABLE  PRINTER
04AD  F0F5          SAVE.
04AE  F0E1          MIR = B.
04AF  F0FC          WHEN SRQ  STEP.
04B0  F098          DW2.
04B1  F085          B = LIT  XOR  B.            COMPLEMENT  DATA  CHARACTER
04B2  E0FF          LIT = @FF@.
04B3  F0C9          JUMP.
                ENDTBL1.
04B4  E045          LIT = @45@.                     E
04B5  E04E          LIT = @4E@.                     N
04B6  E044          LIT = @44@.                     D
04B7  E000          LIT = @00@.                     SP
04B8  E000          LIT = @00@.                     SP
04B9  E012          LIT = @12@.                     2
04BA  E014          LIT = @14@.                     4
04BB  E000          LIT = @00@.                     SP
04BC  E050          LIT = @50@.                     P
04BD  E04B          LIT = @4B@.                     K
04BE  E000          LIT = @00@.                     SP
04BF  E04B          LIT = @4B@.                     K
04C0  E045          LIT = @45@.                     E
04C1  E059          LIT = @59@.                     Y
04C2  E053          LIT = @53@.                     S
                ENDTBL2.
04C3  E045          LIT = @45@.                     E
04C4  E04E          LIT = @4E@.                     N
04C5  E044          LIT = @44@.                     D
04C6  E000          LIT = @00@.                     SP
04C7  E000          LIT = @00@.                     SP
04C8  E011          LIT = @11@.                     1
04C9  E016          LIT = @16@.                     6
04CA  E000          LIT = @00@.                     SP
04CB  E050          LIT = @50@.                     P
04CC  E04B          LIT = @4B@.                     K
04CD  E000          LIT = @00@.                     SP
04CE  E04B          LIT = @4B@.                     K
04CF  E045          LIT = @45@.                     E
04D0  E059          LIT = @59@.                     Y
04D1  E053          LIT = @53@.                     S
                KBDTBL.                         KEYBOARD  TABLE
04D2  E070          LIT = @70@.                     PK1
04D3  E071          LIT = @71@.                     PK2
04D4  E072          LIT = @72@.                     PK3
04D5  E073          LIT = @73@.                     PK4
04D6  E074          LIT = @74@.                     PK5
04D7  E075          LIT = @75@.                     PK6
04D8  E076          LIT = @76@.                     PK7
04D9  E077          LIT = @77@.                     PK8
04DA  E078          LIT = @78@.                     PK9
04DB  E079          LIT = @79@.                     PK10
04DC  E07A          LIT = @7A@.                     PK11
04DD  E07B          LIT = @7B@.                     PK12
04DE  E07C          LIT = @7C@.                     PK13
04DF  E07D          LIT = @7D@.                     PK14
04E0  E07E          LIT = @7E@.                     PK15
04E1  E07F          LIT = @7F@.                     PK16
04E2  E06C          LIT = @6C@.                     PK17
04E3  E060          LIT = @60@.                     PK18
04E4  E061          LIT = @61@.                     PK19
04E5  E062          LIT = @62@.                     PK20
04E6  E063          LIT = @63@.                     PK21
04E7  E06D          LIT = @6D@.                     PK22
04E8  E06E          LIT = @6E@.                     PK23
04E9  E06F          LIT = @6F@.                     PK24
04EA  E011          LIT = @11@.                     1
04EB  E012          LIT = @12@.                     2
04EC  E013          LIT = @13@.                     3
04ED  E014          LIT = @14@.                     4
04EE  E015          LIT = @15@.                     5
04EF  E016          LIT = @16@.                     6
04F0  E017          LIT = @17@.                     7
04F1  E018          LIT = @18@.                     8
04F2  E019          LIT = @19@.                     9
04F3  E010          LIT = @10@.                     0
04F4  E039          LIT = @39@.                     -
04F5  E03D          LIT = @3D@.                     /
04F6  E01E          LIT = @1E@.                     OPEN - CLOSE  PLATEN
04F7  E01C          LIT = @1C@.                     BACKWARD  ARROW
04F8  E041          LIT = @41@.                     Q
04F9  E047          LIT = @47@.                     W
04FA  E055          LIT = @55@.                     E
04FB  E042          LIT = @42@.                     R
04FC  E044          LIT = @44@.                     T
04FD  E049          LIT = @49@.                     Y
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04FE  E045        LIT  = @45@.        U
04FF  E059        LIT  = @59@.        I
0500  E05F        LIT  = @5F@.        O
0501  E040        LIT  = @40@.        P
0502  E03F        LIT  = @3F@.        TILDA
0503  E01D        LIT  = @1D@.        LEFT  PLAT  ADV
0504  E035        LIT  = @35@.        OCK  I
0505  E051        LIT  = @51@.        A
0506  E043        LIT  = @43@.        S
0507  E054        LIT  = @54@.        D
0508  E056        LIT  = @56@.        F
0509  E057        LIT  = @57@.        G
050A  E058        LIT  = @58@.        H
050B  E05A        LIT  = @5A@.        J
050C  E05B        LIT  = @5B@.        K
050D  E05C        LIT  = @5C@.
050E  E038        LIT  = @38@.        ;
050F  E03C        LIT  = @3C@.        :
0510  E036        LIT  = @36@.        OCK  II
0511  E04A        LIT  = @4A@.        Z
0512  E048        LIT  = @48@.        X
0513  E053        LIT  = @53@.        C
0514  E046        LIT  = @46@.        V
0515  E052        LIT  = @52@.        B
0516  E05E        LIT  = @5E@.        N
0517  E05D        LIT  = @5D@.        M
0518  E03A        LIT  = @3A@.        ,
0519  E03B        LIT  = @3B@.        .
051A  E03E        LIT  = @3E@.        /
051B  E091        LIT  = @91@.        ;
051C  E092        LIT  = @92@.        `
051D  E093        LIT  = @93@.
051E  E094        LIT  = @94@.        $
051F  E095        LIT  = @95@.        %
0520  E096        LIT  = @96@.        &
0521  E097        LIT  = @97@.        '
0522  E098        LIT  = @98@.              OPEN  BRACKETS
0527  E09E        LIT  = @9E@.        CLOSE  BRACKETS
0528  E09C        LIT  = @9C@.        FORWARD  ARROW
0529  E0C1        LIT  = @C1@.
052A  E0C7        LIT  = @C7@.
052B  E0D5        LIT  = @D5@.
052C  E0C2        LIT  = @C2@.
052D  E0C4        LIT  = @C4@.
052E  E0C9        LIT  = @C9@.
052F  E0C5        LIT  = @C5@.
0530  E0D9        LIT  = @D9@.
0531  E0DF        LIT  = @DF@.
0532  E0C0        LIT  = @C0@.
0533  E0BF        LIT  = @BF@.
0534  E09D        LIT  = @9D@.
0535  E0B5        LIT  = @B5@.
0536  E0D1        LIT  = @D1@.
0537  E0C3        LIT  = @C3@.
0538  E0D4        LIT  = @D4@.
0539  E0D6        LIT  = @D6@.
053A  E0D7        LIT  = @D7@.
053B  E0D8        LIT  = @D8@.
053C  E0DA        LIT  = @DA@.
053D  E0DB        LIT  = @DB@.
053E  E0DC        LIT  = @DC@.
053F  E0B8        LIT  = @B8@.
0540  E0BC        LIT  = @BC@.
0541  E0B6        LIT  = @B6@.
0542  E0CA        LIT  = @CA@.
0543  E0C8        LIT  = @C8@.
0544  E0D3        LIT  = @D3@.
0545  E0C6        LIT  = @C6@.
0546  E0D2        LIT  = @D2@.
0547  E0DE        LIT  = @DE@.
0548  E0DD        LIT  = @DD@.
0549  E0BA        LIT  = @BA@.
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054A  E0BB        LIT  = @BB@.
054B  E0BE        LIT  = @BE@.
054C  E030        LIT  = @30@.
054D  E02E        LIT  = @2E@.
054E  E02C        LIT  = @2C@.
054F  E01F        LIT  = @1F@.
0550  E02F        LIT  = @2F@.
0551  E020        LIT  = @20@.
0552  E027        LIT  = @27@.
0553  E024        LIT  = @24@.
0554  E021        LIT  = @21@.
0555  E028        LIT  = @28@.
0556  E025        LIT  = @25@.
0557  E022        LIT  = @22@.
0558  E02A        LIT  = @2A@.
0559  E029        LIT  = @29@.
055A  E026        LIT  = @26@.
055B  E023        LIT  = @23@.
055C  E02B        LIT  = @2B@.
055D  E02D        LIT  = @2D@.
055E  E04D        LIT  = @4D@.
055F  E04C        LIT  = @4C@.
0560  E04F        LIT  = @4F@.
0561  E04E        LIT  = @4E@.
      INDSH.
0562  F057        A3 = LIT  L.
0563  C802        SAR = 8  LIT  = 2.
0564  F0CA        LCTR.
0565  E060        LIT = @60@.
0566  F0EF        MIR = Z.
0567  E000        LIT = @00@.
0568  F098        DW2.
      AIND.
0569  C890        SAR = 8  LIT  = @90@.
056A  8573        CPCR = SLAWR - 1.
      BIND.
056B  C888        SAR = 8  LIT  = @88@.
056C  8573        CPCR = SLAWR - 1.
      CIND.
056D  C884        SAR = 8  LIT  = @84@.
056E  8573        CPCR = SLAWR - 1.
      DIND.
056F  C882        SAR = 8  LIT  = @82@.
0570  8573        CPCR = SLAWR - 1.
      SIND.
0571  C881        SAR = 8  LIT  = @81@.
0572  8573        CPCR = SLAWR - 1.
0573  4561        MPCR = INDSH - 1.
      SLAWR.
0574  F1AE        IF  NOT  URQ  SKIP.
0575  444E        MPCR = TSELR - 1.
0576  F077        B = B001.
0577  F039        A2 = LIT  L.
      SLAWRA.
0578  F1CB        MIR = A2  OR  B.
0579  F098        DW2.
057A  F07D        B = B C.
057B  DF00        SAR = 15.
057C  F03C        A3  EQV  B.
057D  F09C        IF  ABT  JUMP.
057E  F10F        A1 = B000.
057F  F0CA        LCTR.
0580  E001        LIT = 1.
      DELAYA.
0581  F012        A1 = A1 + 1.
0582  F09E        IF  AOV  SKIP.
0583  4580        MPCR = DELAYA - 1.
0584  F0C8        INC,  IF  COV  SKIP.
0585  4580        MPCR = DELAYA - 1.
0586  4577        MPCR = SLAWRA - 1.
0587  4000        CNST = @4000@.
      FINISH.
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MANUAL PROCEDURES

E1	OPERATOR ACTION	MACHINE ACTION	A	D
1	FE MEMORY TEST INDICATED CONSOLE FAILING BUSS TEST		2	F413
2	PUT MTR METER ON PADM1M (CCDREAD)	METER READING 0%	3	F 10
3	PUT MTR METER ON PADN3F (CCENSTA)	METER READING 0%	4	F 11
4	SELECT EXT BUSS BIT THAT FE MTR INDICATED BAD			
		EXT BIT 1	F 16	
		EXT BIT 14	F 13	
		EXT BIT 9, 10, 11, OR 12	F 14	
		EXT BIT 13, 15, OR 16	F 12	

E2	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADP4R (PSIRQ/)	METER READING 100%	F1	2
2	PUT MTR METER ON PADP7N (DINT8/)	METER READING 100%	3	19
3	PUT MTR METER ON PADP7P (SINT8/)	METER READING 100%	4	19
4	PUT MTR METER ON PADP8M (DINT7/)	METER READING 100%	5	F426
5	PUT MTR METER ON PADP8P (SINT7/)	METER READING 100%	6	F426
6	PUT MTR METER ON PADP8L (DINT6/)	METER READING 100%	7	F2
7	PUT MTR METER ON PADP7L (SINT6/)	METER READING 100%	8	F2
8	PUT MTR METER ON PADP8N (DINT5/)	METER READING 100%	9	F3
9	PUT MTR METER ON PADP8K (SINT5/)	METER READING 100%	10	F3
10	PUT MTR METER ON PADP4N (DINT4/)	METER READING 100%	11	F4
11	PUT MTR METER ON PADP4P (SINT4/)	METER READING 100%	12	F4
12	PUT MTR METER ON PADP5M (DINT3/)	METER READING 100%	13	F5
13	PUT MTR METER ON PADP5P (SINT3/)	METER READING 100%	14	F5
14	PUT MTR METER ON PADP5L (DINT2/)	METER READING 100%	15	F6
15	PUT MTR METER ON PADP4L (SINT2/)	METER READING 100%	16	F6
16	PUT MTR METER ON PADP5N (DINT1/)	METER READING 100%	17	F7
17	PUT MTR METER ON PADP5K (SINT1/)	METER READING 100%	18	F7
18	REMOVE CARD PADP4 THEN PUT METER ON PADP7R (PSIRQ/)	METER READING 100%	F8	F9
19	PRESS FORCE STEP AND GO TO E3			

E3	OPERATOR ACTION	MACHINE ACTION	A	4
1	PUT MTR METER ON PADP7N (DINT8/)	METER READING = 100%	7	2
2	OBSERVE MIR	BIT A8 IS ON	3	F17
3	OBSERVE MIR	BIT C1 IS ON	F18	4
4	OBSERVE MIR	BIT C2 IS ON	F19	5
5	OBSERVE MIR	BIT C4 IS ON	F20	6
6	OBSERVE MIR	BIT C8 IS ON	F26	F37
7	OBSERVE MIR	BIT D1 IS ON	F22	8
8	OBSERVE MIR	BIT D2 IS ON	F23	9
9	OBSERVE MIR	BIT D4 IS ON	F24	10
10	OBSERVE MIR	BIT D8 IS ON	F25	F0

E4	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADP7P (SINT8/)	METER READING = 0%	2	3
2	PUT MTR METER ON PADP7R (PSIRQ/)	METER READING = 0%	F1	F27
3	PUT MTR METER ON PADN3K (CIRDYSW)	METER READING = 100%	4	F28
4	HOLD READY BUTTON IN	METER READING = 100%	F29	5
5	PUT METER ON PADK9G (CCCS/)	METER READING = 97%	F 30	6
6	PUT METER ON PADQ1G (SCLKC)	METER READING 3-5%	7	F407
7	PUT METER ON PADQ1F (SCLKD)	METER READING 3-5%	F 31	F407

E5	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT SGL/NOR TO SGL,			

	PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL AND PRESS SGL 3 TIMES OBSERVE MIR	MIR = 0000	2	4	
2	PUT METER ON PADQ4I (EOASR/)	METER READING 0%	2A	F401	
2A	KEEP METER ON PADQ4I AND PRESS SGL 1 TIME	METER READING 100%	3	F415	A
3	PUT METER ON PADP8Y (CLEAR) AND PRESS AND HOLD SYSTEM CLEAR PUSHBUTTON	METER READING 100%	F 32	F402	
4	OBSERVE MIR	MIR B BITS = 7	5	F403	
5	OBSERVE MIR	MIR BIT D8 NOT ON	6	F 34	
6	PUT METER ON PADN6Y (STINT8/)	METER READING 0%	7	F 43	
7	PUT METER ON PADP8J (PSENST8/)	METER READING 0%	F 33	F404	

E6	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN6Y (STINT8/)	METER READING 0%	F341	2
2	PUT MTR METER ON PADP7R (PSIRQ/)	METER READING 0%	F9	F1

E7	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN6J (DINT8/)	METER READING 100%	2	F35
2	PUT MTR METER ON PADN0V (CCDINT)	METER READING 100%	F36	3
3	PUT MTR METER ON PADK9D (CCEKDI/)	METER READING 0%	F37	4
4	PUT MTR METER ON PADM4I (CCKBSTA)	METER READING 95%	5	F38
5	PUT MTR METER ON PADK8G (CCKBST)	METER READING 95%	6	F39
6	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 5 PLUS 1% INCREASE	7	F40
7	PUT MTR METER ON PADK9B MEMORY LOADER SWITCH ON	METER READING 40%	F41	F42

E8	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT A8 NOT SET	F43	2
2	OBSERVE MIR	MIR BIT C1 NOT SET	F44	F45

E9	OPERATOR ACTION	MACHIME ACTION		
1	PUT MTR METER ON PADN2E (CCKSTA/)	METER READING 100%	2	F46
2	PUT MTR METER ON PADM9C (CCKST/) PRESS MEMORY LOADER SWITCH ON	METER READING 60%	F47	F48
E10	OBSERVE MIR	MIR BIT D4 NOT SET	F49	F50

E11	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE INDICATORS	LAMP A1 ON	2	4
2	PUT MTR METER ON PADL2D (CCI01/)	METER READING 100%	F51	3
3	OBSERVE INDICATORS	LAMPS A1, B1, C1, D1, ON	F52	F53
4	OBSERVE INDICATORS	LAMP A2 ON	5	7
5	PUT MTR METER ON PADL1D (CCI02/)	METER READING 100%	F54	6
6	OBSERVE INDICATORS	LAMPS A2, B2, C2, D2 ON	F55	F56
7	OBSERVE INDICATORS	LAMP A3 ON	8	10
8	PUT MTR METER ON PADL1F (CCI03/)	METER READING 100%	F57	9
9	OBSERVE INDICATORS	LAMPS A3, B3, C3, D3 ON	F58	F59
10	OBSERVE INDICATORS	LAMP A4 ON	11	13
11	PUT MTR METER ON PADL1E (CCI04/)	METER READING 100%	F60	12
12	OBSERVE INDICATORS	LAMPS A4, B4, C4, D4 ON	F61	F62
13	OBSERVE INDICATORS	LAMP A5 ON	14	16
14	PUT MTR METER ON PADK8F (CCI05/)	METER READING 100%	F63	15
15	OBSERVE INDICATORS	LAMPS A5, B5, C5, D5 ON	F64	F65
16	OBSERVE INDICATORS	LAMP A6 ON	17	19
17	PUT MTR METER ON PADK9E (CCI06/)	METER READING 100%	F66	18
18	OBSERVE INDICATORS	LAMPS A6, B6, C6, D6 ON	F67	F68
19	OBSERVE INDICATORS	LAMP A7 ON	20	22
20	PUT MTR METER ON PADK8E (CCI07/)	METER READING 100%	F69	21
21	OBSERVE INDICATORS	LAMPS A7, B7, C7, D7 ON	F70	F71
22	OBSERVE INDICATORS	LAMP A8 ON	23	25
23	PUT MTR METER ON PADK9F (CCI08/)	METER READING 100%	F72	24
24	OBSERVE INDICATORS	LAMPS A8, B8, C8, D8 ON	F73	F74
25	OBSERVE INDICATORS	LAMP B1 ON	26	27
26	PUT MTR METER ON PADL2K (CCI09/)	METER READING 100%	F75	F76
27	OBSERVE INDICATORS	LAMP B2 ON	28	29

28	PUT MTR METER ON PADL1K (CCI10/)	METER READING 100%	F77	F76	
29	OBSERVE INDICATORS	LAMP B3 ON	30	31	
30	PUT MTR METER ON PADL1L (CCI11/)	METER READING 100%	F78	F76	
31	OBSERVE INDICATORS	LAMP B4 ON	32	33	
32	PUT MTR METER ON PADL1J (CCI12/)	METER READING 100%	F79	F76	
33	OBSERVE INDICATORS	LAMP B5 ON	34	35	
34	PUT MTR METER ON PADK8J (CCI131)	METER READING 100%	F80	F81	
35	OBSERVE INDICATORS	LAMP B6 ON	36	37	
36	PUT MTR METER ON PADK9K (CCI141)	METER READING 100%	F82	F81	
37	OBSERVE INDICATORS	LAMP B7 ON	38	39	
38	PUT MTR METER ON PADK8N (CCI151)	METER READING 100%	F83	F81	
39	OBSERVE INDICATORS	LAMP B8 ON	40	41	
40	PUT MTR METER ON PADK9J (CCI161)	METER READING 100%	F84	F81	
41	OBSERVE INDICATORS	LAMP C1 ON	42	43	
42	PUT MTR METER ON PADL1P (CCI171)	METER READING 100%	F85	F86	
43	OBSERVE INDICATORS	LAMP C2 ON	44	45	
44	PUT MTR METER ON PADL2P (CCI181)	METER READING 100%	F87	F86	
45	OBSERVE INDICATORS	LAMP C3 ON	46	47	
46	PUT MTR METER ON PADL2Q (CCI191)	METER READING 100%	F88	F86	
47	OBSERVE INDICATORS	LAMP C4 ON	48	49	
48	PUT MTR METER ON PADL1N (CCI201)	METER READING 100%	F89	F86	
49	OBSERVE INDICATORS	LAMP C5 ON	50	51	
50	PUT MTR METER ON PADK9Q (CCI21/)	METER READING 100%	F90	F91	
51	OBSERVE INDICATORS	LAMP C6 ON	52	53	
52	PUT MTR METER ON PADK8Q (CCI22/)	METER READING 100%	F92	F93	
53	OBSERVE INDICATORS	LAMP C7 ON	54	55	
54	PUT MTR METER ON PADK9R (CCI23/)	METER READING 100%	F94	F95	
55	OBSERVE INDICATORS	LAMP C8 ON	56	57	
56	PUT MTR METER ON PADK9U (CCI24/)	METER READING 100%	F96	F97	
57	OBSERVE INDICATORS	LAMP D1 ON	58	59	
58	PUT MTR METER ON PADL1T (CCI251)	METER READING 100%	F98	F99	
59	OBSERVE INDICATORS	LAMP D2 ON	60	61	
60	PUT MTR METER ON PADL2T (CCI261)	METER READING 100%	F100	F101	
61	OBSERVE INDICATORS	LAMP D3 ON	62	63	
62	PUT MTR METER ON PADL2S (CCI271)	METER READING 100%	F102	F103	
63	OBSERVE INDICATORS	LAMP D4 ON	64	65	
64	PUT MTR METER ON PADL1U	METER READING 100%	F104	F105	
65	OBSERVE INDICATORS	LAMP D5 ON	66	67	
66	PUT MTR METER ON PADK8V (CCI29/)	METER READING 100%	F106	F107	
67	OBSERVE INDICATORS	LAMP D6 ON	68	69	
68	PUT MTR METER ON PADK8U (CCI30/)	METER READING 100%	F108	F109	
69	OBSERVE INDICATORS	LAMP D7 ON	70	71	
70	PUT MTR METER ON PADK9W (CCI31/)	METER READING 100%	F110	F111	
71	OBSERVE INDICATORS	LAMP D8 ON	72	73	
72	PUT MTR METER ON PADK9T (CCI32/)	METER READING 100%	F112	F113	
73	OBSERVE INDICATORS	LAMP S1 ON	74	75	
74	PUT MTR METER ON PADL2W (CCI33/)	METER READING 100%	F114	F115	
75	OBSERVE INDICATORS	LAMP S2 ON	76	77	
76	PUT MTR METER ON PADL1X (CCI34/)	METER READING 100%	F116	F115	
77	OBSERVE INDICATORS	LAMP S4 ON	78	79	
78	PUT MTR METER ON PADL2X (CCI36/)	METER READING 100%	F117	F115	
79	OBSERVE INDICATORS	LAMP S3 ON	80	81	
80	PUT MTR METER ON PADL2V (CCI35/)	METER READING 100%	F118	F115	
E12	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON PADN6Y (STINT8/)	METER READING 0%	F384	2	
2	PUT SGL/NOR SWITCH TO SGL. PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL AND PRESS SGL 3 TIMES.				
	PUT METER ON PADP7V (PSREAD8/)	METER READING 0%	3	F405	

3	PUT MTR METER ON PADP8I (PSINST2)	METER READING 0%	F119	F406
E13	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT SGL/NOR SWITCH TO SGL - PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL PRESS SGL TWICE			
2	OBSERVE INDICATORS	NONE OF A INDICATORS ON	3	5
3	PUT MTR METER ON PADK8W (PSINST2)	METER READING 0%	4	F120
4	PUT MTR METER ON PADK8P (PSWRITE8/)	METER READING 0%	F122	F121
5	OBSERVE INDICATORS	LAMPS A1 THRU A4 OFF	F123	6
6	OBSERVE INDICATORS	LAMPS A5 THRU A8 OFF	F124	7
7	OBSERVE INDICATORS	LAMP A1 OFF	8	11
8	PUT MTR METER ON PADL5U (CCIAOF/)	METER READING 0%	F125	9
9	PUT MTR METER ON PADL2D (CCI01/)	METER READING 0%	F126	10
10	PUT MTR METER ON PADL1H (CCDMIR16)	METER READING 100%	F127	F128
11	OBSERVE INDICATORS	LAMP A2 OFF	12	15
12	PUT MTR METER ON PADL5V (CCIA1F/)	METER READING 0%	F129	13
13	PUT MTR METER ON PADL1D (CCI02/)	METER READING 0%	F130	14
14	PUT MTR METER ON PADL2H (CCDMIR15)	METER READING 100%	F127	F131
15	OBSERVE INDICATORS	LAMP A3 OFF	16	19
16	PUT MTR METER ON PADL5D (CCIA2F/)	METER READING 0%	F132	17
17	PUT MTR METER ON PADL1F (CCI03/)	METER READING 0%	F133	18
18	PUT MTR METER ON PADL2M (CCDMIR14)	METER READING 100%	F127	F134
19	OBSERVE INDICATORS	LAMP A4 OFF	20	23
20	PUT MTR METER ON PADL5C (CCIA3F/)	METER READING 0%	F135	21
21	PUT MTR METER ON PADL1E (CCI04/)	METER READING 0%	F136	22
22	PUT MTR METER ON PADL2R (CCDMIR13)	METER READING 100%	F127	F134
23	OBSERVE INDICATORS	LAMP A5 OFF	24	27
24	PUT MTR METER ON PADL5B (CCIA4F/)	METER READING 0%	F137	25
25	PUT MTR METER ON PADK8F (CCI05/)	METER READING 0%	F138	26
26	PUT MTR METER ON PADK8L (CCDMIR12)	METER READING 100%	F139	F140
27	OBSERVE INDICATORS	LAMP A6 OFF	28	31
28	PUT MTR METER ON PADL5F (CCIA5F/)	METER READING 0%	F141	29
29	PUT MTR METER ON PADK9E (CCI06/)	METER READING 0%	F142	30
30	PUT MTR METER ON PADK9S (CCDMIR11)	METER READING 100%	F139	F143
31	OBSERVE INDICATORS	LAMP A7 OFF	32	35
32	PUT MTR METER ON PADL5F (CCIA6F/)	METER READING 0%	F144	33
33	PUT MTR METER ON PADK8E (CCI07/)	METER READING 0%	F145	34
34	PUT MTR METER ON PADK9L (CCDMIR10)	METER READING 100%	F139	F140
35	OBSERVE INDICATORS	LAMP A8 OFF	36	39
36	PUT MTR METER ON PADL5G (CCIA7F/)	METER READING 0%	F146	37
37	PUT MTR METER ON PADK9F (CCI08/)	METER READING 0%	F147	38
38	PUT MTR METER ON PADK8X (CCDMIR9)	METER READING 100%	F139	F143
39	OBSERVE INDICATORS	ANY B INDICATORS ON	F391	40
40	OBSERVE INDICATORS	ANY C INDICATORS ON	F391	41
41	OBSERVE INDICATORS	ANY D INDICATORS ON	F392	42
42	OBSERVE INDICATORS	ANY S INDICATORS ON	F392	2
E14	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE INDICATORS	B INDICATORS ON = 99	F425	1A
1A	OBSERVE INDICATORS	ALL B INDICATORS OFF	F148	2
2	OBSERVE INDICATORS	LAMPS B1 THRU B4 OFF	F149	3
3	OBSERVE INDICATORS	LAMPS B5 THRU B8 OFF	F150	4
4	OBSERVE INDICATORS	LAMP B1 OFF	5	7
5	PUT MTR METER ON PADL5M (CC1B0F/)	METER READING 0%	F151	6
6	PUT MTR METER ON PADL2K (CCI09/)	METER READING 0%	F152	F153
7	OBSERVE INDICATORS	LAMP B2 OFF	8	10
8	PUT MTR METER ON PADL5L (CC1B1F/)	METER READING 0%	F154	9

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9	PUT MTR METER ON PADL1K (CCI10/)	METER READING	0%	F155	F153
10	OBSERVE INDICATORS	LAMP B3 OFF		11	13
11	PUT MTR METER ON PADL5H (CCIB2F/)	METER READING	0%	F156	12
12	PUT MTR METER ON PADL1L (CCI11/)	METER READING	0%	F157	F153
13	OBSERVE INDICATORS	LAMP B4 OFF		14	16
14	PUT MTR METER ON PADL5I (CCIB3F/)	METER READING	0%	F158	15
15	PUT MTR METER ON PADL1J (CCI12/)	METER READING	0%	F159	F153
16	OBSERVE INDICATORS	LAMP B5 OFF		17	19
17	PUT MTR METER ON PADL5Y (CCIB1F/)	METER READING	0%	F160	18
18	PUT MTR METER ON PADK8J (CCI13/)	METER READING	0%	F161	F162
19	OBSERVE INDICATORS	LAMP B6 OFF		20	22
20	PUT MTR METER ON PADL5X (CCIB5F/)	METER READING	0%	F163	21
21	PUT MTR METER ON PADK9K (CCI14/)	METER READING	0%	F164	F162
22	OBSERVE INDICATORS	LAMP B7 OFF		23	25
23	PUT MTR METER ON PADL5W (CCIB6F/)	METER READING	0%	F165	24
24	PUT MTR METER ON PADK8N (CCI15/)	METER READING	0%	F166	F162
25	OBSERVE INDICATORS	LAMP B8 OFF		26	28
26	PUT MTR METER ON PADL5T (CCIB7F/)	METER READING	0%	F167	27
27	PUT MTR METER ON PADK9J (CCI16/)	METER READING	0%	F168	F162
28	OBSERVE INDICATORS	ANY A INDICATORS ON		F393	29
29	OBSERVE INDICATORS	AMY C INDICATORS ON		F393	1
E15	OPERATOR ACTION	MACHINE ACTION		A	D
1	OBSERVE INDICATORS	ALL C INDICATORS OFF		F169	2
2	OBSERVE INDICATORS	LAMPS C1 THRU C4 OFF		F170	3
3	OBSERVE INDICATORS	LAMPS C5 THRU C8 OFF		F171	4
4	OBSERVE INDICATORS	LAMP C1 OFF		5	7
5	PUT MTR METER ON PADL8M (CCIC0F/)	METER READING	0%	F172	6
6	PUT MIR METER ON PADL1P (CCI17/)	METER READING	0%	F173	F174
7	OBSERVE INDICATORS	LAMP C2 OFF		8	10
8	PUT MTR METER ON PADL8L (CCIC1F/)	METER READING	0%	F175	9
9	PUT MTR METER ON PADL2P (CCI18/)	METER READING	0%	F176	F174
10	OBSERVE INDICATORS	LAMP C3 OFF		11	13
11	PUT MTR METER ON PADL8H (CCIC2F/)	METER READING	0%	F177	12
12	PUT MTR METER ON PADL2Q (CCI19/)	METER READING	0%	F178	F174
13	OBSERVE INDICATORS	LAMP C4 OFF		14	16
14	PUT MTR METER ON PADL8I (CCIC3F/)	METER READING	0%	F179	15
15	PUT MTR METER ON PADL1N (CCI20/)	METER READING	0%	F180	F174
16	OBSERVE INDICATORS	LAMP C5 OFF		17	19
17	PUT MTR METER ON PADL8Y (CCIC4F/)	METER READING	0%	F181	18
18	PUT MTR METER ON PADK9Q (CCI21/)	METER READING	0%	F182	F183
19	OBSERVE INDICATORS	LAMP C6 OFF		20	22
20	PUT MTR METER ON PADL8X (CCIC5F/)	METER READING	0%	F184	21
21	PUT MTR METER ON PADK8Q (CCI22/)	METER READING	0%	F185	F183
22	OBSERVE INDICATORS	LAMP C7 OFF		23	25
23	PUT MTR METER ON PADL8W (CCIC6F/)	METER READING	0%	F186	24
24	PUT MTR METER ON PADK9R (CCI23/)	METER READING	0%	F187	F183
25	OBSERVE INDICATORS	LAMP C8 OFF		26	1
26	PUT MTR METER ON PADL8T (CCIC7F/)	METER READING	0%	F188	27
27	PUT MTR METER ON PADK9U (CCI24/)	METER READING	0%	F189	F183
E16	OPERATOR ACTION	MACHINE ACTION		A	D
1	OBSERVE INDICATORS	ALL D INDICATORS OFF		F190	2
2	OBSERVE INDICATORS	LAMPS D1 THRU D4 OFF		F191	3
3	OBSERVE INDICATORS	LAMPS D5 THRU D8 OFF		F192	4
4	OBSERVE INDICATORS	LAMP D1 OFF		5	7
5	PUT MTR METER ON PADL8U (CCID0F/)	METER READING	0%	F193	6

6	PUT MTR METER ON PADL8T (CCI25/)	METER READING	0%	F194	F195
7	OBSERVE INDICATORS	LAMP D2 OFF		8	10
8	PUT MTR METER ON PADL8V (CCID1F/)	METER READING	0%	F196	9
9	PUT MTR METER ON PADL2T (CCI26/)	METER READING	0%	F197	F195
10	OBSERVE INDICATORS (CCID2F/)	LAMP D3 OFF		11	13
11	PUT MTR METER ON 6FDU3D (CCID2F/)	METER READING	0%	F298	12
12	PUT MTR METER ON PADL2S (CCI27/)	METER READING	0%	F199	F195
13	OBSERVE INDICATORS	LAMP D4 OFF		14	16
14	PUT MTR METER ON PADL8C (CCID3F/)	METER READING	0%	F200	15
15	PUT MTR METER ON PADL1U (CCI28/)	METER READING	0%	F201	F202
16	OBSERVE INDICATORS	LAMP D5 OFF		17	19
17	PUT MTR METER ON PADL8B (CCID4F/)	METER READING	0%	F203	18
18	PUT MTR METER ON PADK8V (CCI29/)	METER READING	0%	F204	F205
19	OBSERVE INDICATORS	LAMP D6 OFF		20	22
20	PUT MTR METER ON PADL8E (CCID5F/)	METER READING	0%	F206	21
21	PUT MTR METER ON PADK8U (CCI30/)	METER READING	0%	F207	F205
22	OBSERVE INDICATORS	LAMP D7 OFF		23	25
23	PUT MTR METER ON PADL8F (CCID6F/)	METER READING	0%	F208	24
24	PUT MTR METER ON PADK9W (CCI31/)	METER READING	0%	F209	F205
25	OBSERVE INDICATORS	LAMP D8 OFF		26	1
26	PUT MTR METER ON PADL86 (CCI04T)	METER READING	0%	F210	27
27	PUT MTR METER ON PADK9W (CCI32/)	METER READING	0%	F211	F212

E17	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE INDICATORS	LAMPS S1 THRU S4 OFF	F213	2
2	OBSERVE INDICATORS	LAMP S1 OFF	3	5
3	PUT MTR METER ON PADL5P (CCITYF/)	METER READING 0%	F214	4
4	PUT MTR METER ON PADL2W (CCI33/)	METER READING 0%	F215	F216
5	OBSERVE INDICATORS	LAMP S2 OFF	6	8
6	PUT MTR METER ON PADL5Q (CCIRYF/)	METER READING 0%	F217	7
7	PUT MTR METER ON PADL1X (CCI34)	METER READING 0%	F218	F216
8	OBSERVE INDICATORS	LAMP S3 OFF	9	11
9	PUT MTR METER ON PADL5J (CCIERF/)	METER READING 0%	F219	10
10	PUT MTR METER ON PADL2V (CCI35/)	METER READING 0%	F220	F216
11	OBSERVE INDICATORS	LAMP S4 OFF	12	1
12	PUT MTR METER ON PADL5N (CCIUNF/)	METER READING 0%	F221	13
13	PUT MTR METER ON PADL2X (CCI36/)	METER READING 0%	F222	F216

E18	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON PADP7Q (PSURQ/)	METER READING 0%	F223	2A	A A A A
2A	PUT METER ON PADP7R (PSIRQ/)	METER READING 0%	F424	2	A A A A
2	PUT MTR METER ON PADP7P (STINT8/)	METER READING 0%	F224	F 50	

E19	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR = 0000	F225	2	A A A A A A
2	CONTINUE MTR				A

E20	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER MOVES TO RIGHT MARGIN ON POWER UP	F385	2
2	NONE	CONSOLE PRINTING IN POSITION	F386	3
3	NONE	INTERPOSER PICKING	F387	4
4	NONE	LEFT OR RIGHT PLATEN ADVANCING	F388	

E21	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADP8Q (PSSRQ/)	METER READING 0%	F223	F226

E22	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT SGL/NOR SWITCH TO SGL - PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL PRESS SGL 7 TIMES			

	PUT MTR METER ON PADN3I (CCFRMS)	METER READING 100%	F238	F239
E23	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN3W (CCTU)	METER READING 46%	4	2
2	PUT MTR METER ON PADN0G (CICTU)	METER READING 98%	F227	3
3	PUT MTR METER ON PADM7J (CCTUA)	METER READING 96%	F228	F229
4	PUT MTR METER ON PADN0-FP4M (FM)	METER READING 100%	5	F230
5	PUT MTR METER ON PADN0-FP4T (FMEN)	METER READING 100%	8	6
6	PUT MTR METER ON PADN0F (CCPCLR)	METER READING 100%	F231	7
7	PUT MTR METER ON PADN3X (CCPR)	METER READING 0%	F232	F233
8	PUT MTR METER ON PADN2-FP3I (FDAEN)	METER READING 100%	9	F234
9	PUT MTR METER ON PADN2-FP3X (FDI/)	METER READING 0%	F235	F236
E24	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F237	2
2	OBSERVE MIR	MIR = 0000	F377	F 50
E25	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN2-FP3P (FMTU)	METER READING 46%	F240	F241
E27	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	PLATEN FAILED TO OPEN AND BELL FAILED TO RING	1A	3
1A	CHECK FUSE F9	FUSE GOOD	2	F281
2	PUT MTR METER ON PADN0-FP4U (RCLR)	METER READING 100%	F242	F243
3	OBSERVE CONSOLE	PLATEN STAYS IN OPEN POSITION	A F390	D 3A
3A	PUT IRQ/EXT SWITCH TO EXT. FORCE STEP (FST)	PLATEN FAILING TO OPEN	4	6
4	PUT MTR METER ON PADM6P (CC0PNP/)	METER READING 95%	F244	5
5	PUT MTR METER ON PADM9L (CCOPNP)	METER READING FLUCTUATES BETWEEN 95 TO 100%	F245	F246
6	OBSERVE CONSOLE	BELL NOT RINGING WHEN PLATEN OPENS	7	9
7	PUT MTR METER ON PADM3U (CCAUDAL/)	METER READING FLUCUATES BETWEEN 95 TO 100%	F247	8
8	PUT MTR METER ON PADM9N (CCAUDAL)	METER READING FLUCTUATES BETWEEN 95 TO 100%	F248	F249
9	OBSERVE CONSOLE	PLATEN NOT CLOSING	10	12
10	PUT MTR METER ON PADM6M (CCCLSP/)	METER READING FLUCTUATES BETWEEN 95 TO 100%	F250	11
11	PUT MTR METER ON PADN0L (CCCLSP)	METER READING FLUCTUATES BETWEEN 95 TO 100%	F251	F246
12	OBSERVE CONSOLE	LEFT OR RIGHT PLATEN ADVANCED	F254	13
13	OBSERVE CONSOLE	SYSTEM POWERED OFF	F255	F 50
E28	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN6F (CCCRDI/)	METER READING 0%	F235	2
2	PUT MTR METER ON PADN5C (CCCINS/)	METER READING 100%	3	F252
3	PUT MTR METER ON PADN6U (CCXCRLT/)	METER READING 100%	4	F253
4	PUT MTR METER ON PADN5N (CCXCRGR/)	METER READING 100%	F257	F256
E29	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F237	F 50
E30	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN6E (CCINIT/)	METER READING 0%	2	F258
2	PUT MTR METER ON PADN5-FPW3 (XCCLR/)	METER READING 100%	F259	F260
E31	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER MOVED TO RIGHT MARGIN	2	5
2	PUT MTR METER ON PADN91 (CCCRH/)	METER READING 100%	3	4
3	PUT MTR METER ON PADN9-FPS4 (LSLP/)	METER READING 100%	F264	F265
4	PUT MTR METER ON PADN6S (CCDEL125/)	METER READING 100%	F266	F267
5	OBSERVE CONSOLE	CARRIER DID NOT MOVE	6	1
6	PUT MTR METER ON PADN9-FPK4 (TU)	METER READING 45%	F268	F269
E32	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN3X (CCPR)	METER READING 100%	2	F283
2	PUT MTR METER ON PADN3N (CCPCLR)	METER READING 0%	3	F284
3	PUT MTR METER ON PADN2-FP3Y (PDI/)	METER READING 0%	F285	F286

E33	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F289	F289
E34	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F365	F365
E35	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	NO CHARACTERS PRINTED	2	4
2	PLACE EXT/IRQ SWITCH TO EXT, FORCE STEP, WHEN NUMERIC LIGHT ON, ENTER NUMERIC KEY 000			
	OPERATOR ACTION	MACHINE ACTION	A	D
	OBSERVE CONSOLE	PRINTER NOW PRINTING	F383	2A
2A	PUT MTR METER ON PADM3Q (CCPC)	METER READING 55%	F296	3
3	PUT MTR METER ON PADN3T (CCPC/)	METER READING 55%	F297	F298
4	OBSERVE PRINTOUT	CHARACTERS PRINTED ARE NOT CORRECT	5	17
5	PLACE EXT/IRQ SWITCH TO EXT, FORCE STEP, WHEN NUMERIC LIGHT ON, ENTER NUMERIC KEY 00			
	PUT MTR METER ON PADM6Y (CCPRR1)	METER READING 77%	7	6
6	PUT MTR METER ON PADN0Q (CCPRR1/)	METER READING 77%	F299	F300
7	PUT MTR METER ON PADM6V (CCPRR2)	METER READING 77%	9	8
8	PUT MTR METER ON PADM9S (CCPRR2/)	METER READING 77%	F301	F300
9	PUT MTR METER ON PADM7X (CCPRR4)	METER READING 77%	11	10
10	PUT MTR METER ON PADM9Q (CCPRR4/)	METER READING 77%	F302	F303
11	PUT MTR METER ON PADM7W (CCPRR8)	METER READING 77%	13	12
12	PUT MTR METER ON PADM9P (CCPRR8/)	METER READING 77%	F304	F305
13	PUT MTR METER ON PADM3Y (CCPRT1)	METER READING 77%	15	14
14	PUT MTR METER ON PADN0J (CCPRT1/)	METER READING 77%	F306	F305
15	PUT MTR METER ON PADM3V (CCPRT2)	METER READING 77%	F307	16
16	PUT MTR METER ON PADM9K (CCPRT2/)	METER READING 77%	F308	F300
17	OBSERVE PRINTOUT	CARRIER DID NOT MOVE FULL 256 SPACES LEFT TO PRINT	F309	18
18	OBSERVE CONSOLE	PLATEN CONTINUED ADVANCING	F378	19
19	OBSERVE CONSOLE	ANY INDICATORS ON	F394	20
20	CONTINUE MTR			
E37	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	PLATEN ADVANCING BAD	2	7
2	REMOVE PAPER FROM CONSOLE. PUT EXT/IRQ SWITCH TO EXT, FORCE STEP. WHEN NUMERIC LIGHT ON RESELECT NUMERIC KEY 3	LEFT PLATEN NOT ADVANCING	3	5
3	PUT MTR METER ON PADM6U (CCLPA/)	METER READING 54%	F310	4
4	PUT MTR METER ON PADN0K (CCLPA)	METER READING 54%	F311	F312
5	PUT MTR METER ON PADM6Q (CCRPA/)	METER READING 54%	F310	6
6	PUT MTR METER ON LFDV5H (CCRPA)	METER READING 54%	F313	F312
7	NONE	CARRIER POSITIONING AT LOW SPEED	F315	8
8	NONE	CARRIER OPERATION NOT NORMAL	F399	9
9	CONTINUE MTR			
E38	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	PRINTED CHARACTERS NOT CORRECT	E35	2
2	OBSERVE PRINTOUT	INTERMITTANT SPACING FAILURES AND CARRIER WAS AT HIGH SPEED WHEN DETENT LATCHING	F314	3
3	NONE	CARRIER WAS MOVING AT LOW SPEED	F315	4
4	NONE	CARRIER SLAMS INTO BUMPER	F398	5
5	NONE	INTERMITTANT PAUSES WHILE PRINTING	F399	6
6	OBSERVE PRINTOUT	SPACING FAILURES	F408	7
7	CONTINUE MTR			
E39	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	CARRIER DID NOT ESCAPE RIGHT	F316	2

2	NONE	CARRIER DID NOT ESCAPE LEFT	F317	3
3	NONE	PLATEN OPEN AND NO CHARACTERS PRINTED	F388	3A
3A	NONE	CHARACTERS PRINTED WERE NOT CORRECT	E35	4
4	NONE	NO RED CHARACTERS PRINTED	5	7
5	PUT MTR METER ON PADM4X (CCRS+8P) FORCE STEP AND RESELECT NUMERIC KEY 4	METER READING WHILE PRINTER ESCAPING LEFT 55-58%	F318	6
6	PUT MTR METER ON PADN3U (CCRS+8P/) RESELECT PRINTER ESCAPE TEST, NUMERIC KEY 4	METER READING WHILE PRINTER ESCAPING LEFT 55-58%	F319	F320
7	NONE	ANY INDICATORS ON	F395	8
8	NONE	CARRIER OPERATION NOT NORMAL	F397	9
9	CONTINUE MTR			

E41	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	E 35	E 35

E42	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 ON	F366	2
2	OBSERVE MIR	MIR BIT D2 ON	F367	F 50

E43	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	1 OR MORE CHARACTERS CONSISTANTLY PRINTED BAD	E 35	2
2	OBSERVE CONSOLE	DOUBLE CHARACTERS PRINTED IN LEFT MARGIN	F 26	F324

E44	OPERATOR ACTION	MACHINE ACTION	A	D
1	PLACE EXT/IRQ SWITCH TO EXT, PRESS READY BUTTON. OBSERVE MIR	MIR BITS B1, D1 COMPARE	2	9
2	OBSERVE MIR	MIR BITS B2, D2 COMPARE	3	12
3	OBSERVE MIR	MIR BITS B4, D4 COMPARE	4	15
4	OBSERVE MIR	MIR BITS B8, D8 COMPARE	5	18
5	OBSERVE MIR	MIR BITS A1, C1 COMPARE	6	21
6	OBSERVE MIR	MIR BITS A2, C2 COMPARE	7	24
7	OBSERVE MIR	MIR BITS A4, C4 COMPARE	8	27
8	OBSERVE MIR	MIR BITS A8, C8 COMPARE	F 50	30

9	PUT MTR METER ON PADM0S (CCIKBL1)	METER READING 97%	10	11
10	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 9 PLUS 2% INCREASE	F325	F 40
11	PUT MTR METER ON PADM4E (CCKBL1A)	METER READING 97%	F 39	F327
12	PUT MTR METER ON PADM1S (CCIKBL2)	METER READING 97%	13	14
13	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 12 PLUS 2% INCREASE	F325	F 40
14	PUT MTR METER ON PADM4F (CCKBL2A)	METER READING 97%	F 39	F328
15	PUT MTR METER ON PADM1T (CCIKBL4)	METER READING 97%	16	17
16	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 15 PLUS 2% INCREASE	F325	F 40
17	PUT MTR METER ON PADM4G (CCKBL4A)	METER READING 97%	F 39	F329
18	PUT MTR METER ON PADM1Q (CCIKBL8)	METER READING 97%	19	20
19	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 18 PLUS 2% INCREASE	F325	F 40
20	PUT MTR METER ON PADM4H (CCKBL8A)	METER READING 97%	F 39	F330
21	PUT MTR METER ON PADM0U (CCIKBU1)	METER READING 97%	22	23
22	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 21 PLUS 2% INCREASE	F326	F 40
23	PUT MTR METER ON PADM7E (CCKBU1A)	METER READING 97%	F 39	F331
24	PUT MTR METER ON PADM1U (CCIKBU2)	METER READING 97%	25	26
25	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 24 PLUS 2% INCREASE	F326	F 40
26	PUT MTR METER ON PADM7F (CCKBU2A)	METER READING 97%	F 39	F332
27	PUT MTR METER ON PADM1R (CCIKBU4)	METER READING 97%	28	29
28	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 27 PLUS 2% INCREASE	F326	F 40
29	PUT MTR METER ON PADM7G (CCKBU4A)	METER READING 97%	F 39	F333
30	PUT MTR METER ON PADM0R (CCIKBU8)	METER READING 97%	31	32
31	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 30 PLUS 2% INCREASE	F326	F 40
32	PUT MTR METER ON PADM7H (CCKBU8A)	METER READING 97%	F 39	F334

E45	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F409	
E46	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F335	F335
E47	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F410	
E48	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F411	
E49	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8080	F412	2
2	ASSURE CARRIER IS FREE OF EXCESSIVE DRAG AND RESTART OVERSPEED TEST			
E50	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 SET	2	3
2	PUT MTR METER ON PADN6E (CCINIT/)	METER READING 0%	F262	F261
3	OBSERVE MIR	MIR BIT D2 SET	F263	F 50
E51	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F287	F287
E52	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F288	2
2	OBSERVE MIR	MIR = 0000	F376	F 50
E55	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN5D (CCZERO/)	METER READING 100%	F290	F291
E56	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN6E (CCINIT/)	METER READING 100%	F293	F292
E57	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F294	F294
E58	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT C2 SET	F295	F 50
E59	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER DID NOT EVEN MOVE 1 SPACE RIGHT	4	2
2	OBSERVE CONSOLE	CARRIER MOVED TO RIGHT MARGIN BUT INTERPOSER CONTINUED PICKING	F270	3
3	OBSERVE CONSOLE	CARRIER MOVED ONLY 1 SPACE RIGHT	16	18
4	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) OBSERVE CONSOLE	INTERPOSER PICKING CARRIER DETENT	7	5
5	PUT MTR METER ON PADM3M (CCCRIP)	METER READING 77%	F271	6
6	PUT MTR METER ON PADN5U (CCCRIP/)	METER READING 77%	F272	F273
7	CHECK FUSE F8	FUSE GOOD	8	F281
8	PUT MTR METER ON PADP2V (CRUTSR/)	METER READING 100%	11	9
9	PUT MTR METER ON PADP1V (TACHRTP)	METER READING 0%	F274	F275
10	PUT MTR METER ON PADN9-FPC4 (REV)	METER READING 0%	14	F369
11	PUT MTR METER ON PADN9S (CCCRGR/)	METER READING 0%	12	13
12	PUT MTR METER ON PADN9R (CCCRGL/)	METER READING 100%	F 22	15
13	PUT MTR METER ON PADN9-FPV4 (LEFT/)	METER READING 100%	10	F277
14	PUT MTR METER ON PADN9M (CCCR4A/)	METER READING 0%	F278	F279
15	PUT MTR METER ON PADN9-FPT4 (LEFT)	METER READING 0%	F280	F277
16	PUT MTR METER ON PADM3P (CCCRH) SET EXT SWITCH TO EXT, FORCE STEP (FST) RESET EXT/IRQ SWITCH AS SOON AS READING TAKEN	METER READING 0%	F338	17
17	PUT MTR METER ON PADN9I (CCCRH/) PERFORM SWITCH FUNCTION STEP 16	METER READING 0%	F339	F340
18	OBSERVE CONSOLE	CARRIER MOVED MORE THAN 1 SPACE AND STOPPED	19	CONT. MTR
19	PUT METER ON PADN5I (CCCPR) TO GET CORRECT READING OPERATOR MAY HAVE TO MANUALLY REPOSITION CARR MORE THAN ONCE TO INSURE POSITIONAL FLAG NOT UNDER COIL	METER READING 97%	20	21
20	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) RESET EXT/IRQ SWITCH AS SOON AS READING TAKEN	METER READING SAME AS STEP 19 PLUS 1-2% INCREASE WHILE CARRIER MOTION.	F342	F343

21	PUT MTR METER ON PADM7I (CCPRA)	METER READING 97%	F344	F345
22	PUT MTR METER ON PADP2K (CCCRGLT/)	METER READING 100%	F276	F379
E60	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER ESCAPED RIGHT AFTER PRINT	F321	F322
E61	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER ESCAPED LEFT AFTER PRINT	F321	F323
E62	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 ON	F396	2
2	OBSERVE MIR	MIR BIT D2 ON	F368	F 50
E64	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F346	F346
E65	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 ON	3	2
2	OBSERVE MIR	MIR BIT D2 ON	16	F 50
3	OBSERVE CONSOLE	CARRIER AT RIGHT MARGIN	6	4
4	OBSERVE CONSOLE	CARRIER AT LEFT MARGIN	14	5
5	OBSERVE CONSOLE	CARRIER MOVED A FEW SPACES LEFT	F347	F 50
6	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) PUT MTR METER ON PADP2U (CRUTSL/)	METER READING 100%	9	7
7	PUT MTR METER ON PADP1R (TACHLTP)	METER READING 0%	F282	F336
9	PUT MTR METER ON PADN9R (CCCRGL/)	METER READING 44-57%	10	11
10	PUT MTR METER ON PADN9S (CCCRGR/)	METER READING 65-75%	F276	13
11	PUT MTR METER ON PADN9-FPT4 (LEFT)	METER READING 100%	12	F277
12	PUT MTR METER ON PADN9L (CCCRHS/)	METER READING 44-57%	F337	F348
13	PUT MTR METER ON PADN9-FPV4 (LEFT/)	METER READING 0%	F277	F349
14	OBSERVE CONSOLE	CARRIER HIT LEFT BUMPER	F356 F357	F358
16	OBSERVE CONSOLE	CARRIER HIT LEFT BUMPER	F361	17
17	PUT MTR METER ON PADN8N (CCEQV1)	METER READING 100%	18	F359
18	PUT MTR METER ON PADP2T (CCTACHBK)	METER READING 100%	F360	19
19	PUT MTR METER ON PADP2V (CCRUTSR/)	METER READING 100%	20	F362
20	PUT MTR METER ON PADP2U (CCRUTSL/)	METER READING 100%	F363	F364
E66	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F374	F374
E67	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT A8 ON	F370	2
2	OBSERVE MIR	MIR BIT C8 ON	F371	3
3	OBSERVE MIR	MIR BIT C4 ON	F371	4
4	OBSERVE MIR	MIR BIT C2 ON	F371	5
5	OBSERVE MIR	MIR BIT C1 ON	F371	6
6	OBSERVE MIR	MIR BIT D8 ON	F372	7
7	OBSERVE MIR	MIR BIT D4 ON	F373	8
8	OBSERVE MIR	MIR BIT D2 ON	F372	9
9	OBSERVE MIR	MIR BIT D1 ON	F372	F 50
E68	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F375	F375
E69	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	ALL CHARACTERS PRINTED AT LEFT MARGIN	F380	2
2	OBSERVE CONSOLE	CHARACTERS PRINTED INSTEAD OF SPACES	F400	
E70	OPERATOR ACTION	MACHINE ACTION	A	D
	NONE	NONE	F382	F382
E71	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F416	
E72	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F417	
E73	OPERATOR ACTION	MACHINE ACTION	A	D
	NONE	NONE	F419	
E74	OPERATOR ACTION	MACHINE ACTION	A	
1	NONE	NONE	F418	

E75	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A
MORE THAN ONE		NONE 1 SPACE AND STOPPED	F420 19	 CONT. MTR	
19	PUT METER ON PADN5I (CCCPR) TO GET CORRECT READING OPERATOR MAY HAVE TO MANUALLY REPOSITION CARR MORE THAN ONCE TO INSURE POSITIONAL FLAG NOT UNDER COIL	METER READING 97%	20	21	
20	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) RESET EXT/IRQ SWITCH AS SOON AS READING TAKEN	METER READING SAME AS STEP 19 PLUS 1-2% INCREASE WHILE CARRIER MOTION.	F342	F343	
21	PUT MTR METER ON PADM7I (CCPRA)	METER READING 97%	F344	F345	
22	PUT MTR METER ON PADP2K (CCCRGLT/)	METER READING 100%	F276	F379	
E60	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE CONSOLE	CARRIER ESCAPED RIGHT AFTER PRINT	F321	F322	
E61	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE CONSOLE	CARRIER ESCAPED LEFT AFTER PRINT	F321	F323	
E62	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR BIT D1 ON	F396	2	
2	OBSERVE MIR	MIR BIT D2 ON	F368	F 50	
E64	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F346	F346	
E65	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR BIT D1 ON	3	2	
2	OBSERVE MIR	MIR BIT D2 ON	16	F 50	
3	OBSERVE CONSOLE	CARRIER AT RIGHT MARGIN	6	4	
4	OBSERVE CONSOLE	CARRIER AT LEFT MARGIN	14	5	
5	OBSERVE CONSOLE	CARRIER MOVED A FEW SPACES LEFT	F347	F 50	
6	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) PUT MTR METER ON PADP2U (CRUTSL/)	METER READING 100%	9	7	
7	PUT MTR METER ON PADP1R (TACHLTP)	METER READING 0%	F282	F336	
9	PUT MTR METER ON PADN9R (CCCRGL/)	METER READING 44-57%	10	11	
10	PUT MTR METER ON PADN9S (CCCRGR/)	METER READING 65-75%	F276	13	
11	PUT MTR METER ON PADN9-FPT4 (LEFT)	METER READING 100%	12	F277	
12	PUT MTR METER ON PADN9L (CCCRHS/)	METER READING 44-57%	F337	F348	
13	PUT MTR METER ON PADN9-FPV4 (LEFT/)	METER READING 0%	F277	F349	
14	OBSERVE CONSOLE	CARRIER HIT LEFT BUMPER	F356 F357	 F358	
16	OBSERVE CONSOLE	CARRIER HIT LEFT BUMPER	F361	17	
17	PUT MTR METER ON PADN8N (CCEQVI)	METER READING 100%	18	F359	
18	PUT MTR METER ON PADP2T (CCTACHBK)	METER READING 100%	F360	19	
19	PUT MTR METER ON PADP2V (CCRUTSR/)	METER READING 100%	20	F362	
20	PUT MTR METER ON PADP2U (CCRUTSL/)	METER READING 100%	F363	F364	
E66	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F374	F374	
E67	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR BIT A8 ON	F370	2	
2	OBSERVE MIR	MIR BIT C8 ON	F371	3	
3	OBSERVE MIR	MIR BIT C4 ON	F371	4	
4	OBSERVE MIR	MIR BIT C2 ON	F371	5	
5	OBSERVE MIR	MIR BIT C1 ON	F371	6	
6	OBSERVE MIR	MIR BIT D8 ON	F372	7	
7	OBSERVE MIR	MIR BIT D4 ON	F373	8	
8	OBSERVE MIR	MIR BIT D2 ON	F372	9	
9	OBSERVE MIR	MIR BIT D1 ON	F372	F 50	
E68	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F375	F375	
E69	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE CONSOLE	ALL CHARACTERS PRINTED AT LEFT MARGIN	F380	2	
2	OBSERVE CONSOLE	CHARACTERS PRINTED INSTEAD OF SPACES	F400		
E70	OPERATOR ACTION	MACHINE ACTION	A	D	
	NONE	NONE	F382	F382	A A
E71	OPERATOR ACTION	MACHINE ACTION	A	D	A

1	NONE	NONE	F416		A
E72	OPERATOR ACTION	MACHINE ACTION	A	D	A
1	NONE	NONE	F417		A
E73	OPERATOR ACTION	MACHINE ACTION	A	D	A
	NONE	NONE	F419		A
E74	OPERATOR ACTION	MACHINE ACTION	A		A
1	NONE	NONE	F418		A
E75	OPERATOR ACTION	MACHINE ACTION	A	D	A
1	NONE	NONE	F420		A
E76	OPERATOR ACTION	MACHINE ACTION	A	D	A
1	NONE	NONE	F421		A
E77	OPERATOR ACTION	MACHINE ACTION	A	D	A
1	PUT METER ON PADP8Q (PSSRQ/)	METER READING 100%	F 1	F422	A
E78	OPERATOR ACTION	MACHINE ACTION	A	D	A
1	PUT METER ON PADP7Q (PSURQ/)	METER READING 100%	F 1	F422	A
E79	OPERATOR ACTION	MACHINE ACTION	A	D	A
1	NONE	NONE	F423		A
E80	OPERATOR ACTION	MACHINE ACTION	A	D	A
1		METER READING ON PADP8J PORT 8 WAS 100%	F425	2	A
		METER READING ON ONE OR MORE OF PORTS 1 THRU 7 WAS 0%	F414		A

FAILURE DICTIONARY

FAILURE	SUSPECT CHIPS OR PROCEDURE
F0	NOT DIAGNOSABLE BY THIS MTR
F1	PAFP4 B,C3
F2	RUN MTR ON DEVICE UTILIZING DDP #6
F3	RUN MTR ON DEVICE UTILIZING DDP #5
F4	RUN MTR ON DEVICE UTILIZING DDP #4
F5	RUN MTR ON DEVICE UTILIZING DDP #3
F6	RUN MTR ON DEVICE UTILIZING DDP #2
F7	RUN MTR ON DEVICE UTILIZING DDP #1
F8	PADP4 E3, D3, C3, D5
F9	PADP7 E3, D3, C3, D5
F10	PADK8 A1, F1, E1 PADP7 E7
F11	PADP7 C5, C7, PADM9 B5 PADK8 D1
F12	PADN5 D7, C7 PADM0 D7
F13	PADN2 B7 PADM0 D7
F14	PADM0 F7 PADM9 F7
F16	PADN5 D7, C7
F17	PADN5 C7 PADM9 C5
F18	PADK8 B5, D5, C5, C7, B1 PADL1 A3, A1, B1
F19	PADM9 F5, F7 PADN2 C3, C1, D3, F3, D1, E3, A1
F20	PADM9 F5, F7, E5, C7, B7 PADN2 C7, D7, C5
F21	PADM9 F5, F7 PADN5 C1, D5, B7, A5, A1, B1
F22	PADN5 D7, C3, A1, B1, C1, D1, E3, E1, F3 PADN2 E1, B1
F23	PADN5 D7, D3, B1, A1 PADM0 D3, D5 PADN8 A1, D1, E1, A5
F24	PADM9 C1, A1, A5 PADN2 A5, B1 PADK8 A1, B1, C7
F25	PADN5 D7, D3 PADN2 B1, E1, F1, F3

B

B

B

B

B

F26	PADM9	B3
	PADN5	C1, D5
	PADN8	D7
F27	PADP7	E3, D3, C3, D5, C1, A3, F7, E7, E5
F28	SIGNAL	FROM READY BUTTON GROUNDED (CIRDYSW)
F29	SIGNAL	FROM READY BUTTON NOT AT GROUND WHEN READY BUTTON IS PRESSED (CIRDYSW)
F30	PADN5	F3, F1, D3, B5
	PADN2	B1, E1, F1, F3
F31	PADK8	C7
	PADL1	A1, A3, B1, C1, D1, B7, A5
	PADN5	F1, F3, B5, D3
F32	PADM9	B5
	PADK8	D1, E1
	PADN5	D3, C7
	PADP7	B5, B3, D3
	PADQ3	A7 A
F33	PADN5	C7, D7, D3
	PADM9	B5
	PADN2	A3
F34	PADN5	D7, D3, C3
	PADM9	F5, F7
	PADN2	B7
F35	PADP7	D5
	PADM9	D1
	PADK8	A5
F36	PADN5	C7
F37	PADM9	F1
F38	PADM3	B4B5, B2D5, A6D7, B4E3, A6D9, E5, C2B7, C8B9
F39	CONSOLE FAILURE	KEYBOARD COIL APPEARS OPEN
F40	CONSOLE FAILURE	KYBD COIL INDUCTANCE NOT CHANGING
F41	PADK8	A5, E1, C1, D5, C5, B1, D1, F1
	PADL1	A1, A3, E1, F1
F42	PADK8	C7, A1, B1
F43	PADN5	D7
F44	PADM9	F5, F7
F45	PADM9	A5, A1, C1
	PADN5	D7, D3
F46	PADN5	F1
F47	PADK8	F1
	PADM9	A1, C1, A5, C3, F1
	PADL1	A3
	PADN2	B1, A5
F48	PADM9	F5
	PADK8	B1, A1
F49	PADN2	B7, A5, B1, A3
	PADM9	C3, A1, C1, C5, F1
F50	RESTART MTR	
F51	PADL4	F5, E4C4
F52	PADL1	C7
F53	PADL1	B5, B3
F54	PADL4	F5 E4C8
F55	PADL1	A1
F56	PADL1	B5 B3
F57	PADL4	A5 B7D4
F58	PADL1	D5
F59	PADL1	B5, B3
F60	PADL4	A5 B7D8
F61	PADL1	D5
F62	PADL1	B5, B3
F63	PADL4	A5 B7E2
F64	PADK8	C5
F65	PADK8	B7, A3
F66	PADL4	A5 B7DO
F67	PADK8	F7
F68	PADK8	B7, A3 B
F69	PADL4	A5 B7C6
F70	PADK8	C5
F71	PADK8	B7, A3
F72	PADL4	A5, B7C2
F73	PADK8	F7
F74	PADK8	B7, A3
F75	PADL4	D5, D6D8
F76	PADL1	C7, C3
F77	PADL4	D5, D6E2
F78	PADL4	E5, D6B4
F79	PADL4	E5, D6B8
F80	PADL4	F5, E4EO
F81	PADK8	D7, D3
F82	PADL4	F5, E4D6
F83	PADL4	F5, E4D2
F84	PADL4	F5, E4CO
F85	PADL7	D5, D6D8

F86	PADL1	D5, D3
F87	PADL7	D5, D6E2
F88	PADL7	E5, D6B4
F89	PADL7	E5 D6B8
F90	PADL7	F5, E4EO
F91	PADK8	E7, E3
F92	PADL7	F5, E4D6
F93	PADK8	E7, E3
F94	PADL7	F5, E4D2
F95	PADK8	E7, E3
F96	PADL7	F5, E4CO
F97	PADK8	E7, E3
F98	PADL7	F5, E4C4
F99	PADL1	E7, F5, F1, F7, E3
F100	PADL7	F5, E4C8
F101	PADL1	E7, F5, F7, F1, E3
F102	PADL7	A5, B7D4
F103	PADL1	E7, F5, F1, E3, A1
F104	PADL7	A5, B7D8
F105	PADL1	E7, F5, F1
F106	PADL7	A5, B7E2
F107	PADK8	F7, F3
F108	PADL7	A5, B7DO
F109	PADK8	F7, F3
F110	PADL7	A5, B7C6
F111	PADK8	F7, F3
F112	PADL7	A5, B7C2
F113	PADK8	F7, B5, F3, C5
F114	PADL4	D5 D6DO
F115	PADL1	F7, F3
F116	PADL4	D5 D6C6
F117	PADL4	D5 D6D4
F118	PADL4	D5 D6C2
F119	PADK8 PADL1	D5, E1, F1, A1 A3
F120	PADP7	D1
F121	PADP7	E7, F7
F122	PADK8 PADL1	C5, E5, E1, F5, D1 B5
F123	PADL1	A5, C5, B3
F124	PADK8	B5, A5, A3
F125	REPLACE	LAMP A1
F126	PADL4	F5, E4C4
F127	PADL1	B5, B3, A1
F128	PADL1	C7
F129	REPLACE	LAMP A2
F130	PADL4	F5, E4C8
F131	PADL1	A1
F132	REPLACE	LAMP A3
F133	PADL4	A5, B7D4
F134	PADL1	D5
F135	REPLACE	LAMP A4
F136	PADL4	A5, B7D8
F137	REPLACE	LAMP A5
F138	PADL4	A5, B7E2
F139	PADK8	B7, A3
F140	PADK8	C5
F141	REPLACE	LAMP A6
F142	PADL4	A5, B7DO
F143	PADK8	F7
F144	REPLACE	LAMP A7
F145	PADL4	A5, B7C6
F146	REPLACE	LAMP A8
F147	PADL4	A5, B7C2
F148	PADL1	B5
F149	PADL1	C5, C3
F150	PADK8	C3, D3
F151	REPLACE	LAMP B1
F152	PADL4	D5, D6D8
F153	PADL1	C7, C3
F154	REPLACE	LAMP B2
F155	PADL4	D5, D6E2

F156	REPLACE LAMP B3	
F157	PADL4 E5, D6B4	
F158	REPLACE LAMP B4	
F159	PADL4 E5, D6B8	
F160	REPLACE LAMP B5	
F161	PADL4 F5, E4EO	
F162	PADK8 D7, D3 PADL1 B7	
F163	REPLACE LAMP B6	
F164	PADL4 F5, E4D6	
F165	REPLACE LAMP B7	
F166	PADL4 F5, E4D2	
F167	REPLACE LAMP B8	
F168	PADL4 F5, E4CO	
F169	PADL1 C7	
F170	PADL1 C5, D3	
F171	PADK8 C3, E3	
F172	REPLACE LAMP C1	
F173	PADL7 D5, D6D8	
F174	PADL1 D5, D3	
F175	REPLACE LAMP C2	
F176	PADL7 D5, D6E2	
F177	REPLACE LAMP C3	
F178	PADL7 E5, D6B4	
F179	REPLACE LAMP C4	
F180	PADL7 E5, D6B8	
F181	REPLACE LAMP C5	
F182	PADL7 F5, E4EO	
F183	PADK8 E7, E3	
F184	REPLACE LAMP C6	
F185	PADL7 F5, E4D6	
F186	REPLACE LAMP C7	
F187	PADL7 F5, E4D2	
F188	REPLACE LAMP C8	
F189 F190	PADL7 F5, E4CO PADL1 E7	
F191	PADL1 E5, E3	
F192	PADK8 C3, F3	
F193	REPLACE LAMP D1	
F194	PADL7 F5, E4C4	
F195	PADL1 E7, F5, F1, E3	
F196	REPLACE LAMP D2	
F197	PADL7 F5, E4C8	
F198	REPLACE LAMP D3	
F199	PADL7 A5, B7D4	
F200	REPLACE LAMP D4	
F201	PADL7 A5, B7D8	
F202	PADL1 E7, F5, E3	
F203	REPLACE LAMP D5	
F204	PADL7 A5, B7E2	
F205	PADK8 F7, F3	
F206	REPLACE LAMP D6	
F207	PADL7 A5, B7D0	
F208	REPLACE LAMP D7	
F209	PADL7 A5, B7C6	
F210	REPLACE LAMP D8	
F211	PADL7 A5, B7C2	
F212	PADK8 F7, E5, F3	
F213	PADL1 E7, E5, F3	
F214	REPLACE LAMP S1	
F215	PADL4 D5, D6DO	
F216	PADL1 F7, F3	
F217	REPLACE LAMP S2	
F218	PADL4 D5, D6C6	
F219	REPLACE LAMP S3	
F220	PADL4 D5, D6C2	
F221	REPLACE LAMP S4	
F222	PADL4 D5, D6D4	
F223	PAFP4 B,C3	A
F224	PADP7 E3, C1, D7, D1, B3	A A
F225	PADM9 B5 PADK8 D1, E1	
F226	PADP7 E3, C1, D7 PADK8 F1	

F227	PADM9 E5, C3, C5, B5 PADN2 B1 PADK8 C5
F228	CONSOLE FAILURE - OPEN DECODER. TU PICKUP COIL OR CABLE.
F229	PADM6 B4B1, C2F1, C8F5
F230	PADM9 C5, C7, B4, C3, B7, A5 PADK8 D1, C5
F231	PADM9 C7, B7, E5, C5
F232	PADN2 D3, D1, E5, E3
F233	PADN2 F3
F234	PADN2 A3, D5, D7, C7, B5 PADK8 D5, D7
F235	PADM9 F1
F236	PADN2 C7, D3, D1
F237	PADM9 F7, F5
F238	PADN2 C5, C7, D7, F3, B5, E5, A3, D5, PADN5 D5
F239	PADK8 D7, D5, F5
F240	PADN2 D5, C5, C7
F241	PADN2 B1, E5, C7, D7, E1, C5, D5 PADM9 C3, C5, A5 PADN8 B3
F242	PADM9 A5, D7, D1, D3, E5, E7, E3 PADN2 C5, E7, E5
F243	PADM9 B7 PADN2 B5 PADK8 D1, E7, E1, E5
F244	CABLE OR OPEN PLATEN SOLENOID FAILING
F245	PADM6 E5, E1D5, D2E0, D8E6, E7F2, D2C7
F246	PADM9 D7, D3, E7
F247	CABLE OR ALARM SOLENOID FAILING
F248	PADM3 E7F0, E7E5, E7E1, E7D5, E1D3, E5
F249	PADM9 D7, D1, E3
F250	CABLE OR CLOSE PLATEN SOLENOID FAILING
F251	PADM6 E5, D2B1, E1B6, D2B9, D8C9, E7D1
F252	PADN5 A5, B7, F1, E1 PADK8 E5
F253	PADN2 B1, E1, F1, E3 PADM9 C1
F254	PADM9 D7, D3, E7
F255	PADM9 D1, E3
F256	PADM9 E5, B3, B1, B5
F257	PADN5 C1, B1, D5, A3, B5 PADN2 C7
F258	PADN5 C7, B7 PADK8 E7, E5
F259	PADN5 A5, C1, B1, A1, C7
F260	PADN5 E1, F1, F3 PADM9 C5 PADK8 E7, E5, F5
F261	PADN5 B3, B1 PADN8 C5
F262	PADN5 A1
F263	PADM0 D5, D3
F264	PADN8 B3, C7, A7 PADN5 A5, A1, B1, A3, B5, F3
F265	PADN8 B7, B5, B3, D7, D3
F266	PADN5 E3, E5, C5, E1, F3, D1, C1, B1, C3, A1, A5, B5 PADN8 D3, C7, A3 PADM0 B1, B5, A5
F267	PADN8 D3, C1 PADM0 B5, B1, A5
F268	PADN8 A7, A5, B1, C3, A3, C1, D3, C5, B3, C7
F269	PADN8 C3, D1, A1 PADN2 E3
F270	PADN8 A5, A3, B1, C1 PADK8 E7, E5
F271	CONSOLE FAILURE INTERPOSER SOLENOID OR CABLE FAILURE
F272	PADM3 E7D1, D8C9, D2B9, E1B6, D2B1, E5
F273	PADN8 C3, B3, C1 PADN5 F3, E7, C7, B3
F274	PADP1 E7A6, F3C1, F3C7
F275	PADP1 E7F5, F4F3
F276	PADP1 F4A6,E7A6, C9F1, B6F1, OR CARRIER POWER DRIVERS OR JAMMED CARRIER, OR CARRIER DRIVE MOTOR
F277	PADN5 B3, C7 PADN8 C5, E7, D5
F278	PADN9 F1, D5, E7, C5, B3, A5, D1, E1
F279	PADN9 D5, C7, A1, F1, E1, C3, D3, D1 PADM0 D5, D3
F280	PADN8 D5, F7 PADN2 E1, E3, F1, B1
F281	REPLACE FUSE
F282	PADP1 E7A6, F3C3, E6C7

F283 PADN2 F3, B5,
PADM9 F1

F284 PADN2 D3, D1, E5, E3

F285 PADM9 B4

F286 PADN2 C3, C1, A3, A1

F287 PADN2 E5, A1, B5, C1, C3
PADK8 E7, E5

F288 PADM9 F7, F5

F289 PADN2 C5, C3, E5, A1, C1, B5, A3

F290 PADN5 B7

F291 PADM9 C3, C5, B5
PADM0 C5, C3

F292 PADN5 B3, C7, A3
PADN8 D3

F293 PADN8 C5, C7, B3, D3
PADK8 E5
PADM0 B5, B3, D3, A7
PADN5 A1, C3, F1

F294 PADN5 D7, C3
PADK8 B1
PADM0 C5, C7

F295 PADN2 B3

F296 DECODER OR PRINT CLUTCH FAILURE

F297 PADM3 E5, E1B4, E7B6, E1C2, E7C6

F298 PADN2 E7, B3, B5, C1, E5, D3, D1
PADM9 B7

F299 PADM6 F5, F0E0, E5A7, F6C0

F300 PADM9 D1, E3, D5

F301 PADM6 F5, F0D6, F5A7, F6C2

F302 PADM6 F5, F0D4, F5B5, F0C4

F303 PADM9 D5, E5, E7

F304 PADM6 F5, F0D8, F0A7, F0B8

F305 PADM9 E7, D5

F306 PADM3 F5, F0E0, E5A7, F6C0

F307 CONSOLE FAILURE, DECODER OR CONSOLE ADJUSTMENT

F308 PADM3 F5, F0D6, F5A7, F6C2
PADN8 D3, C5, D7
PADN2 E7, B3

F309 PADM0 C7, C5, B7, B3, D3, A3, D5, D1, B5
PADN5 E3, A1, B1, A5
PADN8 B3, F7, F1, D5, E3

F310 CONSOLE FAILURE, PLATEN ADV SOLENOID OR CABLE

F311 PADM6 E5, E1D3, E7D5, E7E1, E7E5, E7F0

F312 PADM9 D7, D3, E7

F313 PADM6 E5, E1B4, E7B6, E1C2, E7C6, E1B2

F314 PADN8 F1, D5, F7, E7, E5
PADN5 E7, F3

F315 PADN8 D5, PADP1 B9B1, C4A8, E6C7, OR TACHOMETER

F316 PADM9 B3, C3, D7, B5, E5, E3
PADN8 E7, C7
PADN2 D3
PADN5 E7, F3

F317 PADM9 C1, B1, B3, B5, E5
PADN2 E3, D3, E1, B1
PADN8 F7, C5, D5, E7, F1, D1

F318 CONSOLE RED RIBBON FAILURE

F319 PADM3 F5, F0D4, F5B5, F0C4

F320 PADN2 E7, B3, B5, A3

F321 PADN5 C1

F322 PADM9 E5, B3, B1, B5, E3

F323 PADM9 E5, B1, C1
PADN2 E3, E1, F1, B1

F324 CONSOLE FAILURE DECODER OR MECHANICAL ADJUSTMENTS

F325 PADM0 D7, E7, E5, E3
OR KYBD KEY FAILURE, TO DETERMINE REPEAT TEST WITH MEMORY LOADER OFF AND RAPIDLY KEY THE KEY IN QUESTION

F326 PADM0 F5, F3, F7, E7, D7
OR KYBD KEY FAILURE, TO DETERMINE REPEAT TEST WITH MEMORY LOADER OFF AND RAPIDLY KEY THE KEY IN QUESTION

F327 PADM3 B4D1, C2C1, C8C5

F328 PADM3 B4C7, C2C7, C8D1

F329 PADM3 B4C3, C2D3, C8D7

F330 PADM3 B4B9, C2D9, C8E3

F331 PADM6 B4D1, C2C1, C8C5

F332 PADM6 B4C7, C2C7, C8D1

F333 PADM6 B4C3, C2D3, C8D7

F334 PADM6 B4B9, C2D9, C8E3

F335 PADM9 D1 OR AC1 CARD FAILING

F336 PADP1 D9F4, E9F3

F337 PADN8 D5, F7, C5, D3
PADN5 B3

F338 CONSOLE FAILURE HOLD COILS OR CABLE FAILURE

F339 PADM3 E7F2, D8E6, D2E0, E1D5, D2C7, E5

F340 PADN8 C7, C5, D3, B3, D7
PADM0 D3
PADN5 D1, C1, A3, B3, C3

F341 PADN5 D3
PADN2 E1, F1, A3

F342 PADN5 E5, E3, C5, C7, B7, E1

F343 CONSOLE POSITIONAL READOUT COIL INDUCTANCE NOT CHANGING

F344 CONSOLE POSITIONAL READOUT COIL APPEARS OPEN

F345 PADM6 B4B5, C2E5, C8E9

F346 PADN8 B3, C7
PADN5 C3, E3, E1

F347 PADN8 C5

F348 PADN8 D5, A5, C3, E1, D1, A1, C5

F349 PADN8 E7

F356 PADN8 E1, D1, A1, F1, E5

F357 PADM0 A3, D3, C5, B3, B7, C7, D5, D1, A1, A7
PADN5 E5, C5

F358 PADM0 D5, D3, B5, B3, C7, D1, C5, B7
PADN8 D7, C7, E1, D7, D5

F359 PADM0 D5, D3, B5, B3, C7, C5
PADN5 E5, C5

F360 PADN8 A1, D1, E1, F1, E5, B7
PADM0 C7

F361 PADN8 F1, E7, D5, D1, E1
PADM0 C7, D5, D3, B3
PADN5 E7, A1
PADP1 E9F3, F4A6 OR TAC.

F362 PADP1 E7A6, F3C1, F3C7, F4F3, E7F5, F4A6

F363 PADP1 F4A6, E7A6

F364 PADP1 E7A6, F3C3, E6C7, D9F4, E9F3, F4A6

F365 PADN8 E3, B7, D3, E1

F366 PADM9 B1, E5
PADM0 C7
PADN8 F1, D7

F367 PADM0 C5, C7, C3, OR
INTERMITTANT FAILURE POSSIBLE TACHOMETER FAILURE OR CARRIER POWER DRIVERS WEAK, RESTART MTR

F368 PADN8 F7 OR F367
PADM0 C5, C7, C3

F369 PADN8 A1, D1, E1, A5, C3

F370 PADN5 D7, C7
F371 PADM9 F7
PADK8 A1
PADN5 D3
PADM0 F7

F372 PADN5 D7, C7
PADM0 D7

F373 PADN2 B7
PADM0 D7

F374 PAFP4 D7

F375 PADN8 D3, E3
PADN5 A5

F376 PADN2 C1, B5, C3

F377 PADN2 C7, D7, B5
PADK8 D5, D7

F378 PADN2 D7, E1
PADM9 C5, C7, B7, D3

F379 PADN2 B1, E1

F380 PADN2 E3, F1

F381 PADN2 E7, E5, B3

F382 PADN2 D1, E5

F383 PADN2 B5

F384 PADM9 C1
PADN2 A5

F385 PADN8 A5, A3, B1
PADM9 B5

F386 PADN2 E7

F387 PADM9 B5, D7, C1
PADN5 B7

F388 PADM9 D3
F389 PADM9 D1, E3, C7, B7
PADN2 C7

F390 PADM9 D3, E7

F391 PADK8 C3
PADL1 C5, B5

F392 PADK8 C3
PADL1 E7, E5

F393 PADK8 A5, B5
PADL1 C5, B5, C7

F394 PADK8 E5, C5
PADL1 E5

F395 PADK8 C3
PADL1 E5, C5

F396 PADM9 E3, B5, C3, C1
PADM0 B5, C5, C7, B7, C3

F397 PADN2 D1, E5
PADM9 D7, B5, C1
PADN5 A3
PADN8 D5

F398 PADN8 B1

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F399    PADN8   E1,  F1,  D1,  D5
F400    PADN2   B3,  B5                                          A
                                                                 A
F401    PADQ3   A1,  B1,  C1,  E1,  B7,  B5,  C7                A
F402    PAFQ0   C1
F403    PADP7   C5,  B7
F404    PADP7   C7,  B5
F405    PADP7   E7,  F7
        PADQ3   A1
F406    PADP7   D1
F407    PADQ0   C3,  B7
F408    PADM0   C7,  C3                                          A
                                                                 A
F409    PADN5   D3                                               A
                                                                 A
                                                                 A
F410    PADN5   B7                                               A
        PADMO   C3                                               A
                                                                 A
                                                                 A
F411    PADN5   F1,  D3,  B1,  A1                                A
                                                                 A
                                                                 A
F412    PADN5   D7,  D3                                          A
F413    PERFORM FE MEMORY MTR
                                                                 A
                                                                 A
F414    PS1-(PROBE      CHART)  A5,  B5,  C5,  C7                A
                                                                 A
                                                                 A
F415    PADQ3   B1,  B5                                          A
                                                                 A
                                                                 A
F416    PADK8   F1,  A1                                          A
                                                                 A
                                                                 A
F417    PADP7   F7,  A5                                          A
                                                                 A
                                                                 A
F418    PADP7   F7,  E7                                          A
        PAFN5   D5                                               A
                                                                 A
                                                                 A
F419    PADP7   E5,  B5,  A5                                     A
                                                                 A
                                                                 A
F420    PADP7   A5,  A7,  B5,  C1                                A
                                                                 A
                                                                 A
F421    PADP7   B3,  D3                                          A
        PADP4   B3,  D3
                                                                 A
                                                                 A
F422    PADP7   E3                                               A
        PADP4   E3                                               A
                                                                 A
                                                                 A
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F423    PADP7   F7                                               A
                                                                 A
                                                                 A
                                                                 A
F424    PADP7   E5,  A5,  F7,  A3,  A7                           A
        PADQ0   A7                                               A
                                                                 A
                                                                 A
F425    PADQ3   B5                                               A
                                                                 C
                                                                 C
F426    RUN MTR ON DEVICE  UTILIZING  DDP #7                     C
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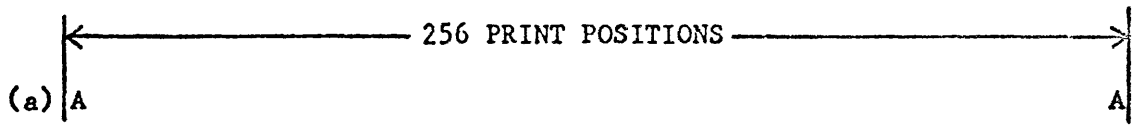
ILLUSTRATIONS

FIGURE 1 - FOR 15 INCH CONSOLE 256 BECOMES 150

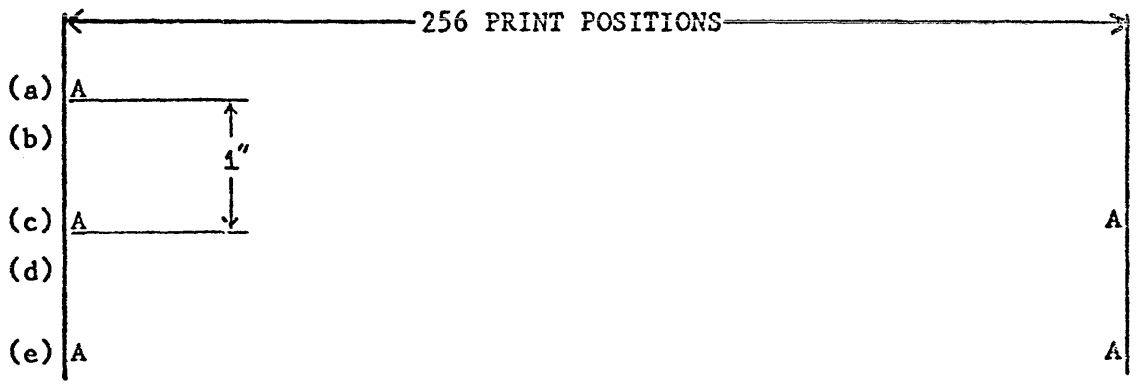
A. THE FOLLOWING IS THE PRINTOUT FOR THE CARRIER TEST. (CARRTST)



(a) THE CARRIER INITIALIZES TO THE RIGHT BUMPER AND AN A IS PRINTED IN PLACE. THE CARRIER THEN INITIALIZES TO THE LEFT BUMPER AND AN A IS PRINTED IN PLACE.

FIGURE 2 - FOR 15 INCH CONSOLE 256 BECOMES 150

A_f THE FOLLOWING IS THE PRINTOUT FOR THE PLATEN ADVANCE TEST. (PLATADV)



(a) CHARACTER A PRINTED AT LEFT MARGIN.

(b) 6 LINE ADVANCES BOTH PLATENS.

(c) CHARACTER A IS PRINTED AT LEFT MARGIN. THE CARRIER MOVES 256 PRINT POSITIONS RIGHT AT HIGH SPEED AND CHARACTER A IS PRINTED.

(d) 6 LINE ADVANCES, BOTH PLATENS.

(e) CHARACTER A IS PRINTED AT RIGHT MARGIN. THE CARRIER MOVES 256 PRINT POSITIONS LEFT AT HIGH SPEED AND CHARACTER A IS PRINTED.

FIGURE 3 - FOR 15 INCH CONSOLE 256 BECOMES 150, 128 BECOMES 75

A. THE FOLLOWING IS THE PRINTOUT FOR THE CARRIER EXHAUSTIVE TEST. (CAREXHTST)

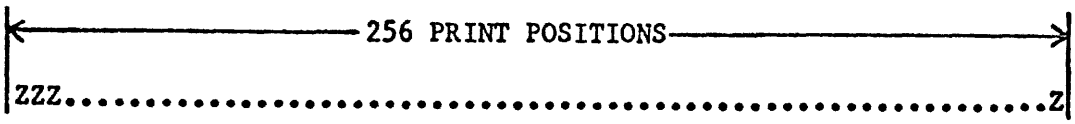
(a) EEEE.....E
(b)

(a) CHARACTER E IS PRINTED IN PLACE AT LEFT MARGIN. THE CARRIER IS POSITIONED RIGHT 256 POSITIONS AND CHARACTER E IS PRINTED AT THE RIGHT MARGIN. THE CARRIER CONTINUES TO MOVE LEFT AND RIGHT AT A DECREMENTING COUNT WITH CHARACTER E PRINTED AT EACH POSITION. WHEN REMAINING UNPRINTED POSITIONS ARE LESS THAN 7, THE CARRIER POSITIONING SWITCHES TO LOW SPEED AND COMPLETES PRINTING A FULL LINE OF CHARACTER E.

(b) CARRIER IS POSITIONED 128 POSITIONS LEFT TO LEFT MARGIN AND ONE LINE ADVANCE BOTH PLATENS, TERMINATES THE TEST.

FIGURE 4 - FOR 15 INCH CONSOLE 256 BECOMES 150

A. THE FOLLOWING IS THE PRINTOUT FOR THE PRINTER ESCAPE TEST. (PRTESCTST)



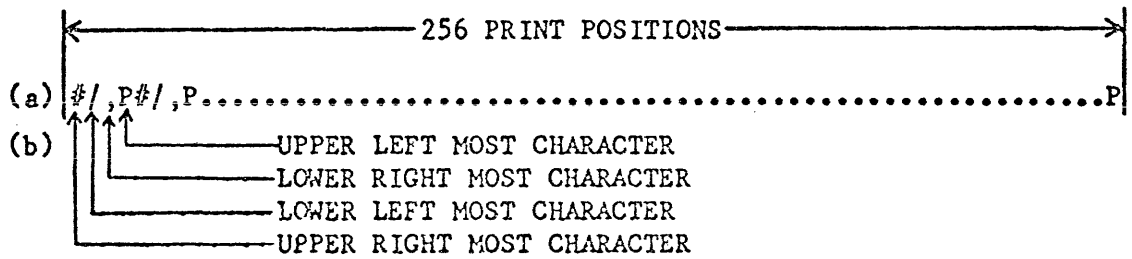
(a) A FULL LINE OF Z'S ARE PRINTED TO THE RIGHT IN BLACK, AND THEN OVERPRINTED TO THE LEFT IN RED.

(b) ONE LINE ADVANCE TO BOTH PLATENS TERMINATES THE TEST.

FIGURE 5 - FOR 15 INCH CONSOLE 256 BECOMES 148

A. THE FOLLOWING ARE THE POSSIBLE PRINTOUTS FOR THE TILT ROTATE TEST. (TLTROTTST)
FOR PRINTBALLS, WITH SPECIAL CHARACTERS OTHER THAN THE ONES SHOWN, USE (1) AS A GUIDE FOR THE PRINTBALL POSITION THAT SHOULD HAVE PRINTED.

(1) PRINTOUT FOR A 64 CHARACTER PRINTER WITH PRINTBALL I.D. #012.



NOTE: THE PRINTBALL POSITIONS SHOWN ARE GIVEN FACING THE REAR OF THE PRINTBALL.

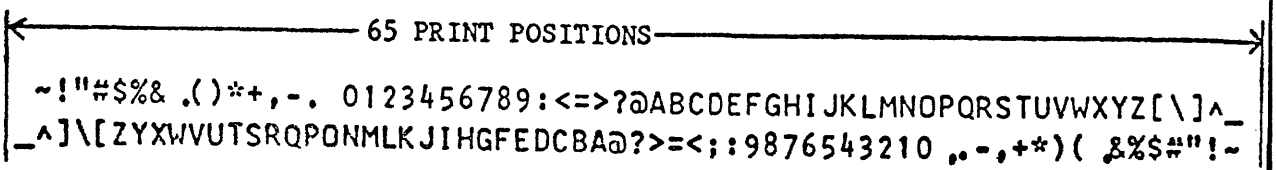
(a) A FULL LINE OF REPEATED FOUR CHARACTERS SHOWN, PRINTED TO THE RIGHT IN BLACK THEN OVERPRINTED TO THE LEFT IN RED.

(b) ONE LINE ADVANCE TO BOTH PLATENS TERMINATES THE TEST.

FIGURE 6

A. THE FOLLOWING ARE THE POSSIBLE PRINTOUTS FOR THE PRINT ALL CHARACTERS TEST. (PRTALCHAR)
THE SPECIAL CHARACTERS WILL VARY ACCORDING TO THE TYPE PRINTBALL BEING USED.

(1) PRINTOUT FOR A 64 CHARACTER PRINTER WITH PRINTBALL I.D. #012.



(a) ONE PRINT POSITION EXCAPE TO THE RIGHT AND THEN 64 CHARACTERS ARE PRINTED TO THE RIGHT IN BLACK.

(b) ONE PRINT POSITION EXCAPE TO THE LEFT AND THEN 64 CHARACTERS ARE PRINTED TO THE LEFT IN RED.

FIGURE 7

A. THE FOLLOWING ARE THE TWO POSSIBLE PRINTOUTS FOR A 16 OR 24 PK KEYBOARD.

(1)

END 24 PK KEYS

(2)

END 16 PK KEYS

CON96MTR CONSOLE (96 CHAR.)
9343 96-CHARACTER
B 43 I/O CONTROL

PLACE MTR/MEM SWITCH IN MTR POSITION
PLACE IRQ/EXT SWITCH IN CENTER POSITION
INSURE THAT PLATENS ARE NOT LOCKED TOGETHER
INSURE THAT CARRIER IS AT LEFT MARGIN
LOAD CON96MTR TAPE 1449 0940
PLACE LOAD SWITCH TO NORMAL - PRESS CLEAR

NOTE

ANY DISAGREEMENT WITH INSTRUCTIONS - SEE INCREMENTER ADDRESS FOR FURTHER ACTIONS

```
START.
0000  845E      CPCR = BUSSB - 1.        TEST EXT BUSS
0001  F000      WAIT.
```

OPERATOR INSTRUCTIONS

PROG STEP	INCR	OPERATOR ACTION
1	0001	PRESS FORCE STEP

NOTES

ERROR NOTED ON INITIAL SET-UP - ERROR #E20

IF SYSTEM POWERS OFF DURING ANY TEST OTHER THAN POWER OFF TEST - FAILURE #F389

IN A FEW ERROR CONDITIONS THE PROGRAM WILL BE LOOPING AND THE INCREMENTER INDICATORS WILL APPEAR AS A FALSE ERROR ADDRESS. TO PREVENT THIS PROBLEM, WHENEVER THE INCREMENTER APPEARS TO HAVE STOPPED ON AN ERROR, THE OPERATOR SHOULD PUT THE SGL/NOR SWITCH TO SGL AND PRESS AND RELEASE SGL PUSHBUTTON UNTIL EITHER IT IS DETERMINED THAT THE INCREMENTER VALUE IS NOT CHANGING, OR THAT THE HIGHEST INCREMENTER VALUE IS OBTAINED FROM THE LOOP. RETURN SGL/NOR SWITCH TO NOR

2	0013	PRESS READY BUTTON ON CONSOLE
3	002A	26 INCH CARRIAGE / FORCE STEP 15 INCH CARRIAGE - PRESS READY FORCE STEP
4	002E	FORCE STEP

NOTE

WHEN THIS STEP HAS BEEN SATISFACTORILY RUN IN PROPER MTR SEQUENCE, THE OPERATOR MAY CHOOSE TO PERFORM ANY TEST FROM THE TEST SELECTOR ROUTINE BY PRESSING THE READY BUTTON AND DOING A FORCE STEP.

5	0035	PRESS PK01 ON CONSOLE
6	0055	ALL INDICATORS OFF - FORCE STEP
7	0058	ALL 'A' INDICATORS ON AND ALL OTHER INDICATORS OFF - FORCE STEP
8	0067	ALL 'B' INDICATORS ON AND ALL OTHER INDICATORS OFF - FORCE STEP
9	0071	ALL 'C' INDICATORS ON - FORCE STEP
10	007B	ALL 'D' INDICATORS ON - FORCE STEP
11	0085	ALL 'S' INDICATORS ON - FORCE STEP
12	0088	PRESS READY BUTTON
13	009B	PRESS PK01
14	00CE	PORT SELECT CARD ENABLE STATUS GATING TEST

TO VERIFY THAT ONLY THE DEVICE GENERATING AN INTERRUPT IS ADDRESSED BY ASR, METER THE FOLLOWING SIGNALS. PORT #8 SHOULD READ 0% AND ALL OTHER PORTS SHOULD READ 100%

SIGNAL		PORT	PS1-
PADP5B	(PSENST1/)	1	1
PADP4K	(PSENST2/)	2	1
PADP4J	(PSENST3/)	3	1
PADP5J	(PSENST4/)	4	1
PADP8B	(PSENST5/)	5	2
PADP7K	(PSENST6/)	6	2
PADP7J	(PSENST7/)	7	2
PADP8J	(PSENST8/)	8	2

FORCE STEP

15	00DA	PRESS PK01 - FORCE STEP
16	0128	FORMS TEST PLATEN SHOULD HAVE OPENED AND CLOSED TWICE AND ALARM SOUNDED TWICE - FORCE STEP

```
*
*      17          0152          CARRIER  AT  RIGHT  MARGIN  -
*                                                    FORCE  STEP
*
*      18          01B7          CARRIER  TEST
*                                PRINTOUT  -  NORMAL  -  SEE  FIG.  #  1
*                                NO  INDICATORS  ON  -  FORCE  STEP
*
*      19          0237          PLATEN  ADVANCE  TEST
*                                PRINTOUT  -  NORMAL  -  SEE  FIG.  #  2
*                                CARRIER  OPERATION  NORMAL  -
*                                                    FORCE  STEP
*
*      20          028B          PRINTER  ESCAPE  TEST
*                                PRINTOUT  -  NORMAL  -  SEE  FIG.  #  4
*                                NO  INDICATORS  ON  AND  CARRIER
*                                OPERATION  NORMAL  -  FORCE  STEP
*
*      21          02A0          TEST  KEYBOARD
*
*   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*   *                                                               *
*   *    1  ENTER  PK01  THRU  PK16  (  OR  PK24  )                 *
*   *                                                               *
*   *    2  ENTER  ALL  ALPHA  NUMERIC  KEYS  LEFT  TO  RIGHT       *
*   *                                                               *
*   *    3  HOLD  SHIFT  AND  ENTER  ALL  ALPHA  NUMERIC  KEYS      *
*   *       LEFT  TO  RIGHT                                         *
*   *                                                               *
*   *    4  KEY  SPACE  BAR                                         *
*   *                                                               *
*   *    5  ENTER  ALL  NUMERIC  KEYS  TOP  TO  BOTTOM              *
*   *                                                               *
*   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*      22          02E5          KEYBOARD  TEST
*                                PRINTOUT  -  NORMAL  -  SEE  FIG.  #  7
*                                                    FORCE  STEP
*
*      23          0480          TEST  SELECT  ROUTINE
*
*   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*   *                                                               *
*   *    IF  NUMERIC  INDICATOR  IS  ON  PERFORM  TESTS  6          *
*   *    THRU  10  IN  ORDER  OR  SEE  BELOW                        *
*   *                                                               *
*   *    NUMERIC  '0'  WILL  RETURN  TO  START                      *
*   *       DIAGNOSIS  CAN  BE  DONE  ONLY  IF  THE  TESTS  ARE     *
*   *       PERFORMED  IN  ORDER,  HOWEVER  THEY  MAY  BE           *
*   *       EXECUTED  IN  ANY  ORDER  OR  REPEATED                  *
*   *                                                               *
*   *    NUMERIC  '00'  FOR  DEBUG  USE  ONLY                       *
*   *       EXECUTES  AN  'AA55'  DATA  PATTERN  TO  THE            *
*   *       PRINTER  DECODER  WITH  NO  PRINT  OR  ESCAPE           *
*   *       BITS  SET                                               *
*   *                                                               *
*   *    NUMERIC  '000'  FOR  DEBUG  USE  ONLY                      *
*   *       EXECUTES  AN  'AA55'  DATA  PATTERN  TO  THE            *
*   *       PRINTER  DECODER  WITH  THE  PRINT  BIT  SET,  BUT      *
*   *       NO  ESCAPE  BIT  SET                                    *
*   *                                                               *
*   *    1  PRESS  NUMERIC  1  FORMS  TEST                          *
*   *                                                               *
*   *    2  PRESS  NUMERIC  2  CARRIER  TEST                        *
*   *                                                               *
*   *    3  PRESS  NUMERIC  3  PLATEN  ADVANCE  TEST                *
*   *                                                               *
*   *    4  PRESS  NUMERIC  4  PRINTER  ESCAPE  TEST                *
*   *                                                               *
*   *    5  PRESS  NUMERIC  5  KEYBOARD  TEST                       *
*   *                                                               *
```

```
*   *    6  PRESS  NUMERIC  6  CARRIER  EXHAUSTIVE  TEST            *
*   *                                                               *
*   *    7  PRESS  NUMERIC  7  TILT  -  ROTATE  TEST                *
*   *                                                               *
*   *    8  PRESS  NUMERIC  8  PRINT  ALL  CHARACTERS  TEST         *
*   *                                                               *
*   *    9  PRESS  NUMERIC  9  OVERSPEED  TEST                      *
*   *                                                               *
*   *   10  PRESS  NUMERIC  C  POWER  OFF  TEST                     *
*   *                                                               *
*   *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*      24          037F          CARRIER  EXHAUSTIVE  TEST
*                                PRINTOUT  -  NORMAL  -  SEE  FIG.  #  3
*                                CARRIER  OPERATION  -  NORMAL  -
*                                                    FORCE  STEP
*
*      25          0480          SEE  PROG  STEP  23
*
*      26          03DE          TILT  -  ROTATE  TEST
*                                PRINTOUT  -  NORMAL  -  SEE  FIG.  #  5
*                                                    FORCE  STEP
*
*      27          0480          SEE  PROG  STEP  23
*
*      28          042F          PRINT  ALL  CHARACTERS  TEST
*                                PRINTOUT  -  NORMAL  -  SEE  FIG.  #  6
*                                                    FORCE  STEP
*
*      29          0480          SEE  PROG  STEP  23
*
*      30          043F          OVERSPEED  TEST
*                                INSTALL  JUMPER  FROM  BACKPLANE
*                                PIN  (PADN9Y)  TO  GROUND  AND
*                                FORCE  STEP
*
*      31          0454          REMOVE  JUMPER  AND  FORCE  STEP
*
*      32          0480          POWER  OFF  TEST
*                                END  OF  CON96MTR
*
*
```

PROGRAM LISTING

```
0002  F00C        RESET  GC1.
0003  F01F        RESET  GC2.
0004  F08F        BR2  = LIT  L.
0005  C807        SAR  = 8  LIT  = @07@.
0006  F16C        BR1  = LIT  L.
0007  E087        LIT  = @87@.
0008  F0BD        IF  NOT IRQ  SKIP.            INTERUPT  CHECK
0009  F0F7        SKIP.
000A  400E        MPCR = TSTIRQ1  - 1.
000B  F000        WAIT.                         INTERRUPT  DETECTED
                  **********ERROR        # E2
000C  F108        ASR  BEX.
000D  F0E1        MIR  = B.
000E  F000        WAIT.
                  **********ERROR        # E3
                   TSTIRQ1.
000F  F1AD        IF  NOT SRQ  SKIP.                                          A
0010  F000        WAIT.                                                       A
                  *********ERROR      # E 77                                  A
0011  F1AE        IF  NOT URQ SKIP.                                           A
0012  F000        WAIT.                                                       A
                  *********ERROR      # E 78                                  A
0013  F0F8        WHEN IRQ  STEP.
                  **********PRESS          READY  BUTTON  ON  CONSOLE
                  **********IF        INCR  DOES  NOT  STEP  -  ERROR  #  E4
0014  8465        CPCR  = BUSSC  -  1.          TEST  EXT  BUSS
                   TSTIRQ1A.
0015  F108        ASR  BEX.
0016  F0CA        LCTR.
0017  E0F8        LIT  = @F8@.
0018  F115        A1  = Z.
0019  E008        LIT  = @08@.
001A  F003        A1  EQV  B.                   CHECK  DEVICE  ADDR & RDY BIT
001B  F0B5        IF  NOT ABT  SKIP.
001C  801F        CPCR  = TSTKBDI  -  1.
001D  F0E1        MIR  = B.                     MIR  = STAT  &  DEV  ADDR
001E  F000        WAIT.                               DEVICE  ADDR  OR  STATUS    R
                  **********ERROR        # E5
001F  4015        MPCR  = TSTIRQ1A.
                   TSTKBDI.                           TEST  KBD  DINT
0020  F0BD        IF  NOT IRQ  SKIP.
0021  F000        WAIT.                         STINT  NOT  RESET  BY  ASR
                  **********ERROR        # E6
0022  F07B        B  = B000.
0023  F05F        B.
0024  F18D        IF  IRQ  ASR  BEX  JUMP.
0025  F0FF        0  EQV  B.
0026  F09D        IF  ABT  SKIP.
0027  F000        WAIT.
                  **********DEVICE         OPERATION  SUCC  FAILURE
                  **********ERROR        # E 66
0028  F05F        B.
0029  F05F        B.
002A  F000        WAIT.                                                       A
                  *********IF       CONSOLE  HAS  A  26  INCH  CARRIAGE  FORCE  STEP   A
                  *********IF       CONSOLE  HAS  A  15  INCH  CARRIAGE  PRESS          A
                  *********READY      BUTTON  AND  FORCE  STEP                         A
002B  F0BD        IF  NOT IRQ  SKIP.                                          A
002C  F0F6        SET  GC2.                     SET  15  INCH  FLAG           A
002D  F108        ASR  BEX.                     RESET  STINT                  A
002E  F000        WAIT.
                  **********IF         PERFORMING  MTR  IN  PROPER  SEQUENCE    A
                  **********FORCE          STEP.
                  **********FOR         OUT  OF  SEQUENCE  TEST  SELECTOR  PRESS
                  **********READY          BUTTON  AND  FORCE  STEP.
```

```
002F  F0BD        IF  NOT IRQ  SKIP.
0030  446A        MPCR  = TSELR  -  1.
0031  F0CA        LCTR.
0032  E06F        LIT  = @6F@.
0033  F128        A2  = Z.                                  A2  =  IND  A  DATA  WORD
0034  E0FF        LIT  = @FF@.
0035  F0F8        WHEN IRQ  STEP.
                  **********PRESS          PK01  ON  CONSOLE
                  **********IF        INCR  DOES  NOT  STEP  -  ERROR  #  7
0036  8465        CPCR  = BUSSC  -  1.          TEST  EXT  BUSS
0037  F108        ASR  BEX.
0038  F0CA        LCTR.
0039  E078        LIT  = @78@.
003A  F115        A1  = Z.
003B  E010        LIT  = @10@.
003C  F003        A1  EQV  B.                   CHECK  DEV  ADDR  &  KDI
003D  F0B5        IF  NOT ABT  SKIP.
003E  8040        CPCR  = INHTST  -  1.
003F  F0E1        MIR  = B.
0040  F000        WAIT.                               DINT  OR  KBD  RDY  BIT  NO    S
                  **********ERROR        # E8
                   INHTST.
0041  F097        DR2  BEX.                           RESET  KBD  DINT
0042  F08F        BR2  = LIT  L.
0043  C88F        SAR  = 8  LIT  = @8F@.
0044  F098        DW2.                          UNSELECT  CONSOLE
0045  F08F        BR2  = LIT  L.
0046  E007        LIT  = @07@.
0047  F18E        IF  IRQ  SKIP.
0048  404A        MPCR  = INHTST1A  -  1.
0049  F000        WAIT.                         INTERRUPT  NOT  RESET
                  **********ERROR        # E12
004A  4040        MPCR  = INHTST  -  1.
                   INHTST1A.
004B  F07B        B  = B000.
004C  F108        ASR  BEX.                     ASR  WHILE  IRQ  NOT  SET          A
004D  F0FF        0  EQV  B.
004E  F09D        IF  ABT  SKIP.                                                   A
004F  F000        WAIT.                         ASR  RETURNED  DATA                A
                  *********ERROR      # E 76                                       A
0050  F0CA        LCTR.
0051  E060        LIT  = @60@.
0052  F0EF        MIR  = Z.
0053  E000        LIT  = 0.
0054  F098        DW2.
0055  F000        WAIT.
                  **********IF         ALL  INDICATORS  ARE  OFF  FORCE  STEP
                  **********IF         DISAGREE  -  ERROR  #  E11
0056  F0DD        MIR  = A2.
0057  F098        DW2.
0058  F000        WAIT.                               OBSERVE  INDICATORS
                  **********IF         ALL  A  INDICATORS  ARE  ON  AND  ALL  OTHER
                  **********INDICATORS          ARE  OFF,  FORCE  STEP
                  **********IF         DISAGREE  -  ERROR  #  E13
0059  F098        DW2.
005A  F0CA        LCTR.
005B  E06F        LIT  = @6F@.
005C  F0EF        MIR  = Z.
005D  E000        LIT  = @00@.
005E  F098        DW2.
005F  F05F        B.
0060  F0CA        LCTR.
0061  E077        LIT  = @77@.
0062  F0EF        MIR  = Z.
0063  E0FF        LIT  = @FF@.
0064  F098        DW2.
0065  F0EF        MIR  = Z.                                                        A
0066  E099        LIT  = @99@.                                                     A
0067  F000        WAIT.
```

```
                  *************IF         ALL  B  INDICATORS   ARE  ON  AND  ALL  OTHER
                  *************INDICATORS        ARE  OFF,   FORCE  STEP
                  *************IF         DISAGREE   -   ERROR  #  E14
0068    E000            LIT   =  @00@.
0069    F0EF            MIR   =  Z.
006A    F098            DW2.
006B    F05F            B.
006C    F0CA            LCTR.
006D    E07B            LIT   =  @7B@.
006E    F0EF            MIR   =  Z.
006F    E0FF            LIT   =  @FF@.
0070    F098            DW2.
0071    F000            WAIT.
                  *************IF         ALL  C  INDICATORS   ARE  ON  FORCE  STEP
                  *************IF         DISAGREE   -   ERROR  #  E15
0072    E000            LIT   =  @00@.
0073    F0EF            MIR   =  Z.
0074    F098            DW2.
0075    F05F            B.
0076    F0CA            LCTR.
0077    E07D            LIT   =  @7D@.
0078    F0EF            MIR   =  Z.
0079    E0FF            LIT   =  @FF@.
007A    F098            DW2.
007B    F000            WAIT.
                  *************IF         ALL  D  INDICATORS   ARE  ON  FORCE  STEP
                  *************IF         DISAGREE   -   ERROR  #  E16
007C    E000            LIT   =  @00@.
007D    F0EF            MIR   =  Z.
007E    F098            DW2.
007F    F05F            B.
0080    F0CA            LCTR.
0081    E07E            LIT   =  @7E@.
0082    F0EF            MIR   =  Z.
0083    E00F            LIT   =  @0F@.
0084    F098            DW2.
0085    F000            WAIT.
                  *************IF         ALL  S  INDICATORS   ARE  ON  FORCE  STEP
                  ************         IF   DISAGREE   -   ERROR  #  17
0086    F05F            B.
0087    F05F            B.
0088    F0FD            WHEN  URQ  STEP.
                  *************PRESS          READY  BUTTON
                  *************IF         INCR   DOES  NOT  STEP   -   ERROR  #  E18
0089    F096            DR1  BEX.
008A    F01D            A1   =  LIT.
008B    E008            LIT   =  @08@.
008C    F003            A1  EQV  B.
008D    F0B5            IF   NOT  ABT  SKIP.
008E    8090            CPCR  =  SRQTST  -  1.
008F    F0E1            MIR  =  B.
0090    F000            WAIT.                                RDY  BIT   NOT  IN   STAT  WO
                  *************ERROR          #  E19
                    SRQTST.
0091    F0CA            LCTR.
0092    E060            LIT   =  @60@.
0093    F0EF            MIR   =  Z.
0094    E000            LIT   =  0.
0095    F098            DW2.                                 TURN  OFF  ALL  INDICATOR
0096    F0CA            LCTR.
0097    E06F            LIT   =  @6F@.
0098    F0EF            MIR   =  Z.
0099    E001            LIT   =  @01@.
009A    F098            DW2.                                 LIGHT   IND  A1
009B    F0FC            WHEN  SRQ  STEP.
                  *************PRESS          PK01
                  *************IF         INCR   DOES  NOT  STEP   -   ERROR  #  E21
009C    F096            DR1  BEX.                       GET  STATUS  WORD
009D    F033            A2   =  B.
009E    F1AD            IF   NOT  SRQ  SKIP.                                          A
```

```
009F    F0F7            SKIP.                                                          A
00A0    F000            WAIT.                        DINT   RESET  BY  STATUS  READ     A
                 *********ERROR        #  E  71                                        A
00A1    F16C            BR1   =  LIT   L.                                              A
00A2    C807            SAR  =  8  LIT   =  @07@.                                      A
00A3    F039            A2  =  LIT   L.                                                A
00A4    F0F1            MR1.                                                           A
00A5    F05F            B.                                                             A
00A6    F1AD            IF   NOT  SRQ  SKIP.                                           A
00A7    F0F7            SKIP.                                                          A
00A8    F000            WAIT.                        MEMORY READ  DESELECTED           A
                 *********ERROR        #  E  72      OR  CAUSED  DATA  READ            A
               MRDDST.                                                                 A
00A9    F07B            B  =  B000.                                                    A
00AA    F0D5            MAR1  =  B.                  START  PORT                       A
00AB    F0E6            MIR  =  B000.                                                  A
00AC    F099            DW1.                         DESELECT   WITH  WRITE            A
00AD    F05F            B.                                                             A
               MRDDSL.                                                                 A
00AE    F096            DR1  BEX.                    READ  OTHER  PORT                 A
00AF    F080            B  =  BMAR.                                                    A
00B0    F07D            B  =  B  C.                                                    A
00B1    F07E            B  =  B  +  1.                                                 A
00B2    F0CB            LIT  EQV  B.                                                   A
00B3    E010            LIT   =  @10@.                                                 A
00B4    F0B5            IF  NOT  ABT  SKIP.                                            A
00B5    40BB            MPCR  =  MRDDSLA  -  1.
00B6    F07D            B  =  B  C.                                                    A
00B7    F0D5            MAR1  =  B.                                                    A
00B8    F116            A2  EQV  B.                  PORT  UNDER  TEST                 A
00B9    F09D            IF  ABT  SKIP.                                                 A
00BA    40AD            MPCR  =  MRDDSL  -  1.                                         A
00BB    40AE            MPCR  =  MRDDSL.                                               A
               MRDDSLA.                                                                A
00BC    F16C            BR1   =  LIT   L.                                              A
00BD    E087            LIT   =  @87@.               RESTORE  PORT                     A
00BE    F096            DR1  BEX.                    RESELECT                          A
00BF    F05F            B.                                                             A
00C0    F1AD            IF  NOT  SRQ  SKIP.                                            A
00C1    40C4            MPCR  =  MRDDSLB  -  1.                                        A
00C2    F0BD            IF  NOT  IRQ  SKIP.
00C3    F000            WAIT.                                                          A
                 *********READ       DID  NOT  SELECT
                 *********ERROR        #  73                                           A
00C4    F000            WAIT.                                                          A
                 *********DINT       RESET  BY  READ  TO  ANOTHER  PORT                A
                 *********ERROR        #  E  74                                        A
               MRDDSLB.                                                                A
00C5    F108            ASR  BEX.                                                      A
00C6    F05F            B.                                                             A
00C7    F1AD            IF  NOT  SRQ  SKIP.                                            A
00C8    F0F7            SKIP.                                                          A
00C9    F000            WAIT.                        ASR  DESELECTED                   A
                 *********ERROR        #  E  75                                        A
00CA    F16C            BR1   =  LIT   L.                                              A
00CB    E00F            LIT   =  @0F@.                                                 A
00CC    F099            DW1.                         DESELECT                          A
00CD    F05E            ASR.                                                           A
00CE    F000            WAIT.                                                          A
                 *********PORT       SELECT  CARD ENABLE  STATUS  GATING  TEST.         A
                 *********TO      VERIFY  ONLY THE DEVICE  GENERATING  AN               A
                 *********INTERRUPT       IS  ADDRESSED  BY ASR,  METER  THE            A
                 *********FOLLOWING       SIGNALS.   CONSOLE  PORT  #  8  SHOULD        A
                 *********READ       0%  -  ALL  OTHERS  SHOULD  READ  100%            A
                 *********                           PORT        PS1-                  A
                 *          *PADP5B   (PSENST1/)      1           1                    A
                 *          *PADP4K   (PSENST2/)      2           1                    A
                 *          *PADP4J   (PSENST3/)      3           1                    A
                 *          *PADP5J   (PSENST4/)      4           1                    A
                 *          *                                                          A
```

```
                *          *PADP8B    (PSENST5/)        5          2                    A
                *          *PADP7K    (PSENST6/)        6          2                    A
                *          *PADP7J    (PSENST7/)        7          2                    A
                *          *PADP8J    (PSENST8/)        8          2                    A
                *********IF       AGREE  FORCE  STEP                                    A
                *********IF       DISAGREE  -  ERROR  #E80                              A
00CF  F16C          BR1  =  LIT  L.                                                     A
00D0  E087          LIT  =  @87@.                                                       A
00D1  F05F          B.                                                                  A
00D2  E090          LIT  =  @90@.
00D3  F0EE          MIR  =  LIT  L.
00D4  D800          SAR  =  8.
00D5  F098          DW2.                                  TURN  OFF  IND  A1
00D6  F0CA          LCTR.
00D7  E07F          LIT  =  @7F@.
00D8  F115          A1  =  Z.
00D9  E010          LIT  =  @10@.
00DA  F000          WAIT.
                ************PRESS          PK01   THEN  FORCE  STEP  -  FST
00DB  F1AE          IF  NOT  URQ  SKIP.
00DC  F0F7          SKIP.
00DD  F000          WAIT.
                *************ERROR          #  E9
                *************INT          NOT  HONORED  DOES  NOT  CAUSE  STINT
00DE  8465          CPCR  =  BUSSC  -  1.          TEST  EXT  BUSS
00DF  F108          ASR  BEX.                                                           A
00E0  F05F          B.                                                                  A
00E1  F1B5          IF  URQ  SKIP.                 TEST  STINT                          A
00E2  F000          WAIT.                          ASR  DID  STATUS  READ               A
                *********ERROR       #  E  79                                          A
00E3  F096          DR1  BEX.
00E4  F0CA          LCTR.
00E5  E07F          LIT  =  @7F@.
00E6  F115          A1  =  Z.
00E7  E014          LIT  =  @14@.
00E8  F003          A1  EQV  B.
00E9  F0B5          IF  NOT  ABT  SKIP.
00EA  80EC          CPCR  =  INDTST  -  1.
00EB  F0E1          MIR  =  B.
00EC  F000          WAIT.                          KBD  DINT  NOT  HONORED  BIT
                *                                  NOT  SET  IN  STATUS  WORD
                *************ERROR          #  E10
                 INDTST.
00ED  F097          DR2  BEX.                             RESET  KBD  DINT
00EE  F05F          B.
                 ENABFMS.
00EF  F0EA          MIR  =  LIT.
00F0  E008          LIT  =  @08@.
00F1  F099          DW1.                                  ENABLE  FORMS
00F2  F05F          B.
00F3  F0FC          WHEN  SRQ  STEP.               DINT  NOT  SET  BY  FORMS  READY
                *************ERROR          #  E23
00F4  8465          CPCR  =  BUSSC  -  1.          TEST  EXT  BUSS
00F5  F096          DR1  BEX.
00F6  F0CA          LCTR.
00F7  E07F          LIT  =  @7F@.
00F8  F115          A1  =  Z.
00F9  E040          LIT  =  @40@.
00FA  F018          SET  LC1.
00FB  F003          A1  EQV  B.
00FC  F0B5          IF  NOT  ABT  SKIP.
00FD  80FF          CPCR  =  OCPLAT  -  1.
00FE  F0E1          MIR  =  B.
00FF  F000          WAIT.                                 FORMS  READY  BIT  NOT  IN     T
                *************ERROR          #  E24
                 OCPLAT.
0100  F0CA          LCTR.
0101  E03F          LIT  =  @3F@.
0102  D800          SAR  =  8.
0103  F01D          A1  =  LIT.
0104  E0C0          LIT  =  @C0@.
0105  F10B          A1  =  A1  C.
0106  F0EF          MIR  =  Z.
0107  E009          LIT  =  @09@.
0108  F098          DW2.                                          OPEN  PLATEN  SOUND  ALAR
0109  F05F          B.
010A  F1AD          IF  NOT  SRQ  SKIP.
010B  F000          WAIT.                          FORMS  DINT  NOT  RESET
                *************ERROR          #  E22
010C  F0DB          MIR  =  A1.
010D  E004          LIT  =  @04@.
010E  F0CA          LCTR.
010F  F0F5          SAVE.
0110  F0FC          WHEN  SRQ  STEP.
                *************DINT          NOT  SET  WHEN  FORMS  READY
                *************ERROR          #  E25
0111  F098          DW2.                           RESET  DINT  WITH  DUMMY  FORMS
0112  F030          INC.
0113  F0B9          IF  NOT  COV  JUMP.            NUMBER  OF  DINTS  =  4
0114  F0CA          LCTR.
0115  E03F          LIT  =  @3F@.
0116  F0EF          MIR  =  Z.
0117  E004          LIT  =  @04@.
0118  F0CA          LCTR.
0119  F0FC          WHEN  SRQ  STEP.
011A  F098          DW2.                           CLOSE  PLATEN
011B  E0C0          LIT  =  @C0@.
011C  F0EE          MIR  =  LIT  L.
011D  F0F5          SAVE.
011E  F0FC          WHEN  SRQ  STEP.
011F  F098          DW2.                           RESET  DINT  WITH  DUMMY  FORMS
0120  F030          INC.
0121  F0B9          IF  NOT  COV  JUMP.            NUMBER  OF  DINTS  =  4
0122  F0BF          IF  NOT  LC1  SKIP.
0123  80FF          CPCR  =  OCPLAT  -  1.
0124  F0BA          IF  NOT  EXT  SKIP.
0125  F0A0          IF  EXT  SKIP.
0126  F0F7          SKIP.
0127  40FF          MPCR  =  OCPLAT  -  1.
0128  F000          WAIT.
                *************PLATEN          SHOULD  HAVE  OPENED  AND  CLOSED
                *************TWICE          AND  ALARM  SOUNDED  TWICE
                *************IF          NORMAL  FORCE  STEP
                *************IF          DISAGREE  ERROR  #  E  27
0129  F0BA          IF  NOT  EXT  SKIP.
012A  F0A0          IF  EXT  SKIP.
012B  F0F7          SKIP.
012C  40FF          MPCR  =  OCPLAT  -  1.
012D  F0BB          IF  NOT  GC1  SKIP.
012E  446A          MPCR  =  TSELR  -  1.
                 CARRTST.                                      CARRIER  TEST
012F  F01D          A1  =  LIT.
0130  E010          LIT  =  @10@.
0131  F0EA          MIR  =  LIT.
0132  F099          DW1.                                      ENABLE  CARRIER
0133  F0CA          LCTR.
0134  E07F          LIT  =  @7F@.
0135  F115          A1  =  Z.
0136  E080          LIT  =  @80@.
0137  F0FC          WHEN  SRQ  STEP.
                *************DINT          NOT  SET  WHEN  CARRIER  RDY
                *************ERROR          #  E  28
0138  8465          CPCR  =  BUSSC  -  1.          TEST  EXT  BUSS
0139  F096          DR1  BEX.                      READ  STATUS  WORD
013A  F003          A1  EQV  B.
013B  F0B5          IF  NOT  ABT  SKIP.
013C  413E          MPCR  =  NTRCARTST  -  1.
013D  F0E1          MIR  =  B.
013E  F000          WAIT.                          CARRIER  ENABLE  BIT  NOT  SET
                *************ERROR          #  E  29
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                NTRCARTST.
013F  D800          SAR  =  8.
0140  E002          LIT  =  @02@.
0141  F0EE          MIR  =  LIT  L.
0142  F098          DW2.                          INITIALIZE     RIGHT
0143  F05F          B.
0144  F1AD          IF  NOT SRQ  SKIP.
0145  F000          WAIT.                         CARRIER  DINT  NOT  RESET
                ************ERROR        #  E 30
0146  F0F5          SAVE.
0147  F1AE          IF  NOT URQ  SKIP.
0148  845B          CPCR  =  CARERR3  -  1.
0149  F0BA          IF  NOT EXT  SKIP.
014A  F0A0          IF  EXT  SKIP.
014B  F0F7          SKIP.
014C  413E          MPCR  =  NTRCARTST  -  1.
014D  F1AD          IF  NOT SRQ  SKIP.
014E  F0F7          SKIP.
014F  F0C9          JUMP.
                ************DINT         NOT  SET  AFTER  CARRIER  INITIALIZED
                ************ERROR        #  E 31
0150  F05F          B.
0151  F05F          B.
0152  F000          WAIT.
                ************CARRIER          AT  RIGHT  MARGIN  IF  AGREE  FORCE  STP
                ************IF          DISAGREE  ERROR  #  E59
0153  F0BA          IF  NOT EXT  SKIP.
0154  F0A0          IF  EXT  SKIP.
0155  F0F7          SKIP.
0156  413E          MPCR  =  NTRCARTST  -  1.
0157  F0EA          MIR  =  LIT.
0158  E004          LIT  =  @04@.
0159  F099          DW1.                                ENABLE  PRINTER
015A  F05F          B.
015B  F0FC          WHEN SRQ  STEP.
                ************DINT         NOT  SET  WHEN PRINTER  READY
                ************ERROR        E  32
015C  8465          CPCR  =  BUSSC  -  1.         TEST  EXT  BUSS
015D  F096          DR1  BEX.                     READ  STATUS  WORD
015E  F0CA          LCTR.
015F  E07F          LIT  =  @7F@.
0160  F115          A1  =  Z.
0161  E020          LIT  =  @20@.
0162  F003          A1  EQV  B.                         CHECK  PRINTER  RDY BIT
0163  F0B5          IF  NOT ABT  SKIP.
0164  8166          CPCR  =  PRTRTMG  -  1.
0165  F0E1          MIR  =  B.
0166  F000          WAIT.                         PRNTR  RDY BIT  NOT  IN  STATUS
                ************ERROR        E  52
                PRTRTMG.
0167  F0CA          LCTR.
0168  E0BE          LIT  =  @BE@.
0169  F128          A2  =  Z.                     A2  =  PRTR  DATA  WORD
016A  E041          LIT  =  @41@.
016B  F0EF          MIR  =  Z.
016C  F098          DW2.                                PRINT  A AT  RIGHT  MARGI
016D  F05F          B.
016E  F1AD          IF  NOT SRQ  SKIP.
016F  F000          WAIT.                         PRINTER  DINT  NOT  RESET
                ************ERROR        #  E51
0170  F0EA          MIR  =  LIT.
0171  E010          LIT  =  @10@.
0172  F0FC          WHEN SRQ  STEP.
                ************DINT         NOT  SET  WITH  PRINT  COMPLETE
                ************ERROR        #  E 33
0173  F099          DW1.                          ENABLE  CARRIER
0174  F0EA          MIR  =  LIT.
0175  E004          LIT  =  4.
0176  F0FC          WHEN SRQ  STEP.
                ************ERROR        #  70
                ************PRINTER          CLEAR  INHIBITING     CARRIER  DINT

0177  F098          DW2.                          STALL  CARRIER
0178  F05F          B.
0179  F1AD          IF  NOT SRQ  SKIP.
017A  F000          WAIT.                         CARRIER  DINT  NOT  RESET
                ************ERROR        #  E55
017B  F0FD          WHEN URQ  STEP.
                ************STALL        FLAG  NOT  SETTING  STINT
                ************ERROR        #  E56
017C  8465          CPCR  =  BUSSC  -  1.         TEST  EXT  BUSS
017D  F096          DR1  BEX.
017E  F05F          B.
017F  F0C3          IF  NOT LST  SKIP.
0180  4182          MPCR  =  PRTRTMGA  -  1.
0181  F0E1          MIR  =  B.
0182  F000          WAIT.
                ************STALL        FLAG  NOT  SET  IN  STATUS.
                ************ERROR        #  E57
                PRTRTMGA.
0183  F1AE          IF  NOT URQ  SKIP.
0184  F000          WAIT.
                ************STALL        FLAG  NOT  RESETTING
                ************ERROR        #  E64
                PRTRTMGA2.
0185  F0CA          LCTR.
0186  E0FE          LIT  =  @FE@.
0187  F05F          B.                                                          A
0188  E095          LIT  =  @95@.                                               A
0189  F0A2          IF  GC2  SKIP.                TEST  15  INCH  FLAG          A
018A  E0FF          LIT  =  @FF@.
018B  F0EF          MIR  =  Z.
018C  F0FC          WHEN SRQ  STEP.
                ************ERROR        #  E68
018D  F098          DW2.                          MOVE  CARR  256  POSITIONS
018E  F0F5          SAVE.
018F  F0BA          IF  NOT EXT  SKIP.
0190  F0A0          IF  EXT  SKIP.
0191  F0F7          SKIP.
0192  4184          MPCR  =  PRTRTMGA2  -  1.
0193  F1AE          IF  NOT URQ  SKIP.
0194  41A1          MPCR  =  CARERR5  -  1.
0195  F1AD          IF  NOT SRQ  SKIP.
0196  F0F7          SKIP.
0197  F0C9          JUMP.
                ************DINT         NOT  SET  WHEN CARR  AT  LEFT  MARGIN
                ************ERROR        E  34
0198  F096          DR1  BEX.                           READ  DEVICE  STATUS
0199  F0CA          LCTR.
019A  E07F          LIT  =  @7F@.
019B  F115          A1  =  Z.
019C  E080          LIT  =  @80@.
019D  F003          A1  EQV  B.
019E  F0B5          IF  NOT ABT  SKIP.
019F  81A5          CPCR  =  PRTLTMG  -  1.
01A0  F0E1          MIR  =  B.
01A1  F000          WAIT.                         STATUS  FAILURE
                ************ERROR        #  E58
                CARERR5.
01A2  F096          DR1  BEX.
01A3  F0E1          MIR  =  B.
01A4  F000          WAIT.
                ************STINT        DETECTED  POSITIONING     LEFT
                ************ERROR        #  E65
01A5  4184          MPCR  =  PRTRTMGA2  -  1.
                PRTLTMG.
01A6  F0EA          MIR  =  LIT.
01A7  E004          LIT  =  @04@.
01A8  F099          DW1.                                ENABLE  PRINTER
01A9  F05F          B.
01AA  F0DD          MIR  =  A2.
01AB  F0FC          WHEN SRQ  STEP.
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01AC  F098          DW2.                          PRINT  A AT LEFT  MARGIN
01AD  F0EA          MIR  = LIT.
01AE  E008          LIT  = @08@.
01AF  F0FC          WHEN SRQ  STEP.
01B0  F099          DW1.                          ENABLE  FORMS
01B1  F0CA          LCTR.
01B2  E03F          LIT  = @3F@.
01B3  F0EF          MIR  = Z.
01B4  E050          LIT  = @50@.
01B5  F0FC          WHEN SRQ  STEP.
01B6  F098          DW2.
01B7  F000          WAIT.                                 OBSERVE  PRINTOUT
              **********IF        PRINTOUT  IS  NORMAL AND NO INDICATORS
              **********ARE         ON,  FORCE  STEP
              **********SEE         FIGURE  1.
              **********IF        DISAGREE  = ERROR # E 35
01B8  F0BA          IF  NOT EXT  SKIP.
01B9  F0A0          IF  EXT  SKIP.
01BA  F0F7          SKIP.
01BB  F0F7          SKIP.
01BC  F0BB          IF  NOT GC1  SKIP.
01BD  446A          MPCR = TSELR  -  1.
            PLATADV.
01BE  F0EA          MIR  = LIT.
01BF  E004          LIT  = @04@.
01C0  F099          DW1.                                  ENABLE  PRINTER
01C1  F0CA          LCTR.
01C2  E0BE          LIT  = @BE@.
01C3  F128          A2  = Z.
01C4  E041          LIT  = @41@.
01C5  F0EF          MIR  = Z.
01C6  F0FC          WHEN SRQ  STEP.
01C7  F098          DW2.                          PRINT  A AT LEFT  MARGIN
01C8  F0EA          MIR  = LIT.
01C9  E008          LIT  = @08@.
01CA  F099          DW1.                                  ENABLE  FORMS
01CB  F0CA          LCTR.
01CC  E03F          LIT  = @3F@.
01CD  F0EF          MIR  = Z.
01CE  E050          LIT  = @50@.
01CF  F05F          B.
            LOOPE.
01D0  E005          LIT  = @05@.
01D1  F0CA          LCTR.
01D2  F0F5          SAVE.
01D3  F0FC          WHEN SRQ  STEP.
01D4  F098          DW2.                          ADVANCE  BOTH  PLATENS
01D5  F030          INC.
01D6  F0B9          IF  NOT COV  JUMP.            # OF PLATEN  ADVANCES  = 5
01D7  F0BA          IF  NOT EXT  SKIP.
01D8  F0A0          IF  EXT  SKIP.
01D9  F0F7          SKIP.
01DA  41CF          MPCR = LOOPE  -  1.
01DB  F0EA          MIR  = LIT.
01DC  E004          LIT  = @04@.
01DD  F0FC          WHEN SRQ  STEP.
01DE  F099          DW1.                          ENABLE  PRINTER
01DF  F0CA          LCTR.
01E0  E0BE          LIT  = @BE@.
01E1  F128          A2  = Z.
01E2  E041          LIT  = @41@.
01E3  F0DD          MIR  = A2.
01E4  F0FC          WHEN SRQ  STEP.
01E5  F098          DW2.                          PRINT  A AT LEFT  MARGIN
01E6  F0EA          MIR  = LIT.
01E7  E010          LIT  = @10@.
01E8  F0FC          WHEN SRQ  STEP.
01E9  F099          DW1.                          ENABLE  CARRIER
01EA  F05F          B.                                                    A
01EB  E095          LIT  = @95@.                                          A
01EC  F0A2          IF  GC2  SKIP.                TEST  15  INCH  FLAG    A
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01ED  E0FF          LIT  = @FF@.
01EE  F0EA          MIR  = LIT.
01EF  F0FC          WHEN SRQ  STEP.
01F0  F098          DW2.                          CARR  MOVE 256  POS  RIGHT
01F1  F0F5          SAVE.
01F2  F1AE          IF  NOT URQ  SKIP.
01F3  8458          CPCR = CARERR2  -  1.
01F4  F1AD          IF  NOT SRQ  SKIP.
01F5  F0F7          SKIP.
01F6  F0C9          JUMP.
01F7  F0EA          MIR  = LIT.
01F8  E004          LIT  = @04@.
01F9  F099          DW1.                                  ENABLE  PRINTER
01FA  F0DD          MIR  = A2.
01FB  F0FC          WHEN SRQ  STEP.
01FC  F098          DW2.                          PRINT  A AT RIGHT  MARGIN
01FD  F0EA          MIR  = LIT.
01FE  E008          LIT  = @08@.
01FF  F0FC          WHEN SRQ  STEP.
0200  F099          DW1.                          ENABLE  FORMS
0201  F0CA          LCTR.
0202  E03F          LIT  = @3F@.
0203  F0EF          MIR  = Z.
0204  E050          LIT  = @50@.
0205  F05F          B.
0206  E005          LIT  = @05@.
0207  F0CA          LCTR.
0208  F0F5          SAVE.
0209  F0FC          WHEN SRQ  STEP.
020A  F098          DW2.                          ADVANCE  BOTH  PLATENS
020B  F030          INC.
020C  F0B9          IF  NOT COV  JUMP.            # OF PLATEN  ADVANCES  = 5
020D  F0EA          MIR  = LIT.
020E  E004          LIT  = @04@.
020F  F0FC          WHEN SRQ  STEP.
0210  F099          DW1.                          ENABLE  PRINTER
0211  F0DD          MIR  = A2.
0212  F0FC          WHEN SRQ  STEP.
0213  F098          DW2.                          PRINT  A AT RIGHT  MARGIN
0214  F0EA          MIR  = LIT.
0215  E010          LIT  = @10@.
0216  F0FC          WHEN SRQ  STEP.
0217  F099          DW1.                          ENABLE  CARRIER
0218  F0CA          LCTR.
0219  E0FE          LIT  = @FE@.
021A  F05F          B.                                                    A
021B  E095          LIT  = @95@.                                          A
021C  F0A2          IF  GC2  SKIP.                TEST  15  INCH  FLAG    A
021D  E0FF          LIT  = @FF@.
021E  F0EF          MIR  = Z.
021F  F0FC          WHEN SRQ  STEP.
0220  F098          DW2.                          CARR  LEFT  256  POSITIONS
0221  F0F5          SAVE.
0222  F1AE          IF  NOT URQ  SKIP.
0223  8455          CPCR = CARERR1  -  1.
0224  F1AD          IF  NOT SRQ  SKIP.
0225  F0F7          SKIP.
0226  F0C9          JUMP.
0227  F0EA          MIR  = LIT.
0228  E004          LIT  = @04@.
0229  F099          DW1.                                  ENABLE  PRINTER
022A  F0DD          MIR  = A2.
022B  F0FC          WHEN SRQ  STEP.
022C  F098          DW2.                          PRINT  A AT LEFT  MARGIN
022D  F0EA          MIR  = LIT.
022E  E008          LIT  = @08@.
022F  F0FC          WHEN SRQ  STEP.
0230  F099          DW1.                          ENABLE  FORMS
0231  F0CA          LCTR.
0232  E03F          LIT  = @3F@.
0233  F0EF          MIR  = Z.
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0234  E051          LIT  = @51@.
0235  F0FC          WHEN SRQ  STEP.
0236  F098          DW2.                          ADV  BOTH  PLAT  &  SND  ALARM
0237  F000          WAIT.                              OBSERVE  PRINT  OUT
                    **********IF          PRINTOUT  GOOD  AND  CARRIER  OPERATION
                    **********NORMAL,          FORCE  STEP
                    **********SEE          FIGURE  2.
                    **********IF          DISAGREE  = ERROR  #  E  37
0238  F0BA          IF  NOT  EXT  SKIP.
0239  F0A0          IF  EXT  SKIP.
023A  F0F7          SKIP.
023B  F0F7          SKIP.
023C  F0BB          IF  NOT  GC1  SKIP.
023D  446A          MPCR = TSELR  -  1.
                  PRTESCTST.                                PRINTER  ESCAPE  TEST
023E  D800          SAR  = 8.
023F  F0EA          MIR  = LIT.
0240  E010          LIT  = @10@.
0241  F099          DW1.                              ENABLE  CARRIER
0242  F0EE          MIR  = LIT  L.
0243  E003          LIT  = @03@.
0244  F0FC          WHEN SRQ  STEP.
0245  F098          DW2.                          INITIALIZE     LEFT
0246  F0EA          MIR  = LIT.
0247  E004          LIT  = @04@.
0248  F0FC          WHEN SRQ  STEP.
0249  F099          DW1.                          ENABLE  PRINTER
024A  F0CA          LCTR.
024B  E0BE          LIT  = @BE@.
024C  F0EF          MIR  = Z.
024D  E05A          LIT  = @5A@.
024E  F0CA          LCTR.
024F  E0B6          LIT  = @B6@.
0250  F115          A1  = Z.
0251  E05A          LIT  = @5A@.
0252  F0FC          WHEN SRQ  STEP.
0253  F098          DW2.                          PRINT  Z  IN  PLACE  BLACK
0254  F05F          B.                                                          A
0255  E094          LIT  = @94@.                                                A
0256  F0A2          IF  GC2  SKIP.                TEST  15  INCH  FLAG          A
0257  E0FE          LIT  = @FE@.
0258  F0CA          LCTR.
0259  F0DB          MIR  = A1.
                  PRBR.
025A  F0FC          WHEN SRQ  STEP.
025B  F098          DW2.                          PRINT  Z  ESCAPE  RIGHT  -  BLAC
025C  F030          INC.
                  LOOPBE.
025D  F1AD          IF  NOT  SRQ  SKIP.
025E  425C          MPCR = LOOPBE  -  1.
                    **********DINT          NOT  RESET  ON RIGHT  EXCAPE
                    **********ERROR          #  60
025F  F02E          IF  COV  SKIP.
0260  4259          MPCR = PRBR  -  1.
0261  F0EE          MIR  = LIT  L.
0262  E040          LIT  = @40@.
0263  F0FC          WHEN SRQ  STEP.
0264  F098          DW2.                          COUNT  1  DINT  =  DUMMY PRINT
0265  F0CA          LCTR.
0266  E0BC          LIT  = @BC@.
0267  F0EF          MIR  = Z.
0268  E05A          LIT  = @5A@.
0269  F0CA          LCTR.
026A  E0B8          LIT  = @B8@.
026B  F115          A1  = Z.
026C  E05A          LIT  = @5A@.
026D  F0FC          WHEN SRQ  STEP.
026E  F098          DW2.                          PRINT  Z  IN  PLACE  -  RED
026F  F05F          B.                                                          A
0270  E094          LIT  = @94@.                                                A
0271  F0A2          IF  GC2  SKIP.                TEST  15  INCH  FLAG          A

0272  E0FE          LIT  = @FE@.
0273  F0CA          LCTR.
0274  F0DB          MIR  = A1.
                  PRRR.
0275  F0FC          WHEN SRQ  STEP.
0276  F098          DW2.                              PRINT  Z  ESCAPE  LEFT  =  RED
0277  F030          INC.
                  LOOPRE.
0278  F1AD          IF  NOT  SRQ  SKIP.
0279  4277          MPCR = LOOPRE  -  1.
                    **********DINT          NOT  RESET  ON LEFT  ESCAPE
                    **********ERROR          #  61
027A  F02E          IF  COV  SKIP.
027B  4274          MPCR = PRRR  -  1.
027C  F0EA          MIR  = LIT.
027D  E008          LIT  = @08@.
027E  F018          SET  LC1.
027F  F0FC          WHEN SRQ  STEP.
0280  F099          DW1.                              ENABLE  FORMS
0281  F0CA          LCTR.
0282  E03F          LIT  = @3F@.
0283  F05F          B.
0284  E050          LIT  = @50@.
0285  F0EF          MIR  = Z.
0286  F0F5          SAVE.
0287  F0FC          WHEN SRQ  STEP.
0288  F098          DW2.                              ADVANCE  BOTH  PLATENS
0289  F05F          B.
028A  F0A6          IF  LC1  JUMP.
028B  F000          WAIT.                                  OBSERVE  PRINTOUT
                    **********IF          PRINTOUT  GOOD,  NO INDICATORS  ARE  ON
                    **********AND          CARRIER  OPERATION  NORMAL,  FORCE  STEP
                    **********SEE          FIGURE  4.
                    **********IF          DISAGREE  = ERROR  #  E  39
028C  F0BA          IF  NOT  EXT  SKIP.
028D  F0A0          IF  EXT  SKIP.
028E  F0F7          SKIP.
028F  F0F7          SKIP.
0290  F0BB          IF  NOT  GC1  SKIP.
0291  446A          MPCR = TSELR  -  1.
                  KBDTST.                                   KEYBOARD  TEST
0292  F0EA          MIR  = LIT.
0293  E002          LIT  = @02@.
0294  F099          DW1.                                  ENABLE  KEYBOARD
0295  04FE          AMPCR = KBDTBL  -  1.
0296  F058          A3  = LIT.                            A3  =  END CHAR CODE
0297  E04E          LIT  = @4E@.
0298  F007          A1  = AMPCR.
0299  F00F          A1  = A1  -  1.
029A  F05F          B.
                  CODECHK.                                  KBD  CODE  CHECK  ROUTINE
029B  F012          A1  = A1  +  1.
029C  F05C          AMPCR = A1.
029D  F05F          B.
029E  F09A          EXEC.
029F  F038          A2  = LIT.
                  ERRRTN.
02A0  F0FC          WHEN SRQ  STEP.
                    **********1ENTER          PK01  THRU  PK16  OR  24
                    **********2ENTER          ALL  ALPHA  NUMERIC  KEYS  LEFT
                    **********          TO  RIGHT.
                    **********3HOLD          SHIFT  AND ENTER  ALL  ALPHA  NUMERIC
                    **********          KEYS  LEFT  TO  RIGHT.
                    **********4KEY          SPACE  BAR.
                    **********5ENTER          ALL  NUMERIC  KEYS  TOP  TO  BOTTOM
02A1  8465          CPCR = BUSSC  -  1.           TEST  EXT  BUSS
02A2  F097          DR2  BEX.
02A3  F116          A2  EQV  B.
02A4  F09D          IF  ABT  SKIP.
02A5  42E6          MPCR = KBDERR  -  1.
02A6  F03C          A3  EQV  B.
```

```
02A7  F09D          IF  ABT  SKIP.
02A8  429A          MPCR = CODECHK  -  1.
02A9  F0EA          MIR  =  LIT.
02AA  E008          LIT  =  @08@.
02AB  F099          DW1.                                ENABLE  FORMS
02AC  F0CA          LCTR.
02AD  E03F          LIT  =  @3F@.
02AE  F0EF          MIR  =  Z.
02AF  E050          LIT  =  @50@.
02B0  F0FC          WHEN SRQ  STEP.
02B1  F098          DW2.
02B2  F0EA          MIR  =  LIT.
02B3  E004          LIT  =  @04@.
02B4  F0FC          WHEN SRQ  STEP.
02B5  F099          DW1.                          ENABLE  PRINTER
02B6  F01D          A1  =  LIT.
02B7  C848          SAR  =  8  LIT  =  @48@.
02B8  F00B          A1  =  A1  L.
02B9  F057          A3  =  LIT  L.                A3  =  ESC  AND  PRINT
02BA  E049          LIT  =  @49@.
02BB  F0CA          LCTR.
02BC  E00D          LIT  =  @0D@.
02BD  04E0          AMPCR = ENDTBL1  -  1.
02BE  F0C0          IF  NOT  LC2  SKIP.           TEST  FOR  16  PK  FLAG          A
02BF  04EF          AMPCR = ENDTBL2  -  1.
02C0  F023          A2  =  AMPCR.
              KBPRTR.
02C1  F102          AMPCR  =  A2.
02C2  F05F          B.
02C3  F09A          EXEC.                         GET  NEXT  CHAR
02C4  F089          B  =  LIT.
02C5  F0FF          0  EQV  B.                    TEST  FOR  SPACE  CODE
02C6  F0B5          IF  NOT  ABT  SKIP.
02C7  F018          SET  LC1.
02C8  F0DF          MIR  =  A3.  OR  B.
02C9  F0BF          IF  NOT  LC1  SKIP.
02CA  F0DC          MIR  =  A1  +  B.
02CB  F05F          B.
02CC  F0FC          WHEN SRQ  STEP.
02CD  F098          DW2.                          PRINT  CHAR
02CE  F02A          A2  =  A2  +  1.
02CF  F0C8          INC,  IF  COV  SKIP.
02D0  42C0          MPCR = KBPRTR  -  1.
02D1  F0EA          MIR  =  LIT.
02D2  E010          LIT  =  @10@.
02D3  F0FC          WHEN SRQ  STEP.
02D4  F099          DW1.                          ENABLE  CARRIER
02D5  F0CA          LCTR.
02D6  E0FE          LIT  =  @FE@.
02D7  F0EF          MIR  =  Z.
02D8  E00F          LIT  =  @0F@.
02D9  F0FC          WHEN SRQ  STEP.
02DA  F098          DW2.                          MOVE  CARR  LEFT
02DB  F0EA          MIR  =  LIT.
02DC  E008          LIT  =  @08@.
02DD  F0FC          WHEN SRQ  STEP.
02DE  F099          DW1.                          ENABLE  FORMS
02DF  F0CA          LCTR.
02E0  E03F          LIT  =  @3F@.
02E1  F0EF          MIR  =  Z.
02E2  E051          LIT  =  @51@.
02E3  F0FC          WHEN SRQ  STEP.
02E4  F098          DW2.                          ADV  BOTH  PLAT  &  SND  ALARM
02E5  F000          WAIT.
              **************IF        PRINTOUT  IS  NORMAL FORCE  STEP
              **************SEE         FIGURE  #  7
              **************IF       DISAGREE  = ERROR  #  69
02E6  446A          MPCR = TSELR  -  1.
              KBDERR.                                 KBD  ERROR  ROUTINE
02E7  E06C          LIT  =  @6C@.
02E8  F117          A2  EQV  LIT.
```

```
02E9  F09D          IF  ABT  SKIP.
02EA  42F3          MPCR = KBDERR1  -  1.
02EB  F05F          B.
02EC  E011          LIT  =  @11@.
02ED  F0CB          LIT  EQV  B.
02EE  F09D          IF  ABT  SKIP.
02EF  42F3          MPCR = KBDERR1  -  1.
02F0  F019          SET  LC2.                                                    A
02F1  E008          LIT  =  @08@.
02F2  F011          A1  =  A1  +  LIT.
02F3  429A          MPCR = CODECHK  -  1.
              KBDERR1.
02F4  F0EA          MIR  =  LIT.
02F5  E008          LIT  =  @08@.
02F6  F099          DW1.                                ENABLE  FORMS
02F7  F0CA          LCTR.
02F8  E03F          LIT  =  @3F@.
02F9  F0EF          MIR  =  Z.
02FA  E001          LIT  =  @01@.
02FB  F0FC          WHEN SRQ  STEP.
02FC  F098          DW2.                          SOUND  ALARM
              KBDERR2.
02FD  C890          SAR  =  8  LIT  =  @90@.
02FE  F07D          B  =  B  C.
02FF  F087          B  =  LIT  OR  B.
0300  F07D          B  =  B  C.
0301  F0E1          MIR  =  B.
0302  F098          DW2.                          ERROR  CHAR  TO  INDICATORS
0303  F0EA          MIR  =  LIT.
0304  E002          LIT  =  @02@.
0305  F099          DW1.                          ENABLE  KYBD
0306  F07C          B  =  B  L.
0307  F06C          B  =  A2  OR  B.
0308  F0E1          MIR  =  B.
0309  F0BA          IF  NOT  EXT  SKIP.
030A  F0A0          IF  EXT  SKIP.                TEST  FOR  LOOPING
030B  F0F7          SKIP.
030C  429F          MPCR = ERRRTN  -  1.
              KBDERR3.
030D  F1AE          IF  NOT  URQ  SKIP.
030E  4316          MPCR = KBDERR4  -  1.
030F  F1AD          IF  NOT  SRQ  SKIP.
0310  F0F7          SKIP.
0311  430C          MPCR = KBDERR3  -  1.
              **************KEYBOARD          CHARACTER  ERROR
              **************MIR          AB  BITS  =  BAD  CHARACTER
              **************MIR          CD  BITS  =  EXPECTED  CHARACTER
              **************FOR          POSSIBLE  OPERATOR  ERROR  PRESS  READY
              **************BUTTON          RE-ENTER  CHARACTER
              **************CONSISTANT          FAILURE  GO  TO  ERROR  NUMBER
              **************ERROR          #  E  44
              **********FOR       MAKING  KEYBOARD  ADJUSTMENTS  ON
              **********INTERMITTANT          KEYS  DO  NOT  PRESS  READY  AND  REKEY
              **********CHARACTER       AS  DESIRED.      THE  A  INDICATOR  DISPLAY
              **********WILL       REFLECT  EACH  KEY  DEPRESSION  AND  ALARM
              **********WILL       SOUND  ONLY  ON  A  DISAGREE  WITH  ORIGINAL
              **********EXPECTED          CHARACTER
0312  F097          DR2  BEX.
0313  F116          A2  EQV  B.
0314  F09D          IF  ABT  SKIP.
0315  42F3          MPCR = KBDERR1  -  1.
0316  42FC          MPCR = KBDERR2  -  1.
              KBDERR4.
0317  F096          DR1  BEX.
0318  F0EE          MIR  =  LIT  L.
0319  E090          LIT  =  @90@.
031A  F098          DW2.                          TURN  OFF  INDICATORS
031B  F05F          B.
031C  429F          MPCR = ERRRTN  -  1.
              CAREXHTST.                                  CARRIER  EXHAUSTIVE  TES
031D  F0CA          LCTR.
```

```
031E  E0BE        LIT  = @BE@.
031F  F115        A1  = Z.                          A1  = PRINTER  DATA  WORD
0320  E045        LIT  = @45@.
0321  F0CA        LCTR.
0322  E0FE        LIT  = @FE@.
0323  F05F        B.                                                          A
0324  E095        LIT  = @95@.                                                A
0325  F0A2        IF  GC2  SKIP.                TEST  15  INCH  FLAG          A
0326  E0FF        LIT  = @FF@.
0327  F05A        A3  = Z.                      A3  = CARR  POS  LEFT  DATA  WD.
0328  F05F        B.                                                          A
0329  E095        LIT  = @95@.                                                A
032A  F0A2        IF  GC2  SKIP.                TEST  15  INCH  FLAG          A
032B  E0FF        LIT  = @FF@.
032C  F038        A2  = LIT.                    A2  = CARR  POS  RT  DATA  WD.
              NTRCET.
032D  F0EA        MIR  = LIT.
032E  E004        LIT  = @04@.
032F  F099        DW1.                              ENABLE  PRINTER
0330  F05F        B.
0331  F0DB        MIR  = A1.
0332  F0FC        WHEN SRQ  STEP.
0333  F098        DW2.                          PRINT  E  IN  PLACE
0334  F0EA        MIR  = LIT.
0335  E010        LIT  = @10@.
0336  F0FC        WHEN SRQ  STEP.
0337  F099        DW1.                          ENABLE  CARRIER
0338  F05F        B.
0339  F0DD        MIR  = A2.
033A  F0FC        WHEN SRQ  STEP.
033B  F098        DW2.                          POSITION  CARRIER  RIGHT
033C  F02B        A2  = A2  -  1.
033D  F04B        A3  = A3  -  1.
033E  E004        LIT  = @04@.
033F  F0EA        MIR  = LIT.
0340  F0F5        SAVE.
0341  F1AE        IF  NOT  URQ  SKIP.
0342  8458        CPCR  = CARERR2  -  1.
0343  F1AD        IF  NOT  SRQ  SKIP.
0344  F0F7        SKIP.
0345  F0C9        JUMP.
0346  F099        DW1.                              ENABLE  PRINTER
0347  F05F        B.
0348  F0DB        MIR  = A1.
0349  F0FC        WHEN SRQ  STEP.
034A  F098        DW2.                          PRINT  E  IN  PLACE
034B  F022        A2  EQV  B000.
034C  F0B5        IF  NOT  ABT  SKIP.
034D  4362        MPCR  = ENDEXHTST  -  1.
034E  F0EA        MIR  = LIT.
034F  E010        LIT  = @10@.
0350  F0FC        WHEN SRQ  STEP.
0351  F099        DW1.                          ENABLE  CARRIER
0352  F05F        B.
0353  F0DE        MIR  = A3.
0354  F0FC        WHEN SRQ  STEP.
0355  F098        DW2.                          CARRIER  POSITION  LEFT
0356  F02B        A2  = A2  -  1.
0357  F04B        A3  = A3  -  1.
0358  E004        LIT  = @04@.
0359  F0EA        MIR  = LIT.
035A  F0F5        SAVE.
035B  F1AE        IF  NOT  URQ  SKIP.
035C  8455        CPCR  = CARERR1  -  1.
035D  F1AD        IF  NOT  SRQ  SKIP.
035E  F0F7        SKIP.
035F  F0C9        JUMP.
0360  F022        A2  EQV  B000.
0361  F09D        IF  ABT  SKIP.
0362  432C        MPCR  = NTRCET  -  1.
              ENDEXHTST.
0363  F0EA        MIR  = LIT.
0364  E010        LIT  = @10@.
0365  F099        DW1.                              ENABLE  CARRIER
0366  F05F        B.                                                          A
0367  E04B        LIT  = @4B@.                                                A
0368  F0A2        IF  GC2  SKIP.                TEST  15  INCH  FLAG          A
0369  E080        LIT  = @80@.
036A  F0E0        MIR  = A3  OR  LIT.
036B  F0FC        WHEN SRQ  STEP.
036C  F098        DW2.                          CARR  128  POSITIONS
036D  F0F5        SAVE.
036E  F1AE        IF  NOT  URQ  SKIP.
036F  8455        CPCR  = CARERR1  -  1.
0370  F1AD        IF  NOT  SRQ  SKIP.
0371  F0F7        SKIP.
0372  F0C9        JUMP.
0373  F018        SET  LC1.
0374  F0EA        MIR  = LIT.
0375  E008        LIT  = @08@.
0376  F099        DW1.                              ENABLE  FORMS
0377  E03F        LIT  = @3F@.
0378  F0CA        LCTR.
0379  F0F5        SAVE.
037A  F0EF        MIR  = Z.
037B  E050        LIT  = @50@.
037C  F0FC        WHEN SRQ  STEP.
037D  F098        DW2.                          ADVANCE  BOTH  PLATENS
037E  F0A6        IF  LC1  JUMP.
037F  F000        WAIT.                             OBSERVE  PRINTOUT
              **********IF  PRINTOUT  IS  NORMAL AND CARRIER
              **********OPERATION  IS  NORMAL FORCE  STEP
              **********SEE  FIGURE  3.
              **********IF  DISAGREE  = ERROR # E 38
0380  446A        MPCR  = TSELR  -  1.
              TLTROTTST.
0381  D800        SAR  = 8.
0382  F0EA        MIR  = LIT.
0383  E010        LIT  = @10@.
0384  F099        DW1.                              ENABLE  CARRIER
0385  F0EE        MIR  = LIT  L.
0386  E003        LIT  = @03@.
0387  F0FC        WHEN SRQ  STEP.
0388  F098        DW2.                          INITIALIZE  LEFT
0389  F0EA        MIR  = LIT.
038A  E004        LIT  = @04@.
038B  F0FC        WHEN SRQ  STEP.
038C  F099        DW1.                          ENABLE  PRINTER
038D  F0CA        LCTR.
038E  E0B6        LIT  = @B6@.
038F  F115        A1  = Z.                      A1  = UR  MOST  BLACK  RIGHT
0390  E060        LIT  = @60@.
0391  F128        A2  = Z.                      A2  = LL  MOST  BLACK  RIGHT
0392  E05F        LIT  = @5F@.
0393  F05A        A3  = Z.                      A3  = LR  MOST  BLACK  RIGHT
0394  E078        LIT  = @78@.
0395  F08A        B  = Z.                       B  = UL  MOST  BLACK  RIGHT
0396  E02F        LIT  = @2F@.
0397  F0CA        LCTR.
0398  E0BE        LIT  = @BE@.
0399  F0EF        MIR  = Z.
039A  E060        LIT  = @60@.
039B  F0FC        WHEN SRQ  STEP.
039C  F098        DW2.                          PRINT  UR  MOST  BLCK  IN  PLACE
039D  F05F        B.                                                          A
039E  E024        LIT  = @24@.                                                A
039F  F0A2        IF  GC2  SKIP.                TEST  15  INCH  FLAG          A
03A0  E03F        LIT  = @3F@.
03A1  F0CA        LCTR.
03A2  F018        SET  LC1.
03A3  43A6        MPCR  = NTRWCTR  -  1.
```

```
                PRTWCTR.
03A4  F0DB          MIR = A1.
03A5  F0FC          WHEN SRQ STEP.
03A6  F098          DW2.                        PRINT UPPER RIGHT MOST CHAR
                NTRWCTR.
03A7  F05F          B.
03A8  F0DD          MIR = A2.
03A9  F0FC          WHEN SRQ STEP.
03AA  F098          DW2.                        PRINT LOWER LEFT MOST CHAR
03AB  F05F          B.
03AC  F0DE          MIR = A3.
03AD  F0FC          WHEN SRQ STEP.
03AE  F098          DW2.                        PRINT LOWER RIGHT MOST CHAR
03AF  F05F          B.
03B0  F0E1          MIR = B.
03B1  F0FC          WHEN SRQ STEP.
03B2  F098          DW2.                        PRINT UPPER LEFT MOST CHAR
03B3  F030          INC.
03B4  F02E          IF COV SKIP.
03B5  43A3          MPCR = PRTWCTR - 1.
03B6  F014          IF LC1 SKIP.
03B7  43D3          MPCR = ENDWCTR - 1.
03B8  F0CA          LCTR.
03B9  E0B8          LIT = @B8@.
03BA  F115          A1 = Z.                     A1 = UL MOST RED LEFT
03BB  E02F          LIT = @2F@.
03BC  F128          A2 = Z.                     A2 = LR MOST RED LEFT
03BD  E078          LIT = @78@.
03BE  F05A          A3 = Z.                     A3 = LL MOST RED LEFT
03BF  E05F          LIT = @5F@.
03C0  F08A          B = Z.                      B = UR MOST RED LEFT
03C1  E060          LIT = @60@.
03C2  F0EE          MIR = LIT L.
03C3  C842          SAR = 8 LIT = @42@.
03C4  F0FC          WHEN SRQ STEP.
03C5  F098          DW2.                        SET RED RIBBON
03C6  F05F          B.
03C7  F0CA          LCTR.
03C8  E0BC          LIT = @BC@.
03C9  F0EF          MIR = Z.
03CA  E02F          LIT = @2F@.
03CB  F0FC          WHEN SRQ STEP.
03CC  F098          DW2.                        PRINT UL MOST RED IN PLACE
03CD  F05F          B.                                                          A
03CE  E024          LIT = @24@.                                                 A
03CF  F0A2          IF GC2 SKIP.                TEST 15 INCH FLAG               A
03D0  E03F          LIT = @3F@.
03D1  F0CA          LCTR.
03D2  F05F          B.
03D3  83A6          CPCR = NTRWCTR - 1.
                ENDWCTR.
03D4  F0EA          MIR = LIT.
03D5  E008          LIT = @08@.
03D6  F0FC          WHEN SRQ STEP.
03D7  F099          DW1.                        ENABLE FORMS
03D8  F0CA          LCTR.
03D9  E03F          LIT = @3F@.
03DA  F0EF          MIR = Z.
03DB  E050          LIT = @50@.
03DC  F0FC          WHEN SRQ STEP.
03DD  F098          DW2.                        ADVANCE BOTH PLATENS
03DE  F000          WAIT.                             OBSERVE PRINTOUT
            **********IF       PRINTOUT IS NORMAL FORCE STEP
            **********SEE        FIGURE 5.
            **********IF       DISAGREE = ERROR # E 43
03DF  446A          MPCR = TSELR - 1.
                PWROFF.
03E0  F0EA          MIR = LIT.
03E1  E008          LIT = @08@.
03E2  F099          DW1.                              ENABLE FORMS
03E3  F0CA          LCTR.
```

```
03E4  E03F          LIT = @3F@.
03E5  F0EF          MIR = Z.
03E6  E002          LIT = @02@.
03E7  F0FC          WHEN SRQ STEP.
03E8  F098          DW2.                        POWER OFF
03E9  F000          WAIT.                             PWR OFF NOT EXECUTED
            **********ERROR       # E 46
                PRTALCHAR.                      PRINT ALL CHARTRS ROUTINE
03EA  F019          SET LC2.
03EB  F018          SET LC1.
                NTRPAC.                         ENTER PRINT ALL CHAR ROUTIN
03EC  F0EA          MIR = LIT.
03ED  E008          LIT = @08@.
03EE  F099          DW1.                              ENABLE FORMS
03EF  F0CA          LCTR.
03F0  E03F          LIT = @3F@.
03F1  F0EF          MIR = Z.
03F2  E050          LIT = @50@.
03F3  F0FC          WHEN SRQ STEP.
03F4  F098          DW2.                        ADVANCE BOTH PLATENS
03F5  F0EA          MIR = LIT.
03F6  E004          LIT = @04@.
03F7  F0FC          WHEN SRQ STEP.
03F8  F099          DW1.                        ENABLE PRINTER
03F9  E0B6          LIT = @B6@.                 CTR = PRINT RIGHT BLACK
03FA  F0C0          IF NOT LC2 SKIP.
03FB  4404          MPCR = PACSTS - 1.
03FC  C842          SAR = 8 LIT = @42@.
03FD  F0EE          MIR = LIT L.
03FE  F0FC          WHEN SRQ STEP.
03FF  F098          DW2.                        SET RED RIBBON
0400  F05F          B.
0401  F0FC          WHEN SRQ STEP.              COUNT 1 DINT
0402  F098          DW2.
0403  F05F          B.
0404  E0B8          LIT = @B8@.                 CTR = PRINT LEFT RED
                PACSTS.
0405  F0CA          LCTR.
0406  F115          A1 = Z.                     A1 = START SET 1.
0407  E030          LIT = @30@.
0408  F08A          B = Z.                      B = END SET 1.
0409  E03A          LIT = @3A@.
040A  841C          CPCR = LOOPRI - 1.                                          A
040B  F115          A1 = Z.                     A1 = START SET 2.               A
040C  E041          LIT = @41@.                                                 A
040D  F08A          B = Z.                      B = END SET 2.
040E  E080          LIT = @80@.
040F  841C          CPCR = LOOPRI - 1.
0410  F115          A1 = Z.                     A1 = START SET 3.
0411  E020          LIT = @20@.
0412  F08A          B = Z.                      B = END SET 3.
0413  E030          LIT = @30@.
0414  841C          CPCR = LOOPRI - 1.
0415  F115          A1 = Z.                     A1 = START SET 4.
0416  E03A          LIT = @3A@.
0417  F08A          B = Z.                      B = END SET 4.
0418  E041          LIT = @41@.
0419  841C          CPCR = LOOPRI - 1.
041A  F014          IF LC1 SKIP.
041B  4424          MPCR = ENDPAC - 1.
041C  43EB          MPCR = NTRPAC - 1.
                LOOPRI.
041D  F0DB          MIR = A1.
041E  F0FC          WHEN SRQ STEP.
041F  F098          DW2.                        PRINT NEXT CHAR FROM A1
0420  F012          A1 = A1 + 1.
0421  F003          A1 EQV B.
0422  F09D          IF ABT SKIP.
0423  441C          MPCR = LOOPRI - 1.
0424  F0C9          JUMP.
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                ENDPAC.
0425  F0EA            MIR  =  LIT.
0426  E008            LIT  =  @08@.
0427  F0FC            WHEN SRQ  STEP.
0428  F099            DW1.                          ENABLE  FORMS
0429  F0CA            LCTR.
042A  E03F            LIT  =  @3F@.
042B  F0EF            MIR  =  Z.
042C  E050            LIT  =  @50@.
042D  F0FC            WHEN SRQ  STEP.
042E  F098            DW2.                          ADVANCE  BOTH  PLATENS
042F  F000            WAIT.                                  OBSERVE  PRINTOUT
                ************IF          PRINTOUT  IS  NORMAL FORCE  STEP
                ************SEE           FIGURE  6.
                ************IF          DISAGREE  =  ERROR  #  E  41
0430  446A            MPCR  =  TSELR  -  1.
                OVSPTST.
0431  F0EA            MIR  =  LIT.
0432  E010            LIT  =  @10@.
0433  F099            DW1.
0434  F0EE            MIR  =  LIT  L.
0435  C801            SAR  =  8  LIT  =  1.
0436  F0FC            WHEN SRQ  STEP.
0437  F098            DW2.
0438  F05F            B.
0439  F1AD            IF  NOT  SRQ  SKIP.
043A  443E            MPCR  =  OVSPA  -  1.
043B  F000            WAIT.
                *********CARRIER        DINT  RESET  WITH  ZERO  SPACE  DATA  WORD
                *********ERROR       #  E  47
043C  F096            DR1  BEX.
043D  F0E1            MIR  =  B.
043E  F000            WAIT.
                OVSPA.
043F  F000            WAIT.
                *********INSTALL         A  JUMPER  FROM  BACKPLANE  PIN  PADN9Y
                *********TO        GROUND AND FORCE  STEP  -  FST
0440  F0EA            MIR  =  LIT.
0441  E00F            LIT  =  @0F@.
0442  F098            DW2.
0443  F0FD            WHEN URQ  STEP.
                *********STINT         NOT  SET  FOR  OVERSPEED
                *********ERROR       #  E  48
0444  F096            DR1  BEX.
0445  F0CA            LCTR.
0446  E07F            LIT  =  @7F@.
0447  F0FE            Z  EQV  B.
0448  E082            LIT  =  @82@.
0449  F0B5            IF  NOT  ABT  SKIP.
044A  444C            MPCR  =  OVSPA1  -  1.
044B  F0E1            MIR  =  B.
044C  F000            WAIT.
                *********OVERSPEED         STATUS  FAILURE
                *********ERROR       #  E  49
                OVSPA1.
044D  F1AE            IF  NOT  URQ  SKIP.
044E  F000            WAIT.
                *********STINT         FAILED  TO  RESET
                *********ERROR       #  E  45
044F  F0EE            MIR  =  LIT  L.
0450  E003            LIT  =  3.
0451  F098            DW2.
0452  F05F            B.
0453  F0FC            WHEN SRQ  STEP.
0454  F000            WAIT.
                *********REMOVE       JUMPER  AND FORCE  STEP  -  FST
0455  446A            MPCR  =  TSELR  -  1.
                CARERR1.
0456  F096            DR1  BEX.
0457  F0E1            MIR  =  B.
0458  F000            WAIT.                         STINT  DETECTED  WHILE
                *                                   POSITIONING  LEFT
                ************ERROR         #  E  42
                CARERR2.
0459  F096            DR1  BEX.
045A  F0E1            MIR  =  B.
045B  F000            WAIT.
                *                                   STINT  DETECTED  WHILE
                *                                   POSITIONING  RIGHT
                ************ERROR         #  E62
                CARERR3.
045C  F096            DR1  BEX.
045D  F0E1            MIR  =  B.
045E  F000            WAIT.
                ************STINT         DETECTED  INITIALIZING  RIGHT
                ************ERROR         #  50
                BUSSB.
045F  F0F9            WHEN RDC  BEX.
0460  F0FF            0  EQV  B.
0461  F09C            IF  ABT  JUMP.
0462  F0E1            MIR  =  B.
0463  F000            WAIT.
                ************EXT         BUSS  FAILURE  OR  PARITY  ERROR
                ************ERROR         #  E  1
0464  F0DA            MIR  =  AMPCR.
0465  F000            WAIT.
                BUSSC.
0466  F0F9            WHEN RDC  BEX.
0467  F0FF            0  EQV  B.
0468  F09C            IF  ABT  JUMP.
0469  F0E1            MIR  =  B.
046A  F000            WAIT.
                ************EXTERNAL          BUSS  FAILURE
                ************ERROR         #  E  67
                TSELR.                                TEST  SELECT  ROUTINE
046B  F096            DR1  BEX.
046C  F006            SET  GC1.
046D  F0EA            MIR  =  LIT.
046E  E008            LIT  =  @08@.
046F  F099            DW1.                          ENABLE  FORMS
0470  F0CA            LCTR.
0471  E03F            LIT  =  @3F@.
0472  F0EF            MIR  =  Z.
0473  E004            LIT  =  @04@.
0474  F0FC            WHEN SRQ  STEP.
0475  F098            DW2.                          CLOSE  PLATENS
0476  F0CA            LCTR.
0477  E07E            LIT  =  @7E@.
0478  F0EF            MIR  =  Z.
0479  E008            LIT  =  @08@.
047A  F098            DW2.                          LIGHT  NUMERIC  IND
047B  F0EA            MIR  =  LIT.
047C  E002            LIT  =  @02@.
047D  F099            DW1.                          ENABLE  KEYBOARD
047E  F038            A2  =  LIT.
047F  E02D            LIT  =  @2D@.                 LIMIT
0480  F0FC            WHEN SRQ  STEP.
                ************IF          NUMERIC  INDICATOR  IS  ON PERFORM                A
                ************TESTS          6  THRU  10  IN  ORDER OR SEE  NOTE  BELOW
                ************1.          PRESS  NUMERIC  1  -  FORMS  TEST
                ************2.          PRESS  NUMERIC  2  -  CARRIER  TEST
                ************3.          PRESS  NUMERIC  3  -  PLATEN  ADVANCE  TEST
                ************4.          PRESS  NUMERIC  4  -  PRTR  ESCAPE  TEST
                ************5.          PRESS  NUMERIC  5  -  KEYBOARD  TEST
                ************6.          PRESS  NUMERIC  6  -  CARRIER  EXH.  TEST
                ************7.          PRESS  NUMERIC  7  -  TILT  -  ROTATE  TEST
                ************8.          PRESS  NUMERIC  8  -  PRINT  ALL  CHARACTERS
                ************9.          PRESS  NUMERIC  9  -  OVERSPEED  TEST
                ************10.          PRESS  NUMERIC  C  -  POWER  OFF  TEST
                ************NUMERIC          0  WILL  RETURN  TO  START
                ************DIAGNOSIS          CAN  BE  DONE  ONLY  IF  THE  TESTS
                ************ARE          PERFORMED  IN  ORDER,  HOWEVER  THEY  MAY
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                ************BE          EXECUTED IN ANY ORDER OR REPEATED
                ************NUMERIC          KEY 00 AND 000 ARE FOR DEBUG USE
                ************ONLY.
                ************KEY          00 EXECUTES AN AA 55 DATA PATTERN TO
                ************THE          PRINTER DECODER WITH NO PRINT OR
                ************ESCAPE           BITS SET.
                ************KEY          000 EXECUTES SAME AA 55 DATA PATTERN
                ************BUT          WITH THE PRINT BIT SET AND NO ESCAPE
                ************BIT          SET.
0481  F097          DR2 BEX.                        READ KBD DATA
0482  F017          A1 = B.
0483  F0CA          LCTR.
0484  E07E          LIT = @7E@.
0485  F0EF          MIR = Z.
0486  E000          LIT = @00@.
0487  F098          DW2.                                TURN OUT NUM IND
0488  F05F          B.
0489  E020          LIT = @20@.
048A  F089          B = LIT.
048B  F0F5          SAVE.
048C  F003          A1 EQV B.
048D  F0B5          IF NOT ABT SKIP.
048E  44AC          MPCR = NTRTSR - 1.
048F  F116          A2 EQV B.
0490  F0B5          IF NOT ABT SKIP.
0491  4493          MPCR = TSERROR - 1.
0492  F07E          B = B + 1.
0493  F0C9          JUMP.
              TSERROR.                                  TEST SELECT ERROR
0494  F0EA          MIR = LIT.
0495  E008          LIT = @08@.
0496  F099          DW1.                                ENABLE FORMS
0497  F0CA          LCTR.
0498  E03F          LIT = @3F@.
0499  F0EF          MIR = Z.
049A  E001          LIT = @01@.
049B  F0FC          WHEN SRQ STEP.
049C  F098          DW2.                            SOUND ALARM
049D  F05F          B.
049E  446A          MPCR = TSELR - 1.
              TESTSEL.
049F  44B7          MPCR = RESTART - 1.                 NUM KEY 0
04A0  40EE          MPCR = ENABFMS - 1.                 NUM KEY 1
04A1  412E          MPCR = CARRTST - 1.                 NUM KEY 2
04A2  41BD          MPCR = PLATADV - 1.                 NUM KEY 3
04A3  423D          MPCR = PRTESCTST - 1.               NUM KEY 4
04A4  4291          MPCR = KBDTST - 1.                  NUM KEY 5
04A5  431C          MPCR = CAREXHTST - 1.               NUM KEY 6
04A6  4380          MPCR = TLTROTTST - 1.               NUM KEY 7
04A7  43E9          MPCR = PRTALCHAR - 1.               NUM KEY 8
04A8  4430          MPCR = OVSPTST - 1.                 NUM KEY 9
04A9  44C0          MPCR = PRTEXC - 1.                  NUM KEY 00
04AA  44BD          MPCR = PRTEXCA - 1.                 NUM KEY 000
04AB  43DF          MPCR = PWROFF - 1.                  NUM KEY C
04AC  458E          MPCR = INDSH - 1.                   NUM KEY RE
              NTRTSR.
04AD  049E          AMPCR = TESTSEL - 1.
04AE  F007          A1 = AMPCR.
04AF  F123          A2 = B C.
04B0  D400          SAR = 4.
04B1  F069          B = A2 R.
04B2  DC00          SAR = 12.
04B3  F010          A1 = A1 + B.
04B4  F05F          B.
04B5  F05C          AMPCR = A1.
04B6  F05F          B.
04B7  F0C9          JUMP.
              RESTART.
04B8  D800          SAR = 8.
04B9  F16C          BR1 = LIT L.
04BA  E08F          LIT = @8F@.
04BB  F099          DW1.                                DESELECT CONSOLE
04BC  F05F          B.
04BD  7FFF          MPCR = START - 1.
              PRTEXCA.
04BE  F089          B = LIT.
04BF  C841          SAR = 8 LIT = @41@.
04C0  44C2          MPCR = LOOPF - 1.
              PRTEXC.
04C1  F089          B = LIT.
04C2  C840          SAR = 8 LIT = @40@.
              LOOPF.
04C3  F052          A3 = B L.
04C4  F0EA          MIR = LIT.
04C5  E004          LIT = @04@.
04C6  F099          DW1.
04C7  F0F5          SAVE.
04C8  F0E0          MIR = A3 OR LIT.
04C9  E075          LIT = @75@.
04CA  F0FC          WHEN SRQ STEP.
04CB  F098          DW2.
04CC  F0E0          MIR = A3 OR LIT.
04CD  E04A          LIT = @4A@.
04CE  F0FC          WHEN SRQ STEP.
04CF  F098          DW2.
04D0  F0E0          MIR = A3 OR LIT.
04D1  E075          LIT = @75@.
04D2  F0FC          WHEN SRQ STEP.
04D3  F098          DW2.
04D4  F0E0          MIR = A3 OR LIT.
04D5  E02A          LIT = @2A@.
04D6  F0FC          WHEN SRQ STEP.
04D7  F098          DW2.
04D8  F0E0          MIR = A3 OR LIT.
04D9  E07D          LIT = @7D@.
04DA  F0FC          WHEN SRQ STEP.
04DB  F098          DW2.
04DC  F0E0          MIR = A3 OR LIT.
04DD  E042          LIT = @42@.
04DE  F0FC          WHEN SRQ STEP.
04DF  F098          DW2.
04E0  F0C9          JUMP.
              ENDTBL1.
04E1  E045          LIT = @45@.                         E
04E2  E04E          LIT = @4E@.                         N
04E3  E044          LIT = @44@.                         D
04E4  E000          LIT = @00@.                         SP
04E5  E000          LIT = @00@.                         SP
04E6  E032          LIT = @32@.                         2
04E7  E034          LIT = @34@.                   4
04E8  E000          LIT = @00@.                         SP
04E9  E050          LIT = @50@.                         P
04EA  E04B          LIT = @4B@.                         K
04EB  E000          LIT = @00@.                         SP
04EC  E04B          LIT = @4B@.                         K
04ED  E045          LIT = @45@.                         E
04EE  E059          LIT = @59@.                         Y
04EF  E053          LIT = @53@.                         S
              ENDTBL2.
04F0  E045          LIT = @45@.                         E
04F1  E04E          LIT = @4E@.                         N
04F2  E044          LIT = @44@.                         D
04F3  E000          LIT = @00@.                         SP
04F4  E000          LIT = @00@.                         SP
04F5  E031          LIT = @31@.                         1
04F6  E036          LIT = @36@.                         6
04F7  E000          LIT = @00@.                         SP
04F8  E050          LIT = @50@.                         P
04F9  E04B          LIT = @4B@.                         K
04FA  E000          LIT = @00@.                         SP
04FB  E04B          LIT = @4B@.                         K
04FC  E045          LIT = @45@.                         E
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04FD  E059        LIT  = @59@.     Y
04FE  E053        LIT  = @53@.     S
              KBDTBL.              KEYBOARD  TABLE
04FF  E070        LIT  = @70@.     PK1
0500  E071        LIT  = @71@.     PK2
0501  E072        LIT  = @72@.     PK3
0502  E073        LIT  = @73@.     PK4
0503  E074        LIT  = @74@.     PK5
0504  E075        LIT  = @75@.     PK6
0505  E076        LIT  = @76@.     PK7
0506  E077        LIT  = @77@.     PK8
0507  E078        LIT  = @78@.     PK9
0508  E079        LIT  = @79@.     PK10
0509  E07A        LIT  = @7A@.     PK11
050A  E07B        LIT  = @7B@.     PK12
050B  E07C        LIT  = @7C@.     PK13
050C  E07D        LIT  = @7D@.     PK14
050D  E07E        LIT  = @7E@.     PK15
050E  E07F        LIT  = @7F@.     PK16
050F  E06C        LIT  = @6C@.     PK17
0510  E060        LIT  = @60@.     PK18
0511  E061        LIT  = @61@.     PK19
0512  E062        LIT  = @62@.     PK20
0513  E063        LIT  = @63@.     PK21
0514  E06D        LIT  = @6D@.     PK22
0515  E06E        LIT  = @6E@.     PK23
0516  E06F        LIT  = @6F@.     PK24
0517  E011        LIT  = @11@.     1
0518  E012        LIT  = @12@.     2
0519  E013        LIT  = @13@.     3
051A  E014        LIT  = @14@.     4
051B  E015        LIT  = @15@.     5
051C  E016        LIT  = @16@.     6
051D  E017        LIT  = @17@.     7
051E  E018        LIT  = @18@.     8
051F  E019        LIT  = @19@.     9
0520  E010        LIT  = @10@.     0
0521  E039        LIT  = @39@.     -
0522  E03D        LIT  = @3D@.     /
0523  E01E        LIT  = @1E@.     OPEN - CLOSE  PLATEN
0524  E01C        LIT  = @1C@.     BACKWARD  ARROW
0525  E041        LIT  = @41@.     Q
0526  E047        LIT  = @47@.     W
0527  E055        LIT  = @55@.     E
0528  E042        LIT  = @42@.     R
0529  E044        LIT  = @44@.     T
052A  E049        LIT  = @49@.     Y
052B  E045        LIT  = @45@.     U
052C  E059        LIT  = @59@.     I
052D  E05F        LIT  = @5F@.     O
052E  E040        LIT  = @40@.     P
052F  E03F        LIT  = @3F@.     TILDA
0530  E01D        LIT  = @1D@.     LEFT  PLAT  ADV
0531  E035        LIT  = @35@.     OCK  I
0532  E051        LIT  = @51@.     A
0533  E043        LIT  = @43@.     S
0534  E054        LIT  = @54@.     D
0535  E056        LIT  = @56@.     F
0536  E057        LIT  = @57@.     G
0537  E058        LIT  = @58@.     H
0538  E05A        LIT  = @5A@.     J
0539  E05B        LIT  = @5B@.     K
053A  E05C        LIT  = @5C@.
053B  E038        LIT  = @38@.     ;
053C  E03C        LIT  = @3C@.     :
053D  E036        LIT  = @36@.     OCK  II
053E  E04A        LIT  = @4A@.     Z
053F  E048        LIT  = @48@.     X
0540  E053        LIT  = @53@.     C
0541  E046        LIT  = @46@.     V
0542  E052        LIT  = @52@.     B
0543  E05E        LIT  = @5E@.     N
0544  E05D        LIT  = @5D@.     M
0545  E03A        LIT  = @3A@.     ,
0546  E03B        LIT  = @3B@.
0547  E03E        LIT  = @3E@.     /
0548  E091        LIT  = @91@.     ;
0549  E092        LIT  = @92@.     '
054A  E093        LIT  = @93@.
054B  E094        LIT  = @94@.     $
054C  E095        LIT  = @95@.     %
054D  E096        LIT  = @96@.     &
054E  E097        LIT  = @97@.     '
054F  E098        LIT  = @98@.
              E0BD        LIT  = @BD@.
0554  E09E        LIT  = @9E@.     CLOSE  BRACKETS
0555  E09C        LIT  = @9C@.     FORWARD  ARROW
0556  E0C1        LIT  = @C1@.
0557  E0C7        LIT  = @C7@.
0558  E0D5        LIT  = @D5@.
0559  E0C2        LIT  = @C2@.
055A  E0C4        LIT  = @C4@.
055B  E0C9        LIT  = @C9@.
055C  E0C5        LIT  = @C5@.
055D  E0D9        LIT  = @D9@.
055E  E0DF        LIT  = @DF@.
055F  E0C0        LIT  = @C0@.
0560  E0BF        LIT  = @BF@.
0561  E09D        LIT  = @9D@.
0562  E0B5        LIT  = @B5@.
0563  E0D1        LIT  = @D1@.
0564  E0C3        LIT  = @C3@.
0565  E0D4        LIT  = @D4@.
0566  E0D6        LIT  = @D6@.
0567  E0D7        LIT  = @D7@.
0568  E0D8        LIT  = @D8@.
0569  E0DA        LIT  = @DA@.
056A  E0DB        LIT  = @DB@.
056B  E0DC        LIT  = @DC@.
056C  E0B8        LIT  = @B8@.
056D  E0BC        LIT  = @BC@.
056E  E0B6        LIT  = @B6@.
056F  E0CA        LIT  = @CA@.
0570  E0C8        LIT  = @C8@.
0571  E0D3        LIT  = @D3@.
0572  E0C6        LIT  = @C6@.
0573  E0D2        LIT  = @D2@.
0574  E0DE        LIT  = @DE@.
0575  E0DD        LIT  = @DD@.
0576  E0BA        LIT  = @BA@.
0577  E0BB        LIT  = @BB@.
0578  E0BE        LIT  = @BE@.
0579  E030        LIT  = @30@.
057A  E02E        LIT  = @2E@.
057B  E02C        LIT  = @2C@.
057C  E01F        LIT  = @1F@.
057D  E02F        LIT  = @2F@.
057E  E020        LIT  = @20@.
057F  E027        LIT  = @27@.
0580  E024        LIT  = @24@.
0581  E021        LIT  = @21@.
0582  E028        LIT  = @28@.
0583  E025        LIT  = @25@.
0584  E022        LIT  = @22@.
0585  E02A        LIT  = @2A@.
0586  E029        LIT  = @29@.
0587  E026        LIT  = @26@.
0588  E023        LIT  = @23@.
0589  E02B        LIT  = @2B@.
058A  E02D        LIT  = @2D@.
058B  E04D        LIT  = @4D@.
058C  E04C        LIT  = @4C@.
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058D  E04F        LIT  =  @4F@.
058E  E04E        LIT  =  @4E@.
            INDSH.
058F  F057        A3  =  LIT  L.
0590  C802        SAR  =  8  LIT  =  2.
0591  F0CA        LCTR.
0592  E060        LIT  =  @60@.
0593  F0EF        MIR  =  Z.
0594  E000        LIT  =  @00@.
0595  F098        DW2.
            AIND.
0596  C890        SAR  =  8  LIT  =  @90@.
0597  85A1        CPCR  =  SLAWR  -  1.
            BIND.
0598  C888        SAR  =  8  LIT  =  @88@.
0599  85A1        CPCR  =  SLAWR  -  1.
            CIND.
059A  C884        SAR  =  8  LIT  =  @84@.
059B  85A1        CPCR  =  SLAWR  -  1.
            DIND.
059C  C882        SAR  =  8  LIT  =  @82@.
059D  85A1        CPCR  =  SLAWR  -  1.
            SIND.
059E  C881        SAR  =  8  LIT  =  @81@.
059F  85A1        CPCR  =  SLAWR  -  1.
05A0  458E        MPCR  =  INDSH  -  1.
05A1  458E        MPCR  =  INDSH  -  1.
            SLAWR.
05A2  F1AE        IF  NOT  URQ  SKIP.
05A3  446A        MPCR  =  TSELR  -  1.
05A4  F077        B  =  B001.
05A5  F039        A2  =  LIT  L.
            SLAWRA.
05A6  F1CB        MIR  =  A2  OR  B.
05A7  F098        DW2.
05A8  F07D        B  =  B  C.
05A9  DF00        SAR  =  15.
05AA  F03C        A3  EQV  B.
05AB  F09C        IF  ABT  JUMP.
05AC  F10F        A1  =  B000.
05AD  F0CA        LCTR.
05AE  E001        LIT  =  1.
            DELAYA.
05AF  F012        A1  =  A1  +  1.
05B0  F09E        IF  AOV  SKIP.
05B1  45AE        MPCR  =  DELAYA  -  1.
05B2  F0C8        INC,  IF  COV  SKIP.
05B3  45AE        MPCR  =  DELAYA  -  1.
05B4  45A5        MPCR  =  SLAWRA  -  1.
05B5  4000        CNST  =  @4000@.
            FINISH.
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MANUAL PROCEDURES

E1	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FE MEMORY TEST INDICATED CONSOLE FAILING BUSS TEST		2	F413	A
2	PUT MTR METER ON PADM1M (CCDREAD)	METER READING 0%	3	F 10	A
3	PUT MTR METER ON PADN3F (CCENSTA)	METER READING 0%	4	F 11	A
4	SELECT EXT BUSS BIT THAT FE MTR INDICATED BAD				A
		EXT BIT 1	F 16		B
		EXT BIT 14	F 13		B
		EXT BIT 9, 10, 11, OR 12	F 14		B
		EXT BIT 13, 15, OR 16	F 12		B

E2	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON PADP4R (PSIRQ/)	METER READING 100%	F1	2	
2	PUT MTR METER ON PADP7N (DINT8/)	METER READING 100%	3	19	
3	PUT MTR METER ON PADP7P (SINT8/)	METER READING 100%	4	19	
4	PUT MTR METER ON PADP8M (DINT7/)	METER READING 100%	5	F431	C
5	PUT MTR METER ON PADP8P (SINT7/)	METER READING 100%	6	F431	C
6	PUT MTR METER ON PADP8L (DINT6/)	METER READING 100%	7	F2	
7	PUT MTR METER ON PADP7L (SINT6/)	METER READING 100%	8	F2	
8	PUT MTR METER ON PADP8N (DINT5/)	METER READING 100%	9	F3	
9	PUT MTR METER ON PADP8K (SINT5/)	METER READING 100%	10	F3	
10	PUT MTR METER ON PADP4N (DINT4/)	METER READING 100%	11	F4	
11	PUT MTR METER ON PADP4P (SINT4/)	METER READING 100%	12	F4	
12	PUT MTR METER ON PADP5M (DINT3/)	METER READING 100%	13	F5	C
13	PUT MTR METER ON PADP5P (SINT3/)	METER READING 100%	14	F5	C
14	PUT MTR METER ON PADP5L (DINT2/)	METER READING 100%	15	F6	C

15	PUT MTR METER ON PADP4L (SINT2/)	METER READING 100%	16	F6	C C C
16	PUT MTR METER ON PADP5N (DINT1/)	METER READING 100%	17	F7	C C C
17	PUT MTR METER ON PADP5K (SINT1/)	METER READING 100%	18	F7	C C C
18	REMOVE CARD PADP4 THEN PUT METER ON PADP7R (PSIRQ/)	METER READING 100%	F8	F9	
19	PRESS FORCE STEP AND GO TO E3				C C C
E3	OPERATOR ACTION	MACHINE ACTION	A	4	
1	PUT MTR METER ON PADP7N (DINT8/)	METER READING = 100%	7	2	
2	OBSERVE MIR	BIT A8 IS ON	3	F17	
3	OBSERVE MIR	BIT C1 IS ON	F18	4	
4	OBSERVE MIR	BIT C2 IS ON	F19	5	
5	OBSERVE MIR	BIT C4 IS ON	F20	6	
6	OBSERVE MIR	BIT C8 IS ON	F26	F37	
7	OBSERVE MIR	BIT D1 IS ON	F22	8	
8	OBSERVE MIR	BIT D2 IS ON	F23	9	
9	OBSERVE MIR	BIT D4 IS ON	F24	10	
10	OBSERVE MIR	BIT D8 IS ON	F25	F0	
E4	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON PADP7P (SINT8/)	METER READING = 0%	2	3	
2	PUT MTR METER ON PADP7R (PSIRQ/)	METER READING = 0%	F1	F27	
3	PUT MTR METER ON PADN3K (CIRDYSW)	METER READING = 100%	4	F28	
4	HOLD READY BUTTON IN	METER READING = 100%	F29	5	
5	PUT METER ON PADK9G (CCCS/)	METER READING = 97%	F 30	6	
6	PUT METER ON PADQ1G (SCLKC)	METER READING 3-5%	7	F407	
7	PUT METER ON PADQ1F (SCLKD)	METER READING 3-5%	F 31	F407	
E5	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT SGL/NOR TO SGL, PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL AND PRESS SGL 3 TIMES OBSERVE MIR	MIR = 0000	2	4	
2	PUT METER ON PADQ4I (EOASR/)	METER READING 0%	2A	F401	
2A	KEEP METER ON PADQ4I AND PRESS SGL 1 TIME	METER READING 100%	3	F424	A
3	PUT METER ON PADP8Y (CLEAR) AND PRESS AND HOLD SYSTEM CLEAR PUSHBUTTON	METER READING 100%	F 32	F402	
4	OBSERVE MIR	MIR B BITS = 7	5	F403	
5	OBSERVE MIR	MIR BIT D8 NOT ON	6	F 34	
6	PUT METER ON PADN6Y (STINT8/)	METER READING 0%	7	F 43	
7	PUT METER ON PADP8J (PSENST8/)	METER READING 0%	F 33	F404	
E6	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON PADN6Y (STINT8/)	METER READING 0%	F341	2	
2	PUT MTR METER ON PADP7R (PSIRQ/)	METER READING 0%	F9	F1	
E7	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON PADN6J (DINT8/)	METER READING 100%	2	F35	
2	PUT MTR METER ON PADN0V (CCDINT)	METER READING 100%	F36	3	
3	PUT MTR METER ON PADK9D (CCEKDI/)	METER READING 0%	F37	4	
4	PUT MTR METER ON PADM4I (CCKBSTA)	METER READING 95%	5	F38	
5	PUT MTR METER ON PADK8G (CCKBST)	METER READING 95%	6	F39	
6	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 5 PLUS 1% INCREASE	7	F40	
7	PUT MTR METER ON PADK9B MEMORY LOADER SWITCH ON	METER READING 40%	F41	F42	
E8	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR BIT A8 NOT SET	F43	2	
2	OBSERVE MIR	MIR BIT C1 NOT SET	F44	F45	
E9	OPERATOR ACTION	MACHIME ACTION			
1	PUT MTR METER ON PADN2E (CCKSTA/)	METER READING 100%	2	F46	
2	PUT MTR METER ON PADM9C (CCKST/) PRESS MEMORY LOADER SWITCH ON	METER READING 60%	F47	F48	
E10	OBSERVE MIR	MIR BIT D4 NOT SET	F49	F50	

E11	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE INDICATORS	LAMP A1 ON	2	4
2	PUT MTR METER ON PADL2D (CCI01/)	METER READING 100%	F51	3
3	OBSERVE INDICATORS	LAMPS A1, B1, C1, D1, ON	F52	F53
4	OBSERVE INDICATORS	LAMP A2 ON	5	7
5	PUT MTR METER ON PADL1D (CCI02/)	METER READING 100%	F54	6
6	OBSERVE INDICATORS	LAMPS A2, B2, C2, D2 ON	F55	F56
7	OBSERVE INDICATORS	LAMP A3 ON	8	10
8	PUT MTR METER ON PADL1F (CCI03/)	METER READING 100%	F57	9
9	OBSERVE INDICATORS	LAMPS A3, B3, C3, D3 ON	F58	F59
10	OBSERVE INDICATORS	LAMP A4 ON	11	13
11	PUT MTR METER ON PADL1E (CCI04/)	METER READING 100%	F60	12
12	OBSERVE INDICATORS	LAMPS A4, B4, C4, D4 ON	F61	F62
13	OBSERVE INDICATORS	LAMP A5 ON	14	16
14	PUT MTR METER ON PADK8F (CCI05/)	METER READING 100%	F63	15
15	OBSERVE INDICATORS	LAMPS A5, B5, C5, D5 ON	F64	F65
16	OBSERVE INDICATORS	LAMP A6 ON	17	19
17	PUT MTR METER ON PADK9E (CCI06/)	METER READING 100%	F66	18
18	OBSERVE INDICATORS	LAMPS A6, B6, C6, D6 ON	F67	F68
19	OBSERVE INDICATORS	LAMP A7 ON	20	22
20	PUT MTR METER ON PADK8E (CCI07/)	METER READING 100%	F69	21
21	OBSERVE INDICATORS	LAMPS A7, B7, C7, D7 ON	F70	F71
22	OBSERVE INDICATORS	LAMP A8 ON	23	25
23	PUT MTR METER ON PADK9F (CCI08/)	METER READING 100%	F72	24
24	OBSERVE INDICATORS	LAMPS A8, B8, C8, D8 ON	F73	F74
25	OBSERVE INDICATORS	LAMP B1 ON	26	27
26	PUT MTR METER ON PADL2K (CCI09/)	METER READING 100%	F75	F76
27	OBSERVE INDICATORS	LAMP B2 ON	28	29
28	PUT MTR METER ON PADL1K (CCI10/)	METER READING 100%	F77	F76
29	OBSERVE INDICATORS	LAMP B3 ON	30	31
30	PUT MTR METER ON PADL1L (CCI11/)	METER READING 100%	F78	F76
31	OBSERVE INDICATORS	LAMP B4 ON	32	33
32	PUT MTR METER ON PADL1J (CCI12/)	METER READING 100%	F79	F76
33	OBSERVE INDICATORS	LAMP B5 ON	34	35
34	PUT MTR METER ON PADK8J (CCI131)	METER READING 100%	F80	F81
35	OBSERVE INDICATORS	LAMP B6 ON	36	37
36	PUT MTR METER ON PADK9K (CCI141)	METER READING 100%	F82	F81
37	OBSERVE INDICATORS	LAMP B7 ON	38	39
38	PUT MTR METER ON PADK8N (CCI151)	METER READING 100%	F83	F81
39	OBSERVE INDICATORS	LAMP B8 ON	40	41
40	PUT MTR METER ON PADK9J (CCI161)	METER READING 100%	F84	F81
41	OBSERVE INDICATORS	LAMP C1 ON	42	43
42	PUT MTR METER ON PADL1P (CCI171)	METER READING 100%	F85	F86
43	OBSERVE INDICATORS	LAMP C2 ON	44	45
44	PUT MTR METER ON PADL2P (CCI181)	METER READING 100%	F87	F86
45	OBSERVE INDICATORS	LAMP C3 ON	46	47
46	PUT MTR METER ON PADL2Q (CCI191)	METER READING 100%	F88	F86
47	OBSERVE INDICATORS	LAMP C4 ON	48	49
48	PUT MTR METER ON PADL1N (CCI201)	METER READING 100%	F89	F86
49	OBSERVE INDICATORS	LAMP C5 ON	50	51
50	PUT MTR METER ON PADK9Q (CCI21/)	METER READING 100%	F90	F91
51	OBSERVE INDICATORS	LAMP C6 ON	52	53
52	PUT MTR METER ON PADK8Q (CCI22/)	METER READING 100%	F92	F93
53	OBSERVE INDICATORS	LAMP C7 ON	54	55
54	PUT MTR METER ON PADK9R (CCI23/)	METER READING 100%	F94	F95
55	OBSERVE INDICATORS	LAMP C8 ON	56	57
56	PUT MTR METER ON PADK9U (CCI24/)	METER READING 100%	F96	F97
57	OBSERVE INDICATORS	LAMP D1 ON	58	59
58	PUT MTR METER ON PADL1T (CCI251)	METER READING 100%	F98	F99

59	OBSERVE INDICATORS	LAMP D2 ON		60	61
60	PUT MTR METER ON PADL2T (CCI261)	METER READING	100%	F100	F101
61	OBSERVE INDICATORS	LAMP D3 ON		62	63
62	PUT MTR METER ON PADL2S (CCI271)	METER READING	100%	F102	F103
63	OBSERVE INDICATORS	LAMP D4 ON		64	65
64	PUT MTR METER ON PADL1U	METER READING	100%	F104	F105
65	OBSERVE INDICATORS	LAMP D5 ON		66	67
66	PUT MTR METER ON PADK8V (CCI29/)	METER READING	100%	F106	F107
67	OBSERVE INDICATORS	LAMP D6 ON		68	69
68	PUT MTR METER ON PADK8U (CCI30/)	METER READING	100%	F108	F109
69	OBSERVE INDICATORS	LAMP D7 ON		70	71
70	PUT MTR METER ON PADK9W (CCI31/)	METER READING	100%	F110	F111
71	OBSERVE INDICATORS	LAMP D8 ON		72	73
72	PUT MTR METER ON PADK9T (CCI32/)	METER READING	100%	F112	F113
73	OBSERVE INDICATORS	LAMP S1 ON		74	75
74	PUT MTR METER ON PADL2W (CCI33/)	METER READING	100%	F114	F115
75	OBSERVE INDICATORS	LAMP S2 ON		76	77
76	PUT MTR METER ON PADL1X (CCI34/)	METER READING	100%	F116	F115
77	OBSERVE INDICATORS	LAMP S4 ON		78	79
78	PUT MTR METER ON PADL2X (CCI36/)	METER READING	100%	F117	F115
79	OBSERVE INDICATORS	LAMP S3 ON		80	81
80	PUT MTR METER ON PADL2V (CCI35/)	METER READING	100%	F118	F115

E12	OPERATOR ACTION	MACHINE ACTION		A	D
1	PUT METER ON PADN6Y (STINT8/)	METER READING	0%	F384	2
2	PUT SGL/NOR SWITCH TO SGL. PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL AND PRESS SGL 3 TIMES. PUT METER ON PADP7V (PSREAD8/)	METER READING	0%	3	F405
3	PUT MTR METER ON PADP8I (PSINST2)	METER READING	0%	F119	F406

E13	OPERATOR ACTION	MACHINE ACTION		A	D
1	PUT SGL/NOR SWITCH TO SGL - PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL PRESS SGL TWICE				
2	OBSERVE INDICATORS	NONE OF A INDICATORS ON		3	5
3	PUT MTR METER ON PADK8W (PSINST2)	METER READING	0%	4	F120
4	PUT MTR METER ON PADK8P (PSWRITE8/)	METER READING	0%	F122	F121
5	OBSERVE INDICATORS	LAMPS A1 THRU A4 OFF		F123	6
6	OBSERVE INDICATORS	LAMPS A5 THRU A8 OFF		F124	7
7	OBSERVE INDICATORS	LAMP A1 OFF		8	11
8	PUT MTR METER ON PADL5U (CCIAOF/)	METER READING	0%	F125	9
9	PUT MTR METER ON PADL2D (CCI01/)	METER READING	0%	F126	10
10	PUT MTR METER ON PADL1H (CCDMIR16)	METER READING	100%	F127	F128
11	OBSERVE INDICATORS	LAMP A2 OFF		12	15
12	PUT MTR METER ON PADL5V (CCIA1F/)	METER READING	0%	F129	13
13	PUT MTR METER ON PADL1D (CCI02/)	METER READING	0%	F130	14
14	PUT MTR METER ON PADL2H (CCDMIR15)	METER READING	100%	F127	F131
15	OBSERVE INDICATORS	LAMP A3 OFF		16	19
16	PUT MTR METER ON PADL5D (CCIA2F/)	METER READING	0%	F132	17
17	PUT MTR METER ON PADL1F (CCI03/)	METER READING	0%	F133	18
18	PUT MTR METER ON PADL2M (CCDMIR14)	METER READING	100%	F127	F134
19	OBSERVE INDICATORS	LAMP A4 OFF		20	23
20	PUT MTR METER ON PADL5C (CCIA3F/)	METER READING	0%	F135	21
21	PUT MTR METER ON PADL1E (CCI04/)	METER READING	0%	F136	22
22	PUT MTR METER ON PADL2R (CCDMIR13)	METER READING	100%	F127	F134
23	OBSERVE INDICATORS	LAMP A5 OFF		24	27
24	PUT MTR METER ON PADL5B (CCIA4F/)	METER READING	0%	F137	25
25	PUT MTR METER ON PADK8F (CCI05/)	METER READING	0%	F138	26

26	PUT MTR METER ON PADK8L (CCDMIR12)	METER READING 100%	F139	F140	
27	OBSERVE INDICATORS	LAMP A6 OFF	28	31	
28	PUT MTR METER ON PADL5F (CCIA5F/)	METER READING 0%	F141	29	
29	PUT MTR METER ON PADK9E (CCI06/)	METER READING 0%	F142	30	
30	PUT MTR METER ON PADK9S (CCDMIR11)	METER READING 100%	F139	F143	
31	OBSERVE INDICATORS	LAMP A7 OFF	32	35	
32	PUT MTR METER ON PADL5F (CCIA6F/)	METER READING 0%	F144	33	
33	PUT MTR METER ON PADK8E (CCI07/)	METER READING 0%	F145	34	
34	PUT MTR METER ON PADK9L (CCDMIR10)	METER READING 100%	F139	F140	
35	OBSERVE INDICATORS	LAMP A8 OFF	36	39	
36	PUT MTR METER ON PADL5G (CCIA7F/)	METER READING 0%	F146	37	
37	PUT MTR METER ON PADK9F (CCI08/)	METER READING 0%	F147	38	
38	PUT MTR METER ON PADK8X (CCDM1R9)	METER READING 100%	F139	F143	
39	OBSERVE INDICATORS	ANY B INDICATORS ON	F391	40	
40	OBSERVE INDICATORS	ANY C INDICATORS ON	F391	41	
41	OBSERVE INDICATORS	ANY D INDICATORS ON	F392	42	
42	OBSERVE INDICATORS	ANY S INDICATORS ON	F392	2	
E14	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE INDICATORS	B INDICATORS ON = 99	F430	1A	A
1A	OBSERVE INDICATORS	ALL B INDICATORS OFF	F148	2	A
2	OBSERVE INDICATORS	LAMPS B1 THRU B4 OFF	F149	3	A
3	OBSERVE INDICATORS	LAMPS B5 THRU B8 OFF	F150	4	A
4	OBSERVE INDICATORS	LAMP B1 OFF	5	7	
5	PUT MTR METER ON PADL5M (CCIB0F/)	METER READING 0%	F151	6	
6	PUT MTR METER ON PADL2K (CCI09/)	METER READING 0%	F152	F153	
7	OBSERVE INDICATORS	LAMP B2 OFF	8	10	
8	PUT MTR METER ON PADL5L (CCIB1F/)	METER READING 0%	F154	9	
9	PUT MTR METER ON PADL1K (CCI10/)	METER READING 0%	F155	F153	
10	OBSERVE INDICATORS	LAMP B3 OFF	11	13	
11	PUT MTR METER ON PADL5H (CCIB2F/)	METER READING 0%	F156	12	
12	PUT MTR METER ON PADL1L (CCI11/)	METER READING 0%	F157	F153	
13	OBSERVE INDICATORS	LAMP B4 OFF	14	16	
14	PUT MTR METER ON PADL5I (CCIB3F/)	METER READING 0%	F158	15	
15	PUT MTR METER ON PADL1J (CCI12/)	METER READING 0%	F159	F153	
16	OBSERVE INDICATORS	LAMP B5 OFF	17	19	
17	PUT MTR METER ON PADL5Y (CCIB1F/)	METER READING 0%	F160	18	
18	PUT MTR METER ON PADK8J (CCI13/)	METER READING 0%	F161	F162	
19	OBSERVE INDICATORS	LAMP B6 OFF	20	22	
20	PUT MTR METER ON PADL5X (CCIB5F/)	METER READING 0%	F163	21	
21	PUT MTR METER ON PADK9K (CCI14/)	METER READING 0%	F164	F162	
22	3BSERVE INDICATORS	LAMP B7 OFF	23	25	
23	PUT MTR METER ON PADL5W (CCIB6F/)	METER READING 0%	F165	24	
24	PUT MTR METER ON PADK8N (CCI15/)	METER READING 0%	F166	F162	
25	OBSERVE INDICATORS	LAMP B8 OFF	26	28	
26	PUT MTR METER ON PADL5T (CCIB7F/)	METER READING 0%	F167	27	
27	PUT MTR METER ON PADK9J (CCI16/)	METER READING 0%	F168	F162	
28	OBSERVE INDICATORS	ANY A INDICATORS ON	F393	29	
29	OBSERVE INDICATORS	AMY C INDICATORS ON	F393	1	
E15	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE INDICATORS	ALL C INDICATORS OFF	F169	2	
2	OBSERVE INDICATORS	LAMPS C1 THRU C4 OFF	F170	3	
3	OBSERVE INDICATORS	LAMPS C5 THRU C8 OFF	F171	4	
4	OBSERVE INDICATORS	LAMP C1 OFF	5	7	
5	PUT MTR METER ON PADL8M (CCIC0F/)	METER READING 0%	F172	6	
6	PUT MIR METER ON PADL1P (CCI17/)	METER READING 0%	F173	F174	
7	OBSERVE INDICATORS	LAMP C2 OFF	8	10	

8	PUT MTR METER ON PADL8L (CCIC1F/)	METER READING	0%	F175	9
9	PUT MTR METER ON PADL2P (CCI18/)	METER READING	0%	F176	F174
10	OBSERVE INDICATORS	LAMP C3 OFF		11	13
11	PUT MTR METER ON PADL8H (CCIC2F/)	METER READING	0%	F177	12
12	PUT MTR METER ON PADL2Q (CCI19/)	METER READING	0%	F178	F174
13	OBSERVE INDICATORS	LAMP C4 OFF		14	16
14	PUT MTR METER ON PADL8I (CCIC3F/)	METER READING	0%	F179	15
15	PUT MTR METER ON PADL1N (CCI20/)	METER READING	0%	F180	F174
16	OBSERVE INDICATORS	LAMP C5 OFF		17	19
17	PUT MTR METER ON PADL8Y (CCIC4F/)	METER READING	0%	F181	18
18	PUT MTR METER ON PADK9Q (CCI21/)	METER READING	0%	F182	F183
19	OBSERVE INDICATORS	LAMP C6 OFF		20	22
20	PUT MTR METER ON PADL8X (CCIC5F/)	METER READING	0%	F184	21
21	PUT MTR METER ON PADK8Q (CCI22/)	METER READING	0%	F185	F183
22	OBSERVE INDICATORS	LAMP C7 OFF		23	25
23	PUT MTR METER ON PADL8W (CCIC6F/)	METER READING	0%	F186	24
24	PUT MTR METER ON PADK9R (CCI23/)	METER READING	0%	F187	F183
25	OBSERVE INDICATORS	LAMP C8 OFF		26	1
26	PUT MTR METER ON PADL8T (CCIC7F/)	METER READING	0%	F188	27
27	PUT MTR METER ON PADK9U (CCI24/)	METER READING	0%	F189	F183

E16	OPERATOR ACTION	MACHINE ACTION		A	D
1	OBSERVE INDICATORS	ALL D INDICATORS OFF		F190	2
2	OBSERVE INDICATORS	LAMPS D1 THRU D4 OFF		F191	3
3	OBSERVE INDICATORS	LAMPS D5 THRU D8 OFF		F192	4
4	OBSERVE INDICATORS	LAMP D1 OFF		5	7
5	PUT MTR METER ON PADL8U (CCID0F/)	METER READING	0%	F193	6
6	PUT MTR METER ON PADL8T (CCI25/)	METER READING	0%	F194	F195
7	OBSERVE INDICATORS	LAMP D2 OFF		8	10
8	PUT MTR METER ON PADL8V (CCID1F/)	METER READING	0%	F196	9
9	PUT MTR METER ON PADL2T (CCI26/)	METER READING	0%	F197	F195
10	OBSERVE INDICATORS (CCID2F/)	LAMP D3 OFF		11	13
11	PUT MTR METER ON 6FDU3D (CCID2F/)	METER READING	0%	F298	12
12	PUT MTR METER ON PADL2S (CCI27/)	METER READING	0%	F199	F195
13	OBSERVE INDICATORS	LAMP D4 OFF		14	16
14	PUT MTR METER ON PADL8C (CCID3F/)	METER READING	0%	F200	15
15	PUT MTR METER ON PADL1U (CCI28/)	METER READING	0%	F201	F202
16	OBSERVE INDICATORS	LAMP D5 OFF		17	19
17	PUT MTR METER ON PADL8B (CCID4F/)	METER READING	0%	F203	18
18	PUT MTR METER ON PADK8V (CCI29/)	METER READING	0%	F204	F205
19	OBSERVE INDICATORS	LAMP D6 OFF		20	22
20	PUT MTR METER ON PADL8E (CCID5F/)	METER READING	0%	F206	21
21	PUT MTR METER ON PADK8U (CCI30/)	METER READING	0%	F207	F205
22	OBSERVE INDICATORS	LAMP D7 OFF		23	25
23	PUT MTR METER ON PADL8F (CCID6F/)	METER READING	0%	F208	24
24	PUT MTR METER ON PADK9W (CCI31/)	METER READING	0%	F209	F205
25	OBSERVE INDICATORS	LAMP D8 OFF		26	1
26	PUT MTR METER ON PADL86 (CCI04T)	METER READING	0%	F210	27
27	PUT MTR METER ON PADK9W (CCI32/)	METER READING	0%	F211	F212

E17	OPERATOR ACTION	MACHINE ACTION		A	D
1	OBSERVE INDICATORS	LAMPS S1 THRU S4 OFF		F213	2
2	OBSERVE INDICATORS	LAMP S1 OFF		3	5
3	PUT MTR METER ON PADL5P (CCITYF/)	METER READING	0%	F214	4
4	PUT MTR METER ON PADL2W (CCI33/)	METER READING	0%	F215	F216
5	OBSERVE INDICATORS	LAMP S2 OFF		6	8

6	PUT MTR METER ON PADL5Q (CCIRYF/)	METER READING 0%	F217	7	
7	PUT MTR METER ON PADL1X (CCI34)	METER READING 0%	F218	F216	
8	OBSERVE INDICATORS	LAMP S3 OFF	9	11	
9	PUT MTR METER ON PADL5J (CCIERF/)	METER READING 0%	F219	10	
10	PUT MTR METER ON PADL2V (CCI35/)	METER READING 0%	F220	F216	
11	OBSERVE INDICATORS	LAMP S4 OFF	12	1	
12	PUT MTR METER ON PADL5N (CCIUNF/)	METER READING 0%	F221	13	
13	PUT MTR METER ON PADL2X (CCI36/)	METER READING 0%	F222	F216	

E18	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON PADP7Q (PSURQ/)	METER READING 0%	F223	2A	A A A A A A A
2A	PUT METER ON PADP7R (PSIRQ/)	METER READING 0%	F429	2	
2	PUT MTR METER ON PADP7P (STINT8/)	METER READING 0%	F224	F 50	

E19	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR = 0000	F225	2	A A A A A A A
2	CONTINUE MTR				

E20	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER MOVES TO RIGHT MARGIN ON POWER UP	F385	2
2	NONE	CONSOLE PRINTING IN POSITION	F386	3
3	NONE	INTERPOSER PICKING	F387	4
4	NONE	LEFT OR RIGHT PLATEN ADVANCING	F388	

E21	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADP8Q (PSSRQ/)	METER READING 0%	F223	F226

E22	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT SGL/NOR SWITCH TO SGL - PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL PRESS SGL 7 TIMES PUT MTR METER ON PADN3I (CCFRMS)	METER READING 100%	F238	F239

E23	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN3W (CCTU)	METER READING 46%	4	2
2	PUT MTR METER ON PADN0G (CICTU)	METER READING 98%	F227	3
3	PUT MTR METER ON PADM7J (CCTUA)	METER READING 96%	F228	F229
4	PUT MTR METER ON PADN0-FP4M (FM)	METER READING 100%	5	F230
5	PUT MTR METER ON PADN0-FP4T (FMEN)	METER READING 100%	8	6
6	PUT MTR METER ON PADN0F (CCPCLR)	METER READING 100%	F231	7
7	PUT MTR METER ON PADN3X (CCPR)	METER READING 0%	F232	F233
8	PUT MTR METER ON PADN2-FP3I (FDAEN)	METER READING 100%	9	F234
9	PUT MTR METER ON PADN2-FP3X (FDI/)	METER READING 0%	F235	F236

E24	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F237	2
2	OBSERVE MIR	MIR = 0000	F377	F 50

E25	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN2-FP3P (FMTU)	METER READING 46%	F240	F241

E27	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	PLATEN FAILED TO OPEN AND BELL FAILED TO RING	1A	3
1A	CHECK FUSE F9	FUSE GOOD	2	F281
2	PUT MTR METER ON PADN0-FP4U (RCLR)	METER READING 100%	F242	F243
3	OBSERVE CONSOLE	PLATEN STAYS IN OPEN POSITION	A F390	D 3A
3A	PUT IRQ/EXT SWITCH TO EXT. FORCE STEP (FST)	PLATEN FAILING TO OPEN	4	6
4	PUT MTR METER ON PADM6P (CC0PNP/)	METER READING 95%	F244	5
5	PUT MTR METER ON PADM9L (CCOPNP)	METER READING FLUCTUATES BETWEEN 95 TO 100%	F245	F246
6	OBSERVE CONSOLE	BELL NOT RINGING WHEN PLATEN OPENS	7	9
7	PUT MTR METER ON PADM3U (CCAUDAL/)	METER READING FLUCUATES BETWEEN 95 TO 100%	F247	8

8	PUT MTR METER ON PADM9N (CCAUDAL)	METER READING FLUCTUATES BETWEEN 95 TO 100%	F248	F249
9	OBSERVE CONSOLE	PLATEN NOT CLOSING	10	12
10	PUT MTR METER ON PADM6M (CCCLSP/)	METER READING FLUCTUATES BETWEEN 95 TO 100%	F250	11
11	PUT MTR METER ON PADN0L (CCCLSP)	METER READING FLUCTUATES BETWEEN 95 TO 100%	F251	F246
12	OBSERVE CONSOLE	LEFT OR RIGHT PLATEN ADVANCED	F254	13
13	OBSERVE CONSOLE	SYSTEM POWERED OFF	F255	F 50
E28	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN6F (CCCRDI/)	METER READING 0%	F235	2
2	PUT MTR METER ON PADN5C (CCCINS/)	METER READING 100%	3	F252
3	PUT MTR METER ON PADN6U (CCXCRLT/)	METER READING 100%	4	F253
4	PUT MTR METER ON PADN5N (CCXCRGR/)	METER READING 100%	F257	F256
E29	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F237	F 50
E30	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN6E (CCINIT/)	METER READING 0%	2	F258
2	PUT MTR METER ON PADN5-FPW3 (XCCLR/)	METER READING 100%	F259	F260
E31	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER MOVED TO RIGHT MARGIN	2	5
2	PUT MTR METER ON PADN9I (CCCRH/)	METER READING 100%	3	4
3	PUT MTR METER ON PADN9-FPS4 (LSLP/)	METER READING 100%	F264	F265
4	PUT MTR METER ON PADN6S (CCDEL125/)	METER READING 100%	F266	F267
5	OBSERVE CONSOLE	CARRIER DID NOT MOVE	6	1
6	PUT MTR METER ON PADN9-FPK4 (TU)	METER READING 45%	F268	F269
E32	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN3X (CCPR)	METER READING 100%	2	F283
2	PUT MTR METER ON PADN3N (CCPCLR)	METER READING 0%	3	F284
3	PUT MTR METER ON PADN2-FP3Y (PDI/)	METER READING 0%	F285	F286
E33	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F289	F289
E34	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F365	F365
E35	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	NO CHARACTERS PRINTED	2	4
2	PLACE EXT/IRQ SWITCH TO EXT, FORCE STEP, WHEN NUMERIC LIGHT ON, ENTER NUMERIC KEY 000			
	OPERATOR ACTION	MACHINE ACTION	A	D
	OBSERVE CONSOLE	PRINTER NOW PRINTING	F383	2A
2A	PUT MTR METER ON PADM3Q (CCPC)	METER READING 55%	F296	3
3	PUT MTR METER ON PADN3T (CCPC/)	METER READING 55%	F297	F298
4	OBSERVE PRINTOUT	CHARACTERS PRINTED ARE NOT CORRECT	5	17
5	PLACE EXT/IRQ SWITCH TO EXT, FORCE STEP, WHEN NUMERIC LIGHT ON, ENTER NUMERIC KEY 00			
	PUT MTR METER ON PADM6Y (CCPRR1)	METER READING 75-78%	7	6
6	PUT MTR METER ON PADN0Q (CCPRR1/)	METER READING 75-78%	F299	F300
7	PUT MTR METER ON PADM6V (CCPRR2)	METER READING 75-78%	9	8
8	PUT MTR METER ON PADM9S (CCPRR2/)	METER READING 75-78%	F301	F300
9	PUT MTR METER ON PADM7X (CCPRR4)	METER READING 75-78%	11	10
10	PUT MTR METER ON PADM9Q (CCPRR4/)	METER READING 75-78%	F302	F303
11	PUT MTR METER ON PADM7W (CCPRR8)	METER READING 80-87%	13	12
12	PUT MTR METER ON PADM9P (CCPRR8/)	METER READING 80-87%	F304	F305
13	PUT MTR METER ON PADM3Y (CCPRT1)	METER READING 75-78%	15	14
14	PUT MTR METER ON PADN0J (CCPRT1/)	METER READING 75-78%	F306	F303
15	PUT MTR METER ON PADM3V (CCPRT2)	METER READING 74-80%	16A	16
16	PUT MTR METER ON PADM9K (CCPRT2/)	METER READING 74-80%	F308	F415
16A	PUT MTR METER ON PADM4X (CCRS+8P)	METER READING 75-78%	F307	16B
16B	PUT MTR METER ON PADN3U (CCRS+8P/)	METER READING 75-78%	F417	F414

17	OBSERVE PRINTOUT	CARRIER DID NOT MOVE FULL 256 SPACES LEFT TO PRINT.	F309	18
18	OBSERVE CONSOLE	PLATEN CONTINUED ADVANCING	F378	19
19	OBSERVE CONSOLE	ANY INDICATORS ON	F394	20
20	OBSERVE PRINTOUT	FORMS ADVANCED WITH EACH CHARACTER PRINTED	F416	21
21	OBSERVE PRINTOUT	TWO CHARACTERS PRINTED AT LEFT MARGIN	F386	2
22	CONTINUE MTR			

E37	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	PLATEN ADVANCING BAD	2	7
2	REMOVE PAPER FROM CONSOLE. PUT EXT/IRQ SWITCH TO EXT, FORCE STEP. WHEN NUMERIC LIGHT ON RESELECT NUMERIC KEY 3	LEFT PLATEN NOT ADVANCING	3	5
3	PUT MTR METER ON PADM6U (CCLPA/)	METER READING 54%	F310	4
4	PUT MTR METER ON PADN0K (CCLPA)	METER READING 54%	F311	F312
5	PUT MTR METER ON PADM6Q (CCRPA/)	METER READING 54%	F310	6
6	PUT MTR METER ON LFDV5H (CCRPA)	METER READING 54%	F313	F312
7	NONE	CARRIER POSITIONING AT LOW SPEED	F315	8
8	NONE	CARRIER OPERATION NOT NORMAL	F399	9
9	CONTINUE MTR			

E38	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	PRINTED CHARACTERS NOT CORRECT	E35	2
2	OBSERVE PRINTOUT	INTERMITTANT SPACING FAILURES AND CARRIER WAS AT HIGH SPEED WHEN DETENT LATCHING	F314	3
3	NONE	CARRIER WAS MOVING AT LOW SPEED	F315	4
4	NONE	CARRIER SLAMS INTO BUMPER	F398	5
5	NONE	INTERMITTANT PAUSES WHILE PRINTING	F399	6
6	OBSERVE PRINTOUT	SPACING FAILURES	F408	7
7	CONTINUE MTR			

E39	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	CARRIER DID NOT ESCAPE RIGHT	F316	2
2	NONE	CARRIER DID NOT ESCAPE LEFT	F317	3
3	NONE	PLATEN OPEN AND NO CHARACTERS PRINTED	F388	3A
3A	NONE	CHARACTERS PRINTED WERE NOT CORRECT	E35	4
4	NONE	NO RED CHARACTERS PRINTED	5	7
5	PUT MTR METER ON PADM4W (CCRS96/) PRESS SYSTEM CLEAR, PRESS FORCE STEP, PRESS READY BUTTON TWICE, AND SELECT NUMERIC KEY 4	METER READING WHILE PRINTER ESCAPING LEFT 0%	F318	6
6	PUT MTR METER ON PADN3V (CCRS96/) FORCE STEP AND RESELECT NUMERIC KEY 4	METER READING WHILE PRINTER ESCAPING LEFT 0%	F319	F320
7	NONE	ANY INDICATORS ON	F395	8
8	NONE	CARRIER OPERATION NOT NORMAL	F397	9
9	NONE	RED CHARACTERS PRINTED ESCAPING RIGHT	10	12
10	PERFORM OPERATOR ACTION IN STEP 5	METER READING WHILE PRINTER ESCAPING RIGHT 100%	F318	11
11	PERFORM OPERATOR ACTION IN STEP 6	METER READING WHILE PRINTER ESCAPING RIGHT 100%	F319	F320
12	CONTINUE MTR			

E41	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	E 35	E 35

E42	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 ON	F366	2
2	OBSERVE MIR	MIR BIT D2 ON	F367	F 50

E43	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	1 OR MORE CHARACTERS CONSISTANTLY PRINTED BAD	E 35	2

2	OBSERVE CONSOLE	DOUBLE CHARACTERS PRINTED IN LEFT MARGIN	F 26	3
3	OBSERVE PRINTOUT	INTERMITTANT PRINTING FAILURE	F324	4
4	OBSERVE PRINTOUT	NO CHARACTERS PRINTED RED	F418	5
5	CONTINUE MTR			

E44	OPERATOR ACTION	MACHINE ACTION	A	D
1	PLACE EXT/IRQ SWITCH TO EXT, PRESS READY BUTTON. OBSERVE MIR	MIR BITS B1, D1 COMPARE	2	9
2	OBSERVE MIR	MIR BITS B2, D2 COMPARE	3	12
3	OBSERVE MIR	MIR BITS B4, D4 COMPARE	4	15
4	OBSERVE MIR	MIR BITS B8, D8 COMPARE	5	18
5	OBSERVE MIR	MIR BITS A1, C1 COMPARE	6	21
6	OBSERVE MIR	MIR BITS A2, C2 COMPARE	7	24
7	OBSERVE MIR	MIR BITS A4, C4 COMPARE	8	27
8	OBSERVE MIR	MIR BITS A8, C8 COMPARE	F 50	30
9	PUT MTR METER ON PADM0S (CCIKBL1)	METER READING 97%	10	11
10	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 9 PLUS 2% INCREASE	F325	F 40
11	PUT MTR METER ON PADM4E (CCKBL1A)	METER READING 97%	F 39	F327
12	PUT MTR METER ON PADM1S (CCIKBL2)	METER READING 97%	13	14
13	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 12 PLUS 2% INCREASE	F325	F 40
14	PUT MTR METER ON PADM4F (CCKBL2A)	METER READING 97%	F 39	F328
15	PUT MTR METER ON PADM1T (CCIKBL4)	METER READING 97%	16	17
16	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 15 PLUS 2% INCREASE	F325	F 40
17	PUT MTR METER ON PADM4G (CCKBL4A)	METER READING 97%	F 39	F329
18	PUT MTR METER ON PADM1Q (CCIKBL8)	METER READING 97%	19	20
19	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 18 PLUS 2% INCREASE	F325	F 40
20	PUT MTR METER ON PADM4H (CCKBL8A)	METER READING 97%	F 39	F330
21	PUT MTR METER ON PADM0U (CCIKBU1)	METER READING 97%	22	23
22	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 21 PLUS 2% INCREASE	F326	F 40
23	PUT MTR METER ON PADM7E (CCKBU1A)	METER READING 97%	F 39	F331
24	PUT MTR METER ON PADM1U (CCIKBU2)	METER READING 97%	25	26
25	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 24 PLUS 2% INCREASE	F326	F 40
26	PUT MTR METER ON PADM7F (CCKBU2A)	METER READING 97%	F 39	F332
27	PUT MTR METER ON PADM1R (CCIKBU4)	METER READING 97%	28	29
28	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 27 PLUS 2% INCREASE	F326	F 40
29	PUT MTR METER ON PADM7G (CCKBU4A)	METER READING 97%	F 39	F333
30	PUT MTR METER ON PADM0R (CCIKBU8)	METER READING 97%	31	32
31	PRESS MEMORY LOADER SWITCH ON	METER READING SAME AS STEP 30 PLUS 2% INCREASE	F326	F 40
32	PUT MTR METER ON PADM7H (CCKBU8A)	METER READING 97%	F 39	F334

E45	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F409	

E46	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F335	F335

E47	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F410	

E48	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F411	

E49	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8080	F412	2
2	ASSURE CARRIER IS FREE OF EXCESSIVE DRAG AND RESTART OVERSPEED TEST			

E50	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 SET	2	3
2	PUT MTR METER ON PADN6E (CCINIT/)	METER READING 0%	F262	F261
3	OBSERVE MIR	MIR BIT D2 SET	F263	F 50

E51	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F287	F287

E52	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F288	2
2	OBSERVE MIR	MIR = 0000	F376 F 50	
E55	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN5D (CCZERO/)	METER READING 100%	F290	F291
E56	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON PADN6E (CCINIT/)	METER READING 100%	F293	F292
E57	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F294	F294
E58	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT C2 SET	F295	F 50
E59	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER DID NOT EVEN MOVE 1 SPACE RIGHT	4	2
2	OBSERVE CONSOLE	CARRIER MOVED TO RIGHT MARGIN BUT INTERPOSER CONTINUED PICKING	F270	3
3	OBSERVE CONSOLE	CARRIER MOVED ONLY 1 SPACE RIGHT	16	18
4	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) OBSERVE CONSOLE	INTERPOSER PICKING CARRIER DETENT	7	5
5	PUT MTR METER ON PADM3M (CCCRIP)	METER READING 77%	F271	6
6	PUT MTR METER ON PADN5U (CCCRIP/)	METER READING 77%	F272	F273
7	CHECK FUSE F8	FUSE GOOD	8	F281
8	PUT MTR METER ON PADP2V (CRUTSR/)	METER READING 100%	11	9
9	PUT MTR METER ON PADP1V (TACHRTP)	METER READING 0%	F274	F275
10	PUT MTR METER ON PADN9-FPC4 (REV)	METER READING 0%	14	F369
11	PUT MTR METER ON PADN9S (CCCRGR/)	METER READING 0%	12	13
12	PUT MTR METER OM PADN9R (CCCRGL/)	METER READING 100%	F 22	15
13	PUT MTR METER ON PADN9-FPV4 (LEFT/)	METER READING 100%	10	F277
14	PUT MTR METER ON PADN9M (CCCR4A/)	METER READING 0%	F278	F279
15	PUT MTR METER ON PADN9-FPT4 (LEFT)	METER READING 0%	F280	F277
16	PUT MTR METER ON PADM3P (CCCRH) SET EXT SWITCH TO EXT, FORCE STEP (FST) RESET EXT/IRQ SWITCH AS SOON AS READING TAKEN	METER READING 0%	F338	17
17	PUT MTR METER ON PADN9I (CCCRH/) PERFORM SWITCH FUNCTION STEP 16	METER READING 0%	F339	F340
18	OBSERVE CONSOLE	CARRIER MOVED MORE THAN 1 SPACE AND STOPPED	19	CONT. MTR
19	PUT METER ON PADN5I (CCCPR) TO GET CORRECT READING OPERATOR MAY HAVE TO MANUALLY REPOSITION CARR MORE THAN ONCE TO INSURE POSITIONAL FLAG NOT UNDER COIL	METER READING 97%	20	21
20	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) RESET EXT/IRQ SWITCH AS SOON AS READING TAKEN	METER READING SAME AS STEP 19 PLUS 1-2% INCREASE WHILE CARRIER MOTION.	F342	F343
21	PUT MTR METER ON PADM7I (CCPRA)	METER READING 97%	F344	F345
22	PUT MTR METER OM PADP2K (CCCRGLT/)	METER READING 100%	F276	F379
E60	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER ESCAPED RIGHT AFTER PRINT	F321	F322
E61	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER ESCAPED LEFT AFTER PRINT	F321	F323
E62	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 ON	F396	2
2	OBSERVE MIR	MIR BIT D2 ON	F368	F 50
E64	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F346	F346
E65	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 ON	3	2
2	OBSERVE MIR	MIR BIT D2 ON	16	F 50
3	OBSERVE CONSOLE	CARRIER AT RIGHT MARGIN	6	4
4	OBSERVE CONSOLE	CARRIER AT LEFT MARGIN	14	5
5	OBSERVE CONSOLE	CARRIER MOVED A FEW SPACES LEFT	F347	F 50

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6	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) PUT MTR METER ON PADP2U (CRUTSL/)	METER READING 100%	9	7	
7	PUT MTR METER ON PADP1R (TACHLTP)	METER READING 0%	F282	F336	
9	PUT MTR METER ON PADN9R (CCCRGL/)	METER READING 44-57%	10	11	
10	PUT MTR METER ON PADN9S (CCCRGR/)	METER READING 65-75%	F276	13	
11	PUT MTR METER ON PADN9-FPT4 (LEFT)	METER READING 100%	12	F277	
12	PUT MTR METER ON PADN9L (CCCRHS/)	METER READING 44-57%	F337	F348	
13	PUT MTR METER ON PADN9-FPV4 (LEFT/)	METER READING 0%	F277	F349	
14	OBSERVE CONSOLE	CARRIER HIT LEFT BUMPER	F356 F357	F358	
16	OBSERVE CONSOLE	CARRIER HIT LEFT BUMPER	F361	17	
17	PUT MTR METER ON PADN8N (CCEQV1)	METER READING 100%	18	F359	
18	PUT MTR METER ON PADP2T (CCTACHBK)	METER READING 100%	F360	19	
19	PUT MTR METER ON PADP2V (CCRUTSR/)	METER READING 100%	20	F362	
20	PUT MTR METER ON PADP2U (CCRUTSL/)	METER READING 100%	F363	F364	
E66	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F374	F374	
E67	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR BIT A8 ON	F370	2	
2	OBSERVE MIR	MIR BIT C8 ON	F371	3	
3	OBSERVE MIR	MIR BIT C4 ON	F371	4	
4	OBSERVE MIR	MIR BIT C2 ON	F371	5	
5	OBSERVE MIR	MIR BIT C1 ON	F371	6	
6	OBSERVE MIR	MIR BIT D8 ON	F372	7	
7	OBSERVE MIR	MIR BIT D4 ON	F373	8	
8	OBSERVE MIR	MIR BIT D2 ON	F372	9	
9	OBSERVE MIR	MIR BIT D1 ON	F372	F 50	
E68	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F375	F375	
E69	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE CONSOLE	ALL CHARACTERS PRINTED AT LEFT MARGIN	F380	2	
2	OBSERVE CONSOLE	CHARACTERS PRINTED INSTEAD OF SPACES	F400		
E70	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F382	F382	A A
E71	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A A A
1	NONE	NONE	F425		A A A A A A A
E72	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A A A
1	NONE	NONE	F426		A A A A A A A
E73	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A A A
	NONE	NONE	F419		A A A A A A A
E74	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A A A
1	NONE	NONE	F427		A A A A A A A
E75	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A A A
1	NONE	NONE	F420		A A A A A A A
E76	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A A A
1	NONE	NONE	F421		A A A A A A A
E77	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A A A
1	PUT METER ON PADP8Q (PSSRQ/)	METER READING 100%	F 1	F422	A A A A A A A
E78	OPERATOR ACTION	MACHINE ACTION	A	D	A A A A A A A
1	PUT METER ON PADP7Q (PSURQ/)	METER READING 100%	F 1	F422	A A A A A A A
E79	OPERATOR ACTION	MACHINE ACTION	A	D	A

1	NONE	NONE	F428		
E80	OPERATOR ACTION	MACHINE ACTION	A	D	
1		METER READING ON PADP8J PORT 8 WAS 100%	F430	2	
		METER READING ON ONE OR MORE OF PORTS 1 THRU 7 WAS 0%	F423		

FAILURE DICTIONARY

FAILURE	SUSPECT CHIPS OR PROCEDURE
F0	NOT DIAGNOSABLE BY THIS MTR
F1	PAFP4 B,C3
F2	RUN MTR ON DEVICE UTILIZING DDP #6
F3	RUN MTR ON DEVICE UTILIZING DDP #5
F4	RUN MTR ON DEVICE UTILIZING DDP #4
F5	RUN MTR ON DEVICE UTILIZING DDP #3
F6	RUN MTR ON DEVICE UTILIZING DDP #2
F7	RUN MTR ON DEVICE UTILIZING DDP #1
F8	PADP4 E3, D3, C3, D5
F9	PADP7 E3, D3, C3, D5
F10	PADK8 A1, F1, E1 PADP7 E7
F11	PADP7 C5, C7, PADM9 B5 PADK8 D1
F12	PADN5 D7, C7 PADM0 D7
F13	PADN2 B7 PADM0 D7
F14	PADM0 F7 PADM9 F7
F16	PADN5 D7, C7
F17	PADN5 C7 PADM9 C5
F18	PADK8 B5, D5, C5, C7, B1 PADL1 A3, A1, B1
F19	PADM9 F5, F7 PADN2 C3, C1, D3, F3, D1, E3, A1
F20	PADM9 F5, F7, E1, C7, B7 PADN2 C7, D7, C5
F21	PADM9 F5, F7 PADN5 C1, D5, B7, A5, A1, B1
F22	PADN5 D7, C3, A1, B1, C1, D1, E3, E1, F3 PADN2 E1, B1
F23	PADN5 D7, D3, B1, A1 PADM0 D3, D5 PADN8 A1, D1, E1, A5
F24	PADM9 C1, A5, A7 PADN2 A5, B1 PADK8 A1, B1, C7

F25	PADN5	D7, D3
	PADN2	B1, E1, F1, F3
F26	PADM9	B3
	PADN5	C1, D5
	PADN8	D7
F27	PADP7	E3, D3, C3, D5, C1, A3, F7, E7, E5
F28	SIGNAL FROM READY BUTTON GROUNDED (CIRDYSW)	
F29	SIGNAL FROM READY BUTTON NOT AT GROUND WHEN READY BUTTON IS PRESSED (CIRDYSW)	
F30	PADN5	F3, F1, D3, B5
	PADN2	B1, E1, F1, F3
F31	PADK8	C7
	PADL1	A1, A3, B1, C1, D1, B7, A5
	PADN5	F1, F3, B5, D3
F32	PADM9	B5
	PADK8	D1, E1
	PADN5	D3, C7
	PADP7	B5, B3, D3 A
	PADQ3	A7 A
F33	PADN5	C7, D7, D3
	PADM9	B5
	PADN2	A3
F34	PADN5	D7, D3, C3
	PADM9	F5, F7
	PADN2	B7
F35	PADP7	D5
	PADM9	D1
	PADK8	A5
F36	PADN5	C7
F37	PADM9	F1
F38	PADM3	B4B5, B2D5, A6D7, B4E3, A6D9, E5, C2B7, C8B9
F39	CONSOLE FAILURE KEYBOARD COIL APPEARS OPEN	
F40	CONSOLE FAILURE KYBD COIL INDUCTANCE NOT CHANGING	
F41	PADK8	A5, E1, C1, D5, C5, B1, D1, F1
	PADL1	A1, A3, E1, F1
F42	PADK8	C7, A1, B1
F43	PADN5	D7
F44	PADM9	F5, F7
F45	PADM9	A7, A5, C1, C3
	PADN5	D7, D3
F46	PADN5	F1
F47	PADK8	F1
	PADM9	A5, C1, A7, E1, F1
	PADL1	A3
	PADN2	B1, A5
F48	PADM9	F5
	PADK8	B1, A1
F49	PADN2	B7, A5, B1, A3
	PADM9	C3, A5, C1, C5, F1
F50	RESTART MTR	
F51	PADL4	F5, E4C4
F52	PADL1	C7
F53	PADL1	B5, B3
F54	PADL4	F5 E4C8
F55	PADL1	A1
F56	PADL1	B5 B3
F57	PADL4	A5 B7D4
F58	PADL1	D5
F59	PADL1	B5, B3
F60	PADL4	A5 B7D8
F61	PADL1	D5
F62	PADL1	B5, B3
F63	PADL4	A5 B7E2
F64	PADK8	C5
F65	PADK8	B7, A3
F66	PADL4	A5 B7DO
F67	PADK8	F7
F68	PADK8	B7, A3 B
F69	PADL4	A5 B7C6
F70	PADK8	C5
F71	PADK8	B7, A3
F72	PADL4	A5, B7C2
F73	PADK8	F7
F74	PADK8	B7, A3
F75	PADL4	D5, D6D8
F76	PADL1	C7, C3
F77	PADL4	D5, D6E2
F78	PADL4	E5, D6B4
F79	PADL4	E5, D6B8
F80	PADL4	F5, E4EO
F81	PADK8	D7, D3
F82	PADL4	F5, E4D6
F83	PADL4	F5, E4D2

F84	PADL4	F5,	E4CO				
F85	PADL7	D5,	D6D8				
F86	PADL1	D5,	D3				
F87	PADL7	D5,	D6E2				
F88	PADL7	E5,	D6B4				
F89	PADL7	E5	D6B8				
F90	PADL7	F5,	E4EO				
F91	PADK8	E7,	E3				
F92	PADL7	F5,	E4D6				
F93	PADK8	E7,	E3				
F94	PADL7	F5,	E4D2				
F95	PADK8	E7,	E3				
F96	PADL7	F5,	E4CO				
F97	PADK8	E7,	E3				
F98	PADL7	F5,	E4C4				
F99	PADL1	E7,	F5,	F1,	F7,	E3	
F100	PADL7	F5,	E4C8				
F101	PADL1	E7,	F5,	F7,	F1,	E3	
F102	PADL7	A5,	B7D4				
F103	PADL1	E7,	F5,	F1,	E3,	A1	
F104	PADL7	A5,	B7D8				
F105	PADL1	E7,	F5,	F1			
F106	PADL7	A5,	B7E2				
F107	PADK8	F7,	F3				
F108	PADL7	A5,	B7DO				
F109	PADK8	F7,	F3				
F110	PADL7	A5,	B7C6				
F111	PADK8	F7,	F3				
F112	PADL7	A5,	B7C2				
F113	PADK8	F7,	B5,	F3,	C5		
F114	PADL4	D5	D6DO				
F115	PADL1	F7,	F3				
F116	PADL4	D5	D6C6				
F117	PADL4	D5	D6D4				
F118	PADL4	D5	D6C2				

F119	PADK8	D5,	E1,	F1,	A1		
	PADL1	A3					
F120	PADP7	D1					
F121	PADP7	E7,	F7				
F122	PADK8	C5,	E5,	E1,	F5,	D1	
	PADL1	B5					
F123	PADL1	A5,	C5,	B3			
F124	PADK8	B5,	A5,	A3			
F125	REPLACE	LAMP	A1				
F126	PADL4	F5,	E4C4				
F127	PADL1	B5,	B3,	A1			
F128	PADL1	C7					
F129	REPLACE	LAMP	A2				
F130	PADL4	F5,	E4C8				
F131	PADL1	A1					
F132	REPLACE	LAMP	A3				
F133	PADL4	A5,	B7D4				
F134	PADL1	D5					
F135	REPLACE	LAMP	A4				
F136	PADL4	A5,	B7D8				
F137	REPLACE	LAMP	A5				
F138	PADL4	A5,	B7E2				
F139	PADK8	B7,	A3				
F140	PADK8	C5					
F141	REPLACE	LAMP	A6				
F142	PADL4	A5,	B7DO				
F143	PADK8	F7					
F144	REPLACE	LAMP	A7				
F145	PADL4	A5,	B7C6				
F146	REPLACE	LAMP	A8				
F147	PADL4	A5,	B7C2				
F148	PADL1	B5					
F149	PADL1	C5,	C3				
F150	PADK8	C3,	D3				
F151	REPLACE	LAMP	B1				
F152	PADL4	D5,	D6D8				
F153	PADL1	C7,	C3				

F154	REPLACE LAMP B2
F155	PADL4 D5, D6E2
F156	REPLACE LAMP B3
F157	PADL4 E5, D6B4
F158	REPLACE LAMP B4
F159	PADL4 E5, D6B8
F160	REPLACE LAMP B5
F161	PADL4 F5, E4EO
F162	PADK8 D7, D3 PADL1 B7
F163	REPLACE LAMP B6
F164	PADL4 F5, E4D6
F165	REPLACE LAMP B7
F166	PADL4 F5, E4D2
F167	REPLACE LAMP B8
F168	PADL4 F5, E4CO
F169	PADL1 C7
F170	PADL1 C5, D3
F171	PADK8 C3, E3
F172	REPLACE LAMP C1
F173	PADL7 D5, D6D8
F174	PADL1 D5, D3
F175	REPLACE LAMP C2
F176	PADL7 D5, D6E2
F177	REPLACE LAMP C3
F178	PADL7 E5, D6B4
F179	REPLACE LAMP C4
F180	PADL7 E5, D6B8
F181	REPLACE LAMP C5
F182	PADL7 F5, E4EO
F183	PADK8 E7, E3
F184	REPLACE LAMP C6
F185	PADL7 F5, E4D6
F186	REPLACE LAMP C7
F187	PADL7 F5, E4D2
F188	REPLACE LAMP C8
F189	PADL7 F5, E4CO
F190	PADL1 E7
F191	PADL1 E5, E3
F192	PADK8 C3, F3
F193	REPLACE LAMP D1
F194	PADL7 F5, E4C4
F195	PADL1 E7, F5, F1, E3
F196	REPLACE LAMP D2
F197	PADL7 F5, E4C8
F198	REPLACE LAMP D3
F199	PADL7 A5, B7D4
F200	REPLACE LAMP D4
F201	PADL7 A5, B7D8
F202	PADL1 E7, F5, E3
F203	REPLACE LAMP D5
F204	PADL7 A5, B7E2
F205	PADK8 F7, F3
F206	REPLACE LAMP D6
F207	PADL7 A5, B7D0
F208	REPLACE LAMP D7
F209	PADL7 A5, B7C6
F210	REPLACE LAMP D8
F211	PADL7 A5, B7C2
F212	PADK8 F7, E5, F3
F213	PADL1 E7, E5, F3
F214	REPLACE LAMP S1
F215	PADL4 D5, D6DO
F216	PADL1 F7, F3
F217	REPLACE LAMP S2
F218	PADL4 D5, D6C6
F219	REPLACE LAMP S3
F220	PADL4 D5, D6C2
F221	REPLACE LAMP S4
F222	PADL4 D5, D6D4
F223	PAFP4 B,C3
F224	PADP7 E3, C1, D7, D1, B3

A
A
A

F225	PADM9 B5 PADK8 D1, E1
F226	PADP7 E3, C1, D7 PADK8 F1
F227	PADM9 E1, C3, C5, B5 PADN2 B1 PADK8 C5
F228	CONSOLE FAILURE - OPEN DECODER TU PICKUP COIL OR CABLE.
F229	PADM6 B4B1, C2F1, C8F5
F230	PADM9 C5, C7, B4, C3, B7, A7, E1 PADK8 D1, C5
F231	PADM9 C7, B7, E1, C5
F232	PADN2 D3, D1, E5, E3
F233	PADN2 F3
F234	PADN2 A3, D5, D7, C7, B5 PADK8 D5, D7
F235	PADM9 F1
F236	PADN2 C7, D3, D1
F237	PADM9 F7, F5
F238	PADN2 C5, C7, D7, F3, B5, E5, A3, D5, PADN5 D5
F239	PADK8 D7, D5, F5
F240	PADN2 D5, C5, C7
F241	PADN2 B1, E5, C7, D7, E1, C5, D5 - PADM9 C3, C5, A7 PADN8 B3
F242	PADM9 A7, D7, D1, D3, E1, E7, E3 PADN2 C5, E7, E5
F243	PADM9 B7 PADN2 B5 PADK8 D1, E7, E1, E5
F244	CABLE OR OPEN PLATEN SOLENOID FAILING
F245	PADM6 E5, E1D5, D2E0, D8E6, E7F2, D2C7
F246	PADM9 D7, D3, E7
F247	CABLE OR ALARM SOLENOID FAILING
F248	PADM3 E7F0, E7E5, E7E1, E7D5, E1D3, E5
F249	PADM9 D7, D1, E3
F250	CABLE OR CLOSE PLATEN SOLENOID FAILING
F251	PADM6 E5, D2B1, E1B6, D2B9, D8C9, E7D1
F252	PADN5 A5, B7, F1, E1 PADK8 E5
F253	PADN2 B1, E1, F1, E3 PADM9 C1
F254	PADM9 D7, D3, E7
F255	PADM9 D1, E3
F256	PADM9 E1, B3, B1, B5
F257	PADN5 C1, B1, D5, A3, B5 PADN2 C7
F258	PADN5 C7, B7 PADK8 E7, E5
F259	PADN5 A5, C1, B1, A1, C7
F260	PADN5 E1, F1, F3 PADM9 C5 PADK8 E7, E5, F5
F261	PADN5 B3, B1 PADN8 C5
F262	PADN5 A1
F263	PADM0 D5, D3
F264	PADN8 B3, C7, A7 PADN5 A5, A1, B1, A3, B5, F3
F265	PADN8 B7, B5, B3, D7, D3
F266	PADN5 E3, E5, C5, E1, F3, D1, C1, B1, C3, A1, A5, B5 PADN8 D3, C7, A3 PADM0 B1, B5, A5
F267	PADN8 D3, C1 PADM0 B5, B1, A5
F268	PADN8 A7, A5, B1, C3, A3, C1, D3, C5, B3, C7
F269	PADN8 C3, D1, A1 PADN2 E3
F270	PADN8 A5, A3, B1, C1 PADK8 E7, E5
F271	CONSOLE FAILURE INTERPOSER SOLENOID OR CABLE FAILURE
F272	PADM3 E7D1, D8C9, D2B9, E1B6, D2B1, E5
F273	PADN8 C3, B3, C1 PADN5 F3, E7, C7, B3
F274	PADP1 E7A6, F3C1, F3C7
F275	PADP1 E7F5, F4F3
F276	PADP1 F4A6, E7A6, C9F1, B6F1, OR CARRIER POWER DRIVERS OR JAMMED CARRIER, OR CARRIER DRIVE MOTOR
F277	PADN5 B3, C7 PADN8 C5, E7, D5
F278	PADN9 F1, D5, E7, C5, B3, A5, D1, E1
F279	PADN9 D5, C7, A1, F1, E1, C3, D3, D1 PADM0 D5, D3
F280	PADN8 D5, F7 PADN2 E1, E3, F1, B1

F281 REPLACE FUSE

F282 PADP1 E7A6, F3C3, E6C7

F283 PADN2 F3, B5,
PADM9 F1

F284 PADN2 D3, D1, E5, E3

F285 PADM9 B4

F286 PADN2 C3, C1, A3, A1

F287 PADN2 E5, A1, B5, C1, C3
PADK8 E7, E5

F288 PADM9 F7, F5

F289 PADN2 C5, C3, E5, A1, C1, B5, A3

F290 PADN5 B7

F291 PADM9 C3, C5, B5
PADM0 C5, C3

F292 PADN5 B3, C7, A3
PADN8 D3

F293 PADN8 C5, C7, B3, D3
PADK8 E5
PADM0 B5, B3, D3, A7
PADN5 A1, C3, F1

F294 PADN5 D7, C3
PADK8 B1
PADM0 C5, C7

F295 PADN2 B3

F296 DECODER OR PRINT CLUTCH FAILURE

F297 PADM3 E5, E1B4, E7B6, E1C2, E7C6

F298 PADN2 A7, B3, B5, C1, E5, D3, D1
PADM9 B7

F299 PADM6 F5, F0E0, E5A7, F6C0

F300 PADM9 D3, E3

F301 PADM6 F5, F0D6, F5A7, F6C2

F302 PADM6 F5, F0D4, F5B5, F0C4

F303 PADM9 D7, E7

F304 PADM6 F5, F0D8, F0A7, F0B8

F305 PADM9 D7, F5, E5, B7, E7, E3

F306 PADM3 F5, F0E0, E5A7, F6C0

F307 CONSOLE FAILURE, DECODER OR CONSOLE ADJUSTMENT

F308 PADM3 F5, F0D6, F5A7, F6C2
PADN8 D3, C5, D7
PADN2 E7, B3

F309 PADM0 C7, C5, B7, B3, D3, A3, D5, D1, B5
PADN5 E3, A1, B1, A5
PADN8 B3, F7, F1, D5, E3

F310 CONSOLE FAILURE, PLATEN ADV SOLENOID OR CABLE

F311 PADM6 E5, E1D3, E7D5, E7E1, E7E5, E7F0

F312 PADM9 D7, D3, E7

F313 PADM6 E5, E1B4, E7B6, E1C2, E7C6, E1B2

F314 PADN8 F1, D5, F7, E7, E5
PADN5 E7, F3

F315 PADN8 D5, PADP1 B9B1, C4A8, E6C7, OR TACHOMETER

F316 PADM9 B3, C3, D7, B5, E1, E3
PADN8 E7, C7
PADN2 D3
PADN5 E7, F3

F317 PADM9 C1, B1, B3, B5, E1
PADN2 E3, D3, E1, B1
PADN8 F7, C5, D5, E7, F1, D1

F318 CONSOLE RED RIBBON FAILURE

F319 PADM3 F5, F0D8, F0A7, F0B8

F320 PADN2 E5, A5, A7, B3, A3, B5

F321 PADN5 C1

F322 PADM9 E1, B3, B1, B5, E3

F323 PADM9 E1, B1, C1
PADN2 E3, E1, F1, B1

F324 CONSOLE FAILURE DECODER OR MECHANICAL ADJUSTMENTS

F325 PADM0 D7, E7, E5, E3
OR KYBD KEY FAILURE, TO DETERMINE REPEAT TEST WITH MEMORY LOADER OFF AND RAPIDLY KEY THE KEY IN QUESTION

F326 PADM0 F5, F3, F7, E7, D7
OR KYBD KEY FAILURE, TO DETERMINE REPEAT TEST WITH MEMORY LOADER OFF AND RAPIDLY KEY THE KEY IN QUESTION

F327 PADM3 B4D1, C2C1, C8C5

F328 PADM3 B4C7, C2C7, C8D1

F329 PADM3 B4C3, C2D3, C8D7

F330 PADM3 B4B9, C2D9, C8E3

F331 PADM6 B4D1, C2C1, C8C5

F332 PADM6 B4C7, C2C7, C8D1

F333 PADM6 B4C3, C2D3, C8D7

F334 PADM6 B4B9, C2D9, C8E3

F335 PADM9 D1 OR AC1 CARD FAILING

F336 PADP1 D9F4, E9F3

F337 PADN8 D5, F7, C5, D3
PADN5 B3

F338 CONSOLE FAILURE HOLD COILS OR CABLE FAILURE

F339 PADM3 E7F2, D8E6, D2E0, E1D5, D2C7, E5

F340 PADN8 C7, C5, D3, B3, D7
PADM0 D3
PADN5 D1, C1, A3, B3, C3

F341 PADN5 D3
PADN2 E1, F1, A3

F342 PADN5 E5, E3, C5, C7, B7, E1

F343 CONSOLE POSITIONING READOUT COIL INDUCTANCE NOT CHANGING

F344 CONSOLE POSITIONAL READOUT COIL APPEARS OPEN

F345 PADM6 B4B5, C2E5, C8E9

F346 PADN8 B3, C7
PADN5 C3, E3, E1

F347 PADN8 C5

F348 PADN8 D5, A5, C3, E1, D1, A1, C5

F349 PADN8 E7

F356 PADN8 E1, D1, A1, F1, E5

F357 PADM0 A3, D3, C5, B3, B7, C7, D5, D1, A1, A7
PADN5 E5, C5

F358 PADM0 D5, D3, B5, B3, C7, D1, C5, B7
PADN8 D7, C7, E1, D7, D5

F359 PADM0 D5, D3, B5, B3, C7, C5
PADN5 E5, C5

F360 PADN8 A1, D1, E1, F1, E5, B7
PADM0 C7

F361 PADN8 F1, E7, D5, D1, E1
PADM0 C7, D5, D3, B3
PADN5 E7, A1
PADP1 E9F3, F4A6 OR TAC.

F362 PADP1 E7A6, F3C1, F3C7, F4F3, E7F5, F4A6

F363 PADP1 F4A6, E7A6

F364 PADP1 E7A6, F3C3, E6C7, D9F4, E9F3, F4A6

F365 PADN8 E3, B7, D3, E1

F366 PADM9 B1, E1, C1
PADM0 C7
PADN8 F1, D7

F367 PADM0 C5, C7, C3, OR
INTERMITTANT FAILURE POSSIBLE TACHOMETER FAILURE OR CARRIER POWER DRIVERS WEAK, RESTART MTR

F368 PADN8 F7 OR F367
PADM0 C5, C7, C3

F369 PADN8 A1, D1, E1, A5, C3

F370 PADN5 D7, C7

F371 PADM9 F7
PADK8 A1
PADN5 D3
PADM0 F7

F372 PADN5 D7, C7
PADM0 D7

F373 PADN2 B7
PADM0 D7

F374 PAFP4 D7

F375 PADN8 D3, E3
PADN5 A5

F376 PADN2 C1, B5, C3

F377 PADN2 C7, D7, B5
PADK8 D5, D7

F378 PADN2 D7, E1
PADM9 C5, C7, B7, D3

F379 PADN2 B1, E1

F380 PADN2 E3, F1

F381 PADN2 E7, E5, B3

F382 PADN2 D1, E5

F383 PADN2 B5

F384 PADM9 C1
PADN2 A5

F385 PADN8 A5, A3, B1
PADM9 B5

F386 PADN2 A7

F387 PADM9 B5, E1, C1
PADN5 B7

F388 PADM9 D3

F389 PADM9 D1, E3, C7, B7
PADN2 C7

F390 PADM9 D3, E7

F391 PADK8 C3
PADL1 C5, B5

F392 PADK8 C3
PADL1 E7, E5

F393 PADK8 A5, B5
PADL1 C5, B5, C7

F394 PADK8 E5, C5
PADL1 E5

F395 PADK8 C3
PADL1 E5, C5

F396 PADM9 E3, B5, C3, C1
PADM0 B5, C5, C7, B7, C3

F397 PADN2 D1, E5
PADM9 E1, B5, C1
PADN5 A3
PADN8 D5

F398 PADN8 B1

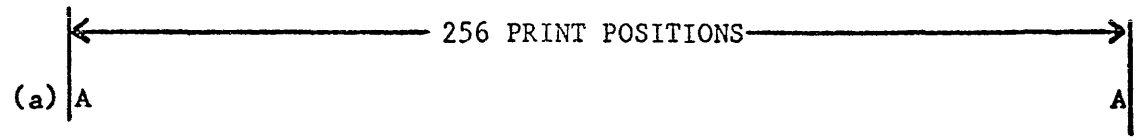
```
F399        PADN8   E1,  F1,  D1,  D5
F400        PADN2   B3,  B5                                          A
                                                                     A
F401        PADQ3   A1,  B1,  C1,  E1,  B7,  B5,  C7                A
F402        PAFQ0   C1
F403        PADP7   C5,  B7
F404        PADP7   C7,  B5
F405        PADP7   E7,  F7
            PADQ3   A1
F406        PADP7   D1
F407        PADQ0   C3,  B7
F408        PADM0   C7,  C3                                          A
                                                                     A
F409        PADN5   D3                                               A
                                                                     A
                                                                     A
F410        PADN5   B7                                               A
            PADMO   C3                                               A
                                                                     A
                                                                     A
F411        PADN5   F1,  D3,  B1,  A1                                A
                                                                     A
                                                                     A
F412        PADN5   D7,  D3                                          A
F413        PERFORM FE MEMORY MTR
F414        PADN2   A7
F415        PADM9   D7,  E5,  F5,  E7
F416        PADM9   E1,  C7
            PADN2   C7,  D5
F417        PADM3   F5,  F0D4,  F0C4,  F5B5
F418        PADN2   A7,  A5                                          A
                                                                     A
F419        PADP7   E5,  B5,  A5                                     A
                                                                     A
                                                                     A
F420        PADP7   A5,  A7,  B5,  C1                                A
F421        PADP7   B3,  D3
            PADP4   B3,  D3                                          A
                                                                     A
F422        PADP7   E3                                               A
            PADP4   E3                                               A
                                                                     A
                                                                     A
F423        PS1-(PROBE      CHART)  A5,  B5,  C5,  C7                A
                                                                     A
                                                                     A
F424        PADQ3   B1,  B5                                          A
                                                                     A
F425        PADK8   F1,  A1                                          A
```

```
                                                                     A
F426        PADP7   F7,  A5                                          A
                                                                     A
F427        PADP7   F7,  E7                                          A
            PAFN5   D5                                               A
                                                                     A
F428        PADP7   F7                                               A
                                                                     A
F429        PADP7   E5,  A5,  F7,  A3,  A7                           A
            PADQ0   A7                                               A
                                                                     A
F430        PADQ3   B5                                               A
                                                                     A
                                                                     C
F431        RUN MTR ON DEVICE   UTILIZING   DDP  #7                  C
```

ILLUSTRATIONS

FIGURE 1 - FOR 15 INCH CONSOLE 256 BECOMES 150

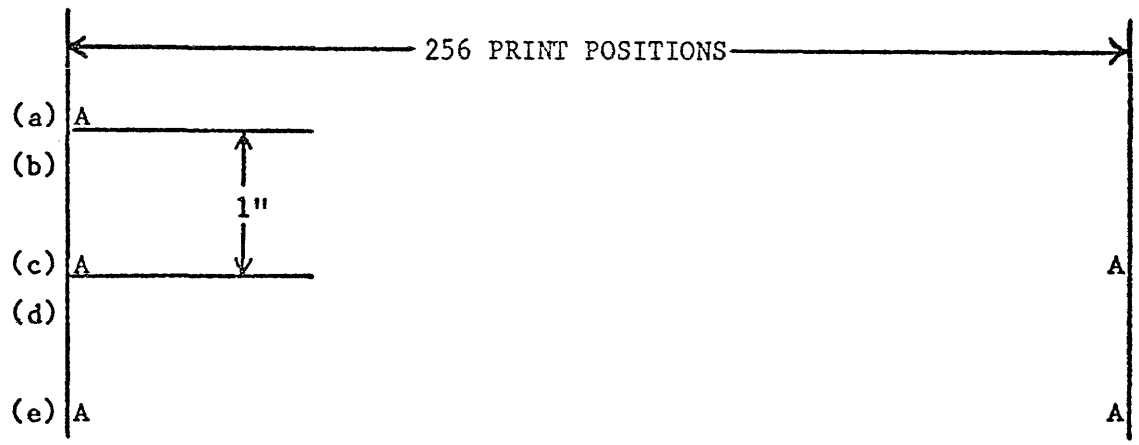
A. THE FOLLOWING IS THE PRINTOUT FOR THE CARRIER TEST. (CARRTST)



(a) THE CARRIER INITIALIZES TO THE RIGHT BUMPER AND AN A IS PRINTED IN PLACE. THE CARRIER THEN INITIALIZES TO THE LEFT BUMPER AND AN A IS PRINTED IN PLACE.

FIGURE 2 - FOR 15 INCH CONSOLE 256 BECOMES 150

A. THE FOLLOWING IS THE PRINTOUT FOR THE PLATEN ADVANCE TEST. (PLATADV)



(a) CHARACTER A PRINTED AT LEFT MARGIN.

(b) 6 LINE ADVANCES BOTH PLATENS.

(c) CHARACTER A IS PRINTED AT LEFT MARGIN. THE CARRIER MOVES 256 PRINT POSITIONS RIGHT AT HIGH SPEED AND CHARACTER A IS PRINTED.

(d) 6 LINE ADVANCES, BOTH PLATENS.

(e) CHARACTER A IS PRINTED AT RIGHT MARGIN. THE CARRIER MOVES 256 PRINT POSITIONS LEFT AT HIGH SPEED AND CHARACTER A IS PRINTED.

FIGURE 3 - FOR 15 INCH CONSOLE 256 BECOMES 150, 128 BECOMES 75

A. THE FOLLOWING IS THE PRINTOUT FOR THE CARRIER EXHAUSTIVE TEST. (CAREXHTST)

```
(a) EEEE.....E
(b)
```

(a) (a) CHARACTER E IS PRINTED IN PLACE AT LEFT MARGIN. THE CARRIER IS POSITIONED RIGHT 256 POSITIONS AND CHARACTER E IS PRINTED AT THE RIGHT MARGIN. THE CARRIER CONTINUES TO MOVE LEFT AND RIGHT AT A DECREMENTING COUNT WITH CHARACTER E PRINTED AT EACH POSITION. WHEN REMAINING UNPRINTED POSITIONS ARE LESS THAN 7, THE CARRIER POSITIONING SWITCHES TO LOW SPEED AND COMPLETES PRINTING A FULL LINE OF CHARACTER E.

(b) CARRIER IS POSITIONED 128 POSITIONS LEFT TO LEFT MARGIN AND ONE LINE ADVANCE BOTH PLATENS, TERMINATES THE TEST.

FIGURE 4 - FOR 15 INCH CONSOLE 256 BECOMES 150

A. THE FOLLOWING IS THE PRINTOUT FOR THE PRINTER ESCAPE TEST. (PRTESCTST)

```
        <-------- 256 PRINT POSITIONS -------->
(a) ZZZ.....Z
(b)
```

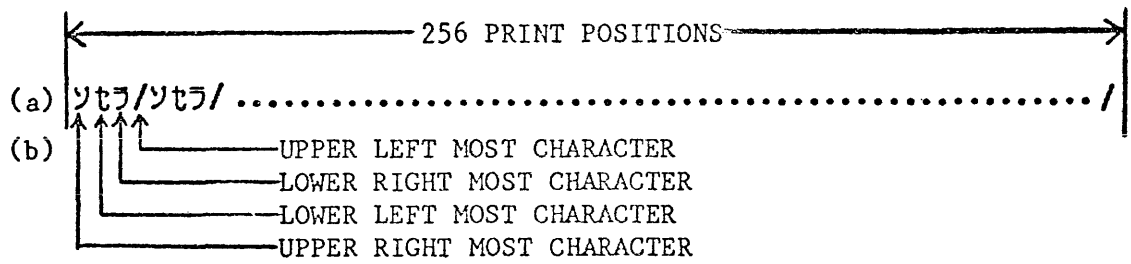
(a) A FULL LINE OF Z'S ARE PRINTED TO THE RIGHT IN BLACK, AND THEN OVERPRINTED TO THE LEFT IN RED.

(b) ONE LINE ADVANCE TO BOTH PLATENS TERMINATES THE TEST.

FIGURE 5 - FOR 15 INCH CONSOLE 256 BECOMES 148

A. THE FOLLOWING ARE THE POSSIBLE PRINTOUTS FOR THE TILT ROTATE TEST. (TLTROTTST)
FOR PRINTBALLS, WITH SPECIAL CHARACTERS OTHER THAN THE ONES SHOWN, USE (b) AS A GUIDE FOR THE PRINTBALL POSITION THAT SHOULD HAVE PRINTED.

(1) PRINTOUT FOR A 94 CHARACTER PRINTER WITH PRINTBALL I.D. #203.



NOTE: THE PRINTBALL POSITIONS SHOWN ARE GIVEN FACING THE REAR OF THE PRINTBALL.

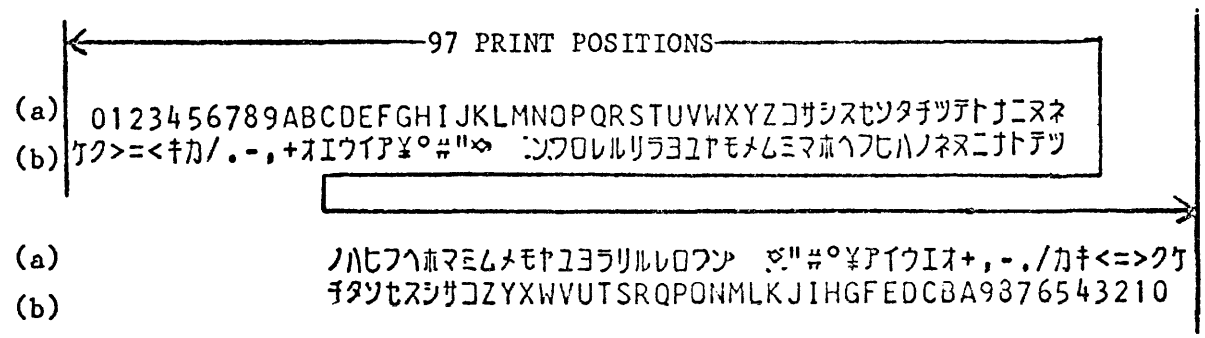
(a) A FULL LINE OF REPEATED FOUR CHARACTERS SHOWN, PRINTED TO THE RIGHT IN BLACK THEN OVERPRINTED TO THE LEFT IN RED.

(b) ONE LINE ADVANCE TO BOTH PLATENS TERMINATES THE TEST.

FIGURE 6

A. THE FOLLOWING ARE THE POSSIBLE PRINTOUTS FOR THE PRINT ALL CHARACTERS TEST. (PRTALCHAR)
THE SPECIAL CHARACTERS WILL VARY ACCORDING TO THE TYPE PRINTBALL BEING USED.

(1) PRINTOUT FOR A 94 CHARACTER PRINTER WITH PRINTBALL I.D. #203.



(a) ONE PRINT POSITION ESCAPE TO THE RIGHT AND THEN 94 CHARACTERS ARE PRINTED TO THE RIGHT IN BLACK.

(b) ONE PRINT POSITION ESCAPE TO THE LEFT AND THEN 94 CHARACTERS ARE PRINTED TO THE LEFT IN RED.

FIGURE 7

A. THE FOLLOWING ARE THE TWO POSSIBLE PRINTOUTS FOR A 16 OR 24 PK KEYBOARD.

(1)

END 24 PK KEYS

(2)

END 16 PK KEYS

ECONMTR ELECTRONIC CONSOLE
9343-21/-22/41/-42 CONSOLE
B 346 AND B 346-1 I/O CONTROL

NOTE: THIS MTR APPLIES TO 64 AND 96 CHARACTER ELECTRONIC CONSOLES - MODELS B9343-21/22/41/42 AND ALSO APPLIES TO DDP B346 OR B346-1

SET UP INSTRUCTIONS

PLACE MTR/MEM SWITCH IN MTR POSITION
PLACE IRQ/EXT SWITCH IN CENTER POSITION
INSURE THAT PLATENS ARE NOT LOCKED TOGETHER
INSURE THAT CARRIER IS AT LEFT MARGIN
PLACE CC3E CARD MOTOR SWITCH TO MAON POSITION
LOAD ECONMTR PROGRAM 2602 9751
PLACE LOAD SWITCH TO NORMAL - PRESS CLEAR

NOTE

ANY DISAGREEMENT WITH INSTRUCTIONS - SEE INCREMENTER ADDRESS FOR FURTHER ACTIONS

PROGRAM LISTING

```
                START.
0000  84D4        CPCR = BUSSB - 1.        TEST EXT BUSS
                  TESTNUMBERLIMIT   VALUE IS 20.
0001  F000        WAIT.
```

OPERATOR INSTRUCTIONS

PROG STEP	INCR	OPERATOR ACTION
1	0001	VERIFY INITIAL SET UP ALSO SEE NOTES BELOW. FORCE STEP

NOTES

ERROR NOTED ON INITIAL SET-UP - ERROR #E20

IF SYSTEM POWERS OFF DURING ANY TEST OTHER THAN POWER OFF TEST - FAILURE #F389

IN A FEW ERROR CONDITIONS THE PROGRAM WILL BE LOOPING AND THE INCREMENTER INDICATORS WILL APPEAR AS A FALSE ERROR ADDRESS. TO PREVENT THIS PROBLEM, WHENEVER THE INCREMENTER APPEARS TO HAVE STOPPED ON AN ERROR, THE OPERATOR SHOULD PUT THE SGL/NOR SWITCH TO SGL AND PRESS AND RELEASE SGL PUSHBUTTON UNTIL EITHER IT IS DETERMINED THAT THE INCREMENTER VALUE IS NOT CHANGING, OR THAT THE HIGHEST INCREMENTER VALUE IS OBTAINED FROM THE LOOP. RETURN SGL/NOR SWITCH TO NOR

2	000F	PRESS CONSOLE READY BUTTON.
3	001A	VERIFY MIR DIGIT B = CONSOLE PORT ADDRESS-(PORT # MINUS ONE)* FORCE STEP.
4	0034	26 INCH CARRIAGE - FORCE STEP 15 INCH CARRIAGE - PRESS READY BUTTON AND FORCE STEP.
5	0038	NORMAL TEST SEQUENCE - FORCE STEP. TEST SELECTOR DESIRED PRESS READY AND FORCE STEP.
6	003F	PRESS PK01
7	005E	ALL INDICATORS OFF - FORCE STEP*
8	0061	ALL 'A' INDICATORS ON, ALL OTHER INDICATORS OFF - FORCE STEP.
9	0070	ALL 'B' INCICATORS ON, ALL OTHER INDICATORS OFF - FORCE STEP.
10	007A	ALL 'C' INCICATORS ON - FORCE STEP.
11	0084	ALL 'D' INDICATORS ON - FORCE STEP.
12	008E	ALL 'S' INDICATORS ON - FORCE STEP.
13	0091	PRESS READY BUTTON
14	00A4	PRESS PK01
15	00D8	PORT SELECT CARD ENABLE STATUS GATING TEST - SEE INCR 00D8 FORCE STEP TO CONTINUE
16	00DE	PRESS PK02, PK03, PK04, - INCR STEPS WHEN AND ONLY WHEN PK04 PRESSED.
17	0138	PLATEN OPENED AND CLOSED TWICE AND ALARM SOUNDED TWICE - FORCE* STEP.
18	0165	CARRIER AT RIGHT MARGIN - FORCE* STEP.
19	01C7	CARRIER TEST PRINTOUT CORRECT (SEE FIG. 1), AND NO INDICATORS* ON - FORCE STEP
20	0247	PLATEN ADV TEST PRINTOUT CORRECT (SEE FIG. 2) AND CARRIER OPERATION NORMAL - FORCE STEP.
21	029B	PRINTER ESCAPE TEST PRINTOUT CORRECT (SEE FIG. 4), NO INDICATORS ON AND CARRIER OPERATION NORMAL - FORCE STEP.
22	02AF	KEYBOARD TEST - SEE INCR 02AF FOR INSTRUCTIONS.

23	02F0	KEYBOARD TEST PRINTOUT CORRECT (SEE FIG. 7) - FORCE STEP.
24	066D	SELECT TESTS -ENTER 2 KEYS TO SELECT (EXAMPLE: 06 = TEST 6), IF CONSOLE HAS A 96 CHARACTER DECODER, SELECT TEST 0 (00) BEFORE SELECTING ANY OTHER TESTS. WHEN NUMERIC LIGHT IS ON SELECT TEST 6.
25	03A3	CARRIER EXHAUSTIVE TEST PRINTOUT CORRECT (SEE FIG. 3) AND CARRIER OPERATION NORMAL - FORCE STEP.
26	066D	SELECT TEST 7 (NUMERIC 07)
27	0420	TILT-ROTATE TEST PRINTOUT CORRECT (SEE FIG. 5) - FORCE STEP.
28	066D	SELECT TEST 8 (NUMERIC 08)
29	045C OR 04A3	ALL CHARACTERS TEST PRINTOUT CORRECT (SEE FIG. 6) - FORCE STEP.
30	066D	SELECT TEST 9 (NUMERIC 09)
31	04B3	INSTALL A JUMPER FROM CC1E CARD PIN 2Y TO GROUND AND FORCE STEP
32	04C8	REMOVE JUMPER AND FORCE STEP.
33	066D	IF FURTHER KEYBOARD TESTING DESIRED SELECT TEST 10, OTHERWISE GO TO STEP 35.
34	05AC	SEE INCR 05AC FOR INSTRUCTION
35	066D	SELECT TEST 11 (NUMERIC 11)
36	0532	PLACE CC3E MOTOR SWITCH TO NORMAL POSITION. IF MOTOR TURNS OFF WITHIN 50 SECONDS - FORCE STEP.
37	0538	DECODER MOTOR TURNED ON AND REMAINED ON FOR 20 TO 50 SEC. WHEN MOTOR OFF FORCE STEP.
38	053E	DECODER MOTOR TURNED ON AND REMAINED ON FOR 20 TO 50 SEC. WHEN MOTOR OFF FORCE STEP.
39	0544	DECODER MOTOR TURNED ON AND REMAINED ON FOR 20 TO 50 SEC. WHEN MOTOR OFF FORCE STEP.
40	054A	DECODER MOTOR TURNED ON AND REMAINED ON FOR 20 TO 50 SEC. WHEN MOTOR OFF FORCE STEP.
41	0550	DECODER MOTOR TURNED ON AND REMAINED ON FOR 20 TO 50 SEC. WHEN MOTOR OFF FORCE STEP.
42	055C	DECODER MOTOR REMAINED OFF. FORCE STEP
43	066D	IF CONSOLE HAS AN END OF PAPER DETECTOR SELECT TEST 12 (NUMERIC 12) OTHERWISE GO TO STEP 46.
44	0561	REMOVE PAPER FROM END OF PAPER DETECTOR AND FORCE STEP.
45	067E	REPLACE PAPER IN END OF PAPER DETECTOR AND FORCE STEP.
46	066D	SELECT TEST 14, IF SYSTEM POWERS OFF END OF MTR

TEST SELECT TABLE

NUMERIC	TEST
00	FLAG 96 CHARACTER PRINTER
01	FORMS TEST
02	CARRIER TEST
03	PLATEN ADVANCE TEST
04	PRINTER ESCAPE TEST
05	KEYBOARD TEST
06	CARRIER EXHAUSTIVE TEST
07	TILT-ROTATE TEST
08	PRINT ALL CHARACTERS TEST
09	OVER SPEED TEST
10	KEYBOARD PRINT TEST - RDY BUTTON TERMINATE
11	MOTOR ON OFF TEST
12	PAPER OUT TEST
13	SPARE
14	POWER OFF TEST
15	INDICATOR SHORT TEST - READY BUTTON TERMINATE - FACTORY USE
16	64 CHARACTER DECODER EXERCISER - NO PRINT OR ESCAPE BITS SET---DEBUG USE
17	64 CHARACTER DECODER EXERCISER - PRINT SET NO ESCAPE BIT---DEBUG USE
18	96 CHARACTER DECODER EXERCISER - NO PRINT OR ESCAPE BITS SET---DEBUG USE
19	96 CHARACTER DECODER EXERCISER - PRINT SET NO ESCAPE BIT---DEBUG USE
20	SPARE

```
0002  F00C        RESET  GC1.
0003  F01F        RESET  GC2.
0004  F0BD        IF  NOT IRQ  SKIP.            INTERUPT  CHECK
0005  F0F7        SKIP.
0006  400A        MPCR = TSTIRQ1   - 1.
0007  F000        WAIT.                         INTERRUPT  DETECTED
                  **********ERROR        # E2
0008  F108        ASR  BEX.
0009  F0E1        MIR = B.
000A  F000        WAIT.
                  **********ERROR        # E3
                   TSTIRQ1.
000B  F1AD        IF  NOT SRQ  SKIP.
000C  F000        WAIT.
                  *********ERROR      # E 77
000D  F1AE        IF  NOT URQ SKIP.
000E  F000        WAIT.
                  *********ERROR      # E 78
000F  F0F8        WHEN IRQ  STEP.
                  **********PRESS          READY  BUTTON  ON  CONSOLE
                  **********IF         INCR  DOES  NOT STEP  -  ERROR  #  E4
0010  84DB        CPCR = BUSSC  -  1.           TEST  EXT  BUSS
                   TSTIRQ1A.
0011  F108        ASR  BEX.
0012  F057        A3  =  LIT  L.
0013  C80F        SAR  =  8  LIT  =  @0F@.
0014  F130        A3  =  A3  AND  B.            STRIP  STATUS
0015  F03D        A3  EQV  B000.
0016  F0B5        IF  NOT ABT  SKIP.
0017  401F        MPCR = TSTIRQ1B   - 1.
0018  F0DE        MIR = A3.
0019  F032        A2 = A3.
001A  F000        WAIT.
                  *********OBSERVE       MIR  AND  VERIFY  DIGIT  B  =  CONSOLE  PORT
                  *********ADDRESS       (PORT  ADDRESS  =  PORT  #  MINUS  1  )
                  *********IF      AGREE  FORCE  STEP--DISAGREE     -  ERROR  #  E  4A
001B  F02F        A2  =  A2  OR  LIT.
001C  E008        LIT  =  8.
001D  F116        A2  EQV  B.
001E  F0B5        IF  NOT ABT  SKIP.            TEST  STATUS  =  0P08
001F  4025        MPCR = TSTKBDI  -  1.
                   TSTIRQ1B.
0020  F0E1        MIR = B.                      MIR = STAT  &  DEV  ADDR
0021  F000        WAIT.                         STATUS  ERROR  ON  RDY  STATUS
                  **********ERROR        # E5
0022  F05E        ASR.
0023  F000        WAIT.
0024  F0F9        WHEN RDC  BEX.
0025  F000        WAIT.
                   TSTKBDI.                     TEST  KBD  DINT
0026  F071        B  =  A3.
0027  F16E        BR2  =  B.
0028  F07A        B  =  B1TT.                   SET  INST  BIT
0029  F0D5        MAR1 = B.
002A  F0BD        IF  NOT IRQ  SKIP.
002B  F000        WAIT.                         STINT  NOT  RESET  BY  ASR
                  **********ERROR        # E6
002C  F07B        B  =  B000.
002D  F05F        B.
002E  F18D        IF  IRQ  ASR  BEX  JUMP.
002F  F0FF        0  EQV  B.
0030  F09D        IF  ABT  SKIP.
0031  F000        WAIT.
                  **********DEVICE         OPERATION  SUCC  FAILURE
                  **********ERROR        # E 66
0032  F05F        B.
0033  F05F        B.
0034  F000        WAIT.
                  *********IF      CONSOLE  HAS  A  26  INCH  CARRIAGE  FORCE  STEP.
                  *********IF      CONSOLE  HAS  A  15  INCH  CARRIAGE  PRESS
                  *********READY      BUTTON  AND  FORCE  STEP.
```

```
0035  F0BD        IF  NOT IRQ  SKIP.
0036  F0F6        SET  GC2.                     SET  15  INCH  FLAG
0037  F108        ASR  BEX.                     RESET  STINT
0038  F000        WAIT.
                  **********IF         PERFORMING  MTR  IN  PROPER  SEQUENCE
                  **********FORCE         STEP.
                  **********FOR         OUT  OF  SEQUENCE  TEST  SELECTOR  PRESS
                  **********READY         BUTTON  AND  FORCE  STEP.
0039  F0BD        IF  NOT IRQ  SKIP.
003A  44E0        MPCR = TSELR   - 1.
003B  F0CA        LCTR.
003C  E06F        LIT  =  @6F@.
003D  F128        A2  =  Z.                     A2  =  IND  A  DATA  WORD
003E  E0FF        LIT  =  @FF@.
003F  F0F8        WHEN IRQ  STEP.
                  **********PRESS          PK01  ON  CONSOLE
                  **********IF         INCR  DOES  NOT STEP  -  ERROR  #  7
0040  84DB        CPCR = BUSSC  -  1.           TEST  EXT  BUSS
0041  F108        ASR  BEX.
0042  F01C        A1  =  BMAR.
0043  F011        A1  =  A1  +  LIT.
0044  E010        LIT  =  @10@.
0045  F003        A1  EQV  B.                   CHECK  DEV  ADDR  &  KDI
0046  F0B5        IF  NOT ABT  SKIP.
0047  8049        CPCR = INHTST  -  1.
0048  F0E1        MIR = B.
0049  F000        WAIT.                         DINT  OR  KBD  RDY  BIT  NOT  SET
                  **********ERROR        # E8
                   INHTST.
004A  F097        DR2  BEX.                     RESET  KBD  DINT
004B  F16C        BR1  =  LIT  L.
004C  C88F        SAR  =  8  LIT  =  @8F@.
004D  F099        DW1.                          DESELECT  CONSOLE
004E  F05F        B.
004F  8641        CPCR = RSTBR1  -  1.
0050  F18E        IF  IRQ  SKIP.
0051  4053        MPCR = INHTST1A   -  1.
0052  F000        WAIT.                         INTERRUPT  NOT  RESET
                  **********ERROR        # E12
0053  4049        MPCR = INHTST  -  1.
                   INHTST1A.
0054  F07B        B  =  B000.
0055  F108        ASR  BEX.                     ASR  WHILE  IRQ  NOT  SET
0056  F0FF        0  EQV  B.
0057  F09D        IF  ABT  SKIP.
0058  F000        WAIT.
                  *********ERROR      # E 76
0059  F0CA        LCTR.
005A  E060        LIT  =  @60@.
005B  F0EF        MIR = Z.
005C  E000        LIT  =  0.
005D  F098        DW2.
005E  F000        WAIT.
                  **********IF         ALL  INDICATORS  ARE  OFF  FORCE  STEP
                  **********IF         DISAGREE  -  ERROR  #  E11
005F  F0DD        MIR = A2.
0060  F098        DW2.
0061  F000        WAIT.                         OBSERVE  INDICATORS
                  **********IF         ALL  A  INDICATORS  ARE  ON  AND  ALL  OTHER
                  **********INDICATORS         ARE  OFF,  FORCE  STEP
                  **********IF         DISAGREE  -  ERROR  #  E13
0062  F098        DW2.
0063  F0CA        LCTR.
0064  E06F        LIT  =  @6F@.
0065  F0EF        MIR = Z.
0066  E000        LIT  =  @00@.
0067  F098        DW2.
0068  F05F        B.
0069  F0CA        LCTR.
006A  E077        LIT  =  @77@.
006B  F0EF        MIR = Z.
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006C  E0FF        LIT  = @FF@.
006D  F098        DW2.
006E  F0EF        MIR  = Z.
006F  E099        LIT  = @99@.
0070  F000        WAIT.
                  **************IF        ALL B INDICATORS   ARE ON AND ALL OTHER
                  **************INDICATORS          ARE OFF,  FORCE STEP
                  **************IF        DISAGREE  -  ERROR # E14
0071  E000        LIT  = @00@.
0072  F0EF        MIR  = Z.
0073  F098        DW2.
0074  F05F        B.
0075  F0CA        LCTR.
0076  E07B        LIT  = @7B@.
0077  F0EF        MIR  = Z.
0078  E0FF        LIT  = @FF@.
0079  F098        DW2.
007A  F000        WAIT.
                  **************IF        ALL C INDICATORS   ARE ON FORCE STEP
                  **************IF        DISAGREE  -  ERROR # E15
007B  E000        LIT  = @00@.
007C  F0EF        MIR  = Z.
007D  F098        DW2.
007E  F05F        B.
007F  F0CA        LCTR.
0080  E07D        LIT  = @7D@.
0081  F0EF        MIR  = Z.
0082  E0FF        LIT  = @FF@.
0083  F098        DW2.
0084  F000        WAIT.
                  **************IF        ALL D INDICATORS   ARE ON FORCE STEP
                  **************IF        DISAGREE  -  ERROR # E16
0085  E000        LIT  = @00@.
0086  F0EF        MIR  = Z.
0087  F098        DW2.
0088  F05F        B.
0089  F0CA        LCTR.
008A  E07E        LIT  = @7E@.
008B  F0EF        MIR  = Z.
008C  E00F        LIT  = @0F@.
008D  F098        DW2.
008E  F000        WAIT.
                  **************IF        ALL S INDICATORS   ARE ON FORCE STEP
                  *************       IF  DISAGREE  -  ERROR # 17
008F  F05F        B.
0090  F05F        B.
0091  F0FD        WHEN URQ STEP.
                  **************PRESS          READY BUTTON
                  **************IF        INCR  DOES  NOT STEP  -  ERROR # E18
0092  F096        DR1 BEX.
0093  F01D        A1  = LIT.
0094  E008        LIT  = @08@.
0095  F003        A1  EQV B.
0096  F0B5        IF  NOT ABT SKIP.
0097  8099        CPCR = SRQTST  -  1.
0098  F0E1        MIR  = B.
0099  F000        WAIT.                              RDY BIT  NOT IN STAT  WORD
                  **************ERROR         # E19
                   SRQTST.
009A  F0CA        LCTR.
009B  E060        LIT  = @60@.
009C  F0EF        MIR  = Z.
009D  E000        LIT  = 0.
009E  F098        DW2.                               TURN OFF  ALL  INDICATORS
009F  F0CA        LCTR.
00A0  E06F        LIT  = @6F@.
00A1  F0EF        MIR  = Z.
00A2  E001        LIT  = @01@.
00A3  F098        DW2.                               LIGHT  IND  A1
00A4  F0FC        WHEN SRQ  STEP.
                  **************PRESS          PK01
                  **************IF        INCR  DOES  NOT STEP  -  ERROR # E21
00A5  F096        DR1 BEX.                           GET  STATUS  WORD
00A6  F033        A2  = B.
00A7  F1AD        IF  NOT SRQ  SKIP.
00A8  F0F7        SKIP.
00A9  F000        WAIT.                              DINT  RESET  BY  STATUS  READ
                  **********ERROR       # E 71
00AA  F080        B  = BMAR.
00AB  F078        B  = B0TT.
00AC  F0D5        MAR1 = B.
00AD  F033        A2  = B.                           SAVE  ADDR
00AE  F1D5        MIR  = B001   + 1.
00AF  F0F3        MW1.                               INITIALIZE     MEMORY
00B0  F05F        B.
00B1  F0F1        MR1.
00B2  F05F        B.
00B3  F1AD        IF  NOT SRQ  SKIP.
00B4  F0F7        SKIP.
00B5  F000        WAIT.                              MEMORY READ  DESELECTED
                  **********ERROR       # E 72       OR CAUSED  DATA READ
                   MRDDST.
00B6  F07B        B  = B000.
00B7  F0D5        MAR1 = B.                          START  PORT
00B8  F0E6        MIR  = B000.
00B9  F099        DW1.                               DESELECT   WITH  WRITE
00BA  F05F        B.
                   MRDDSL.
00BB  F096        DR1 BEX.                           READ  OTHER  PORT
00BC  F080        B  = BMAR.
00BD  F07D        B  = B C.
00BE  F07E        B  = B + 1.
00BF  F0CB        LIT  EQV B.
00C0  E010        LIT  = @10@.
00C1  F0B5        IF  NOT ABT SKIP.
00C2  40C8        MPCR = MRDDSLA -  1.
00C3  F07D        B  = B C.
00C4  F0D5        MAR1 = B.
00C5  F116        A2  EQV B.                         PORT  UNDER  TEST
00C6  F09D        IF  ABT SKIP.
00C7  40BA        MPCR = MRDDSL -  1.
00C8  40BB        MPCR = MRDDSL.
                   MRDDSLA.
00C9  8641        CPCR = RSTBR1  -  1.
00CA  F096        DR1 BEX.                           RESELECT
00CB  F05F        B.
00CC  F1AD        IF  NOT SRQ  SKIP.
00CD  40D0        MPCR = MRDDSLB -  1.
00CE  F0BD        IF  NOT IRQ  SKIP.
00CF  F000        WAIT.
                  **********READ      DID  NOT SELECT
                  **********ERROR       # 73
00D0  F000        WAIT.
                  **********DINT       RESET  BY  READ  TO ANOTHER  PORT
                  **********ERROR       # E 74
                   MRDDSLB.
00D1  F108        ASR BEX.
00D2  F05F        B.
00D3  F1AD        IF  NOT SRQ  SKIP.
00D4  F0F7        SKIP.
00D5  F000        WAIT.
                  **********ERROR       # E 75
00D6  864B        CPCR = DESELRSETI   -  1.  DESELECT
00D7  F05E        ASR.
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00D8  F000          WAIT.
                  *********PORT       SELECT  CARD ENABLE  STATUS  GATING  TEST.
                  *********TO         VERIFY  ONLY THE DEVICE  GENERATING  AN
                  *********INTERRUPT        IS  ADDRESSED  BY  ASR,  METER  THE
                  *********FOLLOWING       SIGNALS.   THE  CONSOLE  PORT  SHOULD
                  *********READ       0%  -  ALL  OTHERS  SHOULD  READ  100%
                  *********IF         AGREE  FORCE  STEP
                  *********IF         DISAGREE  -  ERROR  #  E  80
                  *
                  **        PORT          PS1-1
                  **
                  **          1       2B(PSENST1/)
                  **          2       1K(PSENST2/)
                  **          3       1J(PSENST3/)
                  **          4       2J(PSENST4/)
                  **                                    PS1-2
                  **
                  **          5                   2B(PSENST5/)
                  **          6                   1K(PSENST6/)
                  **          7                   1J(PSENST7/)
                  **          8                   2J(PSENST8/)
                  **                                              PS1-3
                  **
                  **          9                                 2B(PSENST09/)
                  **         10                                 1K(PSENST10/)
                  **         11                                 1J(PSENST11/)
                  **         12                                 2J(PSENST12/)
                  **
                  **        NOTE:  SYSTEM  MAY  HAVE  1,  2  OR  3  PS1  CARDS
                  *
00D9  8685          CPCR  =  TSTDEVOP  -  1.
00DA  E090          LIT  =  @90@.
00DB  F0EE          MIR  =  LIT  L.
00DC  D800          SAR  =  8.
00DD  F098          DW2.                          TURN  OFF  IND  A1
00DE  F0FD          WHEN URQ STEP.
                  ********PRESS        PK02,   PK03,   PK04  AND  VERIFY   THAT  THE
                  *********INCREMENTER        STEPS  WHEN AND ONLY  WHEN THE
                  *********THIRD        KEY  (PK04)     IS  PRESSED.
                  *********IF         DISAGREE---ERROR      #  E  8A
00DF  F05F          B.
00E0  F1AE          IF  NOT  URQ  SKIP.
00E1  40E8          MPCR  =  INTNH  -  1.
00E2  F096          DR1  BEX.
00E3  F0E1          MIR  =  B.
00E4  F000          WAIT.                         MIR  =  STATUS  WORD
                  *********ERROR       #  E9
                   INTNH1.
00E5  F097          DR2  BEX.                     READ  DATA  BUFF
00E6  F0E1          MIR  =  B.
00E7  F000          WAIT.
00E8  40E4          MPCR  =  INTNH1  -  1.
                   INTNH.
00E9  84DB          CPCR  =  BUSSC  -  1.         TEST  EXT  BUSS
00EA  F108          ASR  BEX.
00EB  F05F          B.
00EC  F1B5          IF  URQ  SKIP.                TEST  STINT
00ED  F000          WAIT.                         ASR  DID  STATUS  READ
                  *********ERROR       #  E  79
00EE  F096          DR1  BEX.
00EF  F0CA          LCTR.
00F0  E07F          LIT  =  @7F@.
00F1  F115          A1  =  Z.
00F2  E014          LIT  =  @14@.
00F3  F003          A1  EQV  B.
00F4  F0B5          IF  NOT  ABT  SKIP.
00F5  80F7          CPCR  =  INDTST  -  1.
00F6  F0E1          MIR  =  B.
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00F7  F000          WAIT.                         KBD  DINT  NOT  HONORED  BIT
                  *                               NOT  SET  IN  STATUS  WORD
                  *************ERROR       #  E10
                   INDTST.
00F8  F097          DR2  BEX.                     RESET  KBD  DINT
00F9  F05F          B.
00FA  F097          DR2  BEX.
00FB  F05F          B.
00FC  F097          DR2  BEX.
00FD  F0E1          MIR  =  B.
00FE  F1AD          IF  NOT  SRQ  SKIP.
00FF  F000          WAIT.                         BUFFERED  DINTS  NOT  RESET
                  *********ERROR       #  E  9B
                   ENABFMS.
0100  F0EA          MIR  =  LIT.
0101  E008          LIT  =  @08@.
0102  F099          DW1.                          ENABLE  FORMS
0103  F0FC          WHEN SRQ  STEP.               DINT  NOT  SET  BY  FORMS  READY
                  *************ERROR       #  E23
0104  84DB          CPCR  =  BUSSC  -  1.         TEST  EXT  BUSS
0105  F096          DR1  BEX.
0106  F0CA          LCTR.
0107  E07F          LIT  =  @7F@.
0108  F115          A1  =  Z.
0109  E040          LIT  =  @40@.
010A  F018          SET  LC1.
010B  F003          A1  EQV  B.
010C  F0B5          IF  NOT  ABT  SKIP.
010D  810F          CPCR  =  OCPLAT  -  1.
010E  F0E1          MIR  =  B.
010F  F000          WAIT.                         STATUS  FAILURE
                  *************ERROR       #  E24
                   OCPLAT.
0110  F0CA          LCTR.
0111  E03F          LIT  =  @3F@.
0112  D800          SAR  =  8.
0113  F01D          A1  =  LIT.
0114  E0C0          LIT  =  @C0@.
0115  F10B          A1  =  A1  C.
0116  F0EF          MIR  =  Z.
0117  E009          LIT  =  @09@.
0118  F098          DW2.                          OPEN  PLATEN  SOUND  ALARM
0119  F05F          B.
011A  F1AD          IF  NOT  SRQ  SKIP.
011B  F000          WAIT.                         FORMS  DINT  NOT  RESET
                  *************ERROR       #  E22
011C  F0DB          MIR  =  A1.
011D  E004          LIT  =  @04@.
011E  F0CA          LCTR.
011F  F0F5          SAVE.
0120  F0FC          WHEN SRQ  STEP.
                  *************DINT          NOT  SET  WHEN  FORMS  READY
                  *************ERROR       #  E25
0121  F098          DW2.                          RESET  DINT  WITH  DUMMY  FORMS
0122  F030          INC.
0123  F0B9          IF  NOT  COV  JUMP.           NUMBER  OF  DINTS  =  4
0124  F0CA          LCTR.
0125  E03F          LIT  =  @3F@.
0126  F0EF          MIR  =  Z.
0127  E004          LIT  =  @04@.
0128  F0CA          LCTR.
0129  F0FC          WHEN SRQ  STEP.
012A  F098          DW2.                          CLOSE  PLATEN
012B  E0C0          LIT  =  @C0@.
012C  F0EE          MIR  =  LIT  L.
012D  F0F5          SAVE.
012E  F0FC          WHEN SRQ  STEP.
012F  F098          DW2.                          RESET  DINT  WITH  DUMMY  FORMS
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0130  F030          INC.
0131  F0B9          IF  NOT  COV  JUMP.          NUMBER  OF  DINTS  =  4
0132  F0BF          IF  NOT  LC1  SKIP.
0133  810F          CPCR  =  OCPLAT  -  1.
0134  F0BA          IF  NOT  EXT  SKIP.
0135  F0A0          IF  EXT  SKIP.
0136  F0F7          SKIP.
0137  410F          MPCR  =  OCPLAT  -  1.
0138  F000          WAIT.
                ************PLATEN        SHOULD  HAVE  OPENED  AND  CLOSED
                ************TWICE          AND  ALARM  SOUNDED  TWICE
                ************IF          NORMAL  FORCE  STEP
                ************IF          DISAGREE  ERROR  #  E  27
0139  F0BA          IF  NOT  EXT  SKIP.
013A  F0A0          IF  EXT  SKIP.
013B  F0F7          SKIP.
013C  410F          MPCR  =  OCPLAT  -  1.
013D  F0BB          IF  NOT  GC1  SKIP.
013E  44E0          MPCR  =  TSELR  -  1.
                CARRTST.                        CARRIER  TEST
013F  F01D          A1  =  LIT.
0140  E010          LIT  =  @10@.
0141  F0EA          MIR  =  LIT.
0142  F099          DW1.                        ENABLE  CARRIER
0143  F0CA          LCTR.
0144  E07F          LIT  =  @7F@.
0145  F115          A1  =  Z.
0146  E080          LIT  =  @80@.
0147  F0FC          WHEN SRQ  STEP.
                ************DINT          NOT  SET  WHEN CARRIER  RDY
                ************ERROR          #  E  28
0148  84DB          CPCR  =  BUSSC  -  1.       TEST  EXT  BUSS
0149  F096          DR1  BEX.                   READ  STATUS  WORD
014A  F003          A1  EQV  B.
014B  F0B5          IF  NOT  ABT  SKIP.
014C  414E          MPCR  =  NTRCARTST  -  1.
014D  F0E1          MIR  =  B.
014E  F000          WAIT.                       CARRIER  ENABLE  BIT  NOT  SET
                ************ERROR          #  E  29
                NTRCARTST.
014F  D800          SAR  =  8.
0150  E002          LIT  =  @02@.
0151  F0EE          MIR  =  LIT  L.
0152  F098          DW2.                        INITIALIZE  RIGHT
0153  F05F          B.
0154  F1AD          IF  NOT  SRQ  SKIP.
0155  F0F7          SKIP.
0156  4159          MPCR  =  NTRCARTST1  -  1.
0157  F0BA          IF  NOT  EXT  SKIP.
0158  F0A0          IF  EXT  SKIP.
0159  F000          WAIT.                       CARRIER  DINT  NOT  RESET
                ************ERROR          #  E  30
                NTRCARTST1.
015A  F0F5          SAVE.
015B  F1AE          IF  NOT  URQ  SKIP.
015C  84C9          CPCR  =  CARERR  -  1.      STINT  WHILE  POSITIONING
                *********ERROR        #  E50     CARRIER.
015D  F0BA          IF  NOT  EXT  SKIP.
015E  F0A0          IF  EXT  SKIP.
015F  F0F7          SKIP.
0160  414E          MPCR  =  NTRCARTST  -  1.
0161  F1AD          IF  NOT  SRQ  SKIP.
0162  F0F7          SKIP.
0163  F0C9          JUMP.
                ************DINT          NOT  SET  AFTER  CARRIER  INITIALIZED
                ************ERROR          #  E  31
0164  F05F          B.
0165  F000          WAIT.
                ************CARRIER          AT  RIGHT  MARGIN  IF  AGREE  FORCE  STP
                ************IF          DISAGREE  ERROR  #  E59
0166  F0BA          IF  NOT  EXT  SKIP.
0167  F0A0          IF  EXT  SKIP.
0168  F0F7          SKIP.
0169  414E          MPCR  =  NTRCARTST  -  1.
016A  F0EA          MIR  =  LIT.
016B  E004          LIT  =  @04@.
016C  F099          DW1.                        ENABLE  PRINTER
016D  F05F          B.
016E  F0FC          WHEN SRQ  STEP.
                ************DINT          NOT  SET  WHEN PRINTER  READY
                ************ERROR          E  32
016F  84DB          CPCR  =  BUSSC  -  1.       TEST  EXT  BUSS
0170  F096          DR1  BEX.                   READ  STATUS  WORD
0171  F0CA          LCTR.
0172  E07F          LIT  =  @7F@.
0173  F115          A1  =  Z.
0174  E020          LIT  =  @20@.
0175  F003          A1  EQV  B.                 CHECK  PRINTER  RDY  BIT
0176  F0B5          IF  NOT  ABT  SKIP.
0177  8179          CPCR  =  PRTRTMG  -  1.
0178  F0E1          MIR  =  B.
0179  F000          WAIT.                       PRNTR  RDY  BIT  NOT  IN  STATUS
                ************ERROR          E  52
                PRTRTMG.
017A  F0CA          LCTR.
017B  E0BE          LIT  =  @BE@.
017C  F128          A2  =  Z.                   A2  =  PRTR  DATA  WORD
017D  E041          LIT  =  @41@.
017E  F0EF          MIR  =  Z.
017F  F098          DW2.                        PRINT  A AT  RIGHT  MARGIN
0180  F05F          B.
0181  F1AD          IF  NOT  SRQ  SKIP.
0182  F000          WAIT.                       PRINTER  DINT  NOT  RESET
                ************ERROR          #  E51
0183  F0EA          MIR  =  LIT.
0184  E010          LIT  =  @10@.
0185  F0FC          WHEN SRQ  STEP.
                ************DINT          NOT  SET  WITH  PRINT  COMPLETE
                ************ERROR          #  E  33
0186  F099          DW1.                        ENABLE  CARRIER
0187  F0EA          MIR  =  LIT.
0188  E004          LIT  =  4.
0189  F0FC          WHEN SRQ  STEP.
                ************ERROR          #  70
                ************PRINTER          CLEAR  INHIBITING  CARRIER  DINT
018A  F098          DW2.                        STALL  CARRIER
018B  F05F          B.
018C  F1AD          IF  NOT  SRQ  SKIP.
018D  F000          WAIT.                       CARRIER  DINT  NOT  RESET
                ************ERROR          #  E55
018E  F0FD          WHEN URQ  STEP.
                ************STALL          FLAG  NOT  SETTING  STINT
                ************ERROR          #  E56
018F  84DB          CPCR  =  BUSSC  -  1.       TEST  EXT  BUSS
0190  F096          DR1  BEX.
0191  F05F          B.
0192  F0C3          IF  NOT  LST  SKIP.
0193  4195          MPCR  =  PRTRTMGA  -  1.
0194  F0E1          MIR  =  B.
0195  F000          WAIT.
                ************STALL          FLAG  NOT  SET  IN  STATUS.
                ************ERROR          #  E57
                PRTRTMGA.
0196  F1AE          IF  NOT  URQ  SKIP.
0197  F000          WAIT.
                ************STALL          FLAG  NOT  RESETTING
                ************ERROR          #  E64
                PRTRTMGA2.
0198  F0CA          LCTR.
0199  E0FE          LIT  =  @FE@.
019A  F05F          B.
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019B  E095          LIT  = @95@.
019C  F0A2          IF  GC2  SKIP.                  TEST  15  INCH  FLAG
019D  E0FF          LIT  = @FF@.
019E  F0EF          MIR  = Z.
019F  F0FC          WHEN SRQ  STEP.
                ************ERROR          #  E68
01A0  F098          DW2.                            MOVE CARR 256   POSITIONS
                  PRTRTMGA3.
01A1  F0BA          IF  NOT  EXT  SKIP.
01A2  F0A0          IF  EXT  SKIP.
01A3  F0F7          SKIP.
01A4  4197          MPCR = PRTRTMGA2  -  1.
01A5  F1AE          IF  NOT  URQ SKIP.
01A6  84C9          CPCR = CARERR  -  1.            STINT  WHILE  POSITIONING
                *********ERROR       #  E65         CARRIER.
01A7  0197          AMPCR = PRTRTMGA2  -  1.
01A8  F1AD          IF  NOT  SRQ  SKIP.
01A9  F0F7          SKIP.
01AA  41A0          MPCR = PRTRTMGA3  -  1.
                ************DINT          NOT  SET  WHEN CARR AT  LEFT  MARGIN
                ************ERROR          E  34
01AB  F096          DR1  BEX.                       READ  DEVICE  STATUS
01AC  F0CA          LCTR.
01AD  E07F          LIT  = @7F@.
01AE  F115          A1  = Z.
01AF  E080          LIT  = @80@.
01B0  F003          A1  EQV  B.
01B1  F0B5          IF  NOT  ABT  SKIP.
01B2  81B5          CPCR = PRTLTMG  -  1.
01B3  F0E1          MIR  = B.
01B4  F000          WAIT.                           STATUS  FAILURE
                ************ERROR          #  E58
01B5  4197          MPCR = PRTRTMGA2  -  1.
                  PRTLTMG.
01B6  F0EA          MIR  = LIT.
01B7  E004          LIT  = @04@.
01B8  F099          DW1.                            ENABLE  PRINTER
01B9  F05F          B.
01BA  F0DD          MIR  = A2.
01BB  F0FC          WHEN SRQ  STEP.
01BC  F098          DW2.                            PRINT  A  AT  LEFT  MARGIN
01BD  F0EA          MIR  = LIT.
01BE  E008          LIT  = @08@.
01BF  F0FC          WHEN SRQ  STEP.
01C0  F099          DW1.                            ENABLE  FORMS
01C1  F0CA          LCTR.
01C2  E03F          LIT  = @3F@.
01C3  F0EF          MIR  = Z.
01C4  E050          LIT  = @50@.
01C5  F0FC          WHEN SRQ  STEP.
01C6  F098          DW2.
01C7  F000          WAIT.                           OBSERVE  PRINTOUT
                ************IF          PRINTOUT  IS  NORMAL AND NO INDICATORS
                ************ARE           ON,  FORCE  STEP
                ************SEE           FIGURE  1.
                ************IF          DISAGREE  =  ERROR  #  E 35
01C8  F0BA          IF  NOT  EXT  SKIP.
01C9  F0A0          IF  EXT  SKIP.
01CA  F0F7          SKIP.
01CB  F0F7          SKIP.
01CC  F0BB          IF  NOT  GC1  SKIP.
01CD  44E0          MPCR = TSELR  -  1.
                  PLATADV.
01CE  F0EA          MIR  = LIT.
01CF  E004          LIT  = @04@.
01D0  F099          DW1.                            ENABLE  PRINTER
01D1  F0CA          LCTR.
01D2  E0BE          LIT  = @BE@.
01D3  F128          A2  = Z.
01D4  E041          LIT  = @41@.
01D5  F0EF          MIR  = Z.
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```
01D6  F0FC          WHEN SRQ  STEP.
01D7  F098          DW2.                            PRINT  A  AT  LEFT  MARGIN
01D8  F0EA          MIR  = LIT.
01D9  E008          LIT  = @08@.
01DA  F0FC          WHEN SRQ  STEP.                 WAIT  FOR  PRINT  COMPLETE
01DB  F099          DW1.                            ENABLE  FORMS
01DC  F0CA          LCTR.
01DD  E03F          LIT  = @3F@.
01DE  F0EF          MIR  = Z.
01DF  E050          LIT  = @50@.
01E0  F05F          B.
                  LOOPE.
01E1  E005          LIT  = @05@.
01E2  F0CA          LCTR.
01E3  F0F5          SAVE.
01E4  F0FC          WHEN SRQ  STEP.
01E5  F098          DW2.                            ADVANCE  BOTH  PLATENS
01E6  F030          INC.
01E7  F0B9          IF  NOT  COV  JUMP.             #  OF  PLATEN  ADVANCES  =  5
01E8  F0BA          IF  NOT  EXT  SKIP.
01E9  F0A0          IF  EXT  SKIP.
01EA  F0F7          SKIP.
01EB  41E0          MPCR = LOOPE  -  1.
01EC  F0EA          MIR  = LIT.
01ED  E004          LIT  = @04@.
01EE  F0FC          WHEN SRQ  STEP.
01EF  F099          DW1.                            ENABLE  PRINTER
01F0  F0CA          LCTR.
01F1  E0BE          LIT  = @BE@.
01F2  F128          A2  = Z.
01F3  E041          LIT  = @41@.
01F4  F0DD          MIR  = A2.
01F5  F0FC          WHEN SRQ  STEP.
01F6  F098          DW2.                            PRINT  A  AT  LEFT  MARGIN
01F7  F0EA          MIR  = LIT.
01F8  E010          LIT  = @10@.
01F9  F0FC          WHEN SRQ  STEP.
01FA  F099          DW1.                            ENABLE  CARRIER
01FB  E095          LIT  = @95@.                    TEST  15  INCH  FLAG
01FC  F0A2          IF  GC2  SKIP.
01FD  E0FF          LIT  = @FF@.
01FE  F0EA          MIR  = LIT.
01FF  F0FC          WHEN SRQ  STEP.
0200  F098          DW2.                            CARR  MOVE  256   POS  RIGHT
0201  F0F5          SAVE.
0202  F1AE          IF  NOT  URQ SKIP.
0203  84C9          CPCR = CARERR  -  1.            STINT  WHILE  POSITIONING
                *********ERROR       #  E62         CARRIER.
0204  F1AD          IF  NOT  SRQ  SKIP.
0205  F0F7          SKIP.
0206  F0C9          JUMP.
0207  F0EA          MIR  = LIT.
0208  E004          LIT  = @04@.
0209  F099          DW1.                            ENABLE  PRINTER
020A  F0DD          MIR  = A2.
020B  F0FC          WHEN SRQ  STEP.
020C  F098          DW2.                            PRINT  A  AT  RIGHT  MARGIN
020D  F0EA          MIR  = LIT.
020E  E008          LIT  = @08@.
020F  F0FC          WHEN SRQ  STEP.
0210  F099          DW1.                            ENABLE  FORMS
0211  F0CA          LCTR.
0212  E03F          LIT  = @3F@.
0213  F0EF          MIR  = Z.
0214  E050          LIT  = @50@.
0215  F05F          B.
0216  E005          LIT  = @05@.
0217  F0CA          LCTR.
0218  F0F5          SAVE.
0219  F0FC          WHEN SRQ  STEP.
021A  F098          DW2.                            ADVANCE  BOTH  PLATENS
```

```
021B  F030          INC.
021C  F0B9          IF  NOT COV  JUMP.          # OF PLATEN  ADVANCES  = 5
021D  F0EA          MIR  = LIT.
021E  E004          LIT  = @04@.
021F  F0FC          WHEN SRQ  STEP.
0220  F099          DW1.                        ENABLE  PRINTER
0221  F0DD          MIR  = A2.
0222  F0FC          WHEN SRQ  STEP.
0223  F098          DW2.                        PRINT  A AT  RIGHT  MARGIN
0224  F0EA          MIR  = LIT.
0225  E010          LIT  = @10@.
0226  F0FC          WHEN SRQ  STEP.
0227  F099          DW1.                        ENABLE  CARRIER
0228  F0CA          LCTR.
0229  E0FE          LIT  = @FE@.
022A  F05F          B.
022B  E095          LIT  = @95@.
022C  F0A2          IF  GC2  SKIP.              TEST  15  INCH  FLAG
022D  E0FF          LIT  = @FF@.
022E  F0EF          MIR  = Z.
022F  F0FC          WHEN SRQ  STEP.
0230  F098          DW2.                        CARR  LEFT  256  POSITIONS
0231  F0F5          SAVE.
0232  F1AE          IF  NOT URQ SKIP.
0233  84C9          CPCR  = CARERR  -  1.       STINT  WHILE  POSITIONING
              *********ERROR     # E42           CARRIER.
0234  F1AD          IF  NOT SRQ  SKIP.
0235  F0F7          SKIP.
0236  F0C9          JUMP.
0237  F0EA          MIR  = LIT.
0238  E004          LIT  = @04@.
0239  F099          DW1.                        ENABLE  PRINTER
023A  F0DD          MIR  = A2.
023B  F0FC          WHEN SRQ  STEP.
023C  F098          DW2.                        PRINT  A AT  LEFT  MARGIN
023D  F0EA          MIR  = LIT.
023E  E008          LIT  = @08@.
023F  F0FC          WHEN SRQ  STEP.
0240  F099          DW1.                        ENABLE  FORMS
0241  F0CA          LCTR.
0242  E03F          LIT  = @3F@.
0243  F0EF          MIR  = Z.
0244  E051          LIT  = @51@.
0245  F0FC          WHEN SRQ  STEP.
0246  F098          DW2.                        ADV  BOTH  PLATENS  & SND  ALM.
0247  F000          WAIT.                       OBSERVE  PRINTOUT
              *************IF        PRINTOUT  GOOD AND CARRIER  OPERATION
              *************NORMAL,        FORCE  STEP
              *************SEE        FIGURE  2.
              *************IF        DISAGREE  = ERROR  #  E 37
0248  F0BA          IF  NOT EXT  SKIP.
0249  F0A0          IF  EXT  SKIP.
024A  F0F7          SKIP.
024B  F0F7          SKIP.
024C  F0BB          IF  NOT GC1  SKIP.
024D  44E0          MPCR  = TSELR  -  1.
            PRTESCTST.                          PRINTER  ESCAPE  TEST
024E  D800          SAR  = 8.
024F  F0EA          MIR  = LIT.
0250  E010          LIT  = @10@.
0251  F099          DW1.                        ENABLE  CARRIER
0252  F0EE          MIR  = LIT  L.
0253  E003          LIT  = @03@.
0254  F0FC          WHEN SRQ  STEP.
0255  F098          DW2.                        INITIALIZE     LEFT
0256  F0EA          MIR  = LIT.
0257  E004          LIT  = @04@.
0258  F0FC          WHEN SRQ  STEP.
0259  F099          DW1.                        ENABLE  PRINTER
025A  F0CA          LCTR.
025B  E0BE          LIT  = @BE@.
025C  F0EF          MIR  = Z.
025D  E05A          LIT  = @5A@.
025E  F0CA          LCTR.
025F  E0B6          LIT  = @B6@.
0260  F115          A1  = Z.
0261  E05A          LIT  = @5A@.
0262  F0FC          WHEN SRQ  STEP.
0263  F098          DW2.                        PRINT  Z IN  PLACE  BLACK
0264  F05F          B.
0265  E094          LIT  = @94@.
0266  F0A2          IF  GC2  SKIP.              TEST  15  INCH  FLAG
0267  E0FE          LIT  = @FE@.
0268  F0CA          LCTR.
0269  F0DB          MIR  = A1.
          PRBR.
026A  F0FC          WHEN SRQ  STEP.
026B  F098          DW2.                        PRINT  Z ESCAPE  RIGHT  -  BLAC
026C  F030          INC.
        LOOPBE.
026D  F1AD          IF  NOT SRQ  SKIP.
026E  426C          MPCR  = LOOPBE  -  1.
              *************DINT        NOT  RESET  ON RIGHT  EXCAPE
              *************ERROR        #  60
026F  F02E          IF  COV  SKIP.
0270  4269          MPCR  = PRBR  -  1.
0271  F0EE          MIR  = LIT  L.
0272  E040          LIT  = @40@.
0273  F0FC          WHEN SRQ  STEP.
0274  F098          DW2.                        COUNT  1  DINT  =  DUMMY PRINT
0275  F0CA          LCTR.
0276  E0BC          LIT  = @BC@.
0277  F0EF          MIR  = Z.
0278  E05A          LIT  = @5A@.
0279  F0CA          LCTR.
027A  E0B8          LIT  = @B8@.
027B  F115          A1  = Z.
027C  E05A          LIT  = @5A@.
027D  F0FC          WHEN SRQ  STEP.
027E  F098          DW2.                        PRINT  Z IN  PLACE  -  RED
027F  F05F          B.
0280  E094          LIT  = @94@.
0281  F0A2          IF  GC2  SKIP.              TEST  15  INCH  FLAG
0282  E0FE          LIT  = @FE@.
0283  F0CA          LCTR.
0284  F0DB          MIR  = A1.
          PRRR.
0285  F0FC          WHEN SRQ  STEP.
0286  F098          DW2.                        PRINT  Z ESCAPE  LEFT  = RED
0287  F030          INC.
        LOOPRE.
0288  F1AD          IF  NOT SRQ  SKIP.
0289  4287          MPCR  = LOOPRE  -  1.
              *************DINT        NOT  RESET  ON LEFT  ESCAPE
              *************ERROR        #  61
028A  F02E          IF  COV  SKIP.
028B  4284          MPCR  = PRRR  -  1.
028C  F0EA          MIR  = LIT.
028D  E008          LIT  = @08@.
028E  F018          SET  LC1.
028F  F0FC          WHEN SRQ  STEP.
0290  F099          DW1.                        ENABLE  FORMS
0291  F0CA          LCTR.
0292  E03F          LIT  = @3F@.
0293  F05F          B.
0294  E050          LIT  = @50@.
0295  F0EF          MIR  = Z.
0296  F0F5          SAVE.
0297  F0FC          WHEN SRQ  STEP.
0298  F098          DW2.                        ADVANCE  BOTH  PLATENS
0299  F05F          B.
```

```
02C8  F0C9          JUMP.
02C9  F0E6          MIR = B000.
02CA  F099          DW1.                              DISABLE  KYBD
02CB  F07B          B = B000.
02CC  F1AD          IF NOT SRQ SKIP.
02CD  F000          WAIT.                             KYBD NOT DISABLED
                  *********ERROR      # E 85
02CE  F097          DR2 BEX.
02CF  F0FF          0 EQV B.
02D0  F09D          IF ABT SKIP.
02D1  F000          WAIT.                             KYBD READ NOT DISABLED
                  *********ERROR      # E 86
02D2  8668          CPCR = ENABLE-KYBD  - 1.
02D3  42B2          MPCR = KYBDTST6  - 1.
                  KYBDTSTE.
02D4  8641          CPCR = RSTBR1  - 1.               RESTORE  BR1
02D5  8320          CPCR = CONSALARM - 1.             SOUND ALARM
                  KYBDTSTE1.
02D6  F07C          B = B L.
02D7  D800          SAR = 8.
02D8  F0DF          MIR = A3 OR B.
02D9  F0FC          WHEN SRQ STEP.
                  ****KEYBOARD   CHARACTER  DISAGREE
                  ****MIR   AB BITS  = KEYBOARD  CHARACTER
                  ****MIR   CD BITS  = EXPECTED  CHARACTER
                  ****TEST   NOW LOOPS  ON SAME EXPECTED  DATA SO  THE
                  ****OPERATOR   CAN REPEAT  THE KEY IN  QUESTION.   THE ALARM
                  ****WILL   SOUND ONLY ON A DISAGREE.   IF DISAGREE  IS DUE
                  ****TO   OPERATOR  ERROR OR A CODE SET  DIFFERENCE,   THE
                  ****TEST   CAN BE FORCED  TO PROCEED  BY PRESSING   READY
                  ****BUTTON   AND THEN KEYING  NEXT CHARACTER  TO BE TESTED.
                  ****
                  ****VALID   KEYBOARD  ERROR      ERROR # E 44

02DA  F1B5          IF URQ SKIP.
02DB  42DD          MPCR = KYBDTSTE2  - 1.
02DC  F096          DR1 BEX.                          RESET  STATUS
02DD  42BE          MPCR = KYBDTST4  - 1.
                  KYBDTSTE2.
02DE  F097          DR2 BEX.
02DF  F05F          B.
02E0  85D4          CPCR = INDSHIFT  - 1.
02E1  F0DE          MIR = A3.
02E2  F098          DW2.
02E3  F12D          A3 = A2 C.
02E4  C8FF          SAR = 8 LIT = @FF@.
02E5  F047          A3 = A3 AND LIT.
02E6  F03C          A3 EQV B.
02E7  F09D          IF ABT SKIP.
02E8  42D3          MPCR = KYBDTSTE  - 1.
02E9  42D5          MPCR = KYBDTSTE1  - 1.
                  KYBDTSTEXIT.
02EA  82F1          CPCR = MEMPRTR - 1.
02EB  F0CA          LCTR.
02EC  E060          LIT = @60@.
02ED  F0EF          MIR = Z.
02EE  E000          LIT = 0.
02EF  F098          DW2.                              ALL  INDICATORS  OFF
02F0  F000          WAIT.
                  *********IF      PRINTOUT  IS  NORMAL FORCE  STEP
                  *********SEE       FIGURE  # 7
                  *********IF      DISAGREE  - ERROR # E 69
02F1  44E0          MPCR = TESTSELECT  - 1.  ADD PRINTING
                  MEMPRTR.
02F2  F0A5          IF LC1 STEP.
02F3  85FA          CPCR = ADVANCE-PLATEN  - 1.
02F4  85EB          CPCR = ENABLE-PRINTER  - 1.
                  MEMPRTR1.
02F5  0319          AMPCR = KYBDMSG.
02F6  F023          A2 = AMPCR.
02F7  F05F          B.

029A  F0A6          IF LC1 JUMP.
029B  F000          WAIT.                             OBSERVE  PRINTOUT
                  *********AND       CARRIER  OPERATION  NORMAL,  FORCE  STEP
                  *********IF      PRINTOUT  GOOD,  NO INDICATORS  ARE ON
                  *********SEE       FIGURE  4.
                  *********IF      DISAGREE  = ERROR # E 39
029C  F0BA          IF NOT EXT SKIP.
029D  F0A0          IF EXT SKIP.
029E  F0F7          SKIP.
029F  F0F7          SKIP.
02A0  F0BB          IF NOT GC1 SKIP.
02A1  44E0          MPCR = TSELR  - 1.
                  KYBDTST.
02A2  F096          DR1 BEX.                          RESET  STATUS
02A3  8668          CPCR = ENABLE-KYBD  - 1.
02A4  032D          AMPCR = KYBDTABLE.
02A5  F007          A1 = AMPCR.
02A6  F019          SET LC2.
                  KYBDTST1.
02A7  F0D0          MAR1 = A1.
02A8  F0F1          MR1.
02A9  F0F9          WHEN RDC BEX.
02AA  F012          A1 = A1 + 1.
02AB  F033          A2 = B.
02AC  8641          CPCR = RSTBR1  - 1.
02AD  F0F7          SKIP.
                  KYBDTST2.
02AE  F025          A2 = A2 C.
                  KYBDTST3.
02AF  F0FC          WHEN SRQ STEP.
                  ****DUE   TO POSSIBLE   CODE SET  CHANGES THE KEYBOARD  TEST,
                  ****TESTS    ONLY THOSE  KEYS NECESSARY   FOR RUNNING  OTHER
                  ****MTRS.    IN THE CASE  OF A CODE SET  DIFFERENCE   IN THE
                  ****KEYS    BEING  TESTED,   THE OPERATOR  CAN FORCE  THE TEST
                  ****TO   PROCEED.   IF THIS  ACTION  IS TAKEN,   THE ABILITY
                  ****TO   RUN THE REMAINING  MTRS IS QUESTIONABLE.    TESTING
                  ****THE   REMAINDER  OF THE KEYBOARD  IS AN OPERATOR
                  ****RESPONSIBILITY       USING  THE KEYBOARD  PRINT  TEST.
                  *********ENTER       PK KEYS 01  THRU 12
                  *********ENTER       ALPHA KEYS I,  L,  M,  N
                  *********ENTER       ALL NUMERIC  KEYS TOP  TO BOTTOM
                  *********IF      INCR  FAILS  TO STEP  AFTER  LAST  KEY -
                  *********ERROR      # E 84
                  *********TO      FORCE  TEST  EXIT,   PRESS  RDY BEFORE  DATA KEY
02B0  84DB          CPCR = BUSSC - 1.
02B1  F0C0          IF NOT LC2 SKIP.
02B2  82C5          CPCR = KYBDTST5  - 1.
                  KYBDTST6.
02B3  F097          DR2 BEX.                          READ  DATA
02B4  F1AE          IF NOT URQ SKIP.
02B5  44E0          MPCR = TESTSELECT  - 1.  FORCED  EXIT  BY RDY BUTTON
02B6  85D4          CPCR = INDSHIFT  - 1.
02B7  F0DE          MIR = A3.
02B8  F098          DW2.                              DISPLAY  DATA IN  INDICATORS
02B9  F12D          A3 = A2 C.
02BA  C8FF          SAR = 8 LIT = @FF@.
02BB  F047          A3 = A3 AND LIT.
02BC  F03C          A3 EQV B.                         COMPARE  DATA
02BD  F09D          IF ABT SKIP.
02BE  42D3          MPCR = KYBDTSTE  - 1.
                  KYBDTST4.
02BF  F03E          A3 EQV LIT.                       LAST  CHAR TST
02C0  E0BE          LIT = @BE@.                       STOP  CODE
02C1  F0B5          IF NOT ABT SKIP.
02C2  42E9          MPCR = KYBDTSTEXIT  - 1.
02C3  F1A4          IF NOT LC1 SET LC1 SKIP.
02C4  42A6          MPCR = KYBDTST1  - 1.
02C5  42AD          MPCR = KYBDTST2  - 1.
                  KYBDTST5.
02C6  F1AD          IF NOT SRQ SKIP.
02C7  F0F7          SKIP.
```

```
                    MEMPRTR2.
02F8  F0D1              MAR1 = A2.
02F9  F0F1              MR1.
02FA  F0F9              WHEN RDC BEX.
02FB  F02A              A2 = A2 + 1.
02FC  F017              A1 = B.
02FD  8641              CPCR = RSTBR1 - 1.
                    MEMPRTR3.
02FE  F10B              A1 = A1 C.
02FF  D800              SAR = 8.
0300  F0C4              IF NOT MST SKIP.
0301  4314              MPCR = END-PRTR - 1.
0302  F062              B = A1 AND LIT.
0303  E0FF              LIT = @FF@.
0304  8308              CPCR = PRT-CODE - 1.
0305  F0BF              IF NOT LC1 SKIP.
0306  42F7              MPCR = MEMPRTR2 - 1.
0307  F018              SET LC1.
0308  42FD              MPCR = MEMPRTR3 - 1.
                    PRT-CODE.
0309  F0CB              LIT EQV B.
030A  E020              LIT = @20@.
030B  F09D              IF ABT SKIP.
030C  430E              MPCR = PRT-CODE1 - 1.
030D  C848              SAR = 8 LIT = @48@.
030E  F0F7              SKIP.
                    PRT-CODE1.
030F  C849              SAR = 8 LIT = @49@.
0310  F057              A3 = LIT L.
0311  F0DF              MIR = A3 OR B.
0312  F0FC              WHEN SRQ STEP.
0313  F098              DW2.
0314  F0C9              JUMP.
                    END-PRTR.
0315  F0A5              IF LC1 STEP.
0316  85F0              CPCR = INIT-LEFT - 1.
0317  85FA              CPCR = ADVANCE-PLATEN - 1.
0318  42EA              MPCR = KYBDTSTEXIT.
                    KYBDMSG.
0319  454E              CNST = @454E@.          EN
031A  4420              CNST = @4420@.          DSP
031B  2031              CNST = @2031@.          SP1
031C  3220              CNST = @3220@.          2SP
031D  504B              CNST = @504B@.          PK
031E  204B              CNST = @204B@.          SPK
031F  4559              CNST = @4559@.          EY
0320  5380              CNST = @5380@.          SSTP
                    CONSALARM.
0321  F0EA              MIR = LIT.
0322  E008              LIT = 8.
0323  F099              DW1.                    ENABLE FORMS
0324  F0CA              LCTR.
0325  E03F              LIT = @3F@.
0326  F0EF              MIR = Z.
0327  E001              LIT = 1.
0328  F0FC              WHEN SRQ STEP.
0329  F098              DW2.                    SOUND ALARM
032A  F05F              B.
032B  F0FC              WHEN SRQ STEP.
032C  4668              MPCR = ENABLE-KYBD - 1.
                    KYBDTABLE.
032D  E0E1              CNST = @E0E1@.          PK1,2
032E  E2E3              CNST = @E2E3@.          PK3,4
032F  E4E5              CNST = @E4E5@.          PK5,6
0330  E6E7              CNST = @E6E7@.          PK7,8
0331  E8E9              CNST = @E8E9@.          PK9,10
0332  EAEB              CNST = @EAEB@.          PK11,12
0333  494C              CNST = @494C@.          I,L
0334  4D4E              CNST = @4D4E@.          M,N
0335  BFB0              CNST = @BFB0@.          F,0
0336  B7B4              CNST = @B7B4@.          7,4
0337  B1B8              CNST = @B1B8@.          1,8
0338  B5B2              CNST = @B5B2@.          5,2
0339  BAB9              CNST = @BAB9@.          A,9
033A  B6B3              CNST = @B6B3@.          6,3
033B  BBAB              CNST = @BBAB@.          B,RESET
033C  BDA1              CNST = @BDA1@.
033D  BCA0              CNST = @BCA0@.          C,1111
033E  A7A3              CNST = @A7A3@.          111,11
033F  BE00              CNST = @BE00@.          E
0340  44E0              MPCR = TESTSELECT - 1.
                    CAREXHTST.                  CARRIER EXHAUSTIVE TEST
0341  F0CA              LCTR.
0342  E0BE              LIT = @BE@.
0343  F115              A1 = Z.                 A1 = PRINTER DATA WORD
0344  E045              LIT = @45@.
0345  F0CA              LCTR.
0346  E0FE              LIT = @FE@.
0347  F05F              B.
0348  E095              LIT = @95@.
0349  F0A2              IF GC2 SKIP.            TEST 15 INCH FLAG
034A  E0FF              LIT = @FF@.
034B  F05A              A3 = Z.                 A3 = CARR POS LEFT DATA WD.
034C  F05F              B.
034D  E095              LIT = @95@.
034E  F0A2              IF GC2 SKIP.            TEST 15 INCH FLAG
034F  E0FF              LIT = @FF@.
0350  F038              A2 = LIT.               A2 = CARR POS RT DATA WD.
                    NTRCET.
0351  F0EA              MIR = LIT.
0352  E004              LIT = @04@.
0353  F099              DW1.                    ENABLE PRINTER
0354  F05F              B.
```

```
0355  F0DB        MIR = A1.
0356  F0FC        WHEN SRQ STEP.
0357  F098        DW2.                          PRINT E IN PLACE
0358  F0EA        MIR = LIT.
0359  E010        LIT = @10@.
035A  F0FC        WHEN SRQ STEP.
035B  F099        DW1.                          ENABLE CARRIER
035C  F05F        B.
035D  F0DD        MIR = A2.
035E  F0FC        WHEN SRQ STEP.
035F  F098        DW2.                          POSITION CARRIER RIGHT
0360  F02B        A2 = A2 - 1.
0361  F04B        A3 = A3 - 1.
0362  E004        LIT = @04@.
0363  F0EA        MIR = LIT.
0364  F0F5        SAVE.
0365  F1AE        IF NOT URQ SKIP.
0366  84C9        CPCR = CARERR - 1.            STINT WHILE POSITIONING
            *********ERROR # E62                CARRIER.
0367  F1AD        IF NOT SRQ SKIP.
0368  F0F7        SKIP.
0369  F0C9        JUMP.
036A  F099        DW1.                          ENABLE PRINTER
036B  F05F        B.
036C  F0DB        MIR = A1.
036D  F0FC        WHEN SRQ STEP.
036E  F098        DW2.                          PRINT E IN PLACE
036F  F022        A2 EQV B000.
0370  F0B5        IF NOT ABT SKIP.
0371  4386        MPCR = ENDEXHTST - 1.
0372  F0EA        MIR = LIT.
0373  E010        LIT = @10@.
0374  F0FC        WHEN SRQ STEP.
0375  F099        DW1.                          ENABLE CARRIER
0376  F05F        B.
0377  F0DE        MIR = A3.
0378  F0FC        WHEN SRQ STEP.
0379  F098        DW2.                          CARRIER POSITION LEFT
037A  F02B        A2 = A2 - 1.
037B  F04B        A3 = A3 - 1.
037C  E004        LIT = @04@.
037D  F0EA        MIR = LIT.
037E  F0F5        SAVE.
037F  F1AE        IF NOT URQ SKIP.
0380  84C9        CPCR = CARERR - 1.            STINT WHILE POSITIONING
            *********ERROR # E42                CARRIER.
0381  F1AD        IF NOT SRQ SKIP.
0382  F0F7        SKIP.
0383  F0C9        JUMP.
0384  F022        A2 EQV B000.
0385  F09D        IF ABT SKIP.
0386  4350        MPCR = NTRCET - 1.
          ENDEXHTST.
0387  F0EA        MIR = LIT.
0388  E010        LIT = @10@.
```

```
0389  F099        DW1.                          ENABLE CARRIER
038A  F05F        B.
038B  E04B        LIT = @4B@.
038C  F0A2        IF GC2 SKIP.                  TEST 15 INCH FLAG
038D  E080        LIT = @80@.
038E  F0E0        MIR = A3 OR LIT.
038F  F0FC        WHEN SRQ STEP.
0390  F098        DW2.                          CARR 128 POSITIONS
0391  F0F5        SAVE.
0392  F1AE        IF NOT URQ SKIP.
0393  84C9        CPCR = CARERR - 1.            STINT WHILE POSITIONING
            *********ERROR # E42                CARRIER.
0394  F1AD        IF NOT SRQ SKIP.
0395  F0F7        SKIP.
0396  F0C9        JUMP.
0397  F018        SET LC1.
0398  F0EA        MIR = LIT.
0399  E008        LIT = @08@.
039A  F099        DW1.                          ENABLE FORMS
039B  E03F        LIT = @3F@.
039C  F0CA        LCTR.
039D  F0F5        SAVE.
039E  F0EF        MIR = Z.
039F  E050        LIT = @50@.
03A0  F0FC        WHEN SRQ STEP.
03A1  F098        DW2.                          ADVANCE BOTH PLATENS
03A2  F0A6        IF LC1 JUMP.
03A3  F000        WAIT.                         OBSERVE PRINTOUT
            ************IF PRINTOUT IS NORMAL AND CARRIER
            ************OPERATION IS NORMAL FORCE STEP
            ************SEE FIGURE 3.
            ************IF DISAGREE = ERROR # E 38
03A4  44E0        MPCR = TSELR - 1.
          TLTROTTST.
03A5  D800        SAR = 8.
03A6  F0EA        MIR = LIT.
03A7  E010        LIT = @10@.
03A8  F099        DW1.                          ENABLE CARRIER
03A9  F0EE        MIR = LIT L.
03AA  E003        LIT = @03@.
03AB  F0FC        WHEN SRQ STEP.
03AC  F098        DW2.                          INITIALIZE LEFT
03AD  F0EA        MIR = LIT.
03AE  E004        LIT = @04@.
03AF  F0FC        WHEN SRQ STEP.
03B0  F099        DW1.                          ENABLE PRINTER
03B1  F0CA        LCTR.
03B2  E0B6        LIT = @B6@.
03B3  F0AE        IF LC3 SET LC3 SKIP.
03B4  43C1        MPCR = CODESET64R - 1.
03B5  F115        A1 = Z.                       A1 = UR MOST BLACK RIGHT
03B6  E060        LIT = @60@.
03B7  F128        A2 = Z.                       A2 = LL MOST BLACK RIGHT
03B8  E05F        LIT = @5F@.
03B9  F05A        A3 = Z.                       A3 = LR MOST BLACK RIGHT
```

```
03BA  E078        LIT  = @78@.
03BB  F08A        B = Z.                        B = UL MOST BLACK RIGHT
03BC  E02F        LIT  = @2F@.
03BD  F0CA        LCTR.
03BE  E0BE        LIT  = @BE@.
03BF  F0EF        MIR  = Z.
03C0  E060        LIT  = @60@.
03C1  43CD        MPCR = STARTPRINTR  - 1.
              CODESET64R.
03C2  F115        A1 = Z.                       A1 = UR MOST BLACK RIGHT
03C3  E003        LIT  = @03@.
03C4  F128        A2 = Z.                       A2 = LL MOST BLACK RIGHT
03C5  E05C        LIT  = @5C@.
03C6  F05A        A3 = Z.                       A3 = LR MOST BLACK RIGHT
03C7  E00F        LIT  = @0F@.
03C8  F08A        B = Z.                        B = UL MOST BLACK RIGHT
03C9  E050        LIT  = @50@.
03CA  F0CA        LCTR.
03CB  E0BE        LIT  = @BE@.
03CC  F0EF        MIR  = Z.
03CD  E003        LIT  = @03@.
              STARTPRINTR.
03CE  F0FC        WHEN SRQ STEP.
03CF  F098        DW2.                          PRINT UR MOST BLCK IN PLACE
03D0  F05F        B.
03D1  E024        LIT  = @24@.
03D2  F0A2        IF GC2 SKIP.                  TEST 15 INCH FLAG
03D3  E03F        LIT  = @3F@.
03D4  F0CA        LCTR.
03D5  F018        SET LC1.
03D6  43D9        MPCR = NTRWCTR - 1.
              PRTWCTR.
03D7  F0DB        MIR  = A1.
03D8  F0FC        WHEN SRQ STEP.
03D9  F098        DW2.                          PRINT UPPER RIGHT MOST CHAR
              NTRWCTR.
03DA  F05F        B.
03DB  F0DD        MIR  = A2.
03DC  F0FC        WHEN SRQ STEP.
03DD  F098        DW2.                          PRINT LOWER LEFT MOST CHAR
03DE  F05F        B.
03DF  F0DE        MIR  = A3.
03E0  F0FC        WHEN SRQ STEP.
03E1  F098        DW2.                          PRINT LOWER RIGHT MOST CHAR
03E2  F05F        B.
03E3  F0E1        MIR  = B.
03E4  F0FC        WHEN SRQ STEP.
03E5  F098        DW2.                          PRINT UPPER LEFT MOST CHAR
03E6  F030        INC.
03E7  F02E        IF COV SKIP.
03E8  43D6        MPCR = PRTWCTR - 1.
03E9  F014        IF LC1 SKIP.
03EA  4415        MPCR = ENDWCTR - 1.
03EB  F0CA        LCTR.
03EC  E0B8        LIT  = @B8@.
03ED  F0AE        IF LC3 SET LC3 SKIP.
03EE  4400        MPCR = CODESET64L  - 1.
03EF  F115        A1 = Z.                       A1 = UL MOST RED LEFT
03F0  E02F        LIT  = @2F@.
03F1  F128        A2 = Z.                       A2 = LR MOST RED LEFT
03F2  E078        LIT  = @78@.
03F3  F05A        A3 = Z.                       A3 = LL MOST RED LEFT
03F4  E05F        LIT  = @5F@.
03F5  F08A        B = Z.                        B =  UR MOST RED LEFT
03F6  E060        LIT  = @60@.
03F7  F0EE        MIR  = LIT L.
03F8  C842        SAR  = 8 LIT  = @42@.
03F9  F0FC        WHEN SRQ STEP.
03FA  F098        DW2.                          SET RED RIBBON
03FB  F05F        B.
03FC  F0CA        LCTR.
03FD  E0BC        LIT  = @BC@.
03FE  F0EF        MIR  = Z.
03FF  E02F        LIT  = @2F@.
0400  440C        MPCR = STARTPRINTL  - 1.
              CODESET64L.
0401  F115        A1 = Z.                       A1 = UL MOST RED LEFT
0402  E050        LIT  = @50@.
0403  F128        A2 = Z.                       A2 = LR MOST RED LEFT
0404  E00F        LIT  = @0F@.
0405  F05A        A3 = Z.                       A3 = LL MOST RED LEFT
0406  E05C        LIT  = @5C@.
0407  F08A        B = Z.                        B = UR MOST RED LEFT
0408  E003        LIT  = @03@.
0409  F0CA        LCTR.
040A  E0BC        LIT  = @BC@.
040B  F0EF        MIR  = Z.
040C  E050        LIT  = @50@.
              STARTPRINTL.
040D  F0FC        WHEN SRQ STEP.
040E  F098        DW2.                          PRINT UL MOST RED IN PLACE
040F  F05F        B.
0410  E024        LIT  = @24@.
0411  F0A2        IF GC2 SKIP.
0412  E03F        LIT  = @3F@.
0413  F0CA        LCTR.
0414  F05F        B.
0415  83D9        CPCR = NTRWCTR - 1.
              ENDWCTR.
0416  F0EA        MIR  = LIT.
0417  E008        LIT  = @08@.
0418  F0FC        WHEN SRQ STEP.
0419  F099        DW1.                          ENABLE FORMS
041A  F0CA        LCTR.
041B  E03F        LIT  = @3F@.
041C  F0EF        MIR  = Z.
041D  E050        LIT  = @50@.
041E  F0FC        WHEN SRQ STEP.
041F  F098        DW2.                          ADVANCE BOTH PLATENS
0420  F000        WAIT.                         OBSERVE PRINTOUT
              **********IF       PRINTOUT IS NORMAL FORCE STEP
              **********SEE        FIGURE 5.
              **********IF       DISAGREE = ERROR # E 43
0421  44E0        MPCR = TSELR - 1.
              PWROFF.
0422  F0EA        MIR  = LIT.
0423  E008        LIT  = @08@.
0424  F099        DW1.                          ENABLE FORMS
0425  F0CA        LCTR.
0426  E03F        LIT  = @3F@.
0427  F0EF        MIR  = Z.
0428  E002        LIT  = @02@.
0429  F0FC        WHEN SRQ STEP.
042A  F098        DW2.                          POWER OFF
042B  F000        WAIT.                         PWR OFF NOT EXECUTED
              **********ERROR       # E 46
              PRTALCHAR.                        PRINT ALL CHARTRS ROUTINE
042C  F0AF        IF LC3 SET LC3 ELSE SKIP.
042D  445D        MPCR = PRTALCHAR96  - 1.
042E  F0CA        LCTR.
042F  E0B6        LIT  = @B6@.
0430  F115        A1 = Z.                       A1 = PRINT FIRST CHARACTER
0431  E020        LIT  = @20@.
0432  F08A        B = Z.                        B = LAST CHARACTER PRINTED
0433  E060        LIT  = @60@.
0434  F018        SET LC1.
              NTRPAC.                           ENTER PRINT ALL CHAR ROUTIN
0435  F0EA        MIR  = LIT.
0436  E008        LIT  = @08@.
0437  F099        DW1.                          ENABLE FORMS
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0438  F0CA          LCTR.
0439  E03F          LIT  = @3F@.
043A  F0EF          MIR  = Z.
043B  E050          LIT  = @50@.
043C  F0FC          WHEN SRQ  STEP.
043D  F098          DW2.                          ADVANCE  BOTH  PLATENS
043E  F0EA          MIR  = LIT.
043F  E004          LIT  = @04@.
0440  F0FC          WHEN SRQ  STEP.
0441  F099          DW1.                          ENABLE  PRINTER
0442  F0F5          SAVE.
0443  F0DB          MIR  = A1.
0444  F0FC          WHEN SRQ  STEP.
0445  F098          DW2.                          PRINT  NEXT  CHAR  FROM  A1
0446  F012          A1  = A1  + 1.
0447  F003          A1  EQV  B.
0448  F0B4          IF  NOT  ABT  JUMP.
0449  F014          IF  LC1  SKIP.
044A  4451          MPCR = ENDPAC  -  1.
044B  F0CA          LCTR.
044C  E0B8          LIT  = @B8@.
044D  F115          A1  = Z.                      A1  = PRINT  FIRST  CHARACTER
                    *                             DATA  WORD
044E  E020          LIT  = @20@.
044F  F08A          B  = Z.                       B  = PRINT  LAST  CHAR  DATA  WD
0450  E060          LIT  = @60@.
0451  8434          CPCR = NTRPAC  -  1.
                  ENDPAC.
0452  F0EA          MIR  = LIT.
0453  E008          LIT  = @08@.
0454  F0FC          WHEN SRQ  STEP.
0455  F099          DW1.                          ENABLE  FORMS
0456  F0CA          LCTR.
0457  E03F          LIT  = @3F@.
0458  F0EF          MIR  = Z.
0459  E050          LIT  = @50@.
045A  F0FC          WHEN SRQ  STEP.
045B  F098          DW2.                          ADVANCE  BOTH  PLATENS
045C  F000          WAIT.                         OBSERVE  PRINTOUT
                  **********IF          PRINTOUT  IS  NORMAL  FORCE  STEP
                  **********SEE           FIGURE  6.
                  **********IF          DISAGREE  = ERROR  #  E  41
045D  44E0          MPCR = TSELR  -  1.
                  PRTALCHAR96.                    PRINT  ALL  CHARACTERS  TEST
045E  F019          SET  LC2.
045F  F018          SET  LC1.
                  NTRPAC96.
0460  F0EA          MIR  = LIT.
0461  E008          LIT  = 8.
0462  F099          DW1.                          ENABLE  FORMS
0463  F0CA          LCTR.
0464  E03F          LIT  = @3F@.
0465  F0EF          MIR  = Z.
0466  E050          LIT  = @50@.
0467  F0FC          WHEN SRQ  STEP.
0468  F098          DW2.                          ADVANCE  BOTH  PLATENS
0469  F0EA          MIR  = LIT.
046A  E004          LIT  = 4.
046B  F0FC          WHEN SRQ  STEP.
046C  F099          DW1.                          ENABLE  PRINTER
046D  E0B6          LIT  = @B6@.                  CTR  = PRINT  RIGHT  BLACK
046E  F0C0          IF  NOT  LC2  SKIP.
046F  4478          MPCR = PACSTS96  -  1.
0470  C842          SAR  = 8  LIT  = @42@.
0471  F0EE          MIR  = LIT  L.
0472  F0FC          WHEN SRQ  STEP.
0473  F098          DW2.                          SET  RED  RIBBON
0474  F05F          B.
```

```
0475  F0FC          WHEN SRQ  STEP.               COUNT  1  DINT
0476  F098          DW2.
0477  F05F          B.
0478  E0B8          LIT  = @B8@.                  CTR  = PRINT  LEFT  RED
                  PACSTS96.
0479  F0CA          LCTR.
047A  F115          A1  = Z.                      A1  = START  SET  1.
047B  E030          LIT  = @30@.
047C  F08A          B  = Z.                       B  = END  SET  1.
047D  E03A          LIT  = @3A@.
047E  8490          CPCR = LOOPRI96  -  1.
047F  F115          A1  = Z.                      A1  = START  SET  2.
0480  E041          LIT  = @41@.
0481  F08A          B  = Z.                       B  = END  SET  2.
0482  E080          LIT  = @80@.
0483  8490          CPCR = LOOPRI96  -  1.
0484  F115          A1  = Z.                      A1  = START  SET  3.
0485  E020          LIT  = @20@.
0486  F08A          B  = Z.                       B  = END  SET  3.
0487  E030          LIT  = @30@.
0488  8490          CPCR = LOOPRI96  -  1.
0489  F115          A1  = Z.
048A  E03A          LIT  = @3A@.                  A1  = START  SET  4.
048B  F08A          B  = Z.
048C  E041          LIT  = @41@.                  B  = END  SET  4.
048D  8490          CPCR = LOOPRI96  -  1.
048E  F014          IF  LC1  SKIP.
048F  4498          MPCR = ENDPAC96  -  1.
0490  445F          MPCR = NTRPAC96  -  1.
                  LOOPRI96.
0491  F0DB          MIR  = A1.
0492  F0FC          WHEN SRQ  STEP.
0493  F098          DW2.                          PRINT  NEXT  CHAR  FROM  A1
0494  F012          A1  = A1  + 1.
0495  F003          A1  EQV  B.
0496  F09D          IF  ABT  SKIP.
0497  4490          MPCR = LOOPRI96  -  1.
0498  F0C9          JUMP.
                  ENDPAC96.
0499  F0EA          MIR  = LIT.
049A  E008          LIT  = 8.
049B  F0FC          WHEN SRQ  STEP.
049C  F099          DW1.                          ENABLE  FORMS
049D  F0CA          LCTR.
049E  E03F          LIT  = @3F@.
049F  F0EF          MIR  = Z.
04A0  E050          LIT  = @50@.
04A1  F0FC          WHEN SRQ  STEP.
04A2  F098          DW2.                          ADVANCE  BOTH  PLATENS
04A3  F000          WAIT.                         OBSERVE  PRINTOUT
                  *********IF        PRINTOUT  IS  NORMAL  FORCE  STEP
                  *********SEE         FIGURE  6.
                  *********IF        DISAGREE--ERROR     #  E  41
04A4  44E0          MPCR = TESTSELECT  -  1.
                  OVSPTST.
04A5  F0EA          MIR  = LIT.
04A6  E010          LIT  = @10@.
04A7  F099          DW1.
04A8  F0EE          MIR  = LIT  L.
04A9  C801          SAR  = 8  LIT  = 1.
04AA  F0FC          WHEN SRQ  STEP.
04AB  F098          DW2.
04AC  F05F          B.
04AD  F1AD          IF  NOT  SRQ  SKIP.
04AE  44B2          MPCR = OVSPA  -  1.
04AF  F000          WAIT.
                  *********CARRIER        DINT  RESET  WITH  ZERO  SPACE  DATA  WORD
                  *********ERROR       #  E  47
```

```
04B0  F096          DR1  BEX.
04B1  F0E1          MIR  =  B.
04B2  F000          WAIT.
                  OVSPA.
04B3  F000          WAIT.
                  *********INSTALL       A JUMPER  FROM  CC1E-2Y    TO  GROUND  AND
                  *********FORCE       STEP.
04B4  F0EA          MIR  =  LIT.
04B5  E00F          LIT  =  @0F@.
04B6  F098          DW2.
04B7  F0FD          WHEN URQ  STEP.
                  *********STINT        NOT  SET  FOR  OVERSPEED
                  *********ERROR        #  E  48
04B8  F096          DR1  BEX.
04B9  F0CA          LCTR.
04BA  E07F          LIT  =  @7F@.
04BB  F0FE          Z  EQV  B.
04BC  E082          LIT  =  @82@.
04BD  F0B5          IF  NOT  ABT  SKIP.
04BE  44C0          MPCR  =  OVSPA1    -  1.
04BF  F0E1          MIR  =  B.
04C0  F000          WAIT.
                  *********OVERSPEED        STATUS  FAILURE
                  *********ERROR        #  E  49
                  OVSPA1.
04C1  F1AE          IF  NOT  URQ  SKIP.
04C2  F000          WAIT.
                  *********STINT        FAILED  TO  RESET
                  *********ERROR        #  E  45
04C3  F0EE          MIR  =  LIT  L.
04C4  E003          LIT  =  3.
04C5  F098          DW2.
04C6  F05F          B.
04C7  F0FC          WHEN SRQ  STEP.
04C8  F000          WAIT.
                  *********REMOVE       JUMPER  AND  FORCE  STEP  -  FST
04C9  44E0          MPCR  =  TSELR  -  1.
                  CARERR.
04CA  F096          DR1  BEX.
04CB  F0DA          MIR  =  AMPCR.
04CC  F000          WAIT.
                  *********GO       TO  INCREMENTER  ADDRESS  DISPLAYED  IN  MIR
04CD  F0E1          MIR  =  B.
04CE  F000          WAIT.
                  *    B  REG  DISPLAY
04CF  F0BA          IF  NOT  EXT  SKIP.
04D0  F0A0          IF  EXT  SKIP.
04D1  44E0          MPCR  =  TESTSELECT    -  1.
04D2  F09A          EXEC.
04D3  F05F          B.
04D4  F0C9          JUMP.
                  BUSSB.
04D5  F0F9          WHEN RDC  BEX.
04D6  F0FF          0  EQV  B.
04D7  F09C          IF  ABT  JUMP.
04D8  F0E1          MIR  =  B.
04D9  F000          WAIT.
                  *************EXT         BUSS  FAILURE  OR  PARITY  ERROR
                  *************ERROR         #  E  1
04DA  F0DA          MIR  =  AMPCR.
04DB  F000          WAIT.
                  BUSSC.
04DC  F0F9          WHEN RDC  BEX.
04DD  F0FF          0  EQV  B.
04DE  F09C          IF  ABT  JUMP.
04DF  F0E1          MIR  =  B.
04E0  F000          WAIT.
                  *************EXTERNAL          BUSS  FAILURE
                  *************ERROR         #  E  67
```

```
                  TSELR.                              TEST  SELECT  ROUTINE
                  TESTSELECT.
04E1  F096          DR1  BEX.                         RESET  STATUS
04E2  F006          SET  GC1.
04E3  865C          CPCR  =  CLOSE-PLAT    -  1.      CLOSE  PLATN  ENAB  KYBD
04E4  8668          CPCR  =  ENABLE-KYBD    -  1.
04E5  F0CA          LCTR.
04E6  E07E          LIT  =  @7E@.
04E7  F0EF          MIR  =  Z.
04E8  E008          LIT  =  8.
04E9  F098          DW2.                              NUMERIC  IND  ON
04EA  866C          CPCR  =  READDATAKEY    -  1.
04EB  F051          A3  =  B.                         TENS  DIGIT
04EC  866C          CPCR  =  READDATAKEY    -  1.
04ED  F0CA          LCTR.
04EE  E07E          LIT  =  @7E@.
04EF  F0EF          MIR  =  Z.
04F0  E000          LIT  =  0.
04F1  F098          DW2.                              NUMERIC  IND  OFF
                  TENSLOOPCHECK.
04F2  E00A          LIT  =  10.
04F3  F032          A2  =  A3.
04F4  F11B          A2  -  LIT.
04F5  F0B7          IF  NOT  AOV  SKIP.
04F6  450A          MPCR  =  INVALIDTEST    -  1.
04F7  F033          A2  =  B.
04F8  F11B          A2  -  LIT.
04F9  F0B7          IF  NOT  AOV  SKIP.
04FA  450A          MPCR  =  INVALIDTEST    -  1.
                  TENSLOOP.
04FB  F04B          A3  =  A3  -  1.
04FC  E00A          LIT  =  10.
04FD  F09E          IF  AOV  SKIP.
04FE  4500          MPCR  =  ENDTENSLOOP    -  1.
04FF  F083          B  =  LIT  +  B.
0500  44FA          MPCR  =  TENSLOOP    -  1.
                  ENDTENSLOOP.
0501  F017          A1  =  B.
0502  E014          LIT  =  TESTNUMBERLIMIT.
0503  F109          A1  -  LIT  -  1.
0504  F0B7          IF  NOT  AOV  SKIP.
0505  450A          MPCR  =  INVALIDTEST    -  1.
0506  F096          DR1  BEX.                         RESET  STATUS
0507  0515          AMPCR  =  TESTTABLE    -  1.
0508  F100          AMPCR  =  A1  +  AMPCR.
0509  F05F          B.
050A  F0C9          JUMP.
                  INVALIDTEST.
050B  F0EA          MIR  =  LIT.
050C  E008          LIT  =  8.
050D  F099          DW1.                              ENABLE  FORMS
050E  F089          B  =  LIT.
050F  C207          SAR  =  2  LIT  =  7.
0510  F0E2          MIR  =  B  C.                     ALARM  DATA  WORD
0511  F0FC          WHEN SRQ  STEP.
0512  F098          DW2.
0513  F05F          B.
0514  F0FC          WHEN SRQ  STEP.
0515  44E0          MPCR  =  TESTSELECT    -  1.
                  TESTTABLE.
0516  452F          MPCR  =  FLAG96CHAR    -  1.
0517  40FF          MPCR  =  ENABFMS    -  1.         KEY  01
0518  413E          MPCR  =  CARRTST    -  1.         KEY  02
0519  41CD          MPCR  =  PLATADV    -  1.         KEY  03
051A  424D          MPCR  =  PRTESCTST    -  1.       KEY  04
051B  42A1          MPCR  =  KYBDTST    -  1.         KEY  05
051C  4340          MPCR  =  CAREXHTST    -  1.       KEY  06
051D  43A4          MPCR  =  TLTROTTST    -  1.       KEY  07
051E  442B          MPCR  =  PRTALCHAR    -  1.       KEY  08
```

```
051F  44A4        MPCR = OVSPTST - 1.       KEY 09
0520  45A3        MPCR = KYBDPRINT - 1.     KEY 10
0521  4531        MPCR = MTORONOFF - 1.     KEY 11
0522  455D        MPCR = PAPROUT - 1.       KEY 12
0523  44E0        MPCR = TESTSELECT - 1.    KEY 13
0524  4421        MPCR = PWROFF - 1.        KEY 14
0525  461C        MPCR = INDSH - 1.         KEY 15
0526  4592        MPCR = PRTEXC - 1.        KEY 16
0527  458F        MPCR = PRTEXCA - 1.       KEY 17
0528  456C        MPCR = PRTEXC96 - 1.      KEY 18
0529  4569        MPCR = PRTEXCA96 - 1.     KEY 19
052A  44E0        MPCR = TESTSELECT - 1.    KEY 20
052B  461C        MPCR = INDSH - 1.         KEY 12
052C  4592        MPCR = PRTEXC - 1.        KEY 13
052D  458F        MPCR = PRTEXCA - 1.       KEY 14
052E  456C        MPCR = PRTEXC96 - 1.      KEY 15
052F  4569        MPCR = PRTEXCA96 - 1.     KEY 16
                FLAG96CHAR.
0530  F01A        SET LC3.
0531  44E0        MPCR = TESTSELECT - 1.
                MTORONOFF.
0532  F000        WAIT.
                **********      PLACE CC3E MOTOR SW. TO NORMAL POSITION.
                *               DECODER NOTOR SHOULD TURN OFF WITHIN
                *               50 SECONDS. DISAGREE ERROR # E 81
                **********      AGREE, FORCE STEP.
0533  F0CA        LCTR.
0534  E0FF        LIT = @FF@.
0535  F0EF        MIR = Z.
0536  E008        LIT = @08@.
0537  F099        DW1.
0538  F000        WAIT.
                **********      DECODER MOTOR SHOULD TURN ON AND
                *               REMAIN ON FOR 20 TO 50 SECONDS.
                *               DISAGREE ERROR # E 81
                **********      AFTER NOTOR TURNS OFF FORCE STEP.
0539  F0CA        LCTR.
053A  E03F        LIT = @3F@.
053B  F0EF        MIR = Z.
053C  E000        LIT = @00@.
053D  F098        DW2.
053E  F000        WAIT.
                **********      DECODER MOTOR TURNED ON AND REMAINED
                *               ON FOR 20 TO 50 SECONDS.
                *               DISAGREE ERROR # E 81
                **********      AFTER MOTOR TURNS OFF FORCE STEP.
053F  F0CA        LCTR.
0540  E0FF        LIT = @FF@.
0541  F0EF        MIR = Z.
0542  E004        LIT = @04@.
0543  F099        DW1.
0544  F000        WAIT.
                **********      DECODER MOTOR TURNED ON AND REMAINED
                *               ON FOR 20 TO 50 SECONDS.
                *               DISAGREE ERROR # E 81
                **********      AFTER MOTOR TURNS OFF FORCE STEP.
0545  F0CA        LCTR.
0546  E0BF        LIT = @BF@.
0547  F0EF        MIR = Z.
0548  F0FC        WHEN SRQ STEP.
                *********ERROR     # E90
0549  F098        DW2.
054A  F000        WAIT.
                **********      DECODER MOTOR TURNED ON AND REMAINED
                *               ON FOR 20 TO 50 SECONDS.
                *               DISAGREE ERROR # E 81
                *               AFTER MOTOR TURNS OFF FORCE STEP.
                **********
054B  F0CA        LCTR.
054C  E0FF        LIT = @FF@.
```

```
054D  F0EF        MIR = Z.
054E  E000        LIT = 0.
054F  F098        DW2.
0550  F000        WAIT.
                **********      DECODER MOTOR TURNED ON AND REMAINED
                *               ON FOR 20 TO 50 SECONDS.
                *               DISAGREE ERROR # E 81
                *               AFTER MOTOR TURNS OFF FORCE STEP.
                **********
0551  F0CA        LCTR.
0552  E0FF        LIT = @FF@.
0553  F0EF        MIR = Z.
0554  E00C        LIT = @0C@.
0555  F05F        B.
0556  F05F        B.
0557  F0CA        LCTR.
0558  E0FF        LIT = @FF@.
0559  F0EF        MIR = Z.
055A  E000        LIT = @00@.
055B  F099        DW1.
055C  F000        WAIT.
                **********      DECODER MOTOR NEVER TURNED ON.
                *               DISAGREE ERROR # E 82
                **********      AGREE FORCE STEP.
055D  44E0        MPCR = TESTSELECT - 1.
                PAPROUT.
055E  F0EA        MIR = LIT.
055F  E008        LIT = 8.
0560  F099        DW1.                      ENABLE FORMS
0561  F000        WAIT.
                *********REMOVE      PAPER FROM END OF PAPER DETECTOR AND
                *********FORCE       STEP.
0562  84DB        CPCR = BUSSC - 1.         TEST EXT BUSS
0563  DE00        SAR = 14.
0564  F096        DR1 BEX.                  READ STATUS
0565  F172        CSAR B = B C.
0566  F0E2        MIR = B C.
0567  F0B2        IF LST SKIP.
0568  F000        WAIT.                     EOP NOT SET IN STATUS
                *********ERROR      # E83
0569  4671        MPCR = TSTEOPRST - 1.
                PRTEXCA96.
056A  F089        B = LIT.
056B  C841        SAR = 8 LIT = @41@.
056C  456E        MPCR = LOOPF96 - 1.
                PRTEXC96.
056D  F089        B = LIT.
056E  C840        SAR = 8 LIT = @40@.
                LOOPF96.
056F  F052        A3 = B L.
0570  F0EA        MIR = LIT.
0571  E004        LIT = @04@.
0572  F099        DW1.
0573  F0F5        SAVE.
0574  F0E0        MIR = A3 OR LIT.
0575  E075        LIT = @75@.
0576  F0FC        WHEN SRQ STEP.
0577  F098        DW2.
0578  F0E0        MIR = A3 OR LIT.
0579  E04A        LIT = @4A@.
057A  F0FC        WHEN SRQ STEP.
057B  F098        DW2.
057C  F0E0        MIR = A3 OR LIT.
057D  E075        LIT = @75@.
057E  F0FC        WHEN SRQ STEP.
057F  F098        DW2.
0580  F0E0        MIR = A3 OR LIT.
0581  E02A        LIT = @2A@.
0582  F0FC        WHEN SRQ STEP.
0583  F098        DW2.
```

```
0584  F0E0          MIR = A3 OR LIT.
0585  E07D          LIT = @7D@.
0586  F0FC          WHEN SRQ STEP.
0587  F098          DW2.
0588  F0E0          MIR = A3 OR LIT.
0589  E042          LIT = @42@.
058A  F0FC          WHEN SRQ STEP.
058B  F098          DW2.
058C  F1B5          IF URQ SKIP.
058D  F0C9          JUMP.
058E  F0FC          WHEN SRQ STEP.
058F  44E0          MPCR = TESTSELECT - 1.
                PRTEXCA.
0590  F089          B = LIT.
0591  C841          SAR = 8 LIT = @41@.
0592  4594          MPCR = LOOPF - 1.
                PRTEXC.
0593  F089          B = LIT.
0594  C840          SAR = 8 LIT = @40@.
                LOOPF.
0595  F07D          B = B C.
0596  F087          B = LIT OR B.
0597  E055          LIT = @55@.
0598  F0EA          MIR = LIT.
0599  E004          LIT = @04@.
059A  F099          DW1.                        ENABLE PRINTER
059B  F0F5          SAVE.
059C  F0E1          MIR = B.
059D  F0FC          WHEN SRQ STEP.
059E  F098          DW2.
059F  F085          B = LIT XOR B.              COMPLEMENT DATA CHARACTER
05A0  E0FF          LIT = @FF@.
05A1  F1B5          IF URQ SKIP.
05A2  F0C9          JUMP.
05A3  44E0          MPCR = TESTSELECT - 1.
                KYBDPRINT.
05A4  8668          CPCR = ENABLE-KYBD - 1.
05A5  F097          DR2 BEX.
05A6  F05F          B.
05A7  F097          DR2 BEX.
05A8  F05F          B.
05A9  F097          DR2 BEX.
05AA  F0E6          MIR = B000.
05AB  F099          DW1.
05AC  F000          WAIT.
                ****KEYBOARD PRINT TEST
                ****
                ****1.  OPERATOR CAN PRESS ANY KEY IN ANY ORDER.
                ****2.  ALL KEY CODES ARE REVERSED FOR READABILITY AND
                ****    DISPLAYED IN THE C INDICATORS.
                ****3.  IF THE KEY PRESSED WAS A PRINTABLE ASCII CODE,
                ****    THE CHARACTER WILL BE PRINTED WITH NO CODE
                ****    CONVERSION.
                ****4.  PRESS READY BUTTON TO EXIT TEST.
                ****5.  THE OPERATOR MUST DETERMINE FROM THE INDICATOR
                ****    DISPLAY OR PRINTED CHARACTER, ANY KEYBOARD
                ****    DATA ERRORS. KEYBOARD ERRORS ERROR # E 44
                ****    PRESS 1 DATA KEY WHICH WILL NOT BE PRINTED AND
                ****    FORCE STEP TO START TEST.
                *
05AD  8668          CPCR = ENABLE-KYBD - 1.
05AE  F1AD          IF NOT SRQ SKIP.
05AF  F000          WAIT.                       KYBD BUFF NOT DISABLED
                *********ERROR # E 87
05B0  F096          DR1 BEX.                    RESET STATUS
05B1  F034          A2 = B000.
05B2  85F0          CPCR = INIT-LEFT - 1.
05B3  F0CA          LCTR.
05B4  E07E          LIT = @7E@.
05B5  F0EF          MIR = Z.
05B6  E001          LIT = 1.
05B7  F098          DW2.                        LIGHT ALPHA
05B8  F05F          B.
                TAKE-CHARACTER.
05B9  8668          CPCR = ENABLE-KYBD - 1.
05BA  F1AE          IF NOT URQ SKIP.
05BB  45E3          MPCR = TERMI - 1.
05BC  F0C5          IF SRQ THEN DR2 BEX SKIP.
05BD  45B9          MPCR = TAKE-CHARACTER.
05BE  F017          A1 = B.
05BF  F07D          B = B C.
05C0  D800          SAR = 8.
05C1  F07D          B = B C.
05C2  F0C4          IF NOT MST SKIP.            TEST VALID ASCII
05C3  45C7          MPCR = DISPLAY - 1.
05C4  85EB          CPCR = ENABLE-PRINTER - 1.
05C5  F02A          A2 = A2 + 1.
05C6  8308          CPCR = PRT-CODE - 1.
05C7  F0FC          WHEN SRQ STEP.
                DISPLAY.
05C8  85D4          CPCR = INDSHIFT - 1.
05C9  F082          B = LIT L.
05CA  C884          SAR = 8 LIT = @84@.
05CB  F0DF          MIR = A3 OR B.
05CC  F098          DW2.                        DISPLAY CHARACTER N
05CD  F117          A2 EQV LIT.                 CHECK FOR 72 CHARS
05CE  E048          LIT = @48@.
05CF  F09D          IF ABT SKIP.
05D0  45B8          MPCR = TAKE-CHARACTER - 1.
05D1  F034          A2 = B000.                  START NEW LINE
05D2  85F0          CPCR = INIT-LEFT - 1.
05D3  85FA          CPCR = ADVANCE-PLATEN - 1.
05D4  45B8          MPCR = TAKE-CHARACTER - 1.
                INDSHIFT.
05D5  F057          A3 = LIT L.
05D6  CF84          SAR = 15 LIT = @84@.
05D7  F0CA          LCTR.
                INDSHIFT1.
05D8  C106          SAR = 1 LIT = 6.
05D9  F172          CSAR B = B C.
05DA  F0C3          IF NOT LST SKIP.
05DB  F04C          A3 = A3 + 1.
05DC  F1B8          INC IF NOT COV SKIP.
05DD  45E0          MPCR = INDSHIFT2 - 1.
05DE  F044          A3 = A3 C.
05DF  F05F          B.
05E0  45D7          MPCR = INDSHIFT1 - 1.
                INDSHIFT2.
05E1  F07D          B = B C.
05E2  D800          SAR = 8.
05E3  F0C9          JUMP.
                TERMI.
05E4  F096          DR1 BEX.
05E5  F05F          B.
05E6  F0CA          LCTR.
05E7  E060          LIT = @60@.
05E8  F0EF          MIR = Z.
05E9  E000          LIT = @00@.
05EA  F098          DW2.
05EB  44E0          MPCR = TESTSELECT - 1.
                ENABLE-PRINTER.
05EC  F0EA          MIR = LIT.
05ED  E004          LIT = @04@.
05EE  F099          DW1.
05EF  F05F          B.
05F0  F0C9          JUMP.
                INIT-LEFT.
05F1  F0EA          MIR = LIT.
05F2  E010          LIT = @10@.
05F3  F099          DW1.                        ENABLE CARRIER
```

```
05F4  F0EE          MIR = LIT L.
05F5  C803          SAR = 8 LIT = 3.
05F6  F0FC          WHEN SRQ STEP.
05F7  F098          DW2.
05F8  F05F          B.
05F9  F0FC          WHEN SRQ STEP.
05FA  F0C9          JUMP.
                ADVANCE-PLATEN.
05FB  F0EA          MIR = LIT.
05FC  E008          LIT = 8.
05FD  F099          DW1.
05FE  F0CA          LCTR.
05FF  E03F          LIT = @3F@.
0600  F0EF          MIR = Z.
0601  E050          LIT = @50@.
0602  F0FC          WHEN SRQ STEP.
0603  F098          DW2.
0604  F05F          B.
0605  F0FC          WHEN SRQ STEP.
0606  F0C9          JUMP.
                ENABLE-CARRIER.
0607  F0EA          MIR = LIT.
0608  E010          LIT = @10@.
0609  F099          DW1.
060A  F05F          B.
060B  F0C9          JUMP.
                ENABLE-FORMS.
060C  F0EA          MIR = LIT.
060D  E008          LIT = @08@.
060E  F099          DW1.
060F  F05F          B.
0610  F0C9          JUMP.
                DINT-FORWCNTRL.
0611  F0FC          WHEN SRQ STEP.
0612  F099          DW1.
0613  F05F          B.
0614  F0C9          JUMP.
                DINT-FORWDATA.
0615  F0FC          WHEN SRQ STEP.
0616  F098          DW2.
0617  F05F          B.
0618  F0C9          JUMP.
                DINT-FORRDATA.
0619  F0FC          WHEN SRQ STEP.
061A  F097          DR2 BEX.
061B  F05F          B.
061C  F0C9          JUMP.
                INDSH.
061D  F057          A3 = LIT L.
061E  C802          SAR = 8 LIT = 2.
061F  F0CA          LCTR.
0620  E060          LIT = @60@.
0621  F0EF          MIR = Z.
0622  E000          LIT = @00@.
0623  F098          DW2.
                AIND.
0624  C890          SAR = 8 LIT = @90@.
0625  862E          CPCR = SLAWR - 1.
                BIND.
0626  C888          SAR = 8 LIT = @88@.
0627  862E          CPCR = SLAWR - 1.
                CIND.
0628  C884          SAR = 8 LIT = @84@.
0629  862E          CPCR = SLAWR - 1.
                DIND.
062A  C882          SAR = 8 LIT = @82@.
062B  862E          CPCR = SLAWR - 1.
                SIND.
062C  C881          SAR = 8 LIT = @81@.
062D  862E          CPCR = SLAWR - 1.
062E  461C          MPCR = INDSH - 1.
                SLAWR.
062F  F1AE          IF NOT URQ SKIP.
0630  44E0          MPCR = TSELR - 1.
0631  F077          B = B001.
0632  F039          A2 = LIT L.
                SLAWRA.
0633  F1CB          MIR = A2 OR B.
0634  F098          DW2.
0635  F07D          B = B C.
0636  DF00          SAR = 15.
0637  F03C          A3 EQV B.
0638  F09C          IF ABT JUMP.
0639  F10F          A1 = B000.
063A  F0CA          LCTR.
063B  E001          LIT = 1.
                DELAYA.
063C  F012          A1 = A1 + 1.
063D  F09E          IF AOV SKIP.
063E  463B          MPCR = DELAYA - 1.
063F  F0C8          INC, IF COV SKIP.
0640  463B          MPCR = DELAYA - 1.
0641  4632          MPCR = SLAWRA - 1.
                RESTORE-BR1.
                RSTBR1.
0642  F0E1          MIR = B.
0643  F05D          ASE.
0644  F080          B = BMAR.
0645  F07A          B = BITT.
0646  D800          SAR = 8.
0647  F07F          B = B R.
0648  F07C          B = B L.
0649  F0D5          MAR1 = B.
064A  F08D          BMI.
064B  F0C9          JUMP.
                DESELRSETI.                     A2 = PARTIAL STAT 0P00
064C  F05D          ASE.
064D  F035          A2 = BMAR.
064E  4652          MPCR = DESEL - 1.
                DESELSETI.                      A2 = PARTIAL STAT 8P00
064F  F05D          ASE.
0650  F080          B = BMAR.
0651  F07A          B = BITT.
0652  F033          A2 = B.
                DESEL.
0653  C80F          SAR = 8 LIT = @0F@.
0654  F16C          BR1 = LIT L.
0655  F099          DW1.
0656  F089          B = LIT.
0657  E0FF          LIT = @FF@.
0658  F144          B = A2 NIM B.
0659  F033          A2 = B.
065A  F07A          B = BITT.
065B  F0D5          MAR1 = B.
065C  F0C9          JUMP.
                CLOSE-PLAT.
065D  F0EA          MIR = LIT.
065E  E008          LIT = 8.
065F  F099          DW1.                        ENABLE FORMS
0660  F0CA          LCTR.
0661  E03F          LIT = @3F@.
0662  F0EF          MIR = Z.
0663  E004          LIT = 4.
0664  F0FC          WHEN SRQ STEP.
0665  F098          DW2.                        CLOSE PLAT
0666  F05F          B.
0667  F0FC          WHEN SRQ STEP.
0668  F0C9          JUMP.
                ENABLE-KYBD.
0669  F1D5          MIR = B001 + 1.
066A  F099          DW1.
```

```
066B  F05F          B.
066C  F0C9          JUMP.
                  READDATAKEY.
066D  F0FC          WHEN SRQ  STEP.
                  *********PRESS       TWO NUMERIC  KEYS  TO  SELECT   TEST
066E  F097          DR2  BEX.
066F  F086          B  =  LIT   AND  B.
0670  E00F          LIT  =  @0F@.
0671  F0C9          JUMP.
                  TSTEOPRST.
0672  F0E6          MIR  =  B000.
0673  F099          DW1.                          DISABLE   FORMS
0674  F05F          B.
0675  DE00          SAR  =  14.
0676  F096          DR1  BEX.
0677  F172          CSAR  B  =  B  C.
0678  F0E2          MIR  =  B  C.
0679  F0C3          IF  NOT  LST  SKIP.
067A  F000          WAIT.                         EOP  NOT  RESET  WITH  FORMS
                  *********ERROR       #  E  83A
067B  F0EA          MIR  =  LIT.
067C  E008          LIT  =  8.                    ENABLE  FORMS
067D  F099          DW1.
067E  F000          WAIT.
                  *********REPLACE       PAPER  IN  END  OF  PAPER  DETECTOR  AND
                  *********FORCE       STEP.
067F  DE00          SAR  =  14.
0680  F096          DR1  BEX.
0681  F172          CSAR  B  =  B  C.
0682  F0E2          MIR  =  B  C.
0683  F0C3          IF  NOT  LST  SKIP.
0684  F000          WAIT.                         EOP  NOT  RESET
                  *********ERROR       #  E  83B
0685  44E0          MPCR  =  TESTSELECT    -  1.
                  TSTDEVOP.
0686  F0E6          MIR  =  B000.
0687  F0C6          IF  SRQ  DW2  SKIP.           TEST  NO  DEV  OP
0688  F0F7          SKIP.
0689  F000          WAIT.                         SRQ  WITH  IRQ
                  *********ERROR       #  E  88
068A  F1AD          IF  NOT  SRQ  SKIP.
068B  F000          WAIT.                         NO  DEV  OP  COND  SELECTED
                  *********ERROR       #  E  89
068C  F0C9          JUMP.
068D  4000          CNST  =  @4000@.
                  FINISH.
```

NOTE 1: PS1-(NOTE 1)
IF CONSOLE PORT # IS 8 USE PS1-2
IF CONSOLE PORT # IS 12 USE PS1-3

E1	OPERATOR ACTION	MACHINE ACTION	A	D
1	FE MEMORY TEST INDICATED CONSOLE FAILING BUSS TEST		2	F413
2	METER CC11E 2N (CCDREAD)	READING = 0%	3	F10
3	METER CC7E 2F (CCENSTA)	READING = 0%	4	F11
4	SELECT EXT BUSS BIT THAT FE MTR INDICATED BAD			
		EXT BIT 1	F	16
		EXT BIT 9, 10, 11, OR 12	F	14
		EXT BIT 13, 15, OR 16	F	12
		EXT BIT 14 OR 2	F	13

MANUAL PROCEDURES

E2	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PS1-1 1R (PSIRQ/)	READING = 100%	F1	2
2	METER USING THE FOLLOWING CHART AND PROBE ONLY THOSE SIGNALS WHERE A PSI CARD IS AVAILABLE. IF ALL AGREE GO TO STEP 3.		3	

LOCATION	PORT #	READING		
PS1-1 2K (SINT1/)	1	100%		F2
PS1-1 2N (DINT1/)	1	100%		F2
PS1-1 1L (SINT2/)	2	100%		F2
PS1-1 2L (DINT2/)	2	100%		F2
PS1-1 2P (SINT3/)	3	100%		F2
PS1-1 2M (DINT3/)	3	100%		F2
PS1-1 1P (SINT4/)	4	100%		F2
PS1-1 1N (DINT4/)	4	100%		F2
PS1-2 2K (SINT5/)	5	100%		F2
PS1-2 2N (DINT5/)	5	100%		F2
PS1-2 1L (SINT6/)	6	100%		F2
PS1-2 2L (DINT6/)	6	100%		F2
PS1-2 2P (SINT7/)	7	100%		F2
PS1-2 2M (DINT7/)	7	100%		F2
PS1-2 1P (SINT8/)	8	100%		F2
PS1-2 1N (DINT8/)	8	100%		F2
PS1-3 2K (SINT9/)	9	100%		F2
PS1-3 2N (DINT9/)	9	100%		F2
PS1-3 1L (SINT10/)	10	100%		F2
PS1-3 2L (DINT10/)	10	100%		F2
PS1-3 2P (SINT11/)	11	100%		F2
PS1-3 2M (DINT11/)	11	100%		F2
PS1-3 1P (SINT12/)	12	100%		F2
PS1-3 1N (DINT12/)	12	100%	3	F2

3	METER PS1-1 1R (PSIRQ/) AND REMOVE 1 PSI CARD AT A TIME UNTIL READING GOES TO 100%		F3	

E3	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC2E 2J (DINTN/)	READING = 100%	7	2
2	OBSERVE MIR	BIT A8 IS ON	3	F17
3	OBSERVE MIR	BIT C1 IS ON	F18	4
4	OBSERVE MIR	BIT C2 IS ON	F19	5
5	OBSERVE MIR	BIT C4 IS ON	F20	6
6	OBSERVE MIR	BIT C8 IS ON	F26	F37
7	OBSERVE MIR	BIT D1 IS ON	F22	8
8	OBSERVE MIR	BIT D2 IS ON	F23	9
9	OBSERVE MIR	BIT D4 IS ON	F24	10
10	OBSERVE MIR	BIT D8 IS ON	F25	F0

E4	OPERATOR ACTION	MACHINE ACTION	A	D

1	METER CC2E 2Y (SINTN/)	READING = 0%	2	3
2	METER PS1-1 1R (PSIRQ/)	READING = 0%	F1	F27
3	METER THE FOLLOWING:			
	CC7E(K) 2K (CCRDYNC/)	READING = 0%		F28
	CC7E(K) 1X (CCRDYNO)	READING = 100%	4	F29
4	HOLD READY BUTTON IN AND METER THE FOLLOWING:			
	CC7E(K) 2K (CCRDYNC/)	READING = 100%		F28
	CC7E(K) 1X (CCRDYNO)	READING = 0%	5	F29
5	METER THE FOLLOWING:			
	CC7E(K) 1B (CDSCLKD)	READING = 3-5%	F30	F4
E4A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F403	
E5	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND OBSERVE MIR	MIR = 0000	2	4
2	METER PS1-1 1E (EOASR/)	READING = 0%	3	F401
3	FORCE STEP AND METER PS1-1 1E (EOASR/)	READING = 100%	F32	F415
4	OBSERVE MIR	MIR DIGIT B = CONSOLE PORT ADDRESS (PORT # MINUS 1)	5	F403
5	OBSERVE MIR	BIT A4 SET	5A	5B
5A	METER CC7E(K) 1Y (ENDOPS/)	READING = 100%	F500	F501
5B	OBSERVE MIR	BIT D8 NOT SET	6	F34
6	METER CC2E 2Y (SINTN/)	READING = 0%	7	F43
7	METER CC6E(K) 2D (PSENSTN/)	READING = 0%	F33	F404
E6	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC2E 2Y (SINTN/)	READING = 0%	F341	2
2	METER PS1-1 1R (PSIRQ/)	READING = 0%	F9	F1
E7	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC2E 2J (DINTN/)	READING = 100%	2	F35
2	METER CC5E 1D (CCKDI)	READING = 100%	3	5
3	METER CC5E 2B (CCKBF)	READING = 100%	F36	4
4	METER CC4 2E (CGCLEARB) AND PRESS AND HOLD SYSTEM CLEAR BUTTON.	READING = 100%	F37	F38
5	METER CC11E 2N (CCDREAD/)	READING = 100%	6	F39
6	METER CC11E 1B (CDSCLKN)	READING = 3-5%	7	F5
7	METER CC5E 2H (CCIW)	READING = 0%	9	8
8	METER CC5E 1P (PSWRITN/)	READING = 100%	F223	F121

9	SCOPE CC11E 2V (STROBEI/) AND PRESS KEYBOARD KEY. LOOK FOR A NEGATIVE PULSE OF APPROXIMATELY 60 USEC FOR EACH KEY DEPRESSION	PULSE PRESENT	F40	F41
E8	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT A8 NOT SET	F 43	2
2	OBSERVE MIR	MIR BIT C1 NOT SET	F 44	F 45
E8A	OPERATOR ACTION	MACHINE ACTION	A	D
1	INCREMENTER STEPPED BEFORE PK04 PRESSED.		F46	2
2	INCREMENTER FAILED TO STEP WHEN PK04 PRESSED.		3	F0
3	FORCE STEP AND OBSERVE MIR	MIR BIT D4 SET	F47	F48
E9	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F 6	
E9B	OPERATOR ACTION	MACHINE ACTION	A	D
E10	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F49	
E11	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE INDICATORS	LAMP A1 ON	2	4
2	METER CC4 2D (CCI01/)	READING = 100%	F51	3
3	OBSERVE INDICATORS	LAMPS A1, B1, C1, D1, ON	F52	F53
4	OBSERVE INDICATORS	LAMP A2 ON	5	7
5	METER CC4 1D (CCI02/)	READING = 100%	F54	6
6	OBSERVE INDICATORS	LAMPS A2, B2, C2, D2 ON	F55	F56
7	OBSERVE INDICATORS	LAMP A3 ON	8	10
8	METER CC4 1F (CCI03/)	READING = 100%	F57	9
9	OBSERVE INDICATORS	LAMPS A3, B3, C3, D3 ON	F58	F59
10	OBSERVE INDICATORS	LAMP A4 ON	11	13
11	METER CC4 1E (CCI04/)	READING = 100%	F60	12
12	OBSERVE INDICATORS	LAMPS A4, B4, C4, D4 ON	F61	F62
13	OBSERVE INDICATORS	LAMP A5 ON	14	16
14	METER CC5E 1F (CCI05/)	READING = 100%	F63	15
15	OBSERVE INDICATORS	LAMPS A5, B5, C5, D5 ON	F64	F65
16	OBSERVE INDICATORS	LAMP A6 ON	17	19
17	METER CC5E 2E (CCI06/)	READING = 100%	F66	18
18	OBSERVE INDICATORS	LAMPS A6, B6, C6, D6 ON	F67	F68

19	OBSERVE INDICATORS	LAMP A7 ON	20	22
20	METER CC5E 1E (CCI07/)	READING = 100%	F69	21
21	OBSERVE INDICATORS	LAMPS A7, B7, C7, D7 ON	F70	F71
22	OBSERVE INDICATORS	LAMP A8 ON	23	25
23	METER CC5E 2F (CCI08/)	READING = 100%	F72	24
24	OBSERVE INDICATORS	LAMPS A8, B8, C8, D8 ON	F73	F74
25	OBSERVE INDICATORS	LAMP B1 ON	26	27
26	METER CC4 2K (CCI09/)	READING = 100%	F75	F76
27	OBSERVE INDICATORS	LAMP B2 ON	28	29
28	METER CC4 1K (CCI10/)	READING = 100%	F77	F76
29	OBSERVE INDICATORS	LAMP B3 ON	30	31
30	METER CC4 1L (CCI11/)	READING = 100%	F78	F76
31	OBSERVE INDICATORS	LAMP B4 ON	32	33
32	METER CC4 1J (CCI12/)	READING = 100%	F79	F76
33	OBSERVE INDICATORS	LAMP B5 ON	34	35
34	METER CC5E 1J (CCI13/)	READING = 100%	F80	F81
35	OBSERVE INDICATORS	LAMP B6 ON	36	37
36	METER CC5E 2K (CCI14/)	READING = 100%	F82	F81
37	OBSERVE INDICATORS	LAMP B7 ON	38	39
38	METER CC5E 1N (CCI15/)	READING = 100%	F83	F81
39	OBSERVE INDICATORS	LAMP B8 ON	40	41
40	METER CC5E 2J (CCI16/)	READING = 100%	F84	F81
41	OBSERVE INDICATORS	LAMP C1 ON	42	43
42	METER CC4 1P (CCI17/)	READING = 100%	F85	F86
43	OBSERVE INDICATORS	LAMP C2 ON	44	45
44	METER CC4 2P (CCI18/)	READING = 100%	F87	F86
45	OBSERVE INDICATORS	LAMP C3 ON	46	47
46	METER CC4 2Q (CCI19/)	READING = 100%	F88	F86
47	OBSERVE INDICATORS	LAMP C4 ON	48	49
48	METER CC4 1N (CCI20/)	READING = 100%	F89	F86
49	OBSERVE INDICATORS	LAMP C5 ON	50	51
50	METER CC5E 2Q (CCI21/)	READING = 100%	F90	F91
51	OBSERVE INDICATORS	LAMP C6 ON	52	53
52	METER CC5E 1Q (CCI22/)	READING = 100%	F92	F93
53	OBSERVE INDICATORS	LAMP C7 ON	54	55
54	METER CC5E 2R (CCI23/)	READING = 100%	F94	F95
55	OBSERVE INDICATORS	LAMP C8 ON	56	57
56	METER CC5E 2U (CCI24/)	READING = 100%	F96	F97
57	OBSERVE INDICATORS	LAMP D1 ON	58	59
58	METER CC4 1T (CCI25/)	READING = 100%	F98	F99
59	OBSERVE INDICATORS	LAMP D2 ON	60	61
60	METER CC4 2T (CCI26/)	READING = 100%	F100	F101
61	OBSERVE INDICATORS	LAMP D3 ON	62	63
62	METER CC4 2S (CCI27/)	READING = 100%	F102	F103
63	OBSERVE INDICATORS	LAMP D4 ON	64	65
64	METER CC4 1U (CCI28/)	READING = 100%	F104	F105
65	OBSERVE INDICATORS	LAMP D5 ON	66	67
66	METER CC5E 1V (CCI29/)	READING = 100%	F106	F107
67	OBSERVE INDICATORS	LAMP D6 ON	68	69
68	METER CC5E 1U (CCI30/)	READING = 100%	F108	F109
69	OBSERVE INDICATORS	LAMP D7 ON	70	71
70	METER CC5E 2W (CCI31/)	READING = 100%	F110	F111
71	OBSERVE INDICATORS	LAMP D8 ON	72	73
72	METER CC5E 2T (CCI32/)	READING = 100%	F112	F113
73	OBSERVE INDICATORS	LAMP S1 ON	74	75
74	METER CC4 2W (CCI33/)	READING = 100%	F114	F115
75	OBSERVE INDICATORS	LAMP S2 ON	76	77
76	METER CC4 1X (CCI34/)	READING = 100%	F116	F115
77	OBSERVE INDICATORS	LAMP S4 ON	78	79
78	METER CC4 2X (CCI36/)	READING = 100%	F117	F115
79	OBSERVE INDICATORS	LAMP S3 ON	80	81
80	METER CC4 2V (CCI35/)	READING = 100%	F118	F115
E12	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC2E 2Y (SINTN/)	READING = 0%	F384	2
2	PUT SGL/NOR SWITCH TO SGL. PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL AND PRESS SGL 3 TIMES. METER CC5E 2V (PSREADN/)	READING = 0%	3	F405
3	METER CC5E 1W (PSINSTN)	READING = 0%	F119	F406
E13	OPERATOR ACTION	MACHINE ACTION	A	D

1	PUT SGL/NOR SWITCH TO SGL - PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL PRESS SGL TWICE				
2	OBSERVE INDICATORS	NONE OF A INDICATORS ON	3	5	
3	METER CC5E 1P (PSWRITEN/)	READING = 0%	F122	F121	
5	OBSERVE INDICATORS	LAMPS A1 THRU A4 OFF	F123	6	
6	OBSERVE INDICATORS	LAMPS A5 THRU A8 OFF	F124	7	
7	OBSERVE INDICATORS	LAMP A1 OFF	8	11	
8	METER CC9-1 2U (CCIA0F/)	READING = 0%	F125	9	
9	METER CC4 2D (CCI01/)	READING = 0%	F126	10	
10	METER CC4 1H (CCDMIR16)	READING = 100%	F127	F128	
11	OBSERVE INDICATORS	LAMP A2 OFF	12	15	
12	METER CC9-1 2V (CCIA1F/)	READING = 0%	F129	13	
13	METER CC4 1D (CCI02/)	READING = 0%	F130	14	
14	METER CC4 2H (CCDMIR15)	READING = 100%	F127	F131	
15	OBSERVE INDICATORS	LAMP A3 OFF	16	19	
16	METER CC9-1 2D (CCIA2F/)	READING = 0%	F132	17	
17	METER CC4 1F (CCI03/)	READING = 0%	F133	18	
18	METER CC4 2M (CCDMIR14)	READING = 100%	F127	F134	
19	OBSERVE INDICATORS	LAMP A4 OFF	20	23	
20	METER CC9-1 2C (CCIA3F/)	READING = 0%	F135	21	
21	METER CC4 1E (CCI04/)	READING = 0%	F136	22	
22	METER CC4 2R (CCDMIR13)	READING = 100%	F127	F134	
23	OBSERVE INDICATORS	LAMP A5 OFF	24	27	
24	METER CC9-1 2B (CCIA4F/)	READING = 0%	F137	25	
25	METER CC5E 1F (CCI05/)	READING = 0%	F138	26	
26	METER CC5E 1L (CCDMIR12)	READING = 100%	F139	F140	
27	OBSERVE INDICATORS	LAMP A6 OFF	28	31	
28	METER CC9-1 2E (CCIA5F/)	READING = 0%	F141	29	
29	METER CC5E 2E (CCI06/)	READING = 0%	F142	30	
30	METER CC5E 2S (CCDMIR11)	READING = 100%	F139	F143	
31	OBSERVE INDICATORS	LAMP A7 OFF	32	35	
32	METER CC9-1 2F (CCIA6F/)	READING = 0%	F144	33	
33	METER CC5E 1E (CCI07/)	READING = 0%	F145	34	
34	METER CC5E 2L (CCDMIR10)	READING = 100%	F139	F140	
35	OBSERVE INDICATORS	LAMP A8 OFF	36	39	
36	METER CC9-1 2G (CCIA7F/)	READING = 0%	F146	37	
37	METER CC5E 2F (CCI08/)	READING = 0%	F147	38	
38	METER CC5E 1X (CCDM1R09)	READING = 100%	F139	F143	
39	OBSERVE INDICATORS	ANY B INDICATORS ON	F391	40	
40	OBSERVE INDICATORS	ANY C INDICATORS ON	F391	41	
41	OBSERVE INDICATORS	ANY D INDICATORS ON	F392	42	
42	OBSERVE INDICATORS	ANY S INDICATORS ON	F392	2	
E14	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE INDICATORS	B INDICATORS ON = 99	F425	1A	
1A	OBSERVE INDICATORS	ALL B INDICATORS OFF	F148	2	
2	OBSERVE INDICATORS	LAMPS B1 THRU B4 OFF	F149	3	
3	OBSERVE INDICATORS	LAMPS B5 THRU B8 OFF	F150	4	
4	OBSERVE INDICATORS	LAMP B1 OFF	5	7	
5	METER CC9-1 2M (CCIB0F/)	READING = 0%	F151	6	
6	METER CC4 2K (CCI09/)	READING = 0%	F152	F153	
7	OBSERVE INDICATORS	LAMP B2 OFF	8	10	
8	METER CC9-1 2L (CCIB1F/)	READING = 0%	F154	9	
9	METER CC4 1K (CCI10/)	READING = 0%	F155	F153	
10	OBSERVE INDICATORS	LAMP B3 OFF	11	13	
11	METER CC9-1 2H (CCIB2F/)	READING = 0%	F156	12	
12	METER CC4 1L (CCI11/)	READING = 0%	F157	F153	
13	OBSERVE INDICATORS	LAMP B4 OFF	14	16	
14	METER CC9-1 2I (CCIB3F/)	READING = 0%	F158	15	
15	METER CC4 1J (CCI12/)	READING = 0%	F159	F153	
16	OBSERVE INDICATORS	LAMP B5 OFF	17	19	
17	METER CC9-1 2Y (CCIB4F/)	READING = 0%	F160	18	
18	METER CC5E 1J (CCI13/)	READING = 0%	F161	F162	
19	OBSERVE INDICATORS	LAMP B6 OFF	20	22	
20	METER CC9-1 2X (CCIB5F/)	READING = 0%	F163	21	
21	METER CC5E 2K (CCI14/)	READING = 0%	F164	F162	
22	OBSERVE INDICATORS	LAMP B7 OFF	23	25	
23	METER CC9-1 2W (CCIB6F/)	READING = 0%	F165	24	
24	METER CC5E 1N (CCI15/)	READING = 0%	F166	F162	
25	OBSERVE INDICATORS	LAMP B8 OFF	26	28	
26	METER CC9-1 2T (CCIB7F/)	READING = 0%	F167	27	

27	METER CC5E 2J (CCI16/)	READING = 0%	F168	F162	
28	OBSERVE INDICATORS	ANY A INDICATORS ON	F393	29	
29	OBSERVE INDICATORS	AMY C INDICATORS ON	F393	1	
E15	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE INDICATORS	ALL C INDICATORS OFF	F169	2	
2	OBSERVE INDICATORS	LAMPS C1 THRU C4 OFF	F170	3	
3	OBSERVE INDICATORS	LAMPS C5 THRU C8 OFF	F171	4	
4	OBSERVE INDICATORS	LAMP C1 OFF	5	7	
5	METER CC9-2 2M (CCIC0F/)	READING = 0%	F172	6	
6	METER CC4 1P (CCI17/)	READING = 0%	F173	F174	
7	OBSERVE INDICATORS	LAMP C2 OFF	8	10	
8	METER CC9-2 2L (CCIC1F/)	READING = 0%	F175	9	
9	METER CC4 2P (CCI18/)	READING = 0%	F176	F174	
10	OBSERVE INDICATORS	LAMP C3 OFF	11	13	
11	METER CC9-2 2H (CCIC2F/)	READING = 0%	F177	12	
12	METER CC4 2Q (CCI19/)	READING = 0%	F178	F174	
13	OBSERVE INDICATORS	LAMP C4 OFF	14	16	
14	METER CC9-2 2I (CCIC3F/)	READING = 0%	F179	15	
15	METER CC4 1N (CCI20/)	READING = 0%	F180	F174	
16	OBSERVE INDICATORS	LAMP C5 OFF	17	19	
17	METER CC9-2 2Y (CCIC4F/)	READING = 0%	F181	18	
18	METER CC5E 2Q (CCI21/)	READING = 0%	F182	F183	
19	OBSERVE INDICATORS	LAMP C6 OFF	20	22	
20	METER CC9-2 2X (CCIC5F/)	READING = 0%	F184	21	
21	METER CC5E 1X (CCI22/)	READING = 0%	F185	F183	
22	OBSERVE INDICATORS	LAMP C7 OFF	23	25	
23	METER CC9-2 2W (CCIC6F/)	READING = 0%	F186	24	
24	METER CC5E 2R (CCI23/)	READING = 0%	F187	F183	
25	OBSERVE INDICATORS	LAMP C8 OFF	26	1	
26	METER CC9-2 2T (CCIC7F/)	READING = 0%	F188	27	
27	METER CC5E 2U (CCI24/)	READING = 0%	F189	F183	
E16	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE INDICATORS	ALL D INDICATORS OFF	F190	2	
2	OBSERVE INDICATORS	LAMPS D1 THRU D4 OFF	F191	3	
3	OBSERVE INDICATORS	LAMPS D5 THRU D8 OFF	F192	4	
4	OBSERVE INDICATORS	LAMP D1 OFF	5	7	
5	METER CC9-2 2U (CCID0F/)	READING = 0%	F193	6	
6	METER CC4 1T (CCI25/)	READING = 0%	F194	F195	
7	OBSERVE INDICATORS	LAMP D2 OFF	8	10	
8	METER CC9-2 2V (CCID1F/)	READING = 0%	F196	9	
9	METER CC4 2T (CCI26/)	READING = 0%	F197	F195	
10	OBSERVE INDICATORS	LAMP D3 OFF	11	13	
11	METER CC9-2 2D (CCID2F/)	READING = 0%	F298	12	
12	METER CC4 2S (CCI27/)	READING = 0%	F199	F195	
13	OBSERVE INDICATORS	LAMP D4 OFF	14	16	
14	METER CC9-2 2C (CCID3F/)	READING = 0%	F200	15	
15	METER CC4 1U (CCI28/)	READING = 0%	F201	F202	
16	OBSERVE INDICATORS	LAMP D5 OFF	17	19	
17	METER CC9-2 2B (CCID4F/)	READING = 0%	F203	18	
18	METER CC5E 1V (CCI29/)	READING = 0%	F204	F205	
19	OBSERVE INDICATORS	LAMP D6 OFF	20	22	
20	METER CC9-2 2E (CCID5F/)	READING = 0%	F206	21	
21	METER CC5E 1U (CCI30/)	READING = 0%	F207	F205	
22	OBSERVE INDICATORS	LAMP D7 OFF	23	25	
23	METER CC9-2 2F (CCID6F/)	READING = 0%	F208	24	
24	METER CC5E 2W (CCI31/)	READING = 0%	F209	F205	
25	OBSERVE INDICATORS	LAMP D8 OFF	26	1	
26	METER CC9-2 2G (CCID7F/)	READING = 0%	F210	27	
27	METER CC5E 2T (CCI32/)	READING = 0%	F211	F212	
E17	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE INDICATORS	LAMPS S1 THRU S4 OFF	F213	2	
2	OBSERVE INDICATORS	LAMP S1 OFF	3	5	
3	METER CC9-1 2P (CCITYF/)	READING = 0%	F214	4	
4	METER CC4 2W (CCI33/)	READING = 0%	F215	F216	
5	OBSERVE INDICATORS	LAMP S2 OFF	6	8	
6	METER CC9-1 2Q (CCIRYF/)	READING = 0%	F217	7	
7	METER CC4 1X (CCI34/)	READING = 0%	F218	F216	
8	OBSERVE INDICATORS	LAMP S3 OFF	9	11	
9	METER CC9-1 2J (CCIERF/)	READING = 0%	F219	10	
10	METER CC4 2V (CCI35/)	READING = 0%	F220	F216	
11	OBSERVE INDICATORS	LAMP S4 OFF	12	1	

12	METER CC9-1 2N (CCIUNF/)	READING = 0%	F221	13
13	METER CC4 2X (CCI36/)	READING = 0%	F222	F216
E18	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PS1-1 1Q (PSURQ/)	READING = 0%	F 1	2
2	METER PS1-1 1R (PSIRQ/)	READING = 0%	F424	F224
E19	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 0000	F225	2
2	OBSERVE MIR	MIR = 00C0 OR 00E0	F39	3
3	CONTINUE MTR			
E20	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER MOVES TO RIGHT MARGIN ON POWER UP	F385	2
2	NONE	CONSOLE PRINTING IN POSITION	F386	3
3	NONE	INTERPOSER PICKING	F387	4
4	NONE	LEFT OR RIGHT PLATEN ADVANCING	F388	5
5	CONTINUE MTR			
E21	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PS1-1 2Q (PSSRQ/)	READING = 0%	F 1	F226
E22	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT SGL/NOR SWITCH TO SGL - PRESS AND HOLD FST AND PRESS SGL. RELEASE FST AND SGL PRESS SGL 7 TIMES METER CC7E 2I (CCFRMS)	READING = 100%	F238	F239
E23	OPERATOR ACTION	MACHINE ACTION	A	D
1	DECODER MOTOR IS ON		2	13
2	METER CC3E 1R (CCCS)	READING = 3-5%	3	F407
3	METER CC7E 2W (CCTUF-1)	READING = 46%	7	4
4	METER CC3E 2R (CCMCTU/)	READING = 46%	F432	5
5	METER CC3E 2S (CCTU)	READING = 98%	F433	6
6	METER CC8E 1E (CCTUA)	READING = 96%	F228	F229
7	METER CC6E FP4M (FMF)	READING = 100%	8	F230
8	METER CC6E FP4T (FMENF-1)	READING = 100%	11	9
9	METER CC6E 2F (CCCLF234			
12	METER CC7E FP3X (FDI/)	READING = 0%	F235	F236
13	CHECK CONSOLE AC AND 24VDC FUSES.	FUSE GOOD	14	F281
14	METER CC3E 2W (CCMOTON/)	READING = 0%	F434	F435
E24	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F237	2
2	OBSERVE MIR	MIR = 0000	F377	3
3	OBSERVE MIR	MIR BIT A4 SET	4	F50
4	METER CC7E(K) 1Y (ENDOPS/)	READING = 100%	F402	F501
E25	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC7E FP3P (FMTU)	READING = 46%	F240	F241
E27	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	PLATEN FAILED TO OPEN AND BELL FAILED TO RING	1A	3
1A	CHECK 24 V FUSES	FUSES GOOD	2	F281
2	METER CC6E(K) FP4U (RCLR/)	READING = 100%	F242	F243
3	OBSERVE CONSOLE	PLATEN STAYS IN OPEN POSITION	F390	3A
3A	PUT IRQ/EXT SWITCH TO EXT. FORCE STEP (FST)	PLATEN FAILING TO OPEN	4	6
4	METER CC8E 2Y (CCOPNP/D)	READING = 95%	F244	5
5	METER CC6E 1L (CCOPNP/)	READING FLUCTUATES BETWEEN 95 TO 100%	F245	F246
6	OBSERVE CONSOLE	BELL NOT RINGING WHEN PLATEN OPENS	7	9
7	METER CC8E 1T (CCAUDL/D)	READING FLUCTUATES BETWEEN 95-100%	F247	8
8	METER CC6E(K) 1N (CCAUDAL/)	READING FLUCTUATES BETWEEN 95-100%	F248	F249
9	OBSERVE CONSOLE	PLATEN NOT CLOSING	10	12
10	METER CC8E 2X (CCCLSP/D)	READING FLUCTUATES BETWEEN 95 TO 100%	F250	11
11	METER CC6E(K) 2L (CCCLSP/)	READING FLUCTUATES BETWEEN 95 TO 100%	F251	F246
12	OBSERVE CONSOLE	LEFT OR RIGHT PLATEN ADVANCED	F254	13
13	OBSERVE CONSOLE	SYSTEM POWERED OFF	F255	F 50
E28	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC2E 2F (CCCRDI/)	READING = 0%	F235	2
2	METER CC2E 1C (CCROP1F)	READING = 100%	3	F252
3	METER CC2E 2U (CCXCRGL/)	READING = 100%	4	F253
4	METER CC2E 1N (CCXCRGR/)	READING = 100%	F257	F256

E29	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F237	F 50
E30	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC2E 2E (CCINITF/)	READING = 0%	2	F258
2	METER CC2E FPW3 (XCCLR/)	READING = 100%	F259	F260
E31	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER MOVED TO RIGHT MARGIN	2	5
2	METER CC1E 2I (CCCRH/)	READING = 100%	3	4
3	METER CC1E FPS4 (LSLP/)	READING = 100%	F264	F265
4	METER CC2E 2S (CCD125/)	READING = 100%	F266	F267
5	OBSERVE CONSOLE	CARRIER AT OR NEAR LEFT MARGIN	6	1
6	METER CC1E FPK4 (TUF-2)	READING = 45%	F268	F269
E32	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC7E 2X (CCPRF)	READING = 100%	2	F283
2	METER CC7E 2N (CCCL+NP)	READING = 0%	3	F284
3	METER CC7E FPY3 (PDI/)	READING = 0%	F235	F286
E33	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F289	F289
E34	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F365	F365
E35	OPERATOR ACTION	MACHINE ACTION	A	D
0	CONSOLE HAS 96 CHARACTER DECODER	NONE	E35A	1
1	OBSERVE PRINTOUT	NO CHARACTERS PRINTED	2	4
2	PLACE EXT/IRQ SWITCH TO EXT, FORCE STEP, WHEN NUMERIC LIGHT ON, SELECT TEST 17 OBSERVE CONSOLE	PRINTER NOW PRINTING	F383	2A
2A	METER CC8E 1V (CCPC/D)	READING = 55%	F296	3
3	METER CC7E 2T (CCPC/)	READING = 55%	F297	F298
4	OBSERVE PRINTOUT	CHARACTERS PRINTED ARE NOT CORRECT	5	17
5	PLACE EXT/IRQ SWITCH TO EXT, FORCE STEP, WHEN NUMERIC LIGHT ON, SELECT TEST 16 METER CC8E 1W (CCPDR1/)	READING = 77%	7	6
6	METER CC6E 2Q (CCPRR1/)	READING = 77%	F299	F300
7	METER CC8E 2U (CCPDR2/)	READING = 77%	9	8
8	METER CC6E 1S (CCPRR2/)	READING = 77%	F301	F300
9	METER CC8E 2F (CCPDR4/)	READING = 77%	11	10
10	METER CC6E 1Q (CCPRR4/)	READING = 77%	F302	F303
11	METER CC8E 2D (CCPDR8/)	READING = 77%	13	12
12	METER CC6E 1P (CCPRR8/)	READING = 77%	F304	F305
13	METER CC8E 2B (CCPDT1/)	READING = 77%	15	14
14	METER CC6E 2J (CCPRT1/)	READING = 77%	F306	F305
15	METER CC8E 2G (CCPDT2/)	READING = 77%	F307	16
16	METER CC6E 1K (CCPRT2/)	READING = 77%	F308	F300
17	OBSERVE PRINTOUT	CARRIER DID NOT MOVE FULL 256 SPACES LEFT TO PRINT	F309	18
18	OBSERVE CONSOLE	PLATEN CONTINUED ADVANCING	F378	19
19	OBSERVE CONSOLE	ANY INDICATORS ON	F394	20
20	CONTINUE MTR			
E35A	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	NO CHARACTERS PRINTED	2	4
2	PLACE EXT/IRQ SWITCH TO EXT, FORCE STEP, WHEN NUMERIC LIGHT ON, SELECT TEST 19 OBSERVE CONSOLE	PRINTER NOW PRINTING	F383	2A
2A	METER CC8E 1V (CCPC/D)	READING = 55%	F296	3
3	METER CC7E 2T (CCPC/)	READING = 55%	F297	F298
4	OBSERVE PRINTOUT	CHARACTERS PRINTED ARE NOT CORRECT	5	17
5	PLACE EXT/IRQ SWITCH TO EXT, FORCE STEP, WHEN NUMERIC LIGHT ON SELECT TEST 18, METER CC8E 1W (CCPDR1/)	READING =75-78%	7	6
6	METER CC6E 2Q (CCPRR1/)	READING =75-78%	F299	F300
7	METER CC8E 2U (CCPDR2/)	READING =75-78%	9	8
8	METER CC6E 1S (CCPRR2/)	READING =75-78%	F301	F300
9	METER CC8E 2F (CCPDR4/)	READING =75-78%	11	10
10	METER CC6E 1Q (CCPRR4/)	READING =75-78%	F302	F303
11	METER CC8E 2D (CCPDR8/)	READING =80-87%	13	12
12	METER CC6E 1P (CCPRR8/)	READING =80-87%	F304	F305
13	METER CC8E 2B (CCPDT1/)	READING =75-78%	15	14

14	METER CC6E 2J (CCPRT1/)	READING =75-78%	F306	F303
15	METER CC8E 2G (CCPDT2/)	READING =74-80%	16A	16
16	METER CC6E 1K (CCPRT2/)	READING =74-80%	F308	F428
16A	METER CC8E 2E (CCRS8P/D)	READING =75-78%	F307	16B
16B	METER CC7E 2U (CCRS+8P/)	READING =75-78%	F430	F427
17	OBSERVE PRINTOUT	CARRIER DID NOT MOVE FULL 256 SPACES LEFT TO PRINT.	F309	18
18	OBSERVE CONSOLE	PLATEN CONTINUED ADVANCING	F378	19
19	OBSERVE CONSOLE	ANY INDICATORS ON	F394	20
20	OBSERVE PRINTOUT	FORMS ADVANCED WITH EACH CHARACTER PRINTED	F429	21
21	OBSERVE PRINTOUT	TWO CHARACTERS PRINTED AT LEFT MARGIN	F386	22
22	CONTINUE MTR			

E37	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	PLATEN ADVANCING BAD	2	7
2	REMOVE PAPER FROM CONSOLE. PUT EXT/IRQ SWITCH TO EXT, FORCE STEP. WHEN NUMERIC LIGHT ON RESELECT NUMERIC KEY 03	LEFT PLATEN NOT ADVANCING	3	5
3	METER CC8E 1X (CCLPA/D)	READING = 54%	F310	4
4	METER CC6E 2K (CCLPA/)	READING = 54%	F311	F312
5	METER CC8E 1Y (CCRPA/D)	READING = 54%	F310	6
6	METER CC6E 2H (CCRPA/)	READING = 54%	F313	F312
7	NONE	CARRIER POSITIONING AT LOW SPEED	F315	8
8	NONE	CARRIER OPERATION NOT NORMAL	F399	9
9	CONTINUE MTR			

E38	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	PRINTED CHARACTERS NOT CORRECT	E35	2
2	OBSERVE PRINTOUT	INTERMITTANT SPACING FAILURES AND CARRIER WAS AT HIGH SPEED WHEN DETENT LATCHING	F314	3
3	NONE	CARRIER WAS MOVING AT LOW SPEED	F315	4
4	NONE	CARRIER SLAMS INTO BUMPER	F398	5
5	NONE	INTERMITTANT PAUSES WHILE PRINTING	F399	6
6	OBSERVE PRINTOUT	SPACING FAILURES	F408	7
7	CONTINUE MTR			

E39	OPERATOR ACTION	MACHINE ACTION	A	D
0	CONSOLE HAS 64 CHARACTER DECODER.		1	E39A
1	NONE	CARRIER DID NOT ESCAPE RIGHT	F316	2
2	NONE	CARRIER DID NOT ESCAPE LEFT	F317	3
3	NONE	PLATEN OPEN AND NO CHARACTERS PRINTED	F388	3A
3A	NONE	CHARACTERS PRINTED WERE NOT CORRECT	E35	4
4	NONE	NO RED CHARACTERS PRINTED	5	7
5	METER CC8E 2E (CCRS8P/D), FORCE STEP AND RESELECT NUMERIC KEYS 04	READING WHILE PRINTER ESCAPING LEFT = 55-58%	F318	6
6	METER CC7E 2U (CCRS+8P/) FORCE STEP AND RESELECT NUMERIC KEYS 04	READING WHILE PRINTER ESCAPING LEFT = 55-58%	F319	F320
7	NONE	ANY INDICATORS ON	F395	8
8	NONE	CARRIER OPERATION NOT NORMAL	F397	9
9	CONTINUE MTR			

E39A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	CARRIER DID NOT ESCAPE RIGHT	F316	2
2	NONE	CARRIER DID NOT ESCAPE LEFT	F317	3
3	NONE	PLATEN OPEN AND NO CHARACTERS PRINTED	F388	3A
3A	NONE	CHARACTERS PRINTED WERE NOT CORRECT	E35	4
4	NONE	NO RED CHARACTERS PRINTED	5	7

5	METER CC8E 2C (CCRS96/D) PUT IRQ/EXT SWITCH TO EXT. FORCE STEP (FST) AND SELECT NUMERIC KEYS 04	READING WHILE PRINTER ESCAPING LEFT = 0%	F318	6
6	METER CC7EK 2S (CCRS96/) FORCE STEP AND RESELECT NUMERIC KEYS 04	READING WHILE PRINTER ESCAPING LEFT = 0%	F325	F320
7	NONE	ANY INDICATORS ON	F395	8
8	NONE	CARRIER OPERATION NOT NORMAL	F397	9
9	NONE	RED CHARACTERS PRINTED ESCAPING RIGHT	10	12
10	PERFORM OPERATOR ACTION IN STEP 5	READING WHILE PRINTER ESCAPING RIGHT = 100%	F318	11
11	PERFORM OPERATOR ACTION IN ' STEP 6	READING WHILE PRINTER ESCAPING RIGHT = 100%	F319	F320
12	CONTINUE MTR			
E41	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	E 35	E 35
E42	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND OBSERVE MIR	MIR BIT D1 ON	F366	2
2	OBSERVE MIR	MIR BIT D2 ON	F367	F 50
E43	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	1 OR MORE CHARACTERS CONSISTANTLY PRINTED BAD	E 35	2
2	OBSERVE CONSOLE	DOUBLE CHARACTERS PRINTED IN LEFT MARGIN	F 26	F324
E44	OPERATOR ACTION	MACHINE ACTION	A	D
0	IF FAILURE FROM KEYBOARD TEST (TEST 05) GO TO STEP 1. IF FAILURE FROM KEYBOARD PRINT TEST (TEST 10) GO TO STEP 3.			
1	OBSERVE MIR	MIR = 00XX (X = DON'T CARE)	F438	2

2	PLACE PROBE #1 OF SCOPE ON CC11E 2V (STROBE I/), SYNC ONTO A NEGATIVE GOING 60 MICROSEC. PULSE FOR EACH KEY DEPESSION. PLACE PROBE #2 ACCORDING TO THE FOLLOWING TABLE, WHERE BITS DO NOT COMPARE. NOTE; IF EXPECTED BIT IN MIR IS ON,PROBE #2 SHOULD BE LOW DURING STROBE TIME, IF EXPECTED BIT IN MIR IS OFF, PROBE #2 SHOULD BE HIGH DURING STROBE TIME.			

MIR BITS THAT DISAGREE		PROBE # 2		
B1	D1	CC11E 1Q (KBD1/)	F436	F426
B2	D2	CC11E 1P (KBD2/)	F436	F426
B4	D4	CC11E 2P (KBD3/)	F436	F426
B8	D8	CC11E 2Y (KBD4/)	F436	F426
A1	C1	CC11E 1U (KBD5/)	F437	F426
A2	C2	CC11E 1V (KBD6/)	F437	F426
A4	C4	CC11E 1S (KBD7/)	F437	F426
A8	C8	CC11E 1R (KBD8/)	F437	F426

NOTE; SIGNALS WILL ONLY OCCUR FOR EACH KEY DEPRESSION.

3	IN KEYBOARD PRINT TEST OPERATOR MUST USE CORRECT CODE CHART FOR THIS KEYBOARD AND SELECT THE CORRECT CODE FOR THE KEY THAT FAILED. COMPARE THIS CODE TO INDICATOR 'C' DISPLAY AND GO TO STEP 2.			
E45	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F409	
E46	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F335	
E47	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F410	
E48	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F411	
E49	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8080	F412	2
2	ASSURE CARRIER IS FREE OF EXCESSIVE DRAG AND RESTART OVERSPEED TEST			

E50	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND OBSERVE MIR	MIR BIT D1 SET	2	3
2	METER CC2E 2E (CCINITF/)	READING = 0%	F262	F261
3	OBSERVE MIR	MIR BIT D2 SET	F263	F 50
E51	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F287	
E52	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR = 8000	F288	2
2	OBSERVE MIR	MIR = 0000	F376	F 50
E55	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC2E 1D (CCZERO/)	READING = 100%	F290	F291
E56	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC2E 2E (CCINITF/)	READING = 100%	F293	F292
E57	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F294	
E58	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT C2 SET	F295	F 50
E59	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER DID NOT EVEN MOVE 1 SPACE RIGHT	4	2
2	OBSERVE CONSOLE	CARRIER MOVED TO RIGHT MARGIN BUT INTERPOSER CONTINUED PICKING	F270	3
3	OBSERVE CONSOLE	CARRIER MOVED ONLY 1 SPACE RIGHT	16	18
4	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) OBSERVE CONSOLE	INTERPOSER PICKING CARRIER DETENT	7	5
5	METER CC8E 2V (CCCRIP/D)	READING = 77%	F271	6
6	METER CC2E 1U (CCCRIP/)	READING = 77%	F272	F273
7	CHECK 24 V FUSES	FUSES GOOD	8	F281
8	METER CC1E 2S (CCCRGR/)	READING = 0%	9	12
9	METER CC1E 2R (CCCRGL/)	READING = 100%	10	15
10	METER CC2E 2V (CCCRLT/)	READING = 100%	11	F227

11	SCOPE THE FOLLOWING POINTS:			
	SCOPE	READING		
	CC0 1D (CCCRDRA)	(+23V) - (+24V)		F274
	CC0 1N (CCCRDRB/)	(-.6V) - (- 2V)		F274
	CC0 2F (CCCRDLA)	(+ 9V) - (+12V)		F275
	CC0 1H (CCCRDLB/)	(+ 3V) - (+3.6V)	F345	F275
12	METER CC1E FPV4 (LEFT/)	READING = 100%	13	F277
13	METER CC1E FPC4 (REV)	READING = 0%	14	F369
14	METER CC1E 2M (CCCR4A/)	READING = 0%	F278	F279
15	METER CC1E 2U (CCCXCRGL/)	READING = 100%	F280	F379
16	METER CC8E 1U (CCCRH/D) SET EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) RESET EXT/IRQ SWITCH AS SOON AS READING TAKEN	READING = 0%	F338	17
17	METER CC1E 2I (CCCRH/) PERFORM SWITCH FUNCTION STEP 16	READING = 0%	F339	F340
18	OBSERVE CONSOLE	CARRIER MOVED MORE THAN 1 SPACE AND STOPPED	19	21
19	SCOPE CC8E 1F (CCPR) AND VERIFY A SIGNAL WITH APPROXIMATELY A 0V TO 5V CHANGE IS PRESENT WHEN THE CARRIER IS MANUALLY POSITIONED IN EITHER DIRECTION.		F342	20
20	SCOPE CC8E 1B (CCCPRA/) AND VERIFY THE SAME SIGNAL AS DESCRIBED IN STEP 19.		F343	F344
21	CONTINUE MTR			
E60	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER ESCAPED RIGHT AFTER PRINT	F321	F322
E61	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	CARRIER ESCAPED LEFT AFTER PRINT	F321	F323
E62	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND OBSERVE MIR	MIR BIT D1 ON	F396	2
2	OBSERVE MIR	MIR BIT D2 ON	F368	F 50
E64	OPERATOR ACTION	MACHINE ACTION	A	D

1	NONE	NONE	F346	
E65	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND OBSERVE MIR	MIR BIT D1 ON	3	2
2	OBSERVE MIR	MIR BIT D2 ON	16	F 50
3	OBSERVE CONSOLE	CARRIER AT RIGHT MARGIN	6	4
4	OBSERVE CONSOLE	CARRIER AT LEFT MARGIN	14	5
5	OBSERVE CONSOLE	CARRIER MOVED A FEW SPACES LEFT	F347	F 50
6	PUT EXT/IRQ SWITCH TO EXT, FORCE STEP (FST) METER CC0 2U (CRUTSL/)	READING = 100%	9	7
7	METER CC0 1R (TACHLTP)	READING = 0%	F282	F336
9	METER CC1E 2R (CCCRGL/)	READING =44-57%	10	11
10	METER CC1E 2S (CCCRGR/)	READING =65-75%	F276	13
11	METER CC1E FPT4 (LEFT)	READING = 100%	12	F277
12	METER CC1E 2L (CCCRHS/)	READING =44-57%	F337	F348
13	METER CC1E FPV4 (LEFT/)	READING = 0%	F277	F349
14	OBSERVE CONSOLE	CARRIER HIT LEFT BUMPER	F356 F357	F358
16	OBSERVE CONSOLE	CARRIER HIT LEFT BUMPER	F361	17
17	METER CC1E 1N (CCEQ1)	READING = 100%	18	F359
18	METER CC0 2T (CCTACHBK)	READING = 100%	F360	19
19	METER CC0 2V (CCRUTSR/)	READING = 100%	20	F362
20	METER CC0 2U (CCRUTSL/)	READING = 100%	F363	F364
E66	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F374	
E67	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR AND SELECT:	BIT A8 ON	F370	
		BIT C8 ON	F371	
		BIT C4 ON	F371	
		BIT C2 ON	F371	
		BIT C1 ON	F371	
		BIT D8 ON	F372	
		BIT D4 ON	F373	
		BIT D2 ON	F372	
		BIT D1 ON	F372	
		BIT A4 ON	F373	F 50

E68	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F375	
E69	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE	ALL CHARACTERS PRINTED AT LEFT MARGIN	F380	2
2	OBSERVE CONSOLE	CHARACTERS PRINTED INSTEAD OF SPACES	F400	
E70	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F382	
E71	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F416	
E72	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F417	
E73	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F419	
E74	OPERATOR ACTION	MACHINE ACTION	A	
1	NONE	NONE	F418	
E75	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F420	
E76	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F421	
E77	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PS1-1 2Q (PSSRQ/)	READING = 100%	F1	F422
E78	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PS1-1 1Q (PSURQ/)	READING = 100%	F1	F422
E79	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F423	
E80	OPERATOR ACTION	MACHINE ACTION	A	D
1		CONSOLE PORT READING WAS 100%	F425	2
2		METER READING ON ONE OR MORE OF PORTS 1 THRU 11 WAS 0%	F414	

E81	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE DECODER MOTOR	MOTOR FAILED TO TURN OFF.	F439	2
2	OBSERVE DECODER MOTOR	MOTOR FAILED TO TURN ON.	F440	3
3	OBSERVE DECODER MOTOR	MOTOR DID NOT REMAIN ON FOR 20 SECOND	F42	F50
E82	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE DECODER MOTOR	MOTOR TURNED ON	F440	F50
E83	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER CC7E(K) 1Y (ENDOPS/)	READING = 0%	F441	F442
E83A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F443	
E83B	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F444	
E84	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F332	
E85	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F120	
E86	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F334	
E87	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F333	
E88	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F345	
E89	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F381	
E90	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F42	F42

FAILURE DICTIONARY

FAILURE	SUSPECT CHIPS OR PROCEDURE	
F0	NOT DIAGNOSABLE BY THIS MTR	3
F1	CU1 B,C3	2 4 77 78
F2	RUN MTR ON DEVICE IN THE PORT INDICATED BY PROBE CHART. IF FAILURE IS CONSOLE PORT, FORCE STEP AND GO TO ERROR # E3	2
F3	PS1-(CARD THAT CAUSED METER READING OF 100% WHEN REMOVED) E3 D3 C3 D5	
F4	NO SYSTEM CLOCK FROM CLOCK DRIVER TO CC7E(K) CARD 4	
F5	NO SYSTEM CLOCK FROM CLOCK DRIVER TO CC11E CARD. 7	
F6	CC7E(K) A5	9
F7	SPARE	
F8	SPARE	
F9	PS1-(NOTE 1) E3 D3 C3 D5	2 6
F10	CC5E D5 E1 PS1-(NOTE 1) E7	1
F11	CC5E D1 CC6E(K) B5 PS1-(NOTE 1) E7	1
F12	CC2E D7 C7 CC3E A5	1
F13	CC7E(K) A7 CC11E A5	1
F14	CC11E F7 CC6E(K) F7 CC6E(K) C5	1
F16	CÇ2E D7, C7	
F17	CC2E C7 CC6E C5	3
F18	CC5E B5 CC11E E5 B7 C5 A1 C7	3
F19	CC6E(K) F5 F7 CC7E(K) C3 C1 D3 F3 D1 E3 A1	3
F20	CC6E(K) F5 F7 E5 C7 B7 CC7E(K) C7 D7 C5	3
F21	CC6E(K) F5 F7 CC2E C1, D5, B7, A5, A1, B1	
F22	CC2E D7 C3 A1	3
F23	CC2E D7, D3, B1, A1 CC3E B1 C1 CC1E A1, D1, E1, A5	3

F24	CC7E(K) A5 B1 CC11E C5 B1	3
F25	CC2E D7, D3 CC7E B1 E1 F1 F3 A7 B7 CC7EK B1 E1 F1 F3 A7 E7	3
F26	CC6E(K) B3 CC2E C1, D5 CC1E D7	3,43
F27	PS1-(NOTE 1) E3 D3 C3 D5 C1 A3 F7 E7 E5	4
F28	CC7E(K) C25 E7 OR CONSOLE READY SWITCH	4
F29	CC7E(K) C26 E7 OR CONSOLE READY SWITCH	4
F30	CC2E D3 F1 F3 B5 CC7E A3 A7 B1 F3 F1 E1 B7 CC7EK A3 A7 B1 F3 F1 E1 B7	4
F31	CC5E C7 CC4 A1, A3, B1, C1, D1, B7, A5 CC2E F1, F3, B5, D3	4
F32	CC6E(K) B5 CC5E D1 E1 CC2E D3, C7 PS1-(NOTE 1) B5 C5 B3 D3 E01 A7 (B711-1)	5
F33	CC2E C7, D7, D3 CC6E(K) B5 CC7E(K) A3	5
F34	CC2E D7 D3 C3 CC6E(K) F5 F7 CC7E(K) A7	5
F35	PS1-(NOTE 1) D5 CC5E A5 B721 E02 A5 B711-1 E01 A1	7
F36	CC5E B5 CC6E(K) F1 CC2E C7	7
F37	CC4 B7 A7 CC5E B1 B7 A5 C5 D1 E1	7
F38	NO SYSTEM CLEAR TO CC4 CARD	7
F39	CC5E D5 E1	7 19
F40	CC11E C7 E5 B5 D5 C5 B1 A1 B7 A7	
F41	KEYBOARD FAILURE - NO KEYBOARD STROBE (STROBE1/)	7
F42	CC3E F3 E3 D5	81 90
F43	CC2E D7 CC11E B7 C5	5,8
F44	CC6E(K) F5 F7	8
F45	CC2E D7 D3	8
F46	CC11E A1 B1	8A
F47	CC7E(K) B1 A5 CC2E F1 CC4 A3 CC6E(K) A1 C1 A5 C3 F1	8A
F48	CC11E C5 B1 A1 CC7E(K) B1 A5 A3	8A
F49	CC7E(K) A7 B721 E02 E7 B711-1 E01 B5	10
F50	THIS FAILURE WAS NOT DETECTED WITH BUGGING. SUGGEST RESTARTING MTR TO VARIFY FAILURE IS NOT INTERMITTANT.	
F51	CC9-1 F5, EAC4	11
F52	CC4 C7	11
F53	CC4 B5, B3	11
F54	CC9-1 F5, E4C8	11
F55	CC4 A1	11
F56	CC4 B5, B3	11
F57	CC9-1 A5, B7D4	11
F58	CC4 D5	11
F59	CC4 B5, B3	11
F60	CC9-1 A5, B7D8	11
F61	CC4 D5	11
F62	CC4 B5, B3	11
F63	CC9-1 A5, B7E2	11
F64	CC5E C5	11
F65	CC5E B7 A3	11
F66	CC9-1 A5, B7D0	11
F67	CC5E F7	11
F68	CC5E B7 A3	11
F69	CC9-1 A5, B7C6	11
F70	CC5E C5	11
F71	CC5E B7 A3	11
F72	CC9-1 A5, B7C2	11
F73	CC5E F7	11
F74	CC5E B7 A3	11
F75	CC9-1 D5, D6D8	11
F76	CC4 C7, C3	11
F77	CC9-1 D5, D6E2	11

F78	CC9-1	E5, D6B4	11
F79	CC9-1	E5, D6B8	11
F80	CC9-1	F5, E4E0	11
F81	CC5E	D7 D3	11
F82	CC9-1	F5, E4D6	11
F83	CC9-1	F5, E4D2	11
F84	CC9-1	F5, E4C0	11
F85	CC9-2	D5, D6D8	11
F86	CC4	D5, D3	11
F87	CC9-2	D5, D6E2	11
F88	CC9-2	E5, D6B4	11
F89	CC9-2	E5, D6B8	11
F90	CC9-2	F5, E4E0	11
F91	CC5E	E7 E3	11
F92	CC9-2	F5, E4D6	11
F93	CC5E	E7 E3	11
F94	CC9-2	F5, E4D2	11
F95	CC5E	E7 E3	11
F96	CC9-2	F5, E4C0	11
F97	CC5E	E7 E3	11
F98	CC9-2	F5, E4C4	11
F99	CC4	E7, F5, F1, F7, E3	11
F100	CC9-2	F5, E4C8	11
F101	CC4	E7, F5, F7, F1, E3	11
F102	CC9-2	A5, B7D4	11
F103	CC4	E7, F5, F1, E3, A1	11
F104	CC9-2	A5, B7D8	11
F105	CC4	E7, F5, F1	11
F106	CC9-2	A5, B7E2	11
F107	CC5E	F7 F3	11
F108	CC9-2	A5, B7D0	11
F109	CC5E	F7 F3	11
F110	CC9-2	A5, B7C6	11
F111	CC5E	F7 F3	11
F112	CC9-2	A5, B7C2	11
F113	CC5E	F7 B5 F3 C5	11
F114	CC9-1	D5, D6D0	11
F115	CC4	F7, F3	11
F116	CC9-1	D5, D6C6	11
F117	CC9-1	D5, D6D4	11
F118	CC9-1	D5, D6C2	11
F119	CC5E D5 E1 CC11E B7 C5 A1 B1		12
F120	CC5E B1 A5 B5		85
F121	PS1-(NOTE 1) E7 F7 B721 E02 E7 B711-1 E01 B5 B7		13 7
F122	CC5E C5 E5 E1 F5 D1 CC4 B5		13
F123	CC4	A5, C5, B3	
F124	CC5E	B5 A5 A3	13
F125	REPLACE LAMP A1		
F126	CC9-1	F5, E4C4	
F127	CC4	B5, B3, A1	
F128	CC4	C7	
F129	REPLACE LAMP A2		
F130	CC9-1	F5, E4C8	
F131	CC4	A1	
F132	REPLACE LAMP A3		
F133	CC9-1	A5, B7D4	
F134	CC4	D5	
F135	REPLACE LAMP A4		
F136	CC9-1	A5, B7D8	
F137	REPLACE LAMP A5		
F138	CC9-1	A5, B7E2	
F139	CC5E	B7 A3	13
F140	CC5E	C5	13
F141	REPLACE LAMP A6		
F142	CC9-1	A5, B7D0	
F143	CC5E	F7	13
F144	REPLACE LAMP A7		
F145	CC9-1	A5, B7C6	
F146	REPLACE LAMP A8		
F147	CC9-1	A5, B7C2	

F148	CC4 B5		
F149	CC4 C5, C3		
F150	CC5E C3 D3		14
F151	REPLACE LAMP B1		
F152	CC9-1 D5, D6D8		
F153	CC4 C7, C3		
F154	REPLACE LAMP B2		
F155	CC9-1 D5, D6E2		
F156	REPLACE LAMP B3		
F157	CC9-1 E5, D6B4		
F158	REPLACE LAMP B4		
F159	CC9-1 E5, D6B8		
F160	REPLACE LAMP B5		
F161	CC9-1 F5, E4E0		
F162	CC5E D7 D3		14
	CC4 B7		
F163	REPLACE LAMP B6		
F164	CC9-1 F5, E4D6		
F165	REPLACE LAMP B7		
F166	CC9-1 F5, E4D2		
F167	REPLACE LAMP B8		
F168	CC9-1 F5, E4C0		
F169	CC4 C7		
F170	CC4 C5, D3		
F171	CC5E C3 E3		15
F172	REPLACE LAMP C1		
F173	CC9-2 D5, D6D8		
F174	CC4 D5, D3		
F175	REPLACE LAMP C2		
F176	CC9-2 D5, D6E2		
F177	REPLACE LAMP C3		
F178	CC9-2 E5, D6B4		
F179	REPLACE LAMP C4		
F180	CC9-2 E5, D6B8		
F181	REPLACE LAMP C5		
F182	CC9-2 F5, E4E0		
F183	CC5E E7 E3		15
F184	REPLACE LAMP C6		
F185	CC9-2 F5, E4D6		
F186	REPLACE LAMP C7		
F187	CC9-2 F5, E4D2		
F188	REPLACE LAMP C8		
F189	CC9-2 F5, E4C0		
F190	CC4 E7		
F191	CC4 E5, E3		
F192	CC5E C3 E3		16
F193	REPLACE LAMP D1		
F194	CC9-2 F5, E4C4		
F195	CC4 E7, F5, F1, E3		
F196	REPLACE LAMP D2		
F197	CC9-2 F5, E4C8		
F198	REPLACE LAMP D3		
F199	CC9-2 A5, B7D4		
F200	REPLACE LAMP D4		
F201	CC9-2 A5, B7D8		
F202	CC4 E7, F5, E3		
F203	REPLACE LAMP D5		
F204	CC9-2 A5, B7E2		
F205	CC5E F7 F3		16
F206	REPLACE LAMP D6		
F207	CC9-2 A5, B7D0		
F208	REPLACE LAMP D7		
F209	CC9-2 A5, B7C6		
F210	REPLACE LAMP D8		
F211	CC9-2 A5, B7C2		
F212	CC5E F7 B5 F3		16
F213	CC4 E7, E5, F3		
F214	REPLACE LAMP S1		
F215	CC9-1 D5, D6D0		
F216	CC4 F7, F3		
F217	REPLACE LAMP S2		
F218	CC9-1 D5, D6C6		

F219	REPLACE LAMP S3	
F220	CC9-1 D5, D6C2	
F221	REPLACE LAMP S4	
F222	CC9-1 D5, D6D4	
F223	CC5E E1 C5 D1	7
F224	PS1-(NOTE 1) E3 C1 D7 D1 B3	18
F225	CC6E(K) B5 CC5E D1 E1	19
F226	PS1-(NOTE 1) E3 C1 D7 CC5E D5	21
F227	CC2E E7	59
F228	CONSOLE FAILURE - OPEN DECODER TU PICKUP COIL OR CABLE.	
F229	CC8E U3 A8D0 A8D5 A5C8 A5D8 B6F6 C1D0 C1D6 C1E0 B3E0 B9E0	23
F230	CC6E C5 C7 B4 C3 B7 A5 CC6EK A7 E1 B4 B7 C7 C5 CC5E D1 C5	23
F231	CC6E C7 B7 E5 C5 CC6EK C7 B7 C5 E1	23
F232	CC7E(K) D3 D1 E5 E3	23
F233	CC7E(K) F3	23
F234	CC7E(K) A3 D5 D7 C7 B5 CC5E D5 D7	23
F235	CC6E(K) F1	28 23 32
F236	CC7E(K) C7 D3 D1	23
F237	CC6E(K) F7 F5	24 29
F238	CC7E(K) C5 C7 D7 F3 B5 E5 A3 D5 CC2E D5	23
F239	CC5E D7 D5 F5	23
F240	CC7E(K) D5 C5 C7	25
F241	CC7E(K) B1 E5 C7 D7 E1 C5 D5 CC6E C3 C5 A5 CC6EK C3 C5 A7 CC1E B3	25
F242	CC6E(K) A5 E5 CC7E(K) C5 E7 E5 CC5E E7 E5	27
F243	CC6E(K) B7 CC7E(K) B5 CC5E D1 E7 E1 E5	27
F244	CABLE OR OPEN PLATEN SOLENOID FAILING	27
F245	CC8E U3, F6E0 E5D8 F6E8 E7E9	27
F246	CC6E D3 E7 CC6EK D5 E7	27
F247	CABLE OR ALARM SOLENOID FAILING	27
F248	CC8E D5C3 E3C2 D3B4 E3B4 U1	27
F249	CC6E D1 E3 CC6EK D3 E3	27
F250	CABLE OR CLOSE PLATEN SOLENOID FAILING	27
F251	CC8E U3 F6F2 E5F0 F6G0 E7G1	27
F252	CC2E A5 B7 F1 E1 CC5E E5	28
F253	CC7E(K) B1 E1 F1 E3 CC6E C1 CC6EK B7	28
F254	CC6E D3 E7 CC6EK D5 E7	27
F255	CC6E D1 E3 CC6EK D3 E3	27
F256	CC6E E5 B3 B1 B5 CC6EK E1 B3 B1 B5	28
F257	CC2E C1 B1 D5 A3 B5 CC7E(K) C7	28
F258	CC2E C7 B7 CC5E E7 E5	30
F259	CC2E A5 C1 B1 A1 C7	30
F260	CC2E E1 F1 F3 CC6E(K) C5 CC5E E7 E5 F5	30
F261	CC2E B3 B1 CC1E C5	50
F262	CC2E A1	50
F263	CC3E B1 C1	50
F264	CC1E B3 C7 A7 CC2E A5 A1 B1 A3 B5 F3	31
F265	CC1E B7 B5 B3 D7 D3	31
F266	CC2E E3 B7 C5 E1 F3 D1 C1 B1 C3 A1 A5 B5 CC1E D3 C7 A3 CC3E E5 A3 A5 C15	31
F267	CC1E D3 C1 CC3E E5 A3 A5 C15	31
F268	CC1E A7 A5 B1 C3 A3 C1 D3 C5 B3 C7 CC3E E7 C5 E1	31
F269	CC1E C3 D1 A1 CC7E(K) E3 B1	31
F270	CC1E A5 A3 B1 C1 C3 CC5E E7 E5	59
F271	CONSOLE INTERPOSER SOLENOID OR CABLE FAILURE	59
F272	CC8E U3, D5G1, E3G0, D3F0, E3F2	59

F273	CC1E C3, B3, C1 CC2E F3, E7, C7, B3	59
F274	CC0 F4A6 E7A6 F3C7 OR CC0 DISCRETE COMPONENTS ASSOCIATED WITH RIGHT DRIVE. (CCCRDRA CCCRDRB/)	59
F275	CC0 F4A6 E7A6 E6C7 OR CC0 DISCRETE COMPONENTS ASSOCIATED WITH LEFT DRIVE. (CCCRDLA CCCRDLB/)	59
F276	CC0 F4A6 E7A6 C9F1 B6F1 OR CARRIER POWER DRIVERS OR CARRIER DRIVE MOTOR OR JAMMED CARRIER.	65
F277	CC2E B3 C7 A3	59 65
F278	CC1E F1 D5 E7 C5 B3 A5 D1 E1	59
F279	CC1E D5 C7 A1 F1 E1 C3 D3 D1 CC3E D5 D3	59
F280	CC1E D5 F7 CC2E B3	59
F281	REPLACE FUSE	27 59
F282	CC0 E7A6, F3C3, E6C7	65
F283	CC7E(K) F3 B5 CC6E(K) F1	32
F284	CC7E(K) D3 D1 E5 E3	32
F285	CC3E D5 E1 C5 D3 D7	90
F286	CC7E(K) C3 C1 A3 A1	32
F287	CC7E(K) E5, A1, B5, C1, C3 CC5E E7 E5	51
F288	CC6E(K) F7 F5	52
F289	CC7E(K) C5 C3 E5 A1 C1 B5 A3	33
F290	CC2E B7	
F291	CC6E(K) C3 C5 B5 CC3E B5, B7	55
F292	CC2E B3, C7, A3 CC1E D3	
F293	CC1E C5, C7, B3, D3 CC5E C3 CC3E C3, A7, A5, B7, B1	56
F294	CC2E D7, C3 CC5E B1 CC3E B7, B3	57
F295	CC7E(K) B3	58
F296	DECODER OR PRINT CLUTCH FAILURE	
F297	CC8E U1, E3C7, D3C5, E3D5	
F298	CC7E E7, B3, B5, C1, E5, D3, D1 CC7EK B7, B3, B5, C1, E5, D3, D1 CC6E F5, B7 CC6EK B7	16, 35
F299	CC8E U1, E7A7, F6A9, E7B0	
F300	CC6E D1, E3 CC6EK D3, E3	35
F301	CC8E U2, D2A8, E1B0, D2B1	
F302	CC8E U3, C2C3, B7C0, C8E6	
F303	CC6E D5, E7, E5 CC6EK D7, E7	35
F304	CC8E U2, C2B6, B7B3, C6B2	
F305	CC6E E7, D5 CC6EK D7, E7, E3, E5, F5, B7	35
F306	CC8E U1, C6A9, B7A6, C6A5	
F307	CONSOLE FAILURE, DECODER OR CONSOLE ADJUSTMENT	
F308	CC8E U2, B3C3, A5C1, B3C0 CC1E D3, C5, D7 CC7E E7, B3 CC7EK A7, B3	
F309	CC3E B3, B7, C7, C3, B1, D3, A5, A1, C1 CC2E E3, A1, B1, A5 CC1E B3, F7, F1, D5, E3	35
F310	CONSOLE FAILURE, PLATEN ADV SOLENOID OR CABLE	
F311	CC8E U2, F6B4, E5B4, F6C2, E7C3	
F312	CC6E(K) D3 D7	37
F313	CC8E U2, F6C7, E5C7, F6D5, E7D6	
F314	CC1E F1, D5, F7, E7, E5 CC2E E7, F3	38
F315	CC1E D5 CC0 B9B1, C4A8, E6C7, OR TACHOMETER	37, 38
F316	CC6E B3, C3, F5, B5, E5, E3 CC6EK B3, C3, E1, B5 CC7E(K) D3 CC1E E7, C7 CC2E E7, F3	39
F317	CC6E B7, B1, E5, B3, B5 CC6EK C1, B1, E1, B3, B5 CC7E(K) E3, D3, E1, B1, F1 CC1E F7, C5, D5, E7, F1, D1	39
F318	CONSOLE RED RIBBON FAILURE	
F319	CC8E U2, B3B6, A5B3, B5B2	
F320	CC7E E7, B3, B5, A3 CC7EK E5, A5, B7, B3, A3, B5	39
F321	CC2E C1	
F322	CC6E E5, B3, B1, B5, E3 CC6EK E1, B3, B1, B5, E3	60
F323	CC6E E5, B1, C1 CC6EK E1, B1, C1 CC7E(K) E3, E1, F1, B1	61

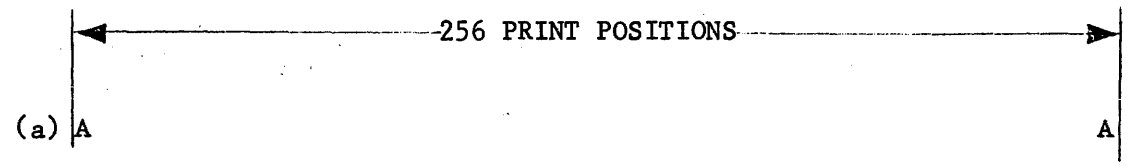
F324	CONSOLE FAILURE DECODER OR MECHANICAL ADJUSTMENTS	
F325	CC8E U2, B3A9, A5A7, B3A5	39A
F332	CC5E B1 A5	84
F333	CC11E D5	87
F334	CC5E D5 B1	86
F335	CC6E D1 OR AC1 CARD FAILING CC6EK D3 OR AC1 CARD FAILING	46
F336	CC0 D9F4, E9F3, F4A6	65
F337	CC1E D5 F7 C5 D3 CC2E B3	65
F338	CONSOLE HOLD COIL FAILURE OR CABLE BAD	59
F339	CC8E U1 D5E9 E3E8 D3E0 E3E0	59
F340	CC1E C7 C5 D3 B3 D7 CC2E D1 C1 A3 B3 C3 B1 CC3E B1	59
F341	CC2E D3 CC7EK E1 F1 A3 A7 B7 C25 C26	6
F342	CC2E E3 C5 C7 B7 E1 F3	59
F343	CC8E U4 B2F8 D8C5 E6E0	59
F344	SIGNAL CCCPRA/ FROM CONSOLE POSITIONAL READOUT FAILING	59
F345	PS1-(NOTE 1) B3 E3 D7 C1	88
F346	CC1E B3 C7 C5 CC2E C3 E3 E1	64
F347	CC1E C5	65
F348	CC1E D5 A5 C3 E1 D1 A1 C5	65
F349	CC1E E7	65
F356	CC1E E1 D1 A1 F1 E5	65
F357	CC3E D3 B1 B7 C3 C7 B3 C1 A1 A7 E5 CC2E E5 C5	65
F358	CC3E C1 B1 C3 B3 B7 CC1E D7 C7 E1 D5	65
F359	CC3E C1 B1 C3 B3 B7 CC2E C5 B7 F3	65
F360	CC1E A1 D1 E1 F1 E5 B7 CC3E B3	65
F361	CC1E F1 E7 D5 D1 E1 CC3E B3 C1 B1 C3 CC2E E7, A1 CC0 E9F3, F4A6 OR TAC	65
F362	CC0 E7A6, F3C1, F3C7, F4F3, E7F5, F4A6	65
F363	CC0 F4A6, E7A6	65
F364	CC0 E7A6, F3C3, E6C7, D9F4, E9F3, F4A6	65
F365	CC1E E3, B7, D3, E1	
F366	CC6E B7, E5, B1 CC6EK B1, C1, E1 CC1E F1, D7, E1 CC3E B3	42
F367	CC3E B3, B7, B5, OR INTERMITTANT FAILURE POSSIBLE TACHOMETER FAILURE OR CARRIER POWER DRIVERS WEAK, RESTART MTR	42
F368	CC1E F7 OR F367 CC3E B7, B3, B5	62
F369	CC1E A1 D1 E1 A5 C3	59
F370	CC2E D7, C7 B721 E02 E7 B711-1 E01 B5 B7	
F371	CC6E(K) F7 CC11E F7, C5	67
F372	CC2E D7, C7 CC7E(K) A7 CC11E A5, C5	67
F373	CC7E(K) A7 CC11E A5	67
F374	CU1 D7	66
F375	CC1E D3 E3 C18 CC2E A5	68
F376	CC7E(K) C1, B5, C3	52
F377	CC7E(K) C7 D7 B5 CC5E D5 D7	24
F378	CC7E(K) E1, D7 CC6E(K) C5, C7, B7, D3	35
F379	CC7E(K) B1 E1 E3 F1	59
F380	CC7E(K) F1, E3	69
F381	B711-1 EO1 B7 B721 EO2 B3	89
F382	CC7E(K) D1 E5	70
F383	CC7E(K) B5	35
F384	CC11E B1 A1	12
F385	CC1E A5 A3 B1 CC6E(K) B5	20
F386	CC7E(K) E7, B7	20, 35
F387	CC6E B5 B7 C1 CC6EK B5 B7 E1 CC2E E7 F3 CC1E C3	20
F388	CC6E D3 CC6EK D5	20
F389	CC6E D1 E3 C7 B7 CC6EK D3 E3 C7 B7 CC7E(K) C7	

F390	CC6E D3, E7	
F391	CC5E C3 CC4 C5, B5	13
F392	CC5E C3 CC4 E7, E5	13
F393	CC5E A5 B5 CC4 C5, B5, C7	14
F394	CC5E E5, C5 CC4 E5	35
F395	CC5E C3 CC4 E5, C5	39
F396	CC6E(K) B5, C3, C1, E3 CC3E A5, B7, B3, C7, B5	62
F397	CC7E(K) D1, E5 CC6E B5, F5, E5, B7 CC6EK C1, B5, E1 CC2E A3 CC1E D5	39
F398	CC1E B1	
F399	CC1E E1, F1, D1, D5 A1	
F400	CC7E(K) B3, B5	38
F401	B721 EO2 C9 C5 A3 E7 C3 B3 B711-1 E01 A1 B1 C1 E1 B7 B5 C7	5
F402	CC7E A5 E7 E5 CC7EK F7 F5	24
F403	PS1-(NOTE 1) C5 B7 B721 E02 A5 B711-1 E01 A1	5
F404	PS1-(NOTE 1) C7 B5	5
F405	PS1-(NOTE 1) E7 F7 B721 E02 A5 B711-1 E01 A1	12
F406	PS1-(NOTE 1) D1	12
F407	CC4 A1 A3 A5 B1 C1 D1 C15 C16 C17 B7	23
F408	CC3E B3, B5, B7	38
F409	CC2E D3	
F410	CC2E B7 CC3E B5	
F411	CC2E F1, D3, B1, A1	
F412	CC2E D7, D3	
F413	PERFORM FE MEMORY MTR	
F414	PS1-(PROBE CHART) A5 B5 C5 C7	80
F415	B721 E02 C9 E7 C5 B711-1 E01 B1 B5 C1	5
F416	CC5E D5 E1	71
F417	PS1-(NOTE 1) F7 A5	72
F418	PS1-(NOTE 1) F7 E7	74
F419	PS1-(NOTE 1) E5 B5 A5	73
F420	PS1-(NOTE 1) A5 A7 B5 C1	75
F421	PS1-1 B3 D3 PS1-2 B3 D3 PS1-3 B3 D3	76
F422	PS1-1 E3 PS1-2 E3 PS1-3 E3	77 78
F423	PS1-(NOTE 1) F7	79
F424	PS1-(NOTE 1) E5 A5 F7 A3 A7	18
F425	B721 EO2 E7 B711-1 EO1 B5 CC5E E1 D1 E5	14 80
F426	SIGNAL AS INDICATED IN PROBE CHART, FAILING FROM KEYBOARD.	
F427	CC7EK B7 CC6EK F5 B7 E7 E3	35A
F428	CC6EK D7, E5, F5, E7, B7, E3	35A
F429	CC6E(K) E1, C7 CC7E(K) C7, D5	35
F430	CC8E U2 B3B6 A5B3 B5B2	35A
F431	CC7E E7, B3 CC7EK E5, A5, B7	43
F432	CC7E(K) B1 CC6E C3 C5 A5 CC6EK C3 C5 A7	23
F433	CC3E F1 F3 E1 D5 D3 D1 D7 C5	23
F434	CC3E E7 CR1 OR CONSOLE FAILING TO RESPOND TO MOTOR ON SIGNAL CCMOTON/	23
F435	CC3E F7 E7 D5 CR1 E5 D1 CC3E SWITCH S1	23
F436	CC11E E7, D7, C7, C3, A3, B3, A5, C5, E5 OR F438	44
F440	CC3E F7 F5 E3	81 82
F441	CC7E E5 E7 A5 A7 CC7EK F5 F7 A7	83
F442	SIGNAL ENDOPS/ FROM CONSOLE FAILING OR CC7E B7 CC7EK E7	83
F443	CC7E A5 CC7EK F7	83A
F444	CC7E A5 E7 CC7EK F7 F5	83B
F500	CC7E E5 E7 A5 A7 CC7EK F5 F7 A7	5
F501	SIGNAL ENDOPS/ FROM CONSOLE BAD OR PAPER NOT UNDER EOP DETECTOR OR CC7E B7 CC7EK E7	5 24

ILLUSTRATIONS

FIGURE 1

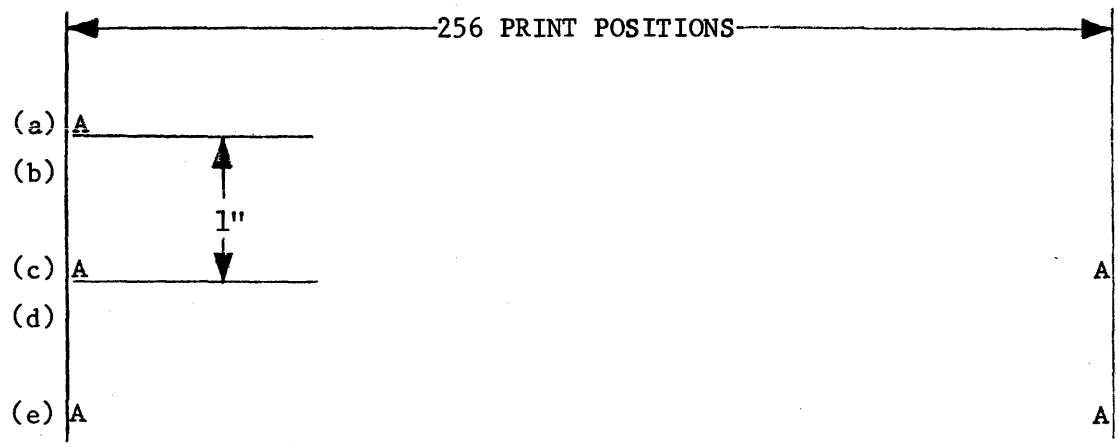
A. THE FOLLOWING IS THE PRINTOUT FOR THE CARRIER TEST. (CARRTST)



(a) THE CARRIER INITIALIZES TO THE RIGHT BUMPER AND AN A IS PRINTED IN PLACE. THE CARRIER THEN INITIALIZES TO THE LEFT BUMPER AND AN A IS PRINTED IN PLACE.

FIGURE 2

A. THE FOLLOWING IS THE PRINTOUT FOR THE PLATEN ADVANCE TEST. (PLATADV)



(a) CHARACTER A PRINTED AT LEFT MARGIN

(b) 6 LINE ADVANCES BOTH PLATENS.

(c) CHARACTER A IS PRINTED AT LEFT MARGIN. THE CARRIER MOVES 256 PRINT POSITIONS RIGHT AT HIGH SPEED AND CHARACTER A IS PRINTED.

(d) 6 LINE ADVANCES, BOTH PLATENS.

(e) CHARACTER A IS PRINTED AT RIGHT MARGIN. THE CARRIER MOVES 256 PRINT POSITIONS LEFT AT HIGH SPEED AND CHARACTER A IS PRINTED.

FIGURE 3

A. THE FOLLOWING IS THE PRINTOUT FOR THE CARRIER EXHAUSTIVE TEST. (CAREXHTST)

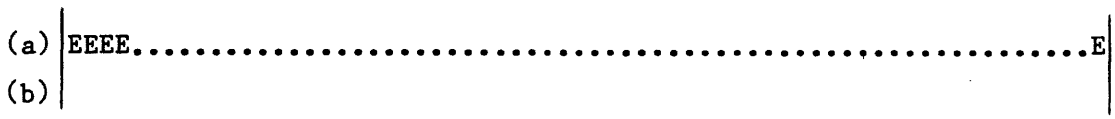


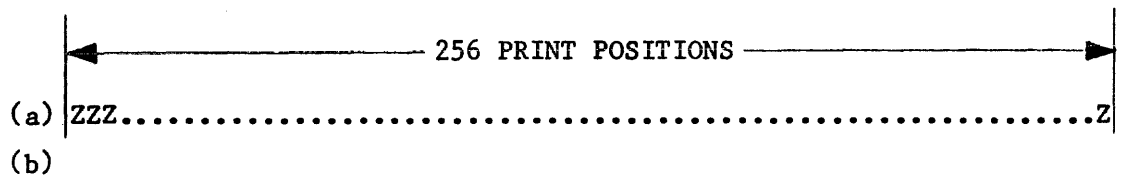
FIGURE 3 (CONTINUED)

(a) CHARACTER E IS PRINTED IN PLACE AT LEFT MARGIN. THE CARRIER IS POSITIONED RIGHT 256 POSITIONS AND CHARACTER E IS PRINTED AT THE RIGHT MARGIN. THE CARRIER CONTINUES TO MOVE LEFT AND RIGHT AT A DECREMENTING COUNT WITH CHARACTER E PRINTED AT EACH POSITION. WHEN REMAINING UNPRINTED POSITIONS ARE LESS THAN 7, THE CARRIER POSITIONING SWITCHES TO LOW SPEED AND COMPLETES PRINTING A FULL LINE OF CHARACTER E.

(b) CARRIER IS POSITIONED 128 POSITIONS LEFT TO LEFT MARGIN AND ONE LINE ADVANCE BOTH PLATENS, TERMINATES THE TEST.

FIGURE 4

A. THE FOLLOWING IS THE PRINTOUT FOR THE PRINTER ESCAPE TEST. (PRTESCTST)



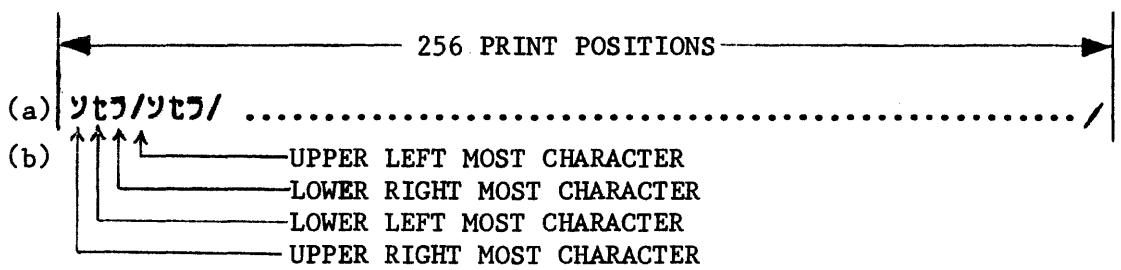
(a) A FULL LINE OF Z'S ARE PRINTED TO THE RIGHT IN BLACK, AND THEN OVERPRINTED TO THE LEFT IN RED.

(b) ONE LINE ADVANCE TO BOTH PLATENS TERMINATES THE TEST.

FIGURE 5

A. THE FOLLOWING ARE THE POSSIBLE PRINTOUTS FOR THE TILT ROTATE TEST. (TLTROTTST)
FOR PRINTBALLS, WITH SPECIAL CHARACTERS OTHER THAN THE ONES SHOWN, USE (b) AS A GUIDE FOR THE PRINTBALL POSITION THAT SHOULD HAVE PRINTED.

(1) PRINTOUT FOR A 94 CHARACTER PRINTER WITH PRINTBALL I.D. #203.



NOTE: THE PRINTBALL POSITIONS SHOWN ARE GIVEN FACING THE REAR OF THE PRINTBALL.

FIGURE 6 (CONTINUED)

(b) ONE PRINT POSITION ESCAPE TO THE LEFT AND THEN 64 CHARACTERS ARE PRINTED TO THE LEFT IN RED.

FIGURE 7

A. THE FOLLOWING IS THE EXPECTED PRINTOUT FOR TEST 05.

(1) END 12 PK KEYS

SPOMTR SUPERVISORY PRINTER
9340 SUPERVISORY PRINTER
B 44 I/O CONTROL

PROGRAM-ID SPOMTR.

NOTE: THIS MTR APPLIES TO -
B9340 SUPERVISORY PRINTER
DDP B34X CONTROL

OPERATOR INSTRUCTIONS

MTR IS TO BE STARTED WITH THE SPO TURNED OFF
NOTE
TO INSURE PROPER PRINTOUT SPO CARRIAGE SHOULD BE RETURNED TO EXTREME LEFT WHEN STARTING MTR. THIS CAN BE ACCOMPLISHED AT PROG STEP 4. CLEAR BEFORE PROCEEDING INTO TEST.

MTR/MEM SWITCH IN MTR MODE
IRQ/EXT SWITCH IN CENTER POSITION

PROG STEP	INCR	OPERATOR ACTION
1	000E	PRESS INPUT REQUEST OBSERVE READY LIGHT NOT LIT
2	00D2	PROG STOPS TO INDICATE SPO IS NOT ON LINE - FORCE STEP
3	00D4	OBSERVE MIR - DIGIT D = 3 PLACE SPO ON LINE - PRESS CLEAR
4	000E	PRESS INPUT REQUEST
5	001D	OBSERVE MIR - DIGIT B = PORT # FORCE STEP
6	0022	FORCE STEP TO CONTINUE MTR IN NORMAL SEQUENCE NOTE IF MTR FAILS AFTER PROG STEP #16 INDIVIDUAL TESTS MAY BE EXERCISED BY RESTARTING MTR AND PRESSING INPUT REQUEST AT STEP #6 TO ENTER MTR AT STEP #17
7	002C	PRESS ERROR READY LIGHT REMAINS LIT
8	0033	PRESS INPUT REQUEST OBSERVE READY LIGHT - LIT
9	0039	PRESS END OF MESSAGE OBSERVE READY LIGHT IS OUT
10	0046	PRESS INPUT REQUEST OBSERVE READY LIGHT IS LIT
11	0077	PRESS DATA KEY 'A' OBSERVE READY LIGHT - LIT
12	008F	MONITOR PSENSTN/ LINES FORCE STEP
13	0091	PRESS DATA KEY 'A' FORCE STEP
14	009E	VERIFY CORRECT SYSTEM CONFIGURATION PRESS INPUT REQUEST
15	00E7	OBSERVE READY LIGHT IS LIT ENTER KEYS FROM KEYBOARD TABLE BELOW - LEFT TO RIGHT TOP TO BOTTOM NOTE IF INCORRECT KEY IS PRESSED ALARM WILL SOUND AND INCR WILL STOP AT 0143. PRESS ERROR AND ENTER CORRECT CHARACTER TO CONTINUE TEST
16	0127	CHECK PRINTOUT FORCE STEP
17	0262	SELECT TEST # FROM TEST TABLE NOTE DURING NORMAL MTR TESTING ONLY TESTS 01, 02, AND 20 NEED BE RUN. FOR COMPARISON TO PRINTOUT TESTS SHOULD BE SELECTED IN SEQUENCE FROM 01 THRU 20.
18	023F	END OF TEST PRESS CLEAR TO RESTART

KEYBOARD TABLE

```
1 2 3 4 5 6 7 8 9 0 ' - Q W E R T Y U I O P
- - - - - - - - - - - - - - - - - - - - - -

A S D F G H J K L ; Z X C V B N M , . /
- - - - - - - - - - - - - - - - - - -

SPACE BAR   LINE FEED   CARRIAGE RETURN
```

HOLD SHIFT KEY AND DEPRESS FOLLOWING KEYS

```
1 2 3 4 5 6 7 8 9 : - 0 P K L ; N M , . /
- - - - - - - - - - - - - - - - - - - - -
```

HOLD CONTROL KEY AND DEPRESS FOLLOWING KEYS

```
Q W E R T Y U I O P LF CR A S D F G H J K L
- - - - - - - - - -       - - - - - - - - -

Z X C V B N
- - - - - -
```

```
*
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*  *                                                               *
*  *           TEST  TABLE                                         *
*  *                                                               *
*  *                                                               *
*  *     00    MEMORY MODIFY                                       *
*  *                                                               *
*  *     01    KEYBOARD  CHARACTER  TEST
*  *
*  *     02    PRINT  FROM PROCESSOR  PROGRAM
*  *     03    RETURN
*  *     04       TO
*  *     05          TEST
*  *     06             SELECT
*  *     08       THESE                                            *
*  *     09          TESTS                                         *
*  *     10             ARE                                        *
*  *     11                USED                                    *
*  *     12                   TO                                   *
*  *     13                      SHOW                              *
*  *     14                         ABILITY                        *
*  *     15                            TO                         *
*  *     16                               SELECT                  *
*  *     17                                  MORE                 *
*  *     18                                     THAN              *
*  *     19                                        20  TEST        *
*  *     20    END  OF  TEST                                       *
*  *                                                               *
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
```

PROGRAM LISTING

```
                    START.
                    SMM-EXIT.                          PRESS  END OF MESSAGE  ON SPO
0000    80B1            CPCR  =  BUST  -  1.           TEST  EXTERNAL  BUSS  =  0000
                    D-FLAGS-OFF.
0001    F10F            A1  =  B000.
0002    F034            A2  =  B000.
0003    F054            A3  =  B000.
0004    F0A5            IF  LC1.
0005    F0A9            IF  LC2.
0006    F0AD            IF  LC3.
0007    F00C            RESET  GC1.
0008    F01F            RESET  GC2.
0009    F18E            IF  IRQ  SKIP.
000A    400D            MPCR  =  SELECTA  -  1.
000B    F108            ASR  BEX.
000C    F0E1            MIR  =  B.
000D    F000            WAIT.                          IRQ  DETECTED
                    *                                                  ERROR  M 2
                    SELECTA.
000E    F0F8            WHEN IRQ  STEP.                PRESS  INPUT  REQUEST  ON SPO
                    *
                    *                                  IF  SPO  PRINT-ROLLER  RUNS OR
                    *                                  INCR  FAILS  TO RESPOND
                    *                                                  ERROR  M 3
000F    82A1            CPCR  =  BUSTB  -  1.
0010    F108            ASR  BEX.
0011    F05F            B.
0012    F0BD            IF  NOT  IRQ  SKIP.
0013    80CE            CPCR  =  ERRSUB  -  1.         IRQ  NOT  RESET
                    *                                                  ERROR  M 4
0014    000D            AMPCR  =  SELECTA  -  1.
0015    F017            A1  =  B.
0016    F086            B  =  LIT  AND  B.
0017    E0FF            LIT  =  @FF@.
0018    F0CB            LIT  EQV  B.
0019    E002            LIT  =  2.
001A    F09D            IF  ABT  SKIP.
001B    80CE            CPCR  =  ERRSUB  -  1.                 ERROR  M 5
                    *
001C    F0DB            MIR  =  A1.
001D    F000            WAIT.                          DIGIT  B  OF  MIR  =  PORT  LOC
                    *                                  AGREE  -  FORCE  STEP
001E    8299            CPCR  =  LOCSPO  -  1.
                    SELECT.
001F    80C5            CPCR  =  TESTRDY  -  1.
0020    001E            AMPCR  =  SELECT  -  1.
0021    827A            CPCR  =  DESELECT  -  1.
0022    F0F8            WHEN IRQ  STEP.                IF  DESIRED  OPERATOR  CAN GO
                    *                                  DIRECTLY  TO TEST  SELECT  BY
                    *                                  PRESSING  INPUT  REQUEST.
                    *                                  OTHERWISE  PRESS  FORCE  STEP
                    *
                    *                                  IF  SPO  PRINT  ROLLER  RUNS
                    *                                                  ERROR  M 6
                    *
0023    F18E            IF  IRQ  SKIP.
0024    4027            MPCR  =  DATIRQ  -  1.
0025    F108            ASR  BEX.
0026    81B8            CPCR  =  TESTMESS  -  1.
0027    41B2            MPCR  =  GETTESTSEL  -  1.
                    DATIRQ.
0028    F0EA            MIR  =  LIT.
0029    E001            LIT  =  @01@.
002A    F099            DW1.
002B    827A            CPCR  =  DESELECT  -  1.
002C    F0F8            WHEN IRQ  STEP.                PRESS  ERROR  ON SPO
                    *
                    *                                  INCR  FAILS  TO RESPOND
                    *                                                  ERROR  M 7
```

```
                *
002D  F108          ASR  BEX.
002E  F05F          B.
002F  F0BD          IF  NOT IRQ  SKIP.
0030  80CE          CPCR  =  ERRSUB  -  1.        IRQ  NOT RESET  BY  ASR
                *                                                  ERROR  M 8
0031  E008          LIT  =  8.
0032  8293          CPCR  =  TSTASRRES  -  1.                      ERROR  M 9
0033  F0F8          WHEN IRQ  STEP.               PRESS  INPUT  REQUEST  ON SPO
                *
                *                                 INCR  FAILS  TO RESPOND
                *                                                  ERROR  M10
                *
0034  F0E7          MIR  =  B001.
0035  F108          ASR  BEX.
0036  F099          DW1.
0037  E002          LIT  =  2.
0038  8293          CPCR  =  TSTASRRES  -  1.      ERROR  BIT  SET
                *                                                  ERROR  M11
0039  F0FD          WHEN URQ STEP.                PRESS  END OF MESSAGE  ON SPO
                *
                *                                 INCR  FAILS  TO RESPOND
                *                                                  ERROR  M12
                *
              DEVREAD.
003A  F096          DR1  BEX.
003B  F05F          B.
003C  F1AE          IF  NOT URQ SKIP.
003D  80CE          CPCR  =  ERRSUB  -  1.                         ERROR  M13
003E  F0CB          LIT  EQV  B.
003F  E004          LIT  =  @04@.                 IS  STATUS  WORD 0004
0040  F09D          IF  ABT  SKIP.
0041  80CE          CPCR  =  ERRSUB  -  1.        END OF MESSAGE  NOT SET
                *                                                  ERROR  M14
0042  F0EA          MIR  =  LIT.
0043  E000          LIT  =  @00@.
0044  F099          DW1.                          DISABLE  KEYBOARD
0045  0039          AMPCR  =  DEVREAD  -  1.
0046  F0FD          WHEN URQ STEP.                PRESS  INPUT  REQUEST  ON SPO
                *
                *                                 INCR  FAILS  TO RESPOND
                *                                                  ERROR  M15
                *
0047  F07B          B  =  B000.
0048  F0BD          IF  NOT IRQ  SKIP.
0049  80CE          CPCR  =  ERRSUB  -  1.        IRQ  SET
                *                                                  ERROR  M16
004A  F108          ASR  BEX.
004B  F05F          B.
004C  F1B5          IF  URQ SKIP.
004D  80CE          CPCR  =  ERRSUB  -  1.        ASR  DESELECTED
                *                                                  ERROR  M17
004E  F0FF          0  EQV  B.
004F  F09D          IF  ABT  SKIP.
0050  80CE          CPCR  =  ERRSUB  -  1.        INPUT  REQUEST  BIT  SET
                *                                                  ERROR  M18
0051  F0EA          MIR  =  LIT.
0052  E001          LIT  =  @01@.
0053  F099          DW1.
0054  F035          A2  =  BMAR.
0055  827A          CPCR  =  DESELECT  -  1.
0056  F097          DR2  BEX.                     SELECT
0057  F05F          B.
0058  F1B5          IF  URQ SKIP.
0059  80CE          CPCR  =  ERRSUB  -  1.        NOT SELECTED  BY  READ
                *                                                  ERROR  M19
005A  F079          B  =  B100.
005B  F0D5          MAR1  =  B.                   START  PORT
              MRDDSL.
```

```
005C  F096          DR1  BEX.                     READ  OTHER  PORT
005D  F080          B  =  BMAR.
005E  F07D          B  =  B  C.
005F  F07E          B  =  B  +  1.
0060  F0CB          LIT  EQV  B.
0061  E090          LIT  =  @90@.
0062  F0B5          IF  NOT ABT  SKIP.
0063  4069          MPCR  =  MRDDSLA  -  1.
0064  F07D          B  =  B  C  .
0065  F0D5          MAR1  =  B.
0066  F116          A2  EQV  B.                   PORT  UNDER  TEST
0067  F09D          IF  ABT  SKIP.
0068  405B          MPCR  =  MRDDSL  -  1.
0069  405C          MPCR  =  MRDDSL.
              MRDDSLA.
006A  F066          B  =  A1.
006B  F07A          B  =  B1TT.
006C  F0D5          MAR1  =  B.
006D  F097          DR2  BEX.                     RESELECT
006E  F05F          B.
006F  F1AE          IF  NOT URQ SKIP.
0070  4073          MPCR  =  MRDDSLB  -  1.
0071  F0BD          IF  NOT IRQ  SKIP.
0072  F000          WAIT.                         PS  ADDRESS  ERROR
                *                                                  ERROR  M20
0073  F000          WAIT.                         STINT  RESET  BY  READ  TO
                *                                 ANOTHER  PORT
                *                                                  ERROR  M21
              MRDDSLB.
0074  F0EA          MIR  =  LIT.
0075  E001          LIT  =  @01@.
0076  F099          DW1.
0077  F0FC          WHEN SRQ  STEP.               PRESS  DATA  KEY  A
                *
                *                                 INCR  FAILS  TO RESPOND
                *                                                  ERROR  M22
                *
0078  F05F          B.
0079  F1AD          IF  NOT SRQ  SKIP.
007A  F0F7          SKIP.
007B  80CE          CPCR  =  ERRSUB  -  1.        DINT  FF  WILL  NOT  REMAIN  SET
                *                                                  ERROR  M23
007C  F096          DR1  BEX.
007D  F05F          B.
007E  F1AD          IF  NOT SRQ  SKIP.
007F  F0F7          SKIP.
0080  80CE          CPCR  =  ERRSUB  -  1.        DINT  RESET  BY  STATUS  READ
                *                                                  ERROR  M24
0081  F05F          B.
0082  F0B3          IF  MST  SKIP.
0083  80CE          CPCR  =  ERRSUB  -  1.        INCORRECT  STATUS
                *                                                  ERROR  M25
0084  F0D0          MAR1  =  A1.
0085  F0F1          MR1.
0086  F05F          B.
0087  F1AD          IF  NOT SRQ  SKIP.
0088  408B          MPCR  =  PSCENABST  -  1.
0089  F0BD          IF  NOT IRQ  SKIP.
008A  F000          WAIT.                         MEM  READ  DESELECTED
                *                                                  ERROR  M26
008B  F000          WAIT.                         MEM  READ  CAUSED  DATA  READ
                *                                                  ERROR  M27
              PSCENABST.
008C  827A          CPCR  =  DESELECT  -  1.
008D  F0F8          WHEN IRQ  STEP.               IRQ  RESET                ERROR  M28
008E  F05E          ASR.
008F  F000          WAIT.                         IF  DATA  KEY  'A'  FAILED
                *                                 TO  PRINT
                *                                                  ERROR  M29
                *
```

```
                *                PORT SELECT CARD ENABLE STATUS GATING TEST
                *                TO VERIFY ONLY THE DEVICE GENERATING AN
                *                INTERRUPT IS ADDRESSED BY ASR, METER THE
                *                FOLLOWING SIGNALS:
                *                SPO PORT SHOULD READ 0%. ALL OTHERS SHOULD
                *                READ 100%.
                *
                *
                *      PORT          PS1-3
                *
                *       12       2J(PSENST12/)
                *       11       1J(PSENST11/)
                *       10       1K(PSENST10/)
                *        9       2B(PSENST09/)
                *                                PS1-2
                *
                *        8                    2J(PSENST8/)
                *        7                    1J(PSENST7/)
                *        6                    1K(PSENST6/)
                *        5                    2B(PSENST5/)
                *                                          PS1-1
                *
                *        4                                 2J(PSENST4/)
                *        3                                 1J(PSENST3/)
                *        2                                 1K(PSENST2/)
                *        1                                 2B(PSENST1/)
                *
                *                             AGREE - FORCE STEP
                *                             DISAGREE - A5 B5 C5 C7 OF
                *                                        PS1 CARD BEING
                *                                        METERED
                *
                *          NOTE - SYSTEM MAY HAVE 1-2- OR3 PS1 CARDS
                *
0090  F096            DR1 BEX.                  RESELECT
0091  F000            WAIT.                     PRESS DATA KEY A
                *                               AND FORCE STEP
                *
                *                               IF SPO GOES OUT OF CONTROL
                *                                                  ERROR M30
                *
0092  F1B5            IF URQ SKIP.
0093  80CE            CPCR = ERRSUB - 1.        STINT NOT SET BY
                *                               SERVICE TOO LATE
                *                                                  ERROR M31
0094  F096            DR1 BEX.
0095  F0CA            LCTR.
0096  E07F            LIT = @7F@.
0097  F0FE            Z EQV B.
0098  E010            LIT = @10@.
0099  F09D            IF ABT SKIP.
009A  80CE            CPCR = ERRSUB - 1.        SERVICE TOO LATE NOT SET
                *                                                  ERROR M32
              CONFIG.
009B  F17D            DLD.                      ENABLE CONFIGURATION READ
009C  F0F9            WHEN RDC BEX.
009D  F0E1            MIR = B.
009E  F0FD            WHEN URQ STEP.            VERIFY MIR CONTAINS CORRECT
                *                               SYSTEM CONFIGURATION
                *
                *                                 IF YES -
                *                                   SPO - INPUT REQUEST
                *                                  IF NO          ERROR M33
009F  F1B5            IF URQ SKIP.
00A0  428F            MPCR = CONFIGLOOP - 1.
00A1  F0F9            WHEN RDC BEX.
00A2  F0E1            MIR = B.
00A3  F0FF            0 EQV B.
00A4  F09D            IF ABT SKIP.
00A5  F000            WAIT.                     CONFIGURATION READ NOT
                *                               RESET BY BEX
                *                                                  ERROR M34
00A6  F097            DR2 BEX.
00A7  F05F            B.
00A8  F1AD            IF NOT SRQ SKIP.
00A9  80CE            CPCR = ERRSUB - 1.        DINT NOT RESET BY DATA READ
                *                                                  ERROR M35
00AA  80AD            CPCR = KYBDTEST - 1.
00AB  8106            CPCR = PRINT - 1.
00AC  81B8            CPCR = TESTMESS - 1.
00AD  81AD            CPCR = RESETFLAGS - 1.
              KYBDTEST.
00AE  F023            A2 = AMPCR.
00AF  F05F            B.
00B0  0145            AMPCR = KYBDCODE - 1.
00B1  40E0            MPCR = CODETEST - 1.
              BUST.
00B2  F0F9            WHEN RDC BEX.
00B3  F0FF            0 EQV B.
00B4  F09C            IF ABT JUMP.
00B5  F0E1            MIR = B.
00B6  F000            WAIT.                     EXT BUSS OR PARITY FAILURE
                *                                                  ERROR M 1
                *                               FORCE STEP
00B7  F0DA            MIR = AMPCR.
00B8  F000            WAIT.                     VALUE ON EXTERNAL BUSS
                *                               FORCE STEP
00B9  80BA            CPCR = BUSTA - 1.
00BA  7FFF            MPCR = START - 1.
              BUSTA.
00BB  F0F9            WHEN RDC BEX.
00BC  F0FF            0 EQV B.
00BD  F09C            IF ABT JUMP.
00BE  F0E1            MIR = B.
00BF  F000            WAIT.                     EXT BUSS FAILURE
                *                                                  ERROR M36
                *                               FORCE STEP
              EXTON.
00C0  F0BA            IF NOT EXT SKIP.
00C1  F0A0            IF EXT SKIP.
00C2  F0C9            JUMP.
00C3  F09A            EXEC.
00C4  F006            SET GC1.
00C5  F0C9            JUMP.
              TESTRDY.
00C6  F0EA            MIR = LIT.
00C7  F096            DR1 BEX.
00C8  F0FF            0 EQV B.
00C9  F0B5            IF NOT ABT SKIP.
00CA  F0C9            JUMP.
00CB  F0E1            MIR = B.
00CC  F008            IF GC1 SKIP.
00CD  F000            WAIT.                     NOT READY BIT SET
                *                               PLACE SPO IN ON LINE POSIT
                *                               FORCE STEP
                *                                                  ERROR M37
00CE  40BF            MPCR = EXTON - 1.
              ERRSUB.
00CF  F0BB            IF NOT GC1 SKIP.
00D0  40BF            MPCR = EXTON - 1.
00D1  F0DA            MIR = AMPCR.
00D2  F000            WAIT.                     ADDRESS OF ERROR IN MIR
                *                               FORCE STEP
00D3  F0E1            MIR = B.
00D4  F000            WAIT.                     STATUS WORD IN MIR
                *                               FORCE STEP
00D5  F0DB            MIR = A1.
00D6  F000            WAIT.                     FORCE STEP
00D7  F0DD            MIR = A2.
00D8  F000            WAIT.                     FORCE STEP
00D9  F0DE            MIR = A3.
```

```
00DA  F000          WAIT.                          FORCE  STEP
00DB  F0E9          MIR  =  BMAR.
00DC  F000          WAIT.                          FORCE  STEP
00DD  40BF          MPCR  =  EXTON  -  1.
00DE  0145          AMPCR  =  KYBDCODE  -  1.
00DF  F0E7          MIR  =  B001.
00E0  F099          DW1.                           ENABLE  KEYBOARD
                  CODETEST.
00E1  F09A          EXEC.
00E2  F01D          A1  =  LIT.
00E3  F0EA          MIR  =  LIT.
00E4  E001          LIT  =  @01@.
00E5  F099          DW1.
00E6  40E6          MPCR  =  ERRTN  -  1.
                  ERRTN.
00E7  F0FC          WHEN SRQ  STEP.                ENTER  KEYS  FROM KEYBOARD
                  *
                  *                              START  AT  UPPER  LEFT  (1)  AND
                  *                              PROCEED  RIGHT  -  TOP  TO  BOTTOM
                  *                              DO  NOT  PRESS  FOLOWING  KEYS  -
                  *
                  *                              HERE  IS  -  ESC  -  LINE  FEED
                  *                              RETURN  -  CONTROL  -  RUB  OUT
                  *                              REPT  -  BREAK  -  SHIFT  -  SPACE
                  *
                  *                              AFTER  PRESSING  (/)  DEPRESS  AND
                  *                              TEST  -  SPACE
                  *                              LINE  FEED  -  RETURN
                  *
                  *                              DEPRESS  AND  HOLD  SHIFT  KEY  AND
                  *                              DEPRESS  THE  FOLLOWING  KEYS  -
                  *
                  *                              1  -  2  -  3  -  4  -  5  -  6  -  7  -  8
                  *                              9  -  :  -  -  -  O  -  P  -  K  -  L  -  ;
                  *                              N  -  M  -  ,  -  .  -  /
                  *
                  *                              AFTER  PRESSING  (/)  RELEASE  SHIFT
                  *                              KEY  -  DEPRESS  AND  HOLD  CONTROL
                  *                              PRESS  FOLLOWING  KEYS  -
                  *
                  *                              Q  -  W  -  E  -  R  -  T  -  Y  -  U  -  I
                  *                              O  -  P  -  LINE  FEED  -  RETURN
                  *                              A  -  S  -  D  -  F  -  G  -  H  -  J  -  K
                  *                              L  -  Z  -  X  -  C  -  V  -  B  -  N
                  *
                  *
                  *                                    INCORRECT  RESPONSE  TO  KEY
                  *                                    ENTERED  BY  OPERATOR
                  *                                                          ERROR  M38
                  *
00E8  F097          DR2  BEX.
00E9  F086          B  =  LIT  AND B.
00EA  E07F          LIT  =  @7F@.
00EB  F003          A1  EQV  B.
00EC  F09D          IF  ABT  SKIP.
00ED  412D          MPCR  =  KYBDERR  -  1.        DATA  FAILURE
00EE  F111          A1  EQV  LIT.
00EF  E00E          LIT  =  @0E@.                  LAST  KEY  CODE
00F0  F0B5          IF  NOT  ABT  SKIP.
00F1  40F4          MPCR  =  ENDKYBD  -  1.
00F2  F105          AMPCR  =  AMPCR  +  1.
00F3  F05F          B.
00F4  40E0          MPCR  =  CODETEST  -  1.
                  ENDKYBD.
00F5  F1D5          MIR  =  B001  +  1.
00F6  F099          DW1.
00F7  F0FC          WHEN SRQ  STEP.                NO  SRQ
                  *                                                         ERROR  M39
00F8  F0EA          MIR  =  LIT.
00F9  E007          LIT  =  @07@.
00FA  F098          DW2.                           SOUND  ALARM  END  KYBDTEST
```

```
00FB  F0FC          WHEN SRQ  STEP.
00FC  F0EA          MIR  =  LIT.
00FD  E00D          LIT  =  @0D@.
00FE  F0FC          WHEN SRQ  STEP.                                    ERROR  M40
00FF  F098          DW2.
0100  F0EA          MIR  =  LIT.
0101  E0QA          LIT  =  @0A@.
0102  F0FC          WHEN SRQ  STEP.                NO  SRQ
                  *                                                    ERROR  M41
0103  F098          DW2.
0104  F102          AMPCR  =  A2.
0105  F0FC          WHEN SRQ  STEP.
0106  F0C9          JUMP.
                  PRINT.
0107  F023          A2  =  AMPCR.
0108  F0E6          MIR  =  B000.
0109  F099          DW1.
010A  F1D5          MIR  =  B001  +  1.
010B  F099          DW1.
010C  F0FC          WHEN SRQ  STEP.
010D  E00A          LIT  =  @0A@.
010E  81A2          CPCR  =  READSEQ  -  1.
010F  E00D          LIT  =  @0D@.
0110  81A2          CPCR  =  READSEQ  -  1.
0111  E000          LIT  =  @00@.
0112  81A2          CPCR  =  READSEQ  -  1.
0113  E000          LIT  =  @00@.
0114  81A2          CPCR  =  READSEQ  -  1.
0115  F01D          A1  =  LIT.
0116  E019          LIT  =  @19@.
                  PRTRTN.
0117  F012          A1  =  A1  +  1.
0118  F0DB          MIR  =  A1.
0119  F111          A1  EQV  LIT.
011A  E060          LIT  =  @60@.
011B  F0B5          IF  NOT  ABT  SKIP.
011C  4120          MPCR  =  ENDPRTRTN  -  1.
011D  F0FC          WHEN SRQ  STEP.
011E  F098          DW2.
011F  F05F          B.
0120  4116          MPCR  =  PRTRTN  -  1.
                  ENDPRTRTN.
0121  E00D          LIT  =  @0D@.
0122  81A2          CPCR  =  READSEQ  -  1.
0123  E00A          LIT  =  @0A@.
0124  81A2          CPCR  =  READSEQ  -  1.
0125  E041          LIT  =  @41@.
0126  81A2          CPCR  =  READSEQ  -  1.
0127  F000          WAIT.                          CHECK  PRINTOUT
                  *                              IF  CORRECT  -  FORCE  STEP
                  *
                  *                              IF  INCORRECT
                  *                                                    ERROR  M42
                  *
0128  F0EA          MIR  =  LIT.
0129  E001          LIT  =  @01@.
012A  F099          DW1.
012B  F102          AMPCR  =  A2.
012C  F05F          B.
012D  F0C9          JUMP.
                  KYBDERR.
012E  F1D5          MIR  =  B001  +  1.
012F  F099          DW1.
0130  F0FC          WHEN SRQ  STEP.
0131  F096          DR1  BEX.
0132  F0EA          MIR  =  LIT.
0133  E007          LIT  =  @07@.
0134  F0FC          WHEN SRQ  STEP.
0135  F098          DW2.                           SOUND  ALARM
0136  F0EA          MIR  =  LIT.
```

```
0137  E05F        LIT  = @5F@.
0138  F0FC        WHEN SRQ  STEP.
0139  F098        DW2.
013A  F0EA        MIR  = LIT.
013B  E001        LIT  = @01@.
013C  F0FC        WHEN SRQ  STEP.
013D  F099        DW1.
013E  F07D        B  = B C.
013F  D800        SAR  = 8.
0140  F0E7        MIR  = B001.              REENABLE  KEYBOARD
0141  F099        DW1.
0142  F0DC        MIR  = A1  + B.
0143  F0FD        WHEN URQ  STEP.           PRESS  ERROR ON SPO  TO
                  *                         CONTINUE  KEYBOARD  TEST
                  *
                  *                         IF  FAULT  EXISTS
                  *                                              ERROR  M43
                  *
0144  F096        DR1  BEX.
0145  40E0        MPCR  = CODETEST  -  1.
              KYBDCODE.
0146  E031        LIT  = @31@.              1
0147  E032        LIT  = @32@.              2
0148  E033        LIT  = @33@.              3
0149  E034        LIT  = @34@.              4
014A  E035        LIT  = @35@.              5
014B  E036        LIT  = @36@.              6
014C  E037        LIT  = @37@.              7
014D  E038        LIT  = @38@.              8
014E  E039        LIT  = @39@.              9
014F  E030        LIT  = @30@.              0
0150  E03A        LIT  = @3A@.              :
0151  E02D        LIT  = @2D@.              -
0152  E051        LIT  = @51@.              Q
0153  E057        LIT  = @57@.              W
0154  E045        LIT  = @45@.              E
0155  E052        LIT  = @52@.              R
0156  E054        LIT  = @54@.              T
0157  E059        LIT  = @59@.              Y
0158  E055        LIT  = @55@.              U
0159  E049        LIT  = @49@.              I
015A  E04F        LIT  = @4F@.              O
015B  E050        LIT  = @50@.              P
015C  E041        LIT  = @41@.              A
015D  E053        LIT  = @53@.              S
015E  E044        LIT  = @44@.              D
015F  E046        LIT  = @46@.              F
0160  E047        LIT  = @47@.              G
0161  E048        LIT  = @48@.              H
0162  E04A        LIT  = @4A@.              J
0163  E04B        LIT  = @4B@.              K
0164  E04C        LIT  = @4C@.              L
0165  E03B        LIT  = @3B@.              ;
0166  E05A        LIT  = @5A@.              Z
0167  E058        LIT  = @58@.              X
0168  E043        LIT  = @43@.              C
0169  E056        LIT  = @56@.              V
016A  E042        LIT  = @42@.              B
016B  E04E        LIT  = @4E@.              N
016C  E04D        LIT  = @4D@.              M
016D  E02C        LIT  = @2C@.              ,
016E  E02E        LIT  = @2E@.              .
016F  E02F        LIT  = @2F@.              /
0170  E020        LIT  = @20@.              SPACE
                  *                       FOLLOWING  CODES  DO NOT PRINT
0171  E00A        LIT  = @0A@.              LINE  FEED
0172  E00D        LIT  = @0D@.              RETURN
                  *                       FOLLOWING  CODES PRINT  AND
                  *                       REQUIRE  SHIFT  KEY
                  *
                  *                     KEY  RESULTANT  PRINT  OUT
                  *
0173  E021        LIT  = @21@.              1       !
0174  E022        LIT  = @22@.              2       "
0175  E023        LIT  = @23@.              3       #
0176  E024        LIT  = @24@.              4       $
0177  E025        LIT  = @25@.              5       %
0178  E026        LIT  = @26@.              6       &
0179  E027        LIT  = @27@.              7       '
017A  E028        LIT  = @28@.              8       (
017B  E029        LIT  = @29@.              9       )
017C  E02A        LIT  = @2A@.              :       *
017D  E03D        LIT  = @3D@.              -       =
017E  E05F        LIT  = @5F@.              O       LEFT  ARROW
017F  E040        LIT  = @40@.              P       @
0180  E05B        LIT  = @5B@.              K       LEFT  BRACKET
0181  E05C        LIT  = @5C@.              L       REVERSE  SLANT
0182  E02B        LIT  = @2B@.              ;       +
0183  E05E        LIT  = @5E@.              N       UPWARD ARROW
0184  E05D        LIT  = @5D@.              M       RIGHT  BRACKET
0185  E03C        LIT  = @3C@.              ,       LESS  THAN
0186  E03E        LIT  = @3E@.              .       MORE THAN
0187  E03F        LIT  = @3F@.              /       ?
                  *                       FOLLOWING  CODES  DO NOT PRINT
                  *                       AND REQUIRE  CONTROL  KEY
                  *                     KEY  RESULTANT  CONTROL
                  *
0188  E011        LIT  = @11@.              Q       DEVICE  CONTROL  1
0189  E017        LIT  = @17@.              W       END OF TRANSMISSION  BLOCK
018A  E005        LIT  = @05@.              E       ENQUIRY
018B  E012        LIT  = @12@.              R       DEVICE  CONTROL  2
018C  E014        LIT  = @14@.              T       DEVICE  CONTROL  4
018D  E019        LIT  = @19@.              Y       END OF MEDIUM
018E  E015        LIT  = @15@.              U       NEGATIVE  ACKNOWLEDGE
018F  E009        LIT  = @09@.              I       HORIZONTAL  TABULATION
0190  E00F        LIT  = @0F@.              O       SHIFT  IN
0191  E010        LIT  = @10@.              P       DATA LINK  ESCAPE
0192  E00A        LIT  = @0A@.        LINE  FEED    LINE  FEED
0193  E00D        LIT  = @0D@.        RETURN        CARRIAGE  RETURN
0194  E001        LIT  = @01@.              A       START  OF HEADING
0195  E013        LIT  = @13@.              S       DEVICE  CONTROL  3
0196  E004        LIT  = @04@.              D       END OF TRANSMISSION
0197  E006        LIT  = @06@.              F       ACKNOWLEDGE
0198  E007        LIT  = @07@.              G       BELL
0199  E008        LIT  = @08@.              H       BACKSPACE
019A  E00A        LIT  = @0A@.              J       LINE  FEED
019B  E00B        LIT  = @0B@.              K       VERTICAL  TABULATION
019C  E00C        LIT  = @0C@.              L       FORM FEED
019D  E01A        LIT  = @1A@.              Z       SUBSTITUTE
019E  E018        LIT  = @18@.              X       CANCEL
019F  E003        LIT  = @03@.              C       END OF TEXT
01A0  E016        LIT  = @16@.              V       SYNCHRONOUS  IDLE
01A1  E002        LIT  = @02@.              B       START  OF TEXT
01A2  E00E        LIT  = @0E@.              N       SHIFT  OUT
              READSEQ.
01A3  F0EA        MIR  = LIT.
01A4  F0FC        WHEN SRQ  STEP.
01A5  F098        DW2.
01A6  F0C9        JUMP.
              WRITSEQ.
01A7  F0EA        MIR  = LIT.
01A8  F099        DW1.
01A9  F0FC        WHEN SRQ  STEP.           NO SRQ
                  *                                              ERROR  M44
01AA  F0C9        JUMP.
              MASK.
01AB  F086        B  = LIT  AND B.
01AC  E07F        LIT  = @7F@.
01AD  F0C9        JUMP.
              RESETFLAGS.
01AE  F0A5        IF  LC1.
```

```
01AF  F0A9          IF   LC2.
01B0  F0AD          IF   LC3.
01B1  F00C          RESET   GC1.
01B2  F01F          RESET   GC2.
                GETTESTSEL.
01B3  F05F          B.
01B4  F05D          ASE.
01B5  F056          A3  =  BMAR.
01B6  81DD          CPCR  =  SETSPOPORT   -  1.
01B7  F05F          B.
01B8  4244          MPCR  =  TESTSEL   +  4.
                TESTMESS.
01B9  F007          A1  =  AMPCR.
01BA  E002          LIT  =  @02@.
01BB  F05F          B.
01BC  81A6          CPCR  =  WRITSEQ   -  1.
01BD  E020          LIT  =  @20@.
01BE  81A2          CPCR  =  READSEQ   -  1.
01BF  E053          LIT  =  @53@.                  S
01C0  81A2          CPCR  =  READSEQ   -  1.
01C1  E045          LIT  =  @45@.                  E
01C2  81A2          CPCR  =  READSEQ   -  1.
01C3  E04C          LIT  =  @4C@.                  L
01C4  81A2          CPCR  =  READSEQ   -  1.
01C5  E045          LIT  =  @45@.                  E
01C6  81A2          CPCR  =  READSEQ   -  1.
01C7  E043          LIT  =  @43@.                  C
01C8  81A2          CPCR  =  READSEQ   -  1.
01C9  E054          LIT  =  @54@.                  T
01CA  81A2          CPCR  =  READSEQ   -  1.
01CB  E020          LIT  =  @20@.
01CC  81A2          CPCR  =  READSEQ   -  1.
01CD  E054          LIT  =  @54@.                  T
01CE  81A2          CPCR  =  READSEQ   -  1.
01CF  E045          LIT  =  @45@.                  E
01D0  81A2          CPCR  =  READSEQ   -  1.
01D1  E053          LIT  =  @53@.                  S
01D2  81A2          CPCR  =  READSEQ   -  1.
01D3  E054          LIT  =  @54@.                  T
01D4  81A2          CPCR  =  READSEQ   -  1.
01D5  E020          LIT  =  @20@.
01D6  81A2          CPCR  =  READSEQ   -  1.
01D7  E023          LIT  =  @23@.                  #
01D8  81A2          CPCR  =  READSEQ   -  1.
01D9  E020          LIT  =  @20@.
01DA  81A2          CPCR  =  READSEQ   -  1.
01DB  F05C          AMPCR  =  A1.
01DC  F0FC          WHEN SRQ  STEP.
01DD  F0C9          JUMP.
                SETSPOPORT.
01DE  F016          A1  =  A3.
01DF  F066          B  =  A1.
01E0  F16E          BR2  =  B.
01E1  F07A          B  =  B1TT.
01E2  F0D5          MAR1  =  B.
01E3  F0C9          JUMP.
                TESTTAB.
01E4  41F8          MPCR  =  LABEL0   -  1.
01E5  41F9          MPCR  =  LABEL1   -  1.
01E6  4203          MPCR  =  LABEL2   -  1.
01E7  420D          MPCR  =  LABEL3   -  1.
01E8  420E          MPCR  =  LABEL4   -  1.
01E9  420F          MPCR  =  LABEL5   -  1.
01EA  4210          MPCR  =  LABEL6   -  1.
01EB  4211          MPCR  =  LABEL7   -  1.
01EC  4212          MPCR  =  LABEL8   -  1.
01ED  4213          MPCR  =  LABEL9   -  1.
01EE  4214          MPCR  =  LABEL10   -  1.
01EF  4215          MPCR  =  LABEL11   -  1.
01F0  4216          MPCR  =  LABEL12   -  1.
01F1  4217          MPCR  =  LABEL13   -  1.
01F2  4218          MPCR  =  LABEL14   -  1.
01F3  4219          MPCR  =  LABEL15   -  1.
01F4  421A          MPCR  =  LABEL16   -  1.
01F5  421B          MPCR  =  LABEL17   -  1.
01F6  421C          MPCR  =  LABEL18   -  1.
01F7  421D          MPCR  =  LABEL19   -  1.
01F8  421E          MPCR  =  LABEL20   -  1.
                LABEL0.
01F9  42A6          MPCR  =  SPO-MEM-MOD   -  1.
                LABEL1.
01FA  F05F          B.
01FB  F05D          ASE.
01FC  F056          A3  =  BMAR.
01FD  81DD          CPCR  =  SETSPOPORT   -  1.
01FE  F05F          B.
01FF  F0EA          MIR  =  LIT.
0200  E001          LIT  =  @01@.
0201  F099          DW1.
0202  80AD          CPCR  =  KYBDTEST   -  1.
0203  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL2.
0204  F05F          B.
0205  F05D          ASE.
0206  F056          A3  =  BMAR.
0207  81DD          CPCR  =  SETSPOPORT   -  1.
0208  F05F          B.
0209  F0EA          MIR  =  LIT.
020A  E002          LIT  =  @02@.
020B  F099          DW1.
020C  8106          CPCR  =  PRINT   -  1.
020D  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL3.
020E  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL4.
020F  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL5.
0210  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL6.
0211  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL7.
0212  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL8.
0213  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL9.
0214  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL10.
0215  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL11.
0216  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL12.
0217  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL13.
0218  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL14.
0219  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL15.
021A  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL16.
021B  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL17.
021C  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL18.
021D  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL19.
021E  41B2          MPCR  =  GETTESTSEL   -  1.
                LABEL20.
021F  E002          LIT  =  @02@.
0220  81A6          CPCR  =  WRITSEQ   -  1.
0221  E00A          LIT  =  @0A@.
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0222  81A2          CPCR  = READSEQ  - 1.
0223  E00D          LIT   = @0D@.
0224  81A2          CPCR  = READSEQ  - 1.
0225  E020          LIT   = @20@.
0226  81A2          CPCR  = READSEQ  - 1.
0227  E020          LIT   = @20@.
0228  81A2          CPCR  = READSEQ  - 1.
0229  E045          LIT   = @45@.                E
022A  81A2          CPCR  = READSEQ  - 1.
022B  E04E          LIT   = @4E@.                 N
022C  81A2          CPCR  = READSEQ  - 1.
022D  E044          LIT   = @44@.                 D
022E  81A2          CPCR  = READSEQ  - 1.
022F  E020          LIT   = @20@.
0230  81A2          CPCR  = READSEQ  - 1.
0231  E04F          LIT   = @4F@.                O
0232  81A2          CPCR  = READSEQ  - 1.
0233  E046          LIT   = @46@.                F
0234  81A2          CPCR  = READSEQ  - 1.
0235  E020          LIT   = @20@.
0236  81A2          CPCR  = READSEQ  - 1.
0237  E054          LIT   = @54@.                T
0238  81A2          CPCR  = READSEQ  - 1.
0239  E045          LIT   = @45@.                E
023A  81A2          CPCR  = READSEQ  - 1.
023B  E053          LIT   = @53@.                S
023C  81A2          CPCR  = READSEQ  - 1.
023D  E054          LIT   = @54@.                T
023E  81A2          CPCR  = READSEQ  - 1.
023F  F000          WAIT.
                TESTSEL.
0240  E002          LIT   = @02@.
0241  81A6          CPCR  = WRITSEQ  - 1.
0242  E020          LIT   = @20@.
0243  81A2          CPCR  = READSEQ  - 1.
0244  81B8          CPCR  = TESTMESS - 1.
0245  E001          LIT   = @01@.
0246  F0EA          MIR   = LIT.
0247  F099          DW1.
0248  F05F          B.
0249  8260          CPCR  = ENABLE   - 1.
024A  826A          CPCR  = VALCODCHK - 1.
024B  F054          A3    = B000.
                CHAR1.
024C  F0FF          0 EQV B.
024D  F0B5          IF NOT ABT SKIP.
024E  4253          MPCR  = CHAR2  - 1.
024F  F04E          A3    = A3 + LIT.
0250  E00A          LIT   = 10.
0251  F162          B     = 0 - B.
0252  F163          B     = 0 - B - 1.
0253  424B          MPCR  = CHAR1  - 1.
                CHAR2.
0254  8260          CPCR  = ENABLE   - 1.
0255  826A          CPCR  = VALCODCHK - 1.
0256  F04D          A3    = A3 + B.
0257  E002          LIT   = @02@.
0258  81A6          CPCR  = WRITSEQ  - 1.
0259  E020          LIT   = @20@.
025A  81A2          CPCR  = READSEQ  - 1.
025B  F104          AMPCR = A3 + AMPCR.
025C  01E3          AMPCR = TESTTAB  - 1.
025D  F0FC          WHEN SRQ STEP.
025E  F0E6          MIR   = B000.
025F  F099          DW1.
0260  F0C9          JUMP.
                ENABLE.
0261  F023          A2    = AMPCR.
0262  F0FC          WHEN SRQ STEP.          PRESS  00/20   FOR TEST SELECT
                *
                *                                IF FAULT EXISTS
                *                                                ERROR M45
                *
0263  F097          DR2 BEX.
0264  81AA          CPCR  = MASK   - 1.
0265  F0EE          MIR   = LIT L.
0266  C800          SAR   = 8 LIT  = @00@.
0267  F098          DW2.
0268  F102          AMPCR = A2.
0269  F05F          B.
026A  F0C9          JUMP.
                VALCODCHK.
026B  F038          A2    = LIT.
026C  E030          LIT   = @30@.              LOWER LIMIT
026D  F11A          A2    - B - 1.
026E  F0B7          IF NOT AOV SKIP.           A2 EQUAL OR LESS THAN B
026F  4282          MPCR  = INVTESTSEL  - 1.
0270  F038          A2    = LIT.
0271  E039          LIT   = @39@.              UPPER LIMIT
0272  F119          A2    - B.
0273  F09E          IF AOV SKIP.               A2 EQUAL OR GREATER THAN B
0274  4282          MPCR  = INVTESTSEL  - 1.
                STRIP.
0275  F07C          B = B L.
0276  D400          SAR   = 4.
0277  F07F          B = B R.
0278  DC00          SAR   = 12.
0279  F05F          B.
027A  F0C9          JUMP.
                DESELECT.
027B  F16C          BR1   = LIT L.
027C  C88F          SAR   = 8 LIT  = @8F@.
027D  F099          DW1.
027E  F05D          ASE.
027F  F080          B     = BMAR.
0280  F07A          B     = B1TT.
0281  F0D5          MAR1  = B.
0282  F0C9          JUMP.
                INVTESTSEL.
0283  E002          LIT   = @02@.
0284  81A6          CPCR  = WRITSEQ  - 1.
0285  E007          LIT   = @07@.
0286  81A2          CPCR  = READSEQ  - 1.
0287  E05F          LIT   = @5F@.
0288  81A2          CPCR  = READSEQ  - 1.
0289  F05F          B.
028A  F05F          B.
028B  423F          MPCR  = TESTSEL  - 1.
                SELECT1.
028C  F0EA          MIR   = LIT.
028D  E002          LIT   = @02@.
028E  F099          DW1.
028F  423F          MPCR  = TESTSEL  - 1.
                CONFIGLOOP.
0290  F17D          DLD.
0291  F0F9          WHEN RDC BEX.
0292  428F          MPCR  = CONFIGLOOP - 1.
0293  809A          CPCR  = CONFIG   - 1.
                TSTASRRES.
0294  F05D          ASE.
0295  F035          A2    = BMAR.
0296  F02F          A2    = A2 OR LIT.
0297  F116          A2 EQV B.
0298  F09C          IF ABT JUMP.
0299  40CE          MPCR  = ERRSUB   - 1.
                LOCSPO.
029A  F067          B     = A1 R.
029B  D800          SAR   = 8.
029C  F07C          B = B L.
029D  F017          A1    = B.
029E  F16E          BR2   = B.
029F  F07A          B = B1TT.
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02A0  F0D5          MAR1 = B.
02A1  F0C9          JUMP.
                BUSTB.
02A2  F0F9          WHEN RDC BEX.
02A3  F0FF          0 EQV B.
02A4  F09C          IF ABT JUMP.
02A5  F0E1          MIR = B.
02A6  F000          WAIT.
                *                                          ERROR M46
                SPO-MEM-MOD.
02A7  F066          B = A1.
02A8  F16E          BR2 = B.
02A9  F0A5          IF LC1.
                SMM-NEW-ADDRESS.
02AA  82D1          CPCR = SMM-ENABLE-OUT - 1.
02AB  E00D          LIT = @0D@.
02AC  830E          CPCR = SMM-DEV-WT-LIT - 1.
02AD  E00A          LIT = @0A@.
02AE  830E          CPCR = SMM-DEV-WT-LIT - 1.
02AF  82D9          CPCR = SMM-SPACE-4 - 1.
02B0  82CE          CPCR = SMM-ENABLE-IN - 1.
02B1  F0A8          IF LC1 SET LC1 SKIP.
02B2  82E2          CPCR = SMM-ACCEPT-4 - 1.
02B3  82D1          CPCR = SMM-ENABLE-OUT - 1.
02B4  F0BF          IF NOT LC1 SKIP.
02B5  82F3          CPCR = SMM-PRINT-4 - 1.
02B6  82D9          CPCR = SMM-SPACE-4 - 1.
02B7  F0D1          MAR1 = A2.
02B8  F0F1          MR1.
02B9  F0F9          WHEN RDC BEX.
02BA  F033          A2 = B.
02BB  82F3          CPCR = SMM-PRINT-4 - 1.
02BC  82CE          CPCR = SMM-ENABLE-IN - 1.
                SMM-WHAT-TO-DO.
02BD  8307          CPCR = SMM-DEV-RD - 1.
02BE  F0CB          LIT EQV B.
02BF  E020          LIT = @20@.
02C0  02C5          AMPCR = SMM-NEW-CONTENT - 1.
02C1  F09B          IF ABT LUOP JUMP.
02C2  E01B          LIT = @1B@.
02C3  F09D          IF ABT SKIP.
02C4  42BC          MPCR = SMM-WHAT-TO-DO - 1.
02C5  F018          SET LC1.
                SMM-NEW-CONTENT.
02C6  82D1          CPCR = SMM-ENABLE-OUT - 1.
02C7  82D9          CPCR = SMM-SPACE-4 - 1.
02C8  82CE          CPCR = SMM-ENABLE-IN - 1.
02C9  82E2          CPCR = SMM-ACCEPT-4 - 1.
02CA  F0DD          MIR = A2.
02CB  F0F3          MW1.
02CC  F0FB          WHEN RMI MAR1 = BMAR + 1.
02CD  F035          A2 = BMAR.
02CE  42A9          MPCR = SMM-NEW-ADDRESS - 1.
                SMM-ENABLE-IN.
02CF  F0FC          WHEN SRQ STEP.
02D0  F0E7          MIR = B001.
02D1  42D2          MPCR = SMM-SEND-CW - 1.
                SMM-ENABLE-OUT.
02D2  F1D5          MIR = B001 + 1.
                SMM-SEND-CW.
02D3  F05D          ASE.
02D4  F080          B = BMAR.
02D5  F16F          BR2 = B1TT.
02D6  F098          DW2.
02D7  F05F          B.
02D8  F16E          BR2 = B.
02D9  F0C9          JUMP.
                SMM-SPACE-4.
02DA  F007          A1 = AMPCR.
02DB  F05F          B.
02DC  F05F          B.
02DD  E020          LIT = @20@.
02DE  830E          CPCR = SMM-DEV-WT-LIT - 1.
02DF  830F          CPCR = SMM-DEV-WT - 1.
02E0  830F          CPCR = SMM-DEV-WT - 1.
02E1  830F          CPCR = SMM-DEV-WT - 1.
02E2  4304          MPCR = SMM-JUMP-A1 - 1.
                SMM-ACCEPT-4.
02E3  F007          A1 = AMPCR.
02E4  F0CA          LCTR.
02E5  CC02          SAR = 12, LIT = 2.
02E6  F034          A2 = B000.
                SMM-ACCEPT-LOOP.
02E7  F026          A2 = A2 L.
02E8  8307          CPCR = SMM-DEV-RD - 1.
02E9  F0CC          LIT - B.
02EA  E040          LIT = @40@.
02EB  F09E          IF AOV SKIP.
02EC  F083          B = LIT + B.
02ED  E009          LIT = 9.
02EE  F086          B = LIT AND B.
02EF  E00F          LIT = @0F@.
02F0  F031          A2 = A2 + B.
02F1  F0C8          INC IF COV SKIP.
02F2  42E6          MPCR = SMM-ACCEPT-LOOP - 1.
02F3  4304          MPCR = SMM-JUMP-A1 - 1.
                SMM-PRINT-4.
02F4  F007          A1 = AMPCR.
02F5  F0CA          LCTR.
02F6  CC02          SAR = 12, LIT = 2.
                SMM-PRINT-LOOP.
02F7  F025          A2 = A2 C.
02F8  F06D          B = A2 AND LIT.
02F9  E00F          LIT = @0F@.
02FA  F0CC          LIT - B.
02FB  E009          LIT = 9.
02FC  F09E          IF AOV SKIP.
02FD  F083          B = LIT + B.
02FE  E007          LIT = @07@.
02FF  F0ED          MIR = LIT + B.
0300  E030          LIT = @30@.
0301  830F          CPCR = SMM-DEV-WT - 1.
0302  F0C8          INC IF COV SKIP.
0303  42F6          MPCR = SMM-PRINT-LOOP - 1.
0304  4304          MPCR = SMM-JUMP-A1 - 1.
                SMM-JUMP-A1.
0305  F05C          AMPCR = A1.
0306  F05F          B.
0307  F0C9          JUMP.
                SMM-DEV-RD.
0308  F1AE          IF NOT URQ SKIP.
0309  4314          MPCR = SMM-STINTS - 1.
030A  F0C5          IF SRQ DR2 BEX SKIP.
030B  4307          MPCR = SMM-DEV-RD - 1.
030C  F086          B = LIT AND B.
030D  E07F          LIT = @7F@.
030E  F0C9          JUMP.
                SMM-DEV-WT-LIT.
030F  F0EA          MIR = LIT.
                SMM-DEV-WT.
0310  F1AE          IF NOT URQ SKIP.
0311  4314          MPCR = SMM-STINTS - 1.
0312  F0C6          IF SRQ DW2 SKIP.
0313  430F          MPCR = SMM-DEV-WT - 1.
0314  F0C9          JUMP.
                SMM-STINTS.
0315  F05D          ASE.
0316  F035          A2 = BMAR.
0317  F08E          BR2 = A2 OR B100.
0318  F097          DR2 BEX.
0319  F07D          B = B C.
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031A	D200	SAR = 2.
031B	F090	BR2 = A2.
031C	F05F	B.
031D	F0B2	IF LST SKIP.
031E	42A6	MPCR = SPO-MEM-MOD - 1.
031F	7FFF	MPCR = SMM-EXIT - 1.

MANUAL PROCEDURES

M1(E1)	OPERATOR ACTION	MACHINE ACTION	A	D	
1	MONITOR RE/ + EN/ (SPO2-Y4)	0%	2	F92	
2	EXT BIT NO. FROM FEMTMTR	1 SPO-1 D7 9-12 SPO-2 F7 13-16 SPO-2 F5			B B
M2	OPERATOR ACTION	MACHINE ACTION	A	D	B
	OBSERVE MIR DIGIT B FOR SPO PORT ADDRESS (PORT ADDRESS = PORT NO MINUS ONE)		1	5	B B
1	INTERCHANGE PS1- BOARDS	PROBLEM GOES AWAY	F3	2	
2	MONITOR DINT/ (SPO1-2N)	100%	3	F4	
3	MONITOR A (SPO2-S4)	100%	4	F5	
4	MONITOR LEINQ/ (SPO2-W4)	100%	F6	F7	
5	GO TO MTR OF DEVICE IN PORT NO IN DIGIT B				B B B
M3	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE PRINT ROLLER ON SPO	ROLLER ACTIVATED AND CAN NOT BE STOPPED BY SYSTEM CLEAR	F8	2	
2	OBSERVE READY LIGHT ON		F9	3	
3	INTERCHANGE PS1- BOARDS	PROBLEM GOES AWAY	F10	4	
4	MONITOR CDSCLKPN (SPO1-1B)	5%	5	F11	
5	DEPRESS & HOLD SYSTEM CLEAR PUSHBUTTON MONITOR CGCLEAR (SPO1-1H)	100%	6	F12	
6	MONITOR CGCLR/ (SPO1-E3)	100%	7	F13	
7	MONITOR LEINQ/ (SPO2-W4)	100%	F14		
M4	OPERATOR ACTION	MACHINE ACTION	A	D	
	INTERCHANGE PS1- BOARDS	PROBLEM GOES AWAY	F17	F18	
M5	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE PRINT ROLLER ON SPO FORCE STEP AND OBSERVE MIR 'CD' BITS	ROLLER ACTIVATED MIR 'CD' BITS = 01	F19	2	
2	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 03	F20	3	
3	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 04	F21	4	
4	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 05	F22	5	
5	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 08	F23	6	
6	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 09	F22	7	
7	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 10	F24	8	
8	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 12	F25	9	
9	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 22	F25	10	
10	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 42	F25	11	
11	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 82	F25	12	
12	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = FF	F26	13	
13	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 00	14		
14	INTERCHANGE PS1- BOARDS	PROBLEM GOES AWAY	F27	15	
15	MONITOR EXT15/ (SPO2-1W)	100%	16		
16	MONITOR RDST/ (SPO1-H3)	100%	F28	F29	
M6	OPERATOR ACTION	MACHINE ACTION	A	D	
		PRINTER ROLLER ACTIVATED NO CONTROL	F32		
M7	OPERATOR ACTION	MACHINE ACTION	A	D	
1	INTERCHANGE PS1- BOARDS	PROBLEM GOES AWAY	F33	2	
2	MONITOR CDSCLKPN (SPO1-1B)	5%	3	F11	
3	MONITOR PSWRITN/ (SPO1-2X)	100%	4	F35	
4	MONITOR LUMIR16/ (SPO1-1W)	0%	5	F36	
5	MONITOR ENI (SPO1-2C)	100%	F37	F38	
M8	OPERATOR ACTION	MACHINE ACTION	A	D	
	NONE	NONE	F39		
M9	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP AND OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 00	F40	2	
2	OBSERVE MIR 'CD' BITS	MIR 'CD' BITS = 02	F41	F42	
M10	OPERATOR ACTION	MACHINE ACTION	A	D	
	NONE	NONE	F43		
M11	OPERATOR ACTION	MACHINE ACTION	A	D	
	NONE	NONE	F44		
M12	OPERATOR ACTION	MACHINE ACTION	A	D	
	INTERCHANGE PS1- BOARDS	PROBLEM GOES AWAY	F45	F46	
M13	OPERATOR ACTION	MACHINE ACTION	A	D	
	NONE	NONE	F47		

M14	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F48	
M15	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F49	
M16	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F50	
M17	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F51	
M18	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F52	
M19	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F53	
M20	OPERATOR ACTION		MACHINE ACTION	A	D
	NOT DETECTED DURING BUGGING RESERVED FOR FUTURE RESULTS				
M21	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F51	
M22	OPERATOR ACTION		MACHINE ACTION	A	D
	1 MONITOR PSSRQ/	(PS1-2Q)	0%	F91	2
	2 INTERCHANGE PS1- BOARDS		PROBLEM GOES AWAY	F54	3
	3 MONITOR CDSCLKPN	(SPO4-1B)	5%	4	F11
	4 MONITOR SPSNDCLK	(SPO4-2N)	NOTE 1	5	7
	5 MONITOR SPRCVCLK	(SPO4-2B)	NOTE 1	6	F55
	6 REPLACE CHIPS IN F56 IF PROBLEM PERSISTS CHANGE CHIPS IN F57				
	7 MONITOR SPENABL	(SPO4-2M)	NOTE 2	F55	5
M23	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F58	
M24	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F59	
M25	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F60	
M26	OPERATOR ACTION		MACHINE ACTION	A	D
	NOT DETECTED DURING BUGGING RESERVED FOR FUTURE RESULTS				
M27	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F59	
M28	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F61	
M29	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F62	
M30	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F63	
M31	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F64	
M32	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F65	
M33	OPERATOR ACTION		MACHINE ACTION	A	D
	NOT DETECTED DURING BUGGING RESERVED FOR FUTURE RESULTS				
M34	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F66	
M35	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F67	
M36	OPERATOR ACTION		MACHINE ACTION	A	D
	NOT DETECTED DURING BUGGING RESERVED FOR FUTURE RESULTS				
M37	OPERATOR ACTION		MACHINE ACTION	A	D
	1 MONITOR PSINSTN	(SPO1-1U)	100%	2	F68
	2 MONITOR PSWRITN	(SPO1-2X)	100%	3	F68
	3 MONITOR I/ + EN/	(SPO1-U3)	100%	F69	F70
M38	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F71	
M39	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F72	
M40	OPERATOR ACTION		MACHINE ACTION	4	D
	NONE		NONE	F73	

M41	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F74	
M42	OPERATOR ACTION		MACHINE ACTION	A	D
	1 OBSERVE PRINTOUT		PRINT TEST PERFORMED	2	F75
	2 OBSERVE PRINTOUT		PRINTOUT INCORRECT NO ALARM SOUNDED	F76	F77
M43	OPERATOR ACTION		MACHINE ACTION	A	D
	1 OBSERVE PRINT ROLLER		ACTIVATED NO CONTROL	F78	2
	2 OBSERVE PRINTOUT		CHARACTER PRINTED NOT AS ENTERED BY OPERATOR	F79	3
	3 MONITOR SPSNDCLK	(SPO4-2N)	NOTE 1	4	F80
	4 MONITOR SPRCVCLK	(SPO4-2B)	NOTE 1	5	F80
	5 MONITOR SR	(SPO1-D3)	NOTE 1	F82	F81
M44	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F85	
M45	OPERATOR ACTION		MACHINE ACTION	A	D
	1 OBSERVE PRINTER ROLLER		ACTIVATED NO CONTROL AFTER PRINTING MESSAGE SELECT TEST #	F86	2
	2 OBSERVE PRINTOUT		SELECT TEST # NOT CORRECTLY PRINTED	F87	3
	3 OBSERVE SPO		GOES NOT READY AFTER OPERATOR ENTERS FIRST CHARACTER	F88	F89
M46	OPERATOR ACTION		MACHINE ACTION	A	D
	NONE		NONE	F90	

NOTE 1: RERUN MTR STEPS 1 - 6
AT STEP 7 - DO NOT PRESS ERROR
PRESS KEY ON KEYBOARD
SCOPE SIGNAL.

SPSNDCLK AND SPRCVCLK ARE POSITIVE GOING
1 USEC PULSE WIDTH
9 MSEC PERIOD

NOTE 2: ONE 90 MSEC PULSE PER KEY DEPRESSION

FAILURE DICTIONARY

F1			
F2	SPO-2 F5 F7 PS1- B3 B5 B7		M1
F3	PS1- C3 C5 D3 D5 D7 E3		M2
F4	SPO-1 A1 A7 B1 B5 C5 E3 SPO-2 A7 D7 E3		M2
F5	SPO-1 C5 E1		M2
F6	SPO-1 B1 A1 A7		M2
F7	SPO-2 A7 B1 B3 C1 C5 D5 E5		M2
F8	SPO-1 D1 D7 F3 SPO-2 A3 SPO-4 TRANSISTOR Q1 & DIODE CR1		M3
F9	SPO-1 B7 E3 SPO-4 A7		M3
F10	PS1- A3 B3 C3 C5 D1 D3 D5 E3		M3
F11	CD1 C3 AND T4H ASSOCIATED WITH DDP LOCATION		M3 M7 M22
F12	CG1 B3 D5 AND B4 ASSOCIATED WITH DDP LOCATION		M3
F13	SPO-1 B1 SPO-2 A3 A5 B1 B3 B5		
F14	SPO-1 A3 A5 A7 B1 B3 C3 C5 D1 E1 SPO-2 A3 A7 B1 B3 C1 C5 E5 INPUT REQUEST SWITCH		
F17	PS1- A5 B3 B5 B7 C5 C7 D3 F7		M4
F18	SPO-1 C5 D3 D7 E7 SPO-2 A5 B5		M4
F19	SPO-2 A3		M5
F20	SPO-2 E7 F3 F5 SPO-4 A7 TRANSISTORS Q1 Q5 Q6		M5
F21	SPO-2 B5		M5
F22	SPO-2 F3 F5		M5
F23	SPO-2 A5		M5
F24	SPO-2 A5 B7		M5
F25	SPO-2 E7 F7		M5
F26	SPO-2 F3		M5
F27	PS1- B3 B5 C7 E5 E7 F7		M5
F28	SPO-1 A1 D3 E1 E7		M5
F29	SPO-1 C5 D3 E1 E7 SPO-2 A7 B3 B5 E5 F3 F5 F7		M5
F32	SPO-1 F7		M6
F33	PS1- A3 A5 B5 B7 C1 E5 E7 F7		M7

F35	PS1-	A5 B5 B7 C1 E7 F7	M7
F36	LU4-2	E5 F7	M7
F37	SPO-2	A3 A5 A7 B3 C1 D5	M7
	SPO-4	A7 TRANSISTORS Q3 & Q4	
	ERROR	SWITCH	
F38	SPO-1	A7 B3 B7 D3 D5 E1 E3 E7 F3 F7	M7
	SPO-2	D5	
	SPO-4	A7 TRANSISTORS Q3 & Q4	
F39	SPO-1	B7 C3 C7 E3 F3	M8
	SPO-2	A3 C7	
	PS1-	E3	
F40	SPO-1	A3	M9
	SPO-2	A5 F3 F5	
F41	SPO-2	C1	M9
	ERROR	SWITCH	
F42	SPO-2	B1 C1 D5	M9
	END OF MESSAGE	SWITCH	
F43	SPO-2	C1	M10
	INPUT	REQUEST SWITCH	
F44	SPO-2	A3 B3 C1 D5	M11
	ERROR	SWITCH	
F45	PS1-	A3 A5 B3 B5 C1 D1 D7 E3 E5 F7	M12
F46	SPO-1	B7 D3 E1 E7 F7	M12
	SPO-2	A3 A7 B1 B5 C1 D5	
	END OF	MESSAGE SWITCH	
F47	SPO-1	A1 B5 D3	M13
	PS1-	C1 D7 E3	
F48	SPO-1	E1	M14
	SPO-2	B5 F3 F5	
	PS1-	E7	
F49	SPO-1	F7	M15
	SPO-2	A3 B1 C1	
	END OF	MESSAGE SWITCH	
F50	SPO-2	A3 D5	M16
	PS1-	C3	
F51	PS1-	F7	M17 M21
F52	SPO-1	E1	M18
	SPO-2	F5	
	PS1-	D3	
F53	SPO-1	D3 E7	M19
	PS1	A5 B5 D1 E5	
F54	PS1-	C1 D7 E3	M22
F55	SPO-4	A5 A7 B5 B7 C5 C7	M22
F56	SPO-1	A1 A3 A5 A7 B5 B7 C3 C5 D3 F3	M22
F57	SPO-1	B3 D1 D5 D7	M22
	SPO-2	A3 C5 C7 D3	
	SPO-4	TRANSISTORS Q2 & DIODE CR1	
F58	SPO-1	B5 C5 F7	M23
	SPO-4	A5	
	PS1-	E3	
F59	SPO-1	B5	M24 M27
F60	SPO-1	D7	M25
	PS1-	C1 D7	
F61	PS1-	D5	M28
F62	SPO-1	D1 D7	M29
F63	SPO-1	B7 C3 D3	M30
F64	SPO-2	A7 C5 D5	M31
F65	SPO-2	A5 B7 E7 F7	M32
F66	SPO-1	D7	M34
F67	SPO-1	B5 C5 E1 F3 F7	M35
F68	PS1-	D1 E5 E7	M37
F69	SPO-1	D3 E1 E3 E7 F7	M37
F70	SPO-1	C5 D7	M37
	SPO-2	A3 B1 B5 C1 C5 E5 F3 F5	
	END OF	MESSAGE SWITCH	
F71	SPO-1	C3 F3	M38
	SPO-2	A7 C5 D3	
	SPO-4	B7	

F72	SPO-1	A7	B3	B5	C7	E3	F7				M39
F73	SPO-1	A5	B3	C3	D3	D5	E1	E3	E7	F3	M40
F74	SPO-1	E3									M41
F75	SPO-1	C3	D1	D7	F3						M42
	SPO-2	D3									
	SPO-4	B7									
F76	SPO-1	A3	A7	B5	F7						M42
F77	SPO-1	D1									M42
	SPO-2	B7	C3	C5	C7	D3					
	SPO-4	B7	C5	C7							
F78	SPO-1	F3									M43
F79	SPO-2	C7	D3								M43
	SPO-4	A5	A7	B5	B7	C5	C7				
F80	SPO-4	B5	B7	C5							M43
F81	SPO-1	A3	A7	C3	D1	D5					M43
	SPO-2	A3	C5	C7	D3	E5					
F82	SPO-1	A1	B7	E1	F3						M43
	SPO-2	C7	D3	D7	E3	E5	E7	F3	F5	F7	
F85	PS1-	E7									M44
F86	SPO-1	F3									M45
F87	SPO-2	B7									M45
F88	SPO-1	D3									M45
F89	SPO-1	B3	C3	E3	F3	F7					M45
F90	PS1-	B7									M46
F91	CU1	B/C3									M22
F92	SPO-1	A1	E1	E7							M1

ILLUSTRATIONS

THE FOLLOWING CHARACTERS ARE NOT CORRECTLY PRINTED BY LINE PRINTERS. THEY ARE PRODUCED BY THE SPO AND SHOULD BE ENTERED BY HAND FOR FUTURE REFERENCE.

EXCLAMATION POINT
LEFT ARROW
REVERSE SLANT
UPWARD ARROW

THESE CHARACTERS APPEAR IN THE PRINTOUT IN THE FOLLOWING LOCATIONS

```
ON LINE  2:
     PRIOR  TO  '  -  SPO  PRINTS  EXCLAMATION  POINT
     PRIOR  TO  @  -  SPO  PRINTS  LEFT  ARROW
     PRIOR  TO  +  -  SPO  PRINTS  REVERSE  SLANT
     PRIOR  TO  !  -  SPO  PRINTS  UPWARD ARROW

ON LINE  6:
     PRIOR  TO  '  -  SPO  PRINTS  EXCLAMATION  POINT
     PRIOR  TO  !  -  SPO  PRINTS  REVERSE  SLANT
     AFTER      !  -  SPO  PRINTS  UPWARD ARROW
                -  SPO  PRINTS  LEFT  ARROW

ON LINE  8:
     PRIOR  TO  '  -  SPO  PRINTS  EXCLAMATION  POINT
     PRIOR  TO  @  -  SPO  PRINTS  LEFT  ARROW
     PRIOR  TO  +  -  SPO  PRINTS  REVERSE  SLANT
     PRIOR  TO  !  -  SPO  PRINTS  UPWARD ARROW

ON LINE  12:
     PRIOR  TO  '  -  SPO  PRINTS  EXCLAMATION  POINT
     PRIOR  TO  !  -  SPO  PRINTS  REVERSE  SLANT
     AFTER      !  -  SPO  PRINTS  UPWARD ARROW
                -  SPO  PRINTS  LEFT  ARROW
```

```
                                                                        LINE
AA1234567890:-QWERTYUIOPASDFGHJKL;ZXXCVBNM,./                            1
  '#$%&'()*=        @#  +  !<>?                                           2
                                                                          3
                                                                          4
                                                                          5
    '#$%&'()*+,-./0123456789:;<=>?@ABCDEEFGHIJKLMNOPQRSTUVWXYZ#       !    6
A  SELECT  TEST  #  01  1234567890:-QWERTYUIOPASDFGHJKL;ZXCVVBNM,./        7
  '#$%&'()*=,       @#  +  !<>?                                           8
                                                                          9
                                                                         10
02                                                                       11
    '#$%&'()*+,-./0123456789:;<=>?@ABCDEEFGHIJKLMNOPQRSTUVWXYZ#       !   12
A03  04  05  06  07  08  09  10  11  12  13  14  15  16  17  18  19  20    13
  END  OF  TEST                                                          14
```

DPMMTR DATA/PROGRAM MEMORY B 711, B 711-1, B 720, AND B 771 PROCESSORS

```
                *  LOAD PROGRAM 1448   6971                                          B
                *  SET IRQ SWITCH TO CENTER & PRESS CLEAR                            B
0000    81A4    *     CPCR = PARERR - 1.
                *  NOTE   SINCE B711 & B771 STOP CLOCKS ON 2ND PARITY                B
                *         ERROR THIS PROG CONNOT BE USED FOR SIGNAL                  B
                *         TRACING IF PARITY ERRORS 0CCURS                            B
                *         FOR B721 SEE INST ON PAGE 14 FOR LOOPING                   C
                *
                *  PROG   MACH
                *  STEP   IND              OPERATOR ACTION
                *
                *
                *      1  INCR = 0005       VERIFY MIR = SYS CONFIG                  B
                *                           IF NO PRESS FST THEN SEE INCR            C
                *                           IF YES PRESS CONSOLE READY               B
                *                           OR SPO INPUT REQ                         B
                *
                *
                *      2  C0N  NUM ON       ENTER MEM START ADDRESS-4 HEX            B
                *         SPO  RDY ON       DIGTS (MSD 1ST),5TH ENTRY WILL           B
                *                           LOCK SELECTION & ADVANCE TO              B
                *                           STEP 3 (USE SPACE KEY)                   B
                *
                *      3  C0N  NUM ON       ENTER MEM END ADDRESS (+1)               B
                *         SPO  RDY ON       4 HEX DIGITS,5TH ENTRY WILL              B
                *                           LOCK SELECTION,SPECIFY 4 OR              B
                *                           8K MEM MODULE & START TEST               B
                *                           SPO SPACE = 8K SLASH = 4K                B
                *                           CON OCK 2 = 8K OCK 1 = 4K                B
                *                           (IF ELECTRONIC CONSOLE USE
                *                            OCK 3 IN STEAD OF OCK 2)                B
                *
                *           NOTE            IN STEPS 2 & 3 CONSOLE RDY OR            B
                *                           SPO ERROR BUTTONS MAY BE USED            B
                *                           PRIOR T0 5TH ENTRY T0 CANCEL &           B
                *                           RETURN T0 STEP 2. SEE TABLES             B
                *                           1 & 2 F0R ADDRESS VALUES                 B
                *                           (SPO LINE FEEDS OR CARRIAGE              B
                *                            RETURNS MUST BE CANCELLED)              B
                *
                *      4  INCR = 0100       END OF MODULE TEST-NO ERRORS             B
                *                           PRESS CONSOLE READY OR SPO               B
                *                           INPUT REQ TO RETURN TO STEP 2            B
                *                           IF ALL MEM MODULES HAVE BEEN             B
                *                           TESTED GO TO STEP 5 IF 711/771           C
                *                           IF 721 TEST IS COMPLETE                  C
                *
                *           NOTE            AT STEP 4 PRESS FST FOR AN               B
                *                           EXHAUSTIVE MEMORY TEST ON THE            B
                *                           PREVIOUSLY SELECTED ADDRESSES            B
                *                           (TEST IS OPTIONAL,REQURING 30            B
                *                            MINUTES F0R 8K,1 H0UR FOR 16K           B
                *
                *      5                    PRESS CONSOLE READY OR SPO               B
                *                           INPUT REQ & ENTER ILLEGAL                B
                *                           ADDRESSES PER TABLE 3                    B
                *
                *                           VERIFY ADDRESS ERROR OCCURS              B
                *                           FOR EACH ILLEGAL VALUE                   B
                *                           IF YES TEST IS COMPLETE                  B
                *                           IF NO REPLACE SM3 CHIPS C5 C7            B
```

```
                *
                *  TABLE 1  8K MEMORY MODULES ONLY                                   B
                *  MEM |  START      |   END                                         B
                *  SIZE|  ADDRESS    |   ADDRESS                                     B
                *                                                                    B
                *   8K     01C6          2000      MODULES MAY BE TESTED             C
                *  16K     2000          4000      INDIVIDUALLY OR IN                B
                *  24K     4000          6000      ONE PASS                          B
                *
                *  TABLE 2  4K MEMORY MODULES OR MIXED SIZES                         B
                *  MEM |  START      |   END                                         B
                *  SIZE|  ADDRESS    |   ADDRESS                                     B
                *
                *   8K     01C6          2000                                      C
                *  10K     2000          2800                                      B
                *  12K     2800          3000                                      B
                *  16K     3800          4000                                      B
                *  14K     3000          3800                                      B
                *  18K     4000          4800                                      B
                *  20K     4800          5000                                      B
                *  22K     5000          5800                                      B
                *  24K     5800          6000                                      B
                *
                *  TABLE 3  ILLEGAL ADDRESSES                                        B
                *  MEM |  START      |   FOR END ADDRESSES                           B
                *  SIZE|  ADDRESSES  |   USE START ADDRESS + 1                       B
                *
                *   8K     4000,8000                                                B
                *  10K     3000,4000,8000                                           B
                *  12K     4000,8000,                                               B
                *  14K     4000,8000                                                B
                *  16K     8000                                                     B
                *  18K     5000,6000,8000                                           B
                *  20K     6000,8000                                                B
                *  22K     6000,8000                                                B
                *  24K     8000                                                     B
```

PROGRAM LISTING

```
0001  F17D        DLD.                                                    B
0002  F0F9        WHEN RDC BEX.        TEST FOR SPO OR CONSOLE            B
0003  F0E1        MIR = B.                                                B
0004  F0B0        IF LST SET LC1.      SET LC1 IF SPO                     B
              BEGIN.
0005  F0F8        WHEN IRQ.
0006  F18E        IF IRQ SKIP.                                            B
0007  41BE        MPCR = CONFIGERROR - 1.                                 B
0008  F108        ASR BEX.                                                B
0009  F078        B = B0TT.                                               B
000A  F16E        BR2 = B.                                                B
000B  F07A        B = B1TT.                                               B
000C  F0D5        MAR1 = B.                                               B
              RESTART.
000D  F00C        RESET GC1.     8K MODULE FLAG                           B
000E  F01F        RESET GC2.     LOOP FLAG                                B
000F  8028        CPCR = ENABLEKEYBRD - 1.                                B
0010  8037        CPCR = GET4DIGITS - 1.     GET START ADDRESS            B
0011  8025        CPCR = DISABLEKEYBRD - 1.                               B
0012  81C2        CPCR = TESTFORZERO - 1.  START ADDR 0 MEANS MEM-MOD
0013  F060        B = AMPCR.                                              B
0014  01C5        AMPCR = FINISH - 1.                                     B
0015  F12B        A3 - B - 1.          TEST FOR START ADDR GRTR THAN      B
0016  F09E        IF AOV SKIP.         END OF PROGRAM                     B
0017  8059        CPCR = LIMITERROR - 1.  START ADDRESS TO SMALL          B
                  *                       FORCE STEP TWICE TO RESTART     B
0018  81B8        CPCR = TIMER - 1.                                       B
0019  8028        CPCR = ENABLEKEYBRD - 1.                                B
001A  F016        A1 = A3.             START ADDRESS TO A1                B
001B  8037        CPCR = GET4DIGITS - 1.  GET END ADDRESS + 1              B
001C  F05F        B.                   IF 5TH ENTRY LSB = 0 (SPACE KEY)   B
001D  F0B2        IF LST SKIP.  SET 8K MOD FLAG                           B
001E  F006        SET GC1.                                                B
001F  8025        CPCR = DISABLEKEYBRD - 1.                               B
0020  F066        B = A1.                 TEST FOR END ADDRESS            B
0021  F12B        A3 - B - 1.             GRTR THAN START ADDRESS         B
0022  F09E        IF AOV SKIP.                                            B
0023  8059        CPCR = LIMITERROR - 1.  END ADDR LESS THAN START        B
                  *                       FORCE STEP TWICE THEN           B
                  *                       RE-ENTER START ADDRESS          B
0024  F032        A2 = A3.          END ADDRESS + 1 TO A2                 B
0025  405E        MPCR = MCCOUNT0 - 1.
              DISABLEKEYBRD.        DISABLE SPO OR CONSOLE                B
0026  F0E6        MIR = 0.                                                B
0027  F019        SET LC2.      NUM IND OFF IF CONSOLE                    B
0028  402B        MPCR = CONTWRT - 1.                                     B
              ENABLEKEYBRD.                                               B
0029  F0E7        MIR = B001.           ENABLE SPO                        B
002A  F0A8        IF LC1 SET LC1 SKIP.                                    B
002B  F1D5        MIR = B001 + 1.       ENABLE CONSOLE                    B
              CONTWRT.                                                    B
002C  F099        DW1.                                                    B
002D  F082        B = LIT L.                                              B
002E  C881        LIT = @81@ SAR = 8.                                     B
002F  F05F        B.                                                      B
0030  E000        LIT = 0.          NUM IND OFF                           B
0031  F015        IF LC2 SKIP.                                            B
0032  E008        LIT = 8.          NUM IND ON                            B
0033  F0EC        MIR = LIT OR B.                                         B
0034  F0A8        IF LC1 SET LC1 SKIP.  SKIP IND WORD IF SPO              B
0035  F098        DW2.                                                    B
0036  F0C9        JUMP.                                                   B
              STARTOVER.                                                  B
0037  F096        DR1 BEX.          RESET STATUS INT                      B
              GET4DIGITS.       READ 4 HEX DIGITS TO A3                   B
0038  F054        A3 = 0.     USE RDY OR INPUT REQ TO START OVER          B
0039  F0CA        LCTR.                                                   B
003A  C403        LIT = 3 SAR = 4.   SAR FOR FINAL SHIFT (5TH ENTRY)      B
              WAITFORDATA.                                                B
003B  F1AE        IF NOT URQ SKIP.                                        B
003C  4036        MPCR = STARTOVER - 1.                                   B
003D  F0C5        IF SRQ DR2 BEX SKIP.                                    B
003E  403A        MPCR = WAITFORDATA - 1.                                 B
003F  F0C8        INC IF COV SKIP.                                        B
0040  4042        MPCR = PROCESSDATA - 1.                                 B
0041  F044        A3 = A3 C.                                              B
0042  F0C9        JUMP.                                                   B
              PROCESSDATA.                                                B
0043  F086        B = LIT AND B.       MASK 0FF PARITY BIT                B
0044  E07F        LIT = @7F@.                                             B
0045  F0CC        LIT - B.                                                B
0046  E040        LIT = @40@.                                             B
0047  F09E        IF AOV SKIP.                                            B
0048  F083        B = LIT + B.                                            B
0049  E009        LIT = 9.                                                B
004A  F086        B = LIT AND B.          CLEAR UPPER DIGIT               B
004B  CC0F        LIT = @0F@ SAR = 12.      MASK OFF UPPER DIGIT          B
004C  F048        A3 = A3 OR B.                                           B
004D  F044        A3 = A3 C.                                              B
004E  F07D        B = B C.                                                B
004F  C890        LIT = @90@ SAR = 8.
0050  F087        B = LIT OR B.                                           B
0051  F0E2        MIR = B C.                                              B
0052  F0A8        IF LC1 SET LC1 SKIP.                                    B
0053  F098        DW2.      DISPLAY HEX DIGIT IN CON A IND UNLESS SPO     B
0054  F0DE        MIR = A3.                                               B
0055  4039        MPCR = WAITFORDATA - 2.                                 B
              DESELECT.                                                   B
0056  F16C        BR1 = LIT L.                                            B
0057  C80F        LIT = 15 SAR = 8.                                       B
0058  F096        DR1 BEX.              DESELECT FOR IRQ'S                B
0059  4004        MPCR = BEGIN - 1.                                       B
              LIMITERROR.                                                 B
005A  F0DA        MIR = AMPCR.                                            B
005B  F000        WAIT.        MIR IS ADDRESS OF LIMIT ERROR              B
005C  F0DE        MIR = A3.  PRESS FST TO SEE 4 DIGITS ENTERED            B
005D  F000        WAIT.        PRESS FST AGAIN TO RESTART                 B
005E  400C        MPCR = RESTART - 1.                                     B
              MCCOUNT0.
005F  F042        A3 = A1.                  A3 CONTAINS START ADDRESS
0060  F0D2        MAR1 = A3.
0061  F0DE        MIR = A3.
                  *                         TEST MEMORY USING AN
                  *                         INCREASING COUNT AND WORST
                  *                         CASE PATTERN
              MCCOUNT1.
0062  F05E        ASR.
0063  F056        A3 = BMAR.
0064  F0F3        MW1.
0065  F05F        B.
0066  F0F1        MR1.
0067  F0F9        WHEN RDC BEX.
0068  F0D7        MAR1 = BMAR + 1.
0069  F03C        A3 EQV B.
006A  F09D        IF ABT SKIP.
006B  8187        CPCR = ERROR1 - 1.
006C  005E        AMPCR = MCCOUNT1 - 4.   LOOP RETN ADDRESS               B
006D  0061        AMPCR = MCCOUNT1 - 1.
006E  F0E9        MIR = BMAR.
006F  F08D        BMI.
0070  F116        A2 EQV B.
0071  F0B4        IF NOT ABT JUMP.
0072  F042        A3 = A1.
0073  F0D2        MAR1 = A3.
0074  F0DE        MIR = A3.
```

```
                MCCOUNT2.
0075    F0F1            MR1.
0076    F0F9            WHEN RDC  THEN  BEX.
0077    F03C            A3  EQV  B.
0078    F09D            IF  ABT  SKIP.
0079    8187            CPCR  =  ERROR1  -  1.
007A    0071            AMPCR  =  MCCOUNT2  -  4.     LOOP  RETN  ADDR          B
007B    F0E7            MIR  =  B001.
007C    F0F3            MW1.
007D    F05F            B.
007E    F0F1            MR1.
007F    F0D7            MAR1  =  BMAR  +  1.
0080    F04C            A3  =  A3  +  1.
0081    F0DE            MIR  =  A3.
0082    F068            B  =  A2.
0083    F03C            A3  EQV  B.
0084    F09D            IF  ABT  SKIP.
0085    4074            MPCR  =  MCCOUNT2  -  1.
                MCOUNT0.
0086    F0D0            MAR1  =  A1.
0087    F043            A3  =  A2.
                MCOUNT1.
0088    F0E6            MIR  =  0.                                              B
0089    F080            B  =  BMAR.
008A    DC00            SAR  =  12.
008B    F008            IF  GC1  SKIP.
008C    DB00            SAR  =  11.
008D    F07D            B  =  B C.
008E    F05F            B.
008F    0156            AMPCR  =  MCOUNT11  -  1.
0090    F0B1            IF  LST  JUMP.
0091    F080            B  =  BMAR.
0092    F05F            B.
0093    0096            AMPCR  =  MCOUNT12  -  1.
0094    F0B1            IF  LST  JUMP.
0095    F076            B  =  B111.
0096    F0E1            MIR  =  B.
                MCOUNT12.
0097    F08D            BMI.
0098    F051            A3  =  B.
0099    F0F3            MW1.
009A    F05F            B.
009B    F0F1            MR1.
009C    F0F9            WHEN RDC  BEX.
009D    F0D7            MAR1  =  BMAR  +  1.
009E    F03C            A3  EQV  B.
009F    F09D            IF  ABT  SKIP.
00A0    818D            CPCR  =  ERROR2  -  1.
00A1    005E            AMPCR  =  MCCOUNT1  -  4.     LOOP  RETN  ADDRESS       B
00A2    F043            A3  =  A2.
00A3    F080            B  =  BMAR.
00A4    F03C            A3  EQV  B.
00A5    0087            AMPCR  =  MCOUNT1  -  1.
00A6    F0B4            IF  NOT  ABT  JUMP.
00A7    F0D0            MAR1  =  A1.
                MCOUNT2.
00A8    F054            A3  =  B000.
00A9    F080            B  =  BMAR.
00AA    DC00            SAR  =  12.
00AB    F008            IF  GC1  SKIP.
00AC    DB00            SAR  =  11.
00AD    F07D            B  =  B C.
00AE    F05F            B.
00AF    015C            AMPCR  =  MCOUNT21  -  1.
00B0    F0B1            IF  LST  JUMP.
00B1    F080            B  =  BMAR.
00B2    F05F            B.
00B3    00B6            AMPCR  =  MCOUNT22  -  1.
00B4    F0B1            IF  LST  JUMP.
00B5    F076            B  =  B111.
00B6    F051            A3  =  B.
```

```
                MCOUNT22.
00B7    F0F1            MR1.
00B8    F0F9            WHEN RDC  BEX.
00B9    F0D7            MAR1  =  BMAR  +  1.
00BA    F03C            A3  EQV  B.
00BB    F09D            IF  ABT  SKIP.
00BC    818D            CPCR  =  ERROR2  -  1.
00BD    00A6            AMPCR  =  MCOUNT2  -  2.      LOOP  RETN  ADDR          B
00BE    F043            A3  =  A2.
00BF    F080            B  =  BMAR.
00C0    F03C            A3  EQV  B.
00C1    F09D            IF  ABT  SKIP.
00C2    40A7            MPCR  =  MCOUNT2  -  1.
00C3    F0D0            MAR1  =  A1.
00C4    F043            A3  =  A2.
                MCOUNT1A.
00C5    F0E8            MIR  =  B111.
00C6    F080            B  =  BMAR.
00C7    DC00            SAR  =  12.
00C8    F008            IF  GC1  SKIP.
00C9    DB00            SAR  =  11.
00CA    F07D            B  =  B C.
00CB    F05F            B.
00CC    016A            AMPCR  =  MCOUNT11A  -  1.
00CD    F0B1            IF  LST  JUMP.
00CE    F080            B  =  BMAR.
00CF    F05F            B.
00D0    00D3            AMPCR  =  MCOUNT12A  -  1.
00D1    F0B1            IF  LST  JUMP.
00D2    F07B            B  =  B000.
00D3    F0E1            MIR  =  B.
                MCOUNT12A.
00D4    F08D            BMI.
00D5    F051            A3  =  B.
00D6    F0F3            MW1.
00D7    F05F            B.
00D8    F0F1            MR1.
00D9    F0F9            WHEN RDC  BEX.
00DA    F0D7            MAR1  =  BMAR  +  1.
00DB    F03C            A3  EQV  B.
00DC    F09D            IF  ABT  SKIP.
00DD    818D            CPCR  =  ERROR2  -  1.
00DE    00C2            AMPCR  =  MCOUNT1A  -  3.     LOOP  RETN  ADDR          B
00DF    F043            A3  =  A2.
00E0    F080            B  =  BMAR.
00E1    F03C            A3  EQV  B.
00E2    00C4            AMPCR  =  MCOUNT1A  -  1.
00E3    F0B4            IF  NOT  ABT  JUMP.
00E4    F0D0            MAR1  =  A1.
                MCOUNT2A.
00E5    F076            B  =  B111.
00E6    F051            A3  =  B.
00E7    F080            B  =  BMAR.
00E8    DC00            SAR  =  12.
00E9    F008            IF  GC1  SKIP.
00EA    DB00            SAR  =  11.
00EB    F07D            B  =  B C.
00EC    F05F            B.
00ED    0163            AMPCR  =  MCOUNT21A  -  1.
00EE    F0B1            IF  LST  JUMP.
00EF    F080            B  =  BMAR.
00F0    F05F            B.
00F1    F0B2            IF  LST  SKIP.
00F2    F054            A3  =  B000.
                MCOUNT22A.
00F3    F0F1            MR1.
00F4    F0F9            WHEN RDC  BEX.
00F5    F0D7            MAR1  =  BMAR  +  1.
00F6    F03C            A3  EQV  B.
00F7    F09D            IF  ABT  SKIP.
00F8    818D            CPCR  =  ERROR2  -  1.
```

```
00F9  00E3        AMPCR = MCOUNT2A - 2.    LOOP RETN ADDR                    B
00FA  F043        A3 = A2.
00FB  F080        B = BMAR.
00FC  F03C        A3 EQV B.
00FD  00E4        AMPCR = MCOUNT2A - 1.
00FE  F0B4        IF NOT ABT JUMP.
00FF  F0A2        IF GC2 SKIP.
0100  F0FD        WHEN URQ STEP.           END OF WORST CASE DATA TEST       B
                  *                        PRESS CONSOLE READY OR SPO INPUT
                  *                        REQ TO RETN TO ADDRESS SELECTION
                  *                        OR PRESS FST TO DO EXHAUSTIVE
                  *                        TEST ON PREVIOUSLY SELECTED
                  *                        ADDRESSES
0101  F1AE        IF NOT URQ SKIP.
0102  4055        MPCR = DESELECT - 1.                                       B
                  *                              REQUIRES APPROXIMATELY
                  *                              THIRTY MINUTES TO TEST 8K
                  *
                  *                              TEST TIME FOR 16K AS 1 UNIT
                  *                              APPROXIMATELY 2 HOURS
                  *
                  *
0103  F0CA        LCTR.
0104  E0FF        LIT = @FF@.
0105  F05F        B.
0106  E000        LIT = 0.
0107  F042        A3 = A1.
0108  F0D0        MAR1 = A1.
0109  F0E6        MIR = 0.
              CPZEROS.
010A  F0F3        MW1.
010B  F0FB        WHEN RMI MAR1 = BMAR + 1.
010C  F080        B = BMAR.
010D  F116        A2 EQV B.
010E  F09D        IF ABT SKIP.
010F  4109        MPCR = CPZEROS - 1.
0110  F0D2        MAR1 = A3.
              WRONES.
0111  F0E8        MIR = B111.
0112  F0F3        MW1.
0113  F0FB        WHEN RMI MAR1 = BMAR + 1.
0114  F056        A3 = BMAR.
0115  F0D0        MAR1 = A1.
              RDZEROS.
0116  F0F1        MR1.
0117  F0FA        WHEN RDC BEX MAR1 = BMAR + 1.
0118  F0E1        MIR = B.
0119  F080        B = BMAR.
011A  F03C        A3 EQV B.
011B  F0B5        IF NOT ABT SKIP.
011C  4176        MPCR = TESTONES - 1.
011D  F08D        BMI.
011E  F0FE        Z EQV B.
011F  F09D        IF ABT SKIP.
0120  819B        CPCR = ERROR3 - 1.
0121  0102        AMPCR = CPZEROS - 8.     LOOP RETN ADDR                    B
              RDZERO.
0122  F080        B = BMAR.
0123  F116        A2 EQV B.
0124  F09D        IF ABT SKIP.
0125  4115        MPCR = RDZEROS - 1.
0126  F071        B = A3.
0127  F116        A2 EQV B.
0128  F09D        IF ABT SKIP.
0129  4170        MPCR = UPONES - 1.
012A  F0CA        LCTR.
012B  E0FF        LIT = @FF@.
012C  F05F        B.
012D  E000        LIT = 0.
012E  F042        A3 = A1.
012F  F0D0        MAR1 = A1.
0130  F0E8        MIR = B111.
              CPONES.
0131  F0F3        MW1.
0132  F0FB        WHEN RMI MAR1 = BMAR + 1.
0133  F080        B = BMAR.
0134  F116        A2 EQV B.
0135  F09D        IF ABT SKIP.
0136  4130        MPCR = CPONES - 1.
0137  F0D2        MAR1 = A3.
              WRZEROS.
0138  F0E6        MIR = 0.
0139  F0F3        MW1.
013A  F0FB        WHEN RMI MAR1 = BMAR + 1.
013B  F056        A3 = BMAR.
013C  F0D0        MAR1 = A1.
              RDONES.
013D  F0F1        MR1.
013E  F0FA        WHEN RDC BEX MAR1 = BMAR + 1.
013F  F0E1        MIR = B.
0140  F080        B = BMAR.
0141  F03C        A3 EQV B.
0142  F0B5        IF NOT ABT SKIP.
0143  4181        MPCR = TESTZEROS - 1.
0144  F08D        BMI.
0145  F05F        B.
0146  F09D        IF ABT SKIP.
0147  8196        CPCR = ERROR4 - 1.
0148  0129        AMPCR = CPONES - 8.      LOOP RETN ADDR                    B
              RDONE.
0149  F080        B = BMAR.
014A  F116        A2 EQV B.
014B  F09D        IF ABT SKIP.
014C  813C        CPCR = RDONES - 1.
014D  F071        B = A3.
014E  F116        A2 EQV B.
014F  F09D        IF ABT SKIP.
0150  417B        MPCR = UPZEROS - 1.
0151  005E        AMPCR = MCCOUNT0 - 1.
0152  F0BC        IF NOT GC2 SKIP.
0153  F0C9        JUMP.
0154  F000        WAIT.                    END OF EXHAUSTIVE TEST            B
                  *                        USE CLEAR T0 START 0VER           B
                  *              NOTE      FORCE STEP WILL CAUSE A L00P      B
                  *                        0F BOTH WORST CASE & EXHAUSTIVE   B
                  *                        TEST ON PREVIOUSLY SELECTED ADDRESSES B
0155  F0F6        SET GC2.
0156  F0C9        JUMP.
              MCOUNT11.
0157  F0E8        MIR = B111.                                                B
0158  F080        B = BMAR.
0159  0096        AMPCR = MCOUNT12 - 1.
015A  F0B1        IF LST JUMP.
015B  F0E6        MIR = 0.                                                   B
015C  F0C9        JUMP.
              MCOUNT21.
015D  F076        B = B111.
015E  F051        A3 = B.
015F  F080        B = BMAR.
0160  00B6        AMPCR = MCOUNT22 - 1.
0161  F0B1        IF LST JUMP.
0162  F054        A3 = B000.
0163  F0C9        JUMP.
              MCOUNT21A.
0164  F054        A3 = B000.
0165  F080        B = BMAR.
0166  00F2        AMPCR = MCOUNT22A - 1.
0167  F0B1        IF LST JUMP.
0168  F076        B = B111.
0169  F051        A3 = B.
016A  F0C9        JUMP.
```

```
                MCOUNT11A.
016B  F0E6          MIR = 0.                                                    B
016C  F080          B = BMAR.
016D  00D3          AMPCR = MCOUNT12A - 1.
016E  F0B1          IF LST JUMP.
016F  F0E8          MIR = B111.                                                 B
0170  F0C9           JUMP.
                UPONES.
0171  F04B          A3 = A3 - 1.
0172  F0E6          MIR = 0.
0173  F0D2          MAR1 = A3.
0174  F0F3          MW1.
0175  F0FB          WHEN RM1 MAR1 = BMAR + 1.
0176  4110          MPCR = WRONES - 1.
                TESTONES.
0177  F08D          BMI.
0178  F05F          B.
0179  F09D          IF ABT SKIP.
017A  8196          CPCR = ERROR4 - 1.
017B  4121          MPCR = RDZERO - 1.
                UPZEROS.
017C  F04B          A3 = A3 - 1.
017D  F0E8          MIR = B111.
017E  F0D2          MAR1 = A3.
017F  F0F3          MW1.
0180  F0FB          WHEN RM1 MAR1 = BMAR + 1.
0181  4137          MPCR = WRZEROS - 1.
                TESTZEROS.
0182  F08D          BMI.
0183  F0FE          Z EQV B.
0184  F09D          IF ABT SKIP.
0185  819B          CPCR = ERROR3 - 1.
0186  0102          AMPCR = CPZEROS - 8.      LOOP RETN ADDR                    B
0187  4148          MPCR = RDONE - 1.
                ERROR1.
0188  F0A3          IF IRQ EXEC.                                                B
0189  F0A4          IF IRQ JUMP.
018A  F000          WAIT. ERROR MIR = EXPECTED VALUE (ADDRESS = DATA)           B
                *                 FORCE STEP FOR ACTUAL DATA                    B
018B  F0E1          MIR = B.
018C  F000          WAIT.
                *                                 MIR EQUALS VALUE READ FROM
                *                                 MEMORY ADDRESS DISPLAYED
                *                                 ABOVE
018D  F091          CALL.                         CONTINUE TESTING
                ERROR2.
018E  F0A3          IF IRQ EXEC.                                                B
018F  F0A4          IF IRQ JUMP.
0190  F0DE          MIR = A3.                     A3 EQUALS EXPECTED VALUE
0191  F000          WAIT. ERROR MIR = EXPECTED VALUE                            B
                *                 FORCE STEP ONCE FOR ACTUAL DATA               B
0192  F0E1          MIR = B.                      ACTUAL VALUE
0193  F000          WAIT.         MIR = ACTUAL DATA-FORCE STEP FOR ADDR         B
0194  F0E9          MIR = BMAR.
0195  F000          WAIT.                         MIR = ADDRESS + 1 WHERE
                *                                 ERROR WAS DETECTED
0196  F091          CALL.                         CONTINUE TESTING
                ERROR4.
0197  F0A3          IF IRQ EXEC.                                                B
0198  F0A4          IF IRQ JUMP.
0199  F0E8          MIR = B111.
019A  F000          WAIT. ERROR MIR = EXPECTED VALUE-FORCE STEP FOR             B
                *                 ACTUAL VALUE                                  B
019B  419F          MPCR = ERROR5 - 1.
                ERROR3.
019C  F0A3          IF IRQ EXEC.                                                B
019D  F0A4          IF IRQ JUMP.
019E  F0E6          MIR = 0.
019F  F000          WAIT. ERROR MIR = EXPECTED VALUE-FORCE STEP FOR             B
                *                 ACTUAL VALUE                                  B
```

```
                ERROR5.
01A0  F0E1          MIR = B.
01A1  F000          WAIT.  MIR = ACTUAL DATA-FORCE STEP FOR ADDRESS             B
01A2  F0E9          MIR = BMAR.
01A3  F000          WAIT.                         ADDRESS + 1 OF THE ERROR
01A4  F091          CALL.


                PARERR.
01A5  F0F9          WHEN RDC BEX.
01A6  F0E1          MIR = B.                                                    C
01A7  F17D          DLD.            RESET ERROR (B721 ONLY)                     C
01A8  F0F9          WHEN RDC BEX.                                               C
01A9  F060          B = AMPCR.                                                  C
01AA  F0FF          0 EQV B.                                                    C
01AB  F0B5          IF NOT ABT SKIP.                                            C
01AC  41B5          MPCR = TESTIRQ - 1.                                         C
01AD  F0AB          IF LC2 SET LC2 ELSE SKIP.      TEST LOOP FLAG               C
01AE  405E          MPCR = MCCOUNT0 - 1.                                        C
01AF  F000          WAIT.    HARD ERROR * MIR = ERROR CODE                      C
01B0  F0DA          MIR = AMPCR.                                                C
01B1  F000          WAIT.          DISPLAY MICRO ADDRESS OF ERROR               C
01B2  F0E9          MIR = BMAR.                                                 C
01B3  F000          WAIT.          DISPLAY DPM ADDRESS                          C
                *             TO LOOP ON ERROR FORCE STEP (B721 ONLY)           C
01B4  F019          SET LC2.       SET LOOP ON HARD ERROR FLAG                  C
01B5  405E          MPCR = MCCOUNT0 - 1.                                        C


                TESTIRQ.                                                        C
01B6  F0BD          IF NOT IRQ SKIP.                                            C
01B7  F000          WAIT.                SET IRQ SWITCH TO CENTER               C
01B8  F0C9          JUMP.                THEN PRESS FST                         C


                TIMER.
01B9  F0CA          LCTR.
01BA  E008          LIT = 8.
01BB  F0A0          IF EXT SKIP.
01BC  41B9          MPCR = TIMER.
01BD  F1B7          INC IF COV JUMP.
01BE  41B9          MPCR = TIMER.
                CONFIGERROR.
                ***********


01BF  F000          WAIT.                                                       C
                *       FORCE STEP & METER CON1 2K                            B
                *       IF 0%  REPLACE CON1 CHIPS D3 D5 C7 D7                 B
                *       IF N0T REPLACE C0N1 CHIPS A5 A7 D5 F5 F7              B
01C0  F17D          DLD.                                                        B
01C1  F0F9          WHEN RDC BEX.                                               B
01C2  41BF          MPCR = CONFIGERROR.                                         C
                ***********
                *
                *          FOR B721  PROG CAN BE LOOPED ON ERRORS BY            C
                *              1 DATA ERRORS:  RESTART MTR BUT SET IRQ          C
                *                              SWITCH AFTER PROG STEP 1         C
                *              2 PARITY ERR :  FORCE STEP THRU ERROR WAITS      B
                *                              PROG WILL RE-START & LOOP        B
                *                      (OPERATING 0N A SMALL RANGE 0F           B
                *                       ADDRESSES WILL SH0RTEN LOOP)            B
                *
                TESTFORZERO.                                                    C
01C3  F03D          A3 EQV 0.          IF START ADDRESS IS 0000                 C
01C4  F0B4          IF NOT ABT JUMP.   GO TO MEM-MOD                            C
01C5  F0C9          JUMP.   NO MEM-MOD
                FINISH.
```

DISKMTR
9480-11/-12 AND 9481-1/-2 DISK DRIVE UNITS
B 489 I/O CONTROL

NOTE: THIS MTR APPLIES TO -
DISK DRIVE MODEL #9480-11/-12
DISK DRIVE MODEL # 9481-1/-2
DDP #B0489

**********DISK MTR SET UP INSTRUCTIONS**********

PLACE MTR/MEM SWITCH IN MTR POSITION

PLACE IRQ/EXT SWITCH IN CENTER POSITION

INSTALL SCRATCH DISK CARTRIDGES ON BOTH DRIVES

PLACE BOTH DRIVES IN RUN MODE

INSURE THAT THE WRITE INHIBIT PLUGS ARE SET TO WRITE ENABLE ON THE CARTRIDGES

PUT LOAD SWITCH IN LOAD POSITION

PRESS SYSTEM CLEAR

LOAD MTR PROGRAM # 1448 6989

PUT LOAD SWITCH IN NORMAL POSITION

PRESS SYSTEM CLEAR

NOTE: ABBREVIATIONS IN OPERATOR INSTRUCTIONS ARE DEFINED AS FOLLOWS;
CON = SERIES L TYPE OPERATOR CONSOLE
SPO = TELETYPE STYLE OPERATOR KEYBOARD

OPERATOR INSTRUCTIONS

PROG STEP	MACHINE INDICATION	OPERATOR ACTION
1	INCR = 000E	VERIFY MIR = SYS CONFIG. YES - PRESS CON READY OR SPO INPUT REQUEST. NO - SEE INCR FOR INST.
2	CON - PK'S ON SPO - RDY ON	PRESS PK OF DISK PORT NO. PRESS TWO NUMERIC KEYS FOR DISK PORT NO.
3	CON - NUM. ON SPO - RDY ON	PRESS TWO NUMERIC KEYS FOR SELECTION OF DISK TESTS. SELECT TESTS 00 THRU 15 SEQUENTIALLY FOR DIAGNOSIS. AFTER EACH SUCCESSFUL TEST THE LIGHT WILL COME ON AGAIN INDICATING THE SYSTEM IS READY FOR THE NEXT TEST.

NOTE

OTHER TESTS MAY BE SELECTED AT THIS POINT. SEE TEST TABLE FOR DETAILS.

TEST SELECT TABLE

NOTE:
BEFORE EXECUTING ANY TESTS, REFER TO THE UNIT REFERENCE TABLE WHICH WILL INDICATE ONLY THOSE TESTS WHICH MAY BE RUN ON A PARTICULAR DISK UNIT. THIS TABLE IS FOUND IMMEDIATELY FOLLOWING THE TEST SELECT TABLE.

TESTS#
00 = WRT ALL TRKS & SEG - DRIVE 0, F0
01 = WRT ALL TRKS & SEG - DRIVE 0, F1
02 = WRT ALL TRKS & SEG - DRIVE 1, F0
03 = WRT ALL TRKS & SEG - DRIVE 1, F1
04 = RD ALL TRKS & SEG - DRIVE 0, F0
05 = RD ALL TRKS & SEG - DRIVE 0, F1
06 = RD ALL TRKS & SEG - DRIVE 1, F0
07 = RD ALL TRKS & SEG - DRIVE 1, F1
08 = LOCATE AND VERIFY TEST
09 = SERVICE LATE AND TIME OUT TEST
10 = WRITE INHIBIT AND POSTAMBLE TIME TEST WITH ONLY A TOP DRIVE IN SYSTEM.
11 = WRITE INHIBIT AND POSTAMBLE TIME TEST WITH TWO DRIVES IN SYSTEM.
12 = RPM TIME TEST - TOP DRIVE
NOTE; THIS TEST CHECKS REVOLUTION TIME BY TIMING SECTORS. IF SECTOR TIMES ARE CORRECT THE TEST WILL RETURN TO TEST SELECT. IF SECTOR TIMES ARE INCORRECT, THE TEST WILL STOP AND DISPLAY THE TIMES ON THE F.E. CARDS. THE SECTOR TIMES MAY BE DISPLAYED UNCONDITIONALY BY SETTING THE EXT SWITCH.
13 = RPM TIME TEST - BOTTOM DRIVE
NOTE; SAME NOTE FOR TEST-12 APPLIES.
14 = DETENT ADDRESSING TEST-TOP DRIVE
15 = DETENT ADDRESSING TEST-BOTTOM DRIVE

IF ALL TESTS WERE COMPLETED SUCCESSFULLY TO THIS POINT - BOTH DRIVE AND DDP ARE ERROR FREE

THE FOLLOWING TESTS ARE FOR SIGNAL TRACING.
NOTE: TESTS MAY BE TERMINATED BY PRESSING READY ON CONSOLE OR INPUT REQUEST ON SPO.

NUMERIC 16 = SEEKS ALL TRACKS - DRIVE 0
17 = SEEKS ALL TRACKS - DRIVE 1
18 = LOOP ON WRITE
19 = LOOP ON READ

THE FOLLOWING TESTS ARE FOR FIELD ENG TEST & ADJ

NUMERIC 20 = DISCRIMINATOR ADJUSTMENT
NOTE: THIS TEST WILL NOT RUN UNLESS TEST #0 HAS BEEN COMPLETED. AFTER WRITING FROM TEST #0 , THIS TEST WILL READ TRACK 100 WHILE THE FIELD

```
*          ENGINEER  ADJUSTS  R198  ON THE CEM BOARD.   THE
*          ALARM ON THE CONSOLE  WILL  RING  IF  R198  IS
*          ADJUSTED  TOO FAR  IN  EITHER  DIRECTION.
*
*     NUMERIC  21  = LOOP  ON  SEEK  TEST
*
*              22  = HEAD  ALIGNMENT  -  DRIVE  0,  F0
*              23  = HEAD  ALIGNMENT  -  DRIVE  0,  F1
*              24  = HEAD  ALIGNMENT  -  DRIVE  1,  F0
*              25  = HEAD  ALIGNMENT  -  DRIVE  1,  F1
*
*  NOTE:  THE  FOLLOWING  PERTAINS  TO  TESTS  22-25
*         DISK  DRIVE  #9480  -  POSITIONS  HEADS  TO  TRACK  90
*         DISK  DRIVE  #9481  -  POSITIONS  HEADS  TO  TRACK  180
*
*         PRESSING  NUMERIC  0  -  RETRACTS  HEADS  ONE  TRACK
*         PRESSING  NUMERIC  1  -  ADVANCES  HEADS  ONE  TRACK
*  NOTE:  TESTS  22-25  MAY  ONLY  BE  EXITED  BY  PRESSING  THE
*         'RESET'  KEY  ON  THE  CONSOLE  OR  THE  'ESC'  KEY
*         ON  THE  SPO.
*
*
*  NOTE:  TESTS  26-29  ALTERNATE  THE  CARRIAGE  ASSEMBLY
*         BETWEEN  TRACKS  0  AND  200  OF  THE  #9480  DRIVE  OR
*         BETWEEN  TRACKS  0  AND  400  OF  THE  #9481  DRIVE
*         WRITES  ZEROS  FOR  ONE  SECTOR  &  THEN  WRITES  ONES
*         FOR  THE  NEXT  SECTOR,  UNTIL  ALL  32  SECTORS  FULL
*         THIS  DATA  PATTERN  IS  THEN  READ  BACK
*         ALTERNATELY  BETWEEN  RESPECTIVE  TRACKS  OF  THE
*         PARTICUALR  TYPE  DRIVE
*         DISK  DRIVE  #9480  -  DONE  ON  TRACKS  0  AND  200
*         DISK  DRIVE  #9481  -  DONE  ON  TRACKS  0  AND  400
*
*              26  = WRITE  CURRENT  TEST  -  DRIVE  0,  F0
*              27  = WRITE  CURRENT  TEST  -  DRIVE  0,  F1
*              28  = WRITE  CURRENT  TEST  -  DRIVE  1,  F0
*              29  = WRITE  CURRENT  TEST  -  DRIVE  1,  F1
*
*     NUMERIC  30  = POSITIONER  TIMING  -  DRIVE  0
*              31  = POSITIONER  TIMING  -  DRIVE  1
*              32  = DOUBLE  TRACK  DENSITY  INDICATOR
*
*
*
*
*                    UNIT  REFERENCE  TABLE
*
*
*     ONLY  THOSE  TESTS  CORRESPONDING  TO  YOUR  DISK-UNIT-
*     NUMBER  WILL  RUN.  REFER  BACK  TO  TEST  SELECT  TABLE
*     FOR  A  DESCRIPTION  OF  THOSE  PARTICULAR  TESTS.
*
*     UNIT  #                TEST#'S
*
*
*     A948O-1                0,1,4,5,8,9,10,12,14,16,18,19,20,
*                            21,22,23,26,27,30.
*
*
*     A9480-2                0,1,2,3,4,5,6,7,8,9,11,12,13,14,
*                            15,16,17,18,19,20,21,22,23,24,25,
*                            26,27,28,29,30,31.
*
*     A9481-1                NOTE:  PRIOR  TO  EXECUTING  TEST-0,
*                                   YOU  MUST  SELECT  TEST-32.
*                                   TEST-32  MUST  BE  RESELECTED
*                                   AFTER  EVERY  STSTEM  CLEAR.
*
*                            32,0,1,4,5,8,9,10,12,14,16,18,19,
*                            20,22,23,26,27,30.
*
*     A9481-2                NOTE:  THE  ABOVE  NOTE  FOR  A9481-1
*                                   APPLIES  HERE  ALSO.
*
*                            32,0,1,2,3,4,5,6,7,8,9,11,12,13,
*                            14,15,16,17,18,19,20,21,22,23,24,
*                            25,26,27,28,29,30,31.
*
*
*
*
**********************************************************
```

PROGRAM LISTING

```
                STARTCONTROLLER.            START  FROM SYSTEM  CLEAR
0000  8153            CPCR  = BUSSTEST   - 1.      TEST  EXTERNAL  BUSS
                      TESTNUMBERLIMIT    VALUE  IS  32.
                *
0001  F18E            IF  IRQ  SKIP.             TEST  FOR  ERROR  IRQ
0002  4005            MPCR = IRQOFF   - 1.                                  D
0003  F108            ASR  BEX.
0004  F0E1            MIR  = B.
0005  F000            WAIT.       UNEXPECTED  IRQ,  ADDRESS  IN  MIR
                *
                ********ERROR      #E2
                *
                 IRQOFF.
0006  F17D            DLD.                       READ  CONFIGURATION   CARD
0007  F0F9            WHEN RDC  BEX.
0008  F0E1            MIR  = B.          SYSTEM  CONFIGURATION   IN  MIR
0009  F017            A1  = B.
000A  F0F9            WHEN RDC  BEX.
000B  F0FF            0  EQV  B.
000C  F09D            IF  ABT  SKIP.
000D  F000            WAIT.              CONFIG  FF  NOT  RESET  BY  BEX-
                **********               FAILURE  IS  CON1  CHIP  D7
000E  F0F8            WHEN IRQ  STEP.
                * IF  PROGRAM  STAYS  HERE  RUN SPO  OR CONSOLE  MTR
                * VERIFY  CORRECT  SYSTEM  CONFIGURATION   DISPLAYED   IN  MIR
                * IF  YES,  PUSH  READY  BUTTON  ON CONSOLE  OR
                * INPUT  REQUEST  ON SPO
                * IF  NO,  PRESS  FST
                * THEN
                * METER  CON1  PIN  2K
                *  IF  0%  REPLACE  CHIPS  D5,D3,C7,D7       ON  CON1  CARD
                *  IF  NOT  0%  REPLACE  CHIPS  D5,A5,A7,F5,F7        ON CON1  CARD
                *
000F  F18E            IF  IRQ  SKIP.
0010  4085            MPCR = CON1LOOP  - 1.
                *
0011  F108            ASR  BEX.
0012  F051            A3  = B.           SAVE  CONTROLLER  ADDRESS
0013  F07A            B  = BITT.         SET  STATUS  WORD DATA  REQUEST  BIT
0014  C820            SAR  = 8  LIT  = @20@.
0015  F07F            B  = B  R.
0016  F036            A2  = B  L.        CLEAR  BITS  9-16
0017  F066            B  = A1.  SYSTEM  CONFIGURATION   FOR  SPO-CONSOLE   CHECK
0018  F05F            B.                                                    D
0019  F05F            B.                                                    D
001A  F05F            B.                                                    D
001B  F0C3            IF  NOT  LST  SKIP.     SPO-CONSOLE   CHECK
001C  E000            LIT  = 0.               SPO  ON  SYSTEM
001D  F1CC            MIR  = A2  OR  LIT.
                * FOR  SPO  CONTPORTADDRESS          = 1000XXXX00000000
                * FOR  CONSOLE  CONTPORTADDRESS   = 1000XXXX00100000
001E  F0CF            MAR1  = AMPCR.
001F  0153            AMPCR  = CONTPORTADDRESS.
0020  F0F3            MW1.               STORE  CONTROLLER  PORT  ADDRESS
0021  8102            CPCR  = CLEARFLAGS   - 1.      CLEAR  ALL  FLAGS
0022  810D            CPCR  = SETCONTADDRS   - 1.
0023  819C            CPCR  = INITMAINSTACK   - 1.      SET  MAIN  STACK  ADDRESS
0024  002D            AMPCR  = CONSPORTSELECT   - 1.
                **
0025  F0DE            MIR  = A3.
0026  F066            B  = A1.  SYSTEM  CONFIGURATION   FOR  SPO-CONSOLE   CHECK
                * REMOVE  WHEN SYS  CONF.  CARD  INSTALLED
0027  F05F            B.                                                    D
0028  F05F            B.                                                    D
0029  F05F            B.                                                    D
                **
```

```
002A  F0C2            IF  NOT  LST  JUMP.
002B  C001            SAR  = 0  LIT  = 1.
                * SET  FLAG  0  IN  FLAG  WORD  1  TO  1  FOR  SPO,   0  FOR  CONSOLE
002C  81B6            CPCR  = SETFLAGW1   - 1.
002D  4088            MPCR  = SPOPORTSELECTP    - 1.
                *
                 CONSPORTSELECT.
                * CONSOLE  ON  SYSTEM
                * PORT  SELECT,   OPERATOR  ENTERS  PK  1-12   TO  INDICATE-
                * THE  PORT  NUMBER  OF  THE  DEVICE   TO  BE  TESTED
                *
002E  810D            CPCR  = SETCONTADDRS   - 1.
002F  F0EA            MIR  = LIT.
0030  E002            LIT  = @02@.     ENABLE  KEYBOARD
0031  F099            DW1.
0032  F05F            B.
0033  8122            CPCR  = LITEINDA   - 1.
0034  E0FF            LIT  = @FF@.                LIGHT  PK  1-8
0035  8128            CPCR  = LITEINDB   - 1.
0036  E00F            LIT  = @0F@.           LIGHT  PK  9-12
                * GET  PORT  NUMBER  (PK  KEY  1-12)
0037  8136            CPCR  = SELECTPORT   - 1.
0038  F017            A1  = B.           SAVE  PORT  ADDRESS
0039  8122            CPCR  = LITEINDA   - 1.
003A  E000            LIT  = 0.                   TURN  OFF  PK  1-8
003B  8128            CPCR  = LITEINDB   - 1.
003C  E000            LIT  = 0.                   TURN  OFF  PK  9-11
003D  F066            B  = A1.           PORT  ADDRESS  TO  B  FOR  SAVEPORT
                 STOREPORT.             FROM  SPO  PORT  SELECT
003E  813D            CPCR  = CSAVEPORT   - 1.      SAVE  PORT  ADDRESS
003F  CF01            SAR  = 15  LIT  = 1.          SET  FLAG  15  TO  INDICATE-
0040  81B6            CPCR  = SETFLAGW1   - 1.      PORT  HAS  BEEN  SELECTED
                * PRINT  TEST  SELECT  MESSAGE  FOR  FIRST  ENTRY  TO  SPO-
                * TEST  SELECT
0041  C001            SAR  = 0  LIT  = 1.
0042  81CC            CPCR  = TESTFLAGW1   - 1.  TEST  SPO-CONSOLE   FLAG
0043  40A3            MPCR  = SPOTESTSELECTP    - 1.    TRUE  RETURN  SPO
                *
                 TESTSELECT.                PROGRAM  JUMPS  HERE  TO  ALLOW  THE-
                *                  OPERATOR  TO  SELECT  A  TEST.    THE  MEMORY-
                *                  FLAG  WORDS  ARE  NOT  CHANGED.
0044  810D            CPCR  = SETCONTADDRS   - 1.
0045  F096            DR1  BEX.          RESET  STATUS  INTERRUPT
0046  F05F            B.
0047  C001            SAR  = 0  LIT  = 1.
0048  81CC            CPCR  = TESTFLAGW1   - 1.      SPO-CONSOLE   FLAG
0049  40A5            MPCR  = SPOTESTSELECT    - 1.    SPO  ON  SYSTEM
                *
                * CONSOLE  ON  SYSTEM
004A  8128            CPCR  = LITEINDB   - 1.
004B  E000            LIT  = 0.                   CLEAR  B  INDICATORS
004C  F0EA            MIR  = LIT.
004D  E002            LIT  = @02@.     ENABLE  KEYBOARD
004E  F099            DW1.
004F  F05F            B.
                *
0050  812A            CPCR  = LITEINDS   - 1.
0051  E008            LIT  = 8.                   LIGHT  NUMERIC  INDICATOR
                *
                *
                * GET  FIRST  DIGIT  OF  TEST  NUMBER  (10   S  DIGIT)
0052  8138            CPCR  = SELECTTEST   - 1.
0053  F051            A3  = B.           SAVE  (10   S  DIGIT)
                *
                * GET  SECOND  DIGIT  OF  TEST  NUMBER  (1   S  DIGIT)
0054  8138            CPCR  = SELECTTEST   - 1.
                *
0055  F05F            B.
0056  812A            CPCR  = LITEINDS   - 1.
0057  E000            LIT  = 0.                   TURN  OFF  NUMERIC  INDICATOR
```

```
                * IF STATUS INT, GO TO MEMORY-MODIFY FOR ANY TEST #
0058  F1B5          IF URQ SKIP.          CONSOLE URQ CHECK
0059  4061          MPCR = CTESTL - 1.
005A  405C          MPCR = STINTM-M - 1.
                TENSLOOPCHECK.
005B  F014          IF LC1 SKIP.      FOR SPO LC1 IS ON IF STINT
005C  4061          MPCR = CTESTL - 1.
                STINTM-M.
005D  F096          DR1 BEX.          RESET STATUS INTERRUPT
005E  C001          SAR = 0 LIT = 1.      SPO-CONSOLE FLAG
005F  81CC          CPCR = TESTFLAGW1 - 1.
0060  431D          MPCR = SPO-MEM-MOD - 1.       SPO MEMORY MODIFY
0061  421B          MPCR = MEMORY-MODIFY - 1.     CON MEMORY MODIFY
                *
                CTESTL.
                * TEST TENS DIGIT FOR 0 THRU 9
0062  E00A          LIT = 10.
0063  F032          A2 = A3.
0064  F11B          A2 - LIT.
0065  F0B7          IF NOT AOV SKIP.
0066  40B7          MPCR = INVALIDTEST - 1.
                * TEST ONES DIGIT FOR 0 THRU 9
0067  F033          A2 = B.
0068  F11B          A2 - LIT.
0069  F0B7          IF NOT AOV SKIP.
006A  40B7          MPCR = INVALIDTEST - 1.
                *
                TENSLOOP.
006B  F04B          A3 = A3 - 1.
006C  E00A          LIT = 10.
006D  F09E          IF AOV SKIP.
006E  4070          MPCR = ENDTENSLOOP - 1.
006F  F083          B = LIT + B.
0070  406A          MPCR = TENSLOOP - 1.
                *
                ENDTENSLOOP.
0071  F017          A1 = B.                   SAVE TEST NUMBER
                * INSURE THAT TEST NUMBER IS NOT GREATER THAN THE UPPER
                * LIMIT FOR THIS MTR (SEE DEFINE TESTNUMBERLIMIT)
0072  E020          LIT = TESTNUMBERLIMIT.
0073  F109          A1 - LIT - 1.
0074  F0B7          IF NOT AOV SKIP.
0075  40B7          MPCR = INVALIDTEST - 1.       ILLEGAL TEST NUMBER
                *
                * DISPLAY TEST NUMBER IN A INDICATORS
0076  F082          B = LIT L.
0077  C890          SAR = 8 LIT = @90@.
0078  F0DC          MIR = A1 + B.
0079  F098          DW2.
007A  F05F          B.
                * DISABLE SYSTEM CONTROLLER (SPO OR CONSOLE)
007B  F0E6          MIR = 0.
007C  F099          DW1.
007D  F05F          B.
                * INSURE THAT BOTH STATUS AND DATA INTERRUPTS FROM SPO-
                * OR CONSOLE ARE CLEARED. BEFORE JUMPING TO MTR
007E  F096          DR1 BEX.        RESET STATUS INTERRUPT
007F  F05F          B.
0080  F097          DR2 BEX.        RESET DATA INTERRUPT
                *
0081  812C          CPCR = SETPORTADDR - 1.   BR1 = INST.  BR2 = DATA
0082  03A1          AMPCR = TESTTABLE - 1.
0083  F100          AMPCR = A1 + AMPCR.
0084  F05F          B.
0085  F0C9          JUMP.
                / SUBROUTINES
                * LOOP USED TO METER PIN 2K (TP 92) ON CON1 CARD
                CON1LOOP.
0086  F17D          DLD.
0087  F0F9          WHEN RDC BEX.
0088  4085          MPCR = CON1LOOP - 1.
```

```
                SPOPORTSELECTP.
                * ENTER HERE TO PRINT SELECT PORT MESSAGE
0089  80DA          CPCR = SPOPRINT - 1.
008A  01AF          AMPCR = PORTPRINT.
                SPOPORTSELECT.
                * ENTER HERE TO AVOID PRINTING
008B  810D          CPCR = SETCONTADDRS - 1.
008C  F0E7          MIR = B001.
008D  F099          DW1.            ENABLE SPO INPUT
                * SELECT PORT # PER NUMERIC KEYS (01 THRU 12)
008E  8136          CPCR = SELECTPORT - 1.        FOR TENS DIGIT
008F  F017          A1 = B.                       SAVE TENS DIGIT
0090  8136          CPCR = SELECTPORT - 1.        FOR ONES DIGIT
                *       ONES DIGIT IS IN B
                * OPERATOR ENTERS PORT NUMBER (1 THROUGH 12)
0091  F0E6          MIR = 0.
0092  F099          DW1.            DISABLE SPO INPUT
                * TEST TENS DIGIT FOR 0 OR 1
0093  E001          LIT = 1.
0094  F109          A1 - LIT - 1.
0095  F0B7          IF NOT AOV SKIP.
0096  414C          MPCR = INVALIDPORT - 1.       TENS DIGIT > 1
                * TEST ONES DIGIT FOR 0 THRU 9
0097  E00A          LIT = 10.
0098  F033          A2 = B.                       ONES DIGIT IN A2
0099  F11B          A2 - LIT.
009A  F0B7          IF NOT AOV SKIP.
009B  414C          MPCR = INVALIDPORT - 1.       ONES DIGIT > 9
                *
009C  E00A          LIT = 10.
009D  F066          B = A1.
009E  F0C3          IF NOT LST SKIP.
009F  F029          A2 = A2 + LIT.
00A0  F068          B = A2.                 PORT ADDRESS IN B
                * SUBTRACT 1 FROM PORT NUMBER TO GET PORT ADDRESS
00A1  F162          B = 0 - B.
00A2  F163          B = 0 - B - 1.
00A3  803D          CPCR = STOREPORT - 1.
                *
                SPOTESTSELECTP.
00A4  80DA          CPCR = SPOPRINT - 1.    PRINT SELECT TEST MESSAGE
00A5  01B3          AMPCR = TESTPRINT.      ADDRESS OF MESSAGE
                *
                SPOTESTSELECT.
                * ENTRY POINT FOR NO PRINTING
00A6  810D          CPCR = SETCONTADDRS - 1.
00A7  F0E7          MIR = B001.
00A8  F099          DW1.            ENABLE SPO INPUT
                * SELECT TEST # PER NUMERIC KEYS (00 THRU 99)
00A9  8138          CPCR = SELECTTEST - 1.        FOR TENS DIGIT
00AA  F051          A3 = B.                       SAVE TENS DIGIT
00AB  8138          CPCR = SELECTTEST - 1.        FOR ONES DIGIT
                *       ONES DIGIT IN B
00AC  F0E6          MIR = 0.
00AD  F099          DW1.            DISABLE SPO INPUT
00AE  F033          A2 = B.         SAVE ONES DIGIT
00AF  F0A5          IF LC1 STEP.
00B0  F1AE          IF NOT URQ SKIP.
00B1  F018          SET LC1.
00B2  80DA          CPCR = SPOPRINT - 1.    SPACE AFTER TESTNUMBER
00B3  00B7          AMPCR = SPACEPRINT.     ADDRESS OF PRINT MESSAGE
00B4  810D          CPCR = SETCONTADDRS - 1.
00B5  F068          B = A2.         ONES DIGIT TO B.
00B6  405A          MPCR = TENSLOOPCHECK - 1.
                SPACEPRINT.
00B7  2080          CNST = @2080@.          =STOP
                *
                INVALIDTEST.
00B8  80B9          CPCR = ALARM - 1.       SOUND BELL
00B9  4043          MPCR = TESTSELECT - 1.
                *
                *
```

```
                ALARM.
                *
00BA  F0DA          MIR = AMPCR.
00BB  F05F          B.
00BC  815B          CPCR = STACK - 1.
00BD  810D          CPCR = SETCONTADDRS - 1.
00BE  C001          SAR = 0 LIT = 1.          SPO-CONSOLE FLAG
00BF  81CC          CPCR = TESTFLAGW1 - 1.
00C0  40CC          MPCR = SPOALARM - 1.      SPO ON SYSTEM
                * CONSOLE ON SYSTEM
00C1  E008          LIT = @08@.
00C2  F0EA          MIR = LIT.
00C3  F099          DW1.
00C4  C207          SAR = 2 LIT = 7.
00C5  F089          B = LIT.
00C6  F05F          B.
00C7  F07D          B = B C.          ALARM DATA WORD FOR CONSOLE
00C8  F0FC          WHEN SRQ STEP.
00C9  F0E1          MIR = B.
00CA  F098          DW2.
00CB  F0FC          WHEN SRQ STEP.
00CC  40D5          MPCR = CALARM - 1.
                *
                SPOALARM.     SPO ON SYSTEM
00CD  E002          LIT = @02@.     ENABLE OUTPUT
00CE  F0EA          MIR = LIT.
00CF  F099          DW1.
00D0  F0EA          MIR = LIT.
00D1  E007          LIT = @07@.     RING BELL
00D2  F0FC          WHEN SRQ STEP.
00D3  F098          DW2.
00D4  F05F          B.
00D5  F0FC          WHEN SRQ STEP.
                *
                CALARM.
00D6  F0E6          MIR = 0.          DISABLE SPO OR CONSOLE
00D7  F099          DW1.
00D8  F05F          B.
00D9  812C          CPCR = SETPORTADDR - 1. BR1 = INST.  BR2 = DATA
00DA  417A          MPCR = UNSTACKRESTOREA - 1. RETURN
                *
                *
                *
                SPOPRINT.
                * SPO PRINT FROM MEMORY
                *
00DB  F0DA          MIR = AMPCR.
00DC  F05F          B.
00DD  815B          CPCR = STACK - 1.          STACK AMPCR AND A REGISTERS
00DE  810D          CPCR = SETCONTADDRS - 1.       SELECT SPO
00DF  81A4          CPCR = RDSTACKAMPCRTOB - 1.
00E0  F05B          AMPCR = B.      RETURN AMPCR FOR EXEC
00E1  F05F          B.
00E2  F09A          EXEC.     ADDRESS OF MESSAGE TO AMPCR
00E3  F0EA          MIR = LIT.
00E4  C802          SAR = 8 LIT = @02@.
00E5  F099          DW1.                    ENABLE SPO PRINTER
                SPOREADY.
00E6  F096          DR1 BEX.              READ SPO STATUS
00E7  F05F          B.
00E8  F0C3          IF NOT LST SKIP.      CHECK FOR READY
00E9  40E5          MPCR = SPOREADY - 1.
                *
00EA  F0CF          MAR1 = AMPCR.         BR1 = ADDRESS OF MESSAGE
                SPOFETCH.
00EB  F0F1          MR1.
00EC  F0FA          WHEN RDC BEX MAR1 = BMAR + 1.
00ED  F05F          B.
00EE  F07D          B = B C.
00EF  F0C4          IF NOT MST SKIP.          MST = STOP CODE
00F0  40FA          MPCR = SPOSTOP - 1.       END PRINT
00F1  F0FC          WHEN SRQ STEP.        WAIT FOR PRINTER INTERRUPT
00F2  F0E1          MIR = B.
00F3  F098          DW2.                  WRITE FIRST CHARACTER
00F4  F07D          B = B C.
00F5  F0C4          IF NOT MST SKIP.          MST = STOP CODE
00F6  40FA          MPCR = SPOSTOP - 1.       END PRINT
00F7  F0E1          MIR = B.
00F8  F0FC          WHEN SRQ STEP.        WAIT FOR PRINTER INTERRUPT
00F9  F098          DW2.                  WRITE SECOND CHARACTER
00FA  40EA          MPCR = SPOFETCH - 1.
                *
                SPOSTOP.
00FB  F0FC          WHEN SRQ STEP.        WAIT FOR LAST CHARACTER TO PRINT
00FC  81C2          CPCR = RSTBR1 - 1.        RESTORE BR1
00FD  F096          DR1 BEX.                  RESET STINT
00FE  F0E6          MIR = B000.
00FF  F099          DW1.                      DISABLE SPO OUTPUT
0100  F05F          B.
0101  812C          CPCR = SETPORTADDR - 1. RESTORE DEVICE PORT ADDRS
0102  417A          MPCR = UNSTACKRESTOREA - 1. RETURN
                *
                CLEARFLAGS.
0103  F023          A2 = AMPCR.               SAVE RETURN
0104  F0E6          MIR = 0.
0105  F0CF          MAR1 = AMPCR.
0106  0152          AMPCR = PORTADDRESS.
0107  F0F3          MW1.                      CLEAR PORT ADDRESS
0108  F0CF          MAR1 = AMPCR.
0109  01DC          AMPCR = MEMFLAGW1.
010A  F0F3          MW1.                      CLEAR MEMORY FLAG WORD 1
010B  F102          AMPCR = A2.               RESTORE RETURN
010C  F05F          B.
010D  F0C9          JUMP.
                *
                SETCONTADDRS.
010E  F060          B = AMPCR.            SAVE RETURN
010F  F0CF          MAR1 = AMPCR.
0110  0153          AMPCR = CONTPORTADDRESS.
0111  F05B          AMPCR = B.            RESTORE RETURN
0112  D800          SAR = 8.
0113  F0F1          MR1.
0114  F0F9          WHEN RDC BEX.         CONTROLLER ADDRESS TO B
0115  F07F          B = B R.
0116  F07C          B = B L.        CLEAR ALL BITS EXCEPT 5,6,7,8
0117  F078          B = B0TT.
0118  F16E          BR2 = B.              BR2 = 0000XXXX DATA
0119  F07A          B = B1TT.
011A  F0D5          MAR1 = B.             BR1 = 1000XXXX INSTRUCTION
011B  F05F          B.
011C  F0C9          JUMP.
011D  F082          B = LIT L.
011E  C887          LIT = @87@ SAR = 8.
011F  F0D5          MAR1 = B.       BR1 = 10000111
0120  F078          B = B0TT.
0121  F16E          BR2 = B.        BR2 = 00000111
0122  F0C9          JUMP.
                *
                LITEINDA.                 LIGHT A INDICATORS
0123  E06F          LIT = @6F@.
0124  F0CA          LCTR.
0125  F09A          EXEC.                 LOAD VARIABLE LIT
0126  F0EF          MIR = Z.
0127  F098          DW2.
0128  F0C9          JUMP.
                LITEINDB.                 LIGHT B INDICATORS
0129  E077          LIT = @77@.
012A  4123          MPCR = LITEINDA.
                *
                LITEINDS.                 LIGHT S INDICATORS
012B  E07E          LIT = @7E@.
012C  4123          MPCR = LITEINDA.
```

```
                *
                 SETPORTADDR.
012D  F060             B = AMPCR.              SAVE  RETURN
012E  F0CF             MAR1 = AMPCR.
012F  0152             AMPCR = PORTADDRESS.
0130  F05B             AMPCR = B.              RESTORE  RETURN
0131  F0F1             MR1.
0132  F0F9             WHEN RDC BEX.           PORT ADDRESS TO B
0133  F16E             BR2 = B.          BR2  FOR DATA
0134  F07A             B = BITT.
0135  F0D5             MAR1 = B.         BR1  FOR INSTRUCTION
0136  F0C9             JUMP.
                *
                 SELECTPORT.
0137  F0DE             MIR = A3.         CONTROLLER ADDRESS (ASR AFTER IRQ)
0138  F0FC             WHEN SRQ STEP.          ENTER PORT ADDRESS
                * VERIFY CORRECT CONTROLLER ADDRESS DISPLAYED IN MIR
                * IF CONTROLLER ADDRESS IS INCORRECT,RUN SPO/CONSOLE MT
                 SELECTTEST.
0139  F0FC             WHEN SRQ STEP.          ENTER TEST NUMBER
013A  F097             DR2 BEX.
013B  F086             B = LIT AND B.          STRIP UPPER DIGIT
013C  E00F             LIT = @0F@.
013D  F0C9             JUMP.
                *
                *
                *
                 CSAVEPORT.                    SAVE PORT ADDRESS (DATA IN B)
                * TEST PORT ADDRESS FOR PORT 12 OR LESS
013E  E00B             LIT = 11.
013F  F017             A1 = B.
0140  F109             A1 - LIT - 1.
0141  F0B7             IF NOT AOV SKIP.
0142  414C             MPCR = INVALIDPORT - 1.       PORT ADDRESS > 12
                * CLEAR ALL BITS EXCEPT 5,6,7,8
0143  F07C             B = B L.
0144  D400             SAR = 4.
0145  F0E5             MIR = B R.
0146  F05F             B.
0147  F060             B = AMPCR.      SAVE  RETURN
0148  F0CF             MAR1 = AMPCR.
0149  0152             AMPCR = PORTADDRESS.
014A  F05B             AMPCR = B.      RESTORE  RETURN
014B  F0F3             MW1.
014C  F0C9             JUMP.
                *
                 INVALIDPORT.
                *
014D  80B9             CPCR = ALARM - 1.       SOUND BELL
                *
014E  C001             SAR = 0 LIT = 1.        SPO-CONSOLE  FLAG
014F  81CC             CPCR = TESTFLAGW1 - 1.
0150  408A             MPCR = SPOPORTSELECT - 1.
0151  402D             MPCR = CONSPORTSELECT - 1.
                 PORTADDRESS.
0152  0000             CNST = @0000@.
                 CONTPORTADDRESS.
0153  0000             CNST = @0000@.
                *
                 BUSSTEST.               EXTERNAL BUSS TEST
0154  F0F9             WHEN RDC BEX.
0155  F0FF             0 EQV B.
0156  F09C             IF ABT JUMP.
0157  F0E1             MIR = B.
0158  F000             WAIT.
                *********EXTERNAL       BUSS FAILURE OR PARITY ERROR
                ********ERROR      #E 0
0159  F0DA             MIR = AMPCR.
015A  F000             WAIT.
015B  7FFF             MPCR = STARTCONTROLLER - 1.
```

```
                /
                 STACK.
                *UNCONDITIONAL SAVE A1, A2, A3, AMPCR IN MEMORY STACK
                *DISTROYS - B, SAR, LIT, MIR
                *ASSUMES BR1, BR2 DIFFER BY INST BIT ONLY
015C  FQ82             B = LIT L.                                        D
015D  C810             LIT = @10@ SAR = 8.                               D
015E  F0D5             MAR1 = B.                STACK POINTER = 4096     D
                 STACKW3.
015F  F0F1             MR1.
0160  F0F9             WHEN RDC BEX.          FETCH POINTER
0161  F083             B = LIT + B.             INCRAMENT POINTER
0162  E004             LIT = 4.
0163  F08C             BMI MIR = B.
0164  F0F3             MW1.                     RESTORE NEW POINTER
0165  F08C             BMI MIR = B.
0166  F0D5             MAR1 = B.                NEW STACK ADDRESS
0167  F0F3             MW1.                     STORE AMPCR TOP OF STACK
0168  F0DB             MIR = A1.
0169  F089             B = LIT.
016A  E003             LIT = 3.
016B  F01C             A1 = BMAR.
016C  F064             B = A1 - B.
016D  F0D5             MAR1 = B.       OLD TOP OF STACK ADDRESS + 1.
016E  F0F3             MW1.                     SAVE A1
016F  F0D7             MAR1 = BMAR + 1.
0170  F0DD             MIR = A2.
0171  F0F3             MW1.                     SAVE A2
0172  F0D7             MAR1 = BMAR + 1.
0173  F0DE             MIR = A3.
0174  F0F3             MW1.                     SAVE A3
0175  F05F             B.
0176  41C2             MPCR = RSTBR1 - 1.       RESTORE BR1 EXIT
                 UNSTACK.
                *RESTORE AMPCR FROM TOP OF MEMORY STACK
                *A REGISTERS REMAIN UNCHANGED
0177  818A             CPCR = STACKR - 1.
0178  F05B             AMPCR = B.               RESTORE AMPCR
0179  F05F             B.
017A  41C2             MPCR = RSTBR1 - 1.       RESTORE BR1 EXIT
                 UNSTACKRESTOREA.
                *RESTORE AMPCR AND A REGISTERS FROM TOP OF STACK
017B  818A             CPCR = STACKR - 1.
017C  F05B             AMPCR = B.               RESTORE AMPCR
017D  F08D             BMI. (ADDRESS - 1) OF STORED A1
017E  F0D6             MAR1 = B + 1.
017F  F0F1             MR1.                     FETCH A1
0180  F0F9             WHEN RDC BEX.
0181  F0D7             MAR1 = BMAR + 1.
0182  F017             A1 = B.                  RESTORE A1
0183  F0F1             MR1.                     FETCH A2
0184  F0F9             WHEN RDC BEX.
0185  F0D7             MAR1 = BMAR + 1.
0186  F033             A2 = B.                  RESTORE A2
0187  F0F1             MR1.                     FETCH A3
0188  F0F9             WHEN RDC BEX.
0189  F051             A3 = B.                  RESTORE A3
018A  41C2             MPCR = RSTBR1 - 1.       RESTORE BR1 AND EXIT
                 STACKR.
018B  F082             B = LIT L.                                        D
018C  C810             LIT = @10@ SAR = 8.                               D
018D  F0D5             MAR1 = B.                STACK POINTER = 4096     D
                 STACKR1.
018E  F0F1             MR1.
018F  F0F9             WHEN RDC BEX.            FETCH POINTER
0190  F0DD             MIR = A2.       SAVE A2
0191  F033             A2 = B.
0192  E004             LIT = 4.
0193  F146             B = A2 - LIT.          DECRAMENT STACK POINTER
0194  F08C             BMI, MIR = B.          EXCHANGE MIR & B
0195  F033             A2 = B.                RESTORE A2
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0196  F08D        BMI.      POINTER  ADDRESS  TO  B
0197  F0F3        MW1.                        RESTORE  POINTER
0198  F083        B = LIT + B.  ADDRESS  OF  SAVED  AMPCR  TO  B
                STACKR2.
0199  F0D5        MAR1 = B.
019A  F0F1        MR1.                        FETCH  AMPCR  FROM  STACK
019B  F0F9        WHEN RDC BEX.
019C  F0C9        JUMP.
                INITMAINSTACK.                INITIALIZE    STACK  POINTER
019D  F079        B = B100.
019E  D300        SAR = 3.
019F  F07F        B = B R.
01A0  F0D5        MAR1 = B.
01A1  F0E1        MIR = B.
01A2  F0F3        MW1.                        POINTER = 4096
01A3  F05F        B.
01A4  41C2        MPCR = RSTBR1 - 1.          RESTORE  BR1  EXIT
                RDSTACKAMPCRTOB.
                *READ  TOP  AMPCR  IN  STACK  TO  B  REG  -  USE  FOR
                *NESTED  EXEC.
01A5  F082        B = LIT L.                                                D
01A6  C810        LIT = @10@  SAR = 8.                                      D
01A7  F0D5        MAR1 = B.                   POINTER  ADDRESS = 4096       D
01A8  F0F1        MR1.                  FETCH  POINTER
01A9  F0F9        WHEN RDC BEX.
01AA  F0D5        MAR1 = B.             TOP  OF  STACK  ADDRESS
01AB  F0F1        MR1.
01AC  F0F9        WHEN RDC BEX.               B = AMPCR FROM STACK
01AD  F05F        B.
01AE  41C2        MPCR = RSTBR1 - 1.          RESTORE  BR1  EXIT
                /
                PORTPRINT.
01AF  0D0A        CNST = @0D0A@.              CR LF
01B0  504F        CNST = @504F@.        PO
01B1  5254        CNST = @5254@.        RT
01B2  2080        CNST = @2080@.        - STOP
                TESTPRINT.
01B3  0D0A        CNST = @0D0A@.              CRLF
01B4  5445        CNST = @5445@.        TE
01B5  5354        CNST = @5354@.        ST
01B6  2080        CNST = @2080@.        - STOP
                /
                *  TEST  FLAG  AND  SET  FLAG  ROUTINES
                *
                SETFLAGW1.                    FLAG  NO.  IN  SAR,  STATE  IN  LIT
01B7  F060        B = AMPCR.                  SAVE  RETURN
01B8  F0CF        MAR1 = AMPCR.                 ADDRESS  OF  FLAG  WORD  1  TO  MAR1
01B9  01DC        AMPCR = MEMFLAGW1.
                *
                SETFLAGS.                     COMMON POINT  TO  SETFLAGW1-2-3-4
01BA  F0F1        MR1.
01BB  F05B        AMPCR = B.                  RESTORE  RETURN
01BC  F0F9        WHEN RDC BEX.                   FLAG  WORD  TO  B
01BD  F092        CSAR.                       CHANGE  VALUE  TO  SHIFT  FLAG  TO  LSB
01BE  F172        CSAR B = B C.                   MOVE  FLAG  IN  B  TO  LSB
01BF  F087        B = LIT OR B.                   SET  FLAG  PER  LIT
01C0  F07D        B = B C.                    SHIFT  FLAGS  BACK  TO  POSITION
01C1  F0E1        MIR = B.                    MODIFIED  FLAG  WORD  TO  MIR
01C2  F0F3        MW1.                        FLAG  WORD  TO  MEMORY
                *
                RESTORE-BR1.
                RSTBR1.                       COMMON POINT  FROM  ABOVE  AND -
                *                             AND  TESTFLAGW1-2-3-4
01C3  F0E1        MIR = B.                        SAVE  B
01C4  F05D        ASE.                        SELECT  BR2
01C5  F080        B = BMAR.
                *  GENERATE  NEW  BR1  (MSB  INST-DATA  SET  OPPOSITE  BR2)
01C6  F159        B = BFTF.
01C7  D800        SAR = 8.
01C8  F07F        B = B R.
01C9  F07C        B = B L.                    CLEAR  MAR (DO  NOT  USE  LIT  HERE)

01CA  F0D5        MAR1 = B.
01CB  F08D        BMI.                            RESTORE  B
01CC  F0C9        JUMP.                 RETURN
                *
                *
                TESTFLAGW1.                   FLAG  NO.  IN  SAR,  STATE  IN  LIT.
01CD  F060        B = AMPCR.                  SAVE  RETURN
01CE  F0CF        MAR1 = AMPCR.                 ADDRESS  OF  FLAG  WORD  1  TO  MAR1
01CF  01DC        AMPCR = MEMFLAGW1.
                *
                TESTFLAGS.                    COMMON POINT  TO  TESTFLAGW1-2-3-4
01D0  F0F1        MR1.
01D1  F05B        AMPCR = B.                  RESTORE  RETURN
01D2  F0F9        WHEN RDC BEX.                   FLAG  WORD  TO  B
01D3  F092        CSAR.
01D4  F07F        B = B R.                    SHIFT  FLAG  TO  LSB
01D5  F157        B = BT0T.
01D6  F078        B = B0TT.
01D7  F05F        B.
01D8  F0CB        LIT EQV B.
01D9  F09D        IF ABT SKIP.                                              D
01DA  F105        AMPCR = AMPCR + 1.              SET  AMPCR  FOR  FALSE  RETURN  D
01DB  41C2        MPCR = RSTBR1 - 1.                                        D
                *
                *  MEMORY WORDS FOR PROGRAM FLAGS
                MEMFLAGW1.
01DC  0000        CNST = @0000@.              FLAGS  1  THRU  16  OF  WORD  1
                *  END  OF  FLAG  ROUTINES
                *
                READDATAKEYTOA1.
                *  SUB-ROUTINE  TO  READ  1  DATA  CHARACTER  FROM  SPO  OR -
                *  CONSOLE  AND  RETURN  WITH  CHARACTER  IN  A1
                *  A2  AND  A3  ARE  SAVED
                *  ALL  OTHER  REGISTERS  ARE  DESTROYED
                *
01DD  F0DA        MIR = AMPCR.
01DE  F05F        B.
01DF  815B        CPCR = STACK - 1.  SAVE  AMPCR  FOR  RETURN
01E0  810D        CPCR = SETCONTADDRS - 1.
01E1  C001        SAR = 0  LIT = 1.               SPO-CONSOLE  FLAG
01E2  81CC        CPCR = TESTFLAGW1 - 1.
01E3  41F5        MPCR = SPOKEY - 1.              SPO  ON  SYSTEM
                *
                *  CONSOLE  ON  SYSTEM
01E4  F0EA        MIR = LIT.
01E5  E002        LIT = @02@.                 ENABLE  KEYBOARD
01E6  F099        DW1.
01E7  F05F        B.
01E8  812A        CPCR = LITEINDS - 1.
01E9  E008        LIT = 8.              LIGHT  NUMERIC  INDICATOR
01EA  F0FC        WHEN SRQ  STEP.
01EB  F097        DR2  BEX.
01EC  F017        A1 = B.                 SAVE  DATA  CHARACTER  IN  A1.
01ED  F009        A1 = A1  AND LIT.       USE  ONLY  LOWER  DIGIT
01EE  E00F        LIT = @0F@.
                *  DISPLAY  LOWER  DIGIT  IN  B  INDICATORS
01EF  F082        B = LIT L.
01F0  C888        SAR = 8  LIT = @88@.
01F1  F0DC        MIR = A1 + B.
01F2  F098        DW2.
01F3  812A        CPCR = LITEINDS - 1.
01F4  E000        LIT = 0.              TURN  NUMERIC  INDICATOR  OFF
01F5  41FC        MPCR = EXITDKEY - 1.
                *
                SPOKEY.                 SPO  ON  SYSTEM
01F6  F0E7        MIR = B001.
01F7  F099        DW1.                  ENABLE  SPO  INPUT
01F8  F0FC        WHEN SRQ  STEP.
01F9  F097        DR2  BEX.
01FA  F017        A1 = B.                 SAVE  DATA  CHARACTER  IN  A1
01FB  F009        A1 = A1  AND LIT.       USE  ONLY  LOWER  DIG
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01FC  E00F          LIT  = @0F@.
                    *
                    EXITDKEY.
01FD  F0E6          MIR  = 0.
01FE  F099          DW1.      DISABLE  SPO  OR CONSOLE
01FF  F05F          B.
0200  812C          CPCR = SETPORTADDR  - 1.       RESTORE  BR1  AND BR2
0201  8176          CPCR = UNSTACK - 1.       RETURN  (CHARACTER  IN A1)
                    *
                    SET-CONT-DINT.
                    * SET  CONTROLLER  DATA  INTERRUPT,   RESTORE  PORT  ADDRESS
                    * IN  BR1  AND BR2  THEN  JUMP
0202  F0DA          MIR  = AMPCR.
0203  F05F          B.
0204  815B          CPCR = STACK - 1.  SAVE  AMPCR,  A1,A2,A3     IN  STACK
0205  810D          CPCR = SETCONTADDRS  - 1.
0206  C001          SAR  = 0  LIT  = 1.                SPO-CONSOLE    FLAG
0207  81CC          CPCR = TESTFLAGW1  - 1.
0208  420A          MPCR = SCDINT  - 1.       SPO  ON SYSTEM
                    *
                    * CONSOLE  ON SYSTEM
0209  E004          LIT  = @04@.     EMABLE  CONSOLE  PRINTER  DINT
020A  F0F7          SKIP.
                    SCDINT.
020B  E002          LIT  = @02@.     ENABLE  SPO  OUTPUT
020C  F0EA          MIR  = LIT.
020D  F099          DW1.
020E  F05F          B.
020F  F0FC          WHEN SRQ  STEP.
                    ********       STOP  HERE  IF  CONTROLLER  ENABLE  DOES  NOT CAUSE
                    *               SRQ    (NOTE-   SPO SRQ HAS BEEN  USED  PRIOR  TO
                    *                        THIS   STOP
                    *              RUN SPO  OR CONSOLE  MTR
                    *
                    RSCDINT.
0210  812C          CPCR = SETPORTADDR  - 1.       RESTORE  BR1  AND BR2
0211  417A          MPCR = UNSTACKRESTOREA  - 1.  RETURN
                    *
                    *
                    RESET-CONT-DINT.
                    *  DISABLE  CONTROLLER,   RESTORE  PORT  ADDRESS  IN  BR1  AND
                    *  BR2,   THEN  JUMP
0212  F0DA          MIR  = AMPCR.
0213  F05F          B.
0214  815B          CPCR = STACK - 1.  SAVE  AMPCR,A1,A2,A3     IN  STACK
0215  810D          CPCR = SETCONTADDRS  - 1.
0216  F0E6          MIR  = 0.
0217  F099          DW1.
0218  F05F          B.
0219  420F          MPCR = RSCDINT  - 1.
                    *
                    /
                    MEM-MOD-SETLC3.      SET  WRITE-BEFORE-READ     FLAG
                    *  JUMP  TO  ABOVE  LABEL  FROM  UPPER  CASE  RESET  KEY  CODE
                    *  ALLOWS  WRITE-BEFORE-READ     OF  FIRST  ADDRESS
021A  F01A          SET  LC3.
021B  F0F7          SKIP.
                    MEMORY-MODIFY.
021C  F0AD          IF  LC3  STEP.
021D  F01F          RESET   GC2.
021E  F0A9          IF  LC2   STEP.
021F  810D          CPCR = SETCONTADDRS  - 1.
                    * RETURNS  WITH  BR1  = INSTRUCTION,     BR2  = DATA
0220  F0EA          MIR  =  LIT.
0221  C881          SAR  = 8  LIT  = @81@.
0222  F082          B  = LIT  L.
0223  F0EC          MIR  = LIT  OR  B.
0224  E009          LIT  = 9.
0225  F098          DW2.
0226  E010          LIT  =  @10@.
0227  F099          DW1.
0228  F082          B  =  LIT  L.
0229  C803          SAR  = 8,    LIT   = @03@.
022A  F0E1          MIR  =  B.
022B  F0FC          WHEN SRQ  STEP.
022C  F098          DW2.                                          READY  THE      R
022D  F0EA          MIR  =  LIT.
022E  E008          LIT  =  @08@.
022F  F0FC          WHEN SRQ  STEP.
0230  F099          DW1.
0231  F082          B  =  LIT  L.
0232  E0C0          LIT  =  @C0@.
0233  F0ED          MIR  =  LIT  +  B.
0234  E004          LIT  =  @04@.
0235  F0FC          WHEN SRQ  STEP.
0236  F098          DW2.
0237  02D6          AMPCR  =  MM-POSITION  -  1.
0238  F01D          A1  =  LIT.
0239  E00A          LIT  =  @0A@.
023A  F091          CALL.                                         POSITION  RIG
                    MM-LIST-NEXT.
023B  02C5          AMPCR  =  MM-ADVANCE  -  1.
023C  F091          CALL.                                         ADVANCE  1  L   E
023D  F018          SET  LC1.
023E  F019          SET  LC2.
023F  F0CA          LCTR.
0240  E003          LIT  =  @03@.
0241  0274          AMPCR  =  MM-KYBD  -  1.
0242  F091          CALL.                                         ACCEPT  AND P   N
0243  F0D1          MAR1  =  A2.
0244  F0E7          MIR  = B001.
0245  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0246  F0F3          MW1.      WRITE  BEFORE  TO  PREVENT  PE.
0247  F0F1          MR1.                                                                D
0248  F05F          B.                                                                  D
0249  F0F9          WHEN RDC  BEX.                                GET  THE  CONT    T
024A  F033          A2  =  B.
024B  E003          LIT  =  @03@.
024C  0254          AMPCR  =  MM-CONTENTS  -  1.
024D  F041          A3  =  AMPCR.
024E  F0CA          LCTR.
024F  02D6          AMPCR  =  MM-POSITION  -  1.
0250  F01D          A1  =  LIT.
0251  E003          LIT  =  @03@.
0252  F091          CALL.
0253  02E8          AMPCR  =  MM-PRINT  -  1.
0254  F0C9          JUMP.                                         PRINT  THE  CO    E
                    MM-CONTENTS.
0255  F0CA          LCTR.
0256  E000          LIT  =  @00@.
0257  F00C          RESET  GC1.
0258  F0AD          IF  LC3  STEP.          RESET  WRITE-BEFORE-READ     FLAG
0259  025E          AMPCR  =  RESET-GC1LC3  -  1.  FOR  RETURN  FROM  MM-KYBD
025A  4274          MPCR  =  MM-KYBD  -  1.
                    *
                    *  MM-KYBD  JUMPS  HERE  FOR  OCK  I,II,III       KEYS
                    SET-LC3GC1.
025B  F01A          SET  LC3.
                    SET-GC1.
025C  F006          SET  GC1.
025D  F0F7          SKIP.
                    SET-LC3.
025E  F01A          SET  LC3.
                    RESET-GC1LC3.
025F  F0CA          LCTR.
0260  E003          LIT  =  @03@.
0261  02D6          AMPCR  =  MM-POSITION  -  1.
0262  F01D          A1  =  LIT.
0263  F091          CALL.
0264  F018          SET  LC1.
0265  0274          AMPCR  =  MM-KYBD  -  1.
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0266  F091          CALL.                                          ACCEPT  AND P    N
0267  F0DD          MIR   =   A2.
0268  F0F3          MW1.
0269  021C          AMPCR = MEMORY-MODIFY.
026A  F19C          IF  NOT GC1   JUMP.
026B  F019          SET  LC2.                                  POS  TO  LEFT.
026C  F01D          A1  = LIT.
026D  E012          LIT     =   @12@.
026E  02D6          AMPCR     =   MM-POSITION     -   1.
026F  F0D7          MAR1   =  BMAR   + 1.
0270  F035          A2    =  BMAR.
0271  F091          CALL.
0272  023A          AMPCR   =   MM-LIST-NEXT      -   1.
0273  F0F6          SET  GC2.
0274  F0C9          JUMP.
                MM-KYBD.
0275  F041          A3    =   AMPCR.                               SAVE  RETURN     D
0276  F081          B   =   NOT  CTR   R.
0277  D800          SAR   =   8.
0278  02E8          AMPCR   = MM-PRINT    -   1.
0279  F0A2          IF  GC2  SKIP.
027A  427C          MPCR   =     MM-NANO-SAVE   -  1.
027B  F01F          RESET  GC2.
027C  F0C9          JUMP.
                MM-NANO-SAVE.
027D  F017          A1   =   B.
027E  F05D          ASE.        SELECT   BR2
027F  F080          B  =  BMAR.
0280  F16F          BR2  =  B1TT.            BR2  =  CONTROL  PORT
0281  F1DB          MIR   =   0   +   Z.
0282  E002          LIT    =    @02@.
0283  F098          DW2.                                       ENABLE  KBD D    A
0284  F034          A2   =  B000.
0285  F05D          ASE.        SELECT   BR2
0286  F080          B  =  BMAR.
0287  F078          B  =  B0TT.
0288  F16E          BR2  =  B.               BR2  =  DATA  PORT
                MM-KYBD-LOOP.
0289  F0C5          IF  SRQ  DR2  BEX  SKIP.
028A  4288          MPCR = MM-KYBD-LOOP   -  1.
028B  021C          AMPCR = MEMORY-MODIFY.
028C  F0CB          LIT    EQV   B.
028D  E01F          LIT  =  @1F@.     RESET  KEY  LOWER  SHIFT   MECHANICAL
028E  F09B          IF  ABT  LUOP  JUMP.  RESET  KEY   START   OVER ,
028F  E0AB          LIT  =  @AB@.     RESET  KEY  LOWER  SHIFT   ELECTRONIC
0290  F09B          IF  ABT  LUOP  JUMP.  RESET  KEY   START   OVER
0291  0219          AMPCR = MEM-MOD-SETLC3    -  1.
0292  E09F          LIT  =  @9F@.     RESET  KEY  UPPER  SHIFT   MECHANICAL
0293  F09B          IF  ABT  LUOP  JUMP.
0294  E08B          LIT  =  @8B@.     RESET  KEY  UPPER  SHIFT   ELECTRONIC
0295  F09B          IF  ABT  LUOP  JUMP.
0296  0317          AMPCR = MICRO-TOOL    -  1.
0297  E04C          LIT  =  @4C@.            OCK  IIII    KEY  MECHANICAL
0298  F09B          IF  ABT  LUOP  JUMP.     OCK  IIII    KEY   GO  TO  END
0299  E0A0          LIT  =  @A0@.            OCK  IIII    KEY  ELECTRONIC
029A  F09B          IF  ABT  LUOP  JUMP.     OCK  IIII    KEY   GO  TO  END
029B  025A          AMPCR = SET-LC3GC1     -  1.
029C  E0CE          LIT  =  @CE@.            OCK  II   UPPER  SHIFT   MECHANICAL
029D  F09B          IF  ABT  LUOP  JUMP.
029E  E083          LIT  =  @83@.            OCK  II   UPPER  SHIFT   ELECTRONIC
029F  F09B          IF  ABT  LUOP  JUMP.
02A0  025B          AMPCR = SET-GC1    -  1.
02A1  E04E          LIT  =  @4E@.            OCK  II   LOWER  SHIFT   MECHANICAL
02A2  F09B          IF  ABT  LUOP  JUMP.
02A3  E0A3          LIT  =  @A3@.            OCK  II   LOWER  SHIFT   ELECTRONIC
02A4  F09B          IF  ABT  LUOP  JUMP.
02A5  025D          AMPCR = SET-LC3    -  1.
02A6  E0CD          LIT  =  @CD@.            OCK  I    UPPER  SHIFT   MECHANICAL
02A7  F09B          IF  ABT  LUOP  JUMP.
02A8  E081          LIT  =  @81@.            OCK  I    UPPER  SHIFT   ELECTRONIC
02A9  F09B          IF  ABT  LUOP  JUMP.

02AA  F0E1          MIR  =  B.
02AB  F07F          B  =  B  R.
02AC  C400          SAR  =  4  LIT  =  0.
02AD  02B4          AMPCR  =  ABCDEF-KEY    -  1.
02AE  E004          LIT  =  @04@.     UPPER  DIGIT   FOR  ALPHA  ELECTRONIC
02AF  F0CB          LIT  EQV  B.
02B0  F09B          IF  ABT  LUOP  JUMP.
02B1  E005          LIT  =  @05@.     UPPER  DIGIT   FOR  ALPHA  MECHANICAL
02B2  F09B          IF  ABT  LUOP  JUMP.
02B3  E000          LIT  =  0.
02B4  F0F7          SKIP.                    NUMERIC  KEY  ENTERED
              ABCDEF-KEY.                    ALPHA  KEY  ENTERED
02B5  E009          LIT  =  @09@.
02B6  F08D          BM1.              RESTORE  B  (CHARACTER   ENTERED)
02B7  F083          B  =  LIT  +  B.  ADD  9  IF  ALPHA  KEY
02B8  F086          B   =  LIT    AND   B.
02B9  CC0F          SAR   =  12,      LIT   =  @0F@.
02BA  F025          A2    =   A2    C.
02BB  F031          A2    =   A2    +   B.                          CONCATENATE
02BC  0288          AMPCR   =   MM-KYBD-LOOP     -   1.
02BD  F030          INC.
02BE  F0B9          IF  NOT  COV     JUMP.                           TEST  FOR  A
02BF  F066          B   =   A1.
02C0  F095          CTR    =   B.                                    RESTORE  COUN    R
02C1  02E8          AMPCR   =     MM-PRINT     -   1.
02C2  F0A6          IF    LC1     JUMP.                             PRINT  FLAG.
02C3  F101          AMPCR   =   A3.
02C4  F05F          B.
02C5  F0C9          JUMP.
              MM-ADVANCE.
02C6  F05D          ASE.        SELECT   BR2
02C7  F080          B  =  BMAR.
02C8  F16F          BR2  =  B1TT.            BR2  =  CONTROL  PORT
02C9  F0EA          MIR   =   LIT.
02CA  E008          LIT   =   @08@.
02CB  F098          DW2.                                          ENABLE    FORM    I
02CC  F082          B  =  LIT   L.
02CD  E0C0          LIT   =   @C0@.
02CE  F0ED          MIR   =   LIT   +  B.
02CF  E050          LIT   =   @50@.
02D0  F05D          ASE.        SELECT   BR2
02D1  F080          B  =  BMAR.
02D2  F078          B  =  B0TT.
02D3  F16E          BR2  =  B.               BR2  =  DATA  PORT
02D4  F0FC          WHEN SRQ  STEP.
02D5  F098          DW2.
02D6  F0C9          JUMP.
              MM-POSITION.
02D7  F05D          ASE.        SELECT   BR2
02D8  F080          B  =  BMAR.
02D9  F16F          BR2  =  B1TT.            BR2  =  CONTROL  PORT
02DA  F0EA          MIR   =   LIT.
02DB  C810          SAR  =  8,  LIT  =  @10@.
02DC  F098          DW2.                                          ENABLE  CARRI
02DD  E001          LIT   =   @01@.                               LEFT  POSITIO    P
02DE  F015          IF  LC2  SKIP.
02DF  E000          LIT   =   @00@.                               RIGHT  POSITI
02E0  F082          B  =  LIT   L.
02E1  F0DC          MIR   =   A1   +  B.
02E2  F05D          ASE.        SELECT   BR2
02E3  F080          B  =  BMAR.
02E4  F078          B  =  B0TT.
02E5  F16E          BR2  =  B.               BR2  =  DATA  PORT
02E6  F0FC          WHEN SRQ  STEP.
02E7  F098          DW2.
02E8  F0C9          JUMP.
              MM-PRINT.
02E9  F0A5          IF  LC1   STEP.
02EA  F1DB          MIR   =   0   +   Z.
02EB  E004          LIT   =   @04@.
02EC  F05D          ASE.        SELECT   BR2
```

```
02ED  F080         B  =  BMAR.
02EE  F16F         BR2  =  BITT.             BR2  =  CONTROL  PORT
02EF  F098         DW2.                                              ENABLE  PRINT
02F0  C84B         SAR  =  8,   LIT   =  @4B@.
02F1  F015         IF  LC2  SKIP.                                    LC2  MEANS  RE    R
02F2  C849         SAR  =  8,   LIT   =  @49@.
02F3  F089         B   =   LIT.
02F4  F01B         A1  =  B  L.
02F5  F081          B   =   NOT   CTR   R.
02F6  F07C         B   =  B   L.
02F7  DE00         SAR   =  14.
02F8  F05F         B.
02F9  F0F4         SAR   =  B.
02FA  F025         A2  =  A2  C.
02FB  F05D         ASE.       SELECT   BR2
02FC  F080         B  =  BMAR.
02FD  F078         B  =  BOTT.
02FE  F16E         BR2  =  B.                BR2  =  DATA  PORT
           MM-PRINT-LOOP.
02FF  F147         B   =   A2    C.
0300  D400         SAR   =   4.
0301  F07F         B   =   B   R.
0302  DC00         SAR  =  12.                                       ISOLATE   NEXT    I
0303  F0CC          LIT   -   B.
0304  E009          LIT    =    @09@.
0305  F09E         IF  AOV  SKIP.
0306  F018         SET    LC1.                                       UNDIGIT
0307  E037         LIT     =    @37@.
0308  F014         IF    LC1    SKIP.
0309  E030         LIT     =    @30@.
030A  F083         B  =  LIT   +  B.                                 PUT  ZONE  ON.
030B  F0DC         MIR  =  A1   +  B.
030C  F0FC         WHEN  SRQ  STEP.
030D  F098          DW2.
030E  F030          INC.
030F  F0C5         IF  SRQ  DR2  BEX  SKIP.
0310  F101         AMPCR    =    A3.
           MM-NANO-DUMB.
0311  F0C5         IF  SRQ  DR2  BEX  SKIP.
0312  4310         MPCR  =  MM-NANO-DUMB  -  1.
0313  F09F         IF     COV  JUMP.                                 END  OF  PRINT
0314  F025         A2      =     A2      C.
0315  DC00         SAR  =  12.                                       LINE   UP  NEXT    I
0316  02FE         AMPCR    =     MM-PRINT-LOOP      -     1.
0317  F0C9         JUMP.
         ***********************************************************                 *
           MICRO-TOOL.                          PRESS    OCK   IIII
         *  MEMORY-MODIFY   USES   LC1,LC2,LC3,GC1,GC2
0318  F0A5         IF   LC1   STEP.
0319  F0A9         IF   LC2   STEP.
031A  F0AD         IF   LC3   STEP.
031B  F00C         RESET   GC1.
031C  F01F         RESET   GC2.
031D  4043         MPCR  =  TESTSELECT   -   1.
         /
           SPO-MEM-MOD.
031E  F0A9         IF  LC2  STEP.   RESET   WRITE-BEFORE-READ      FLAG
031F  810D         CPCR   =  SETCONTADDRS   -   1.
         *  RETURNS  WITH  BR1   =  INSTRUCTION,     BR2   =  DATA
0320  F0A5         IF  LC1.
           SMM-NEW-ADDRESS.
0321  834C         CPCR   =  SMM-ENABLE-OUT    -   1.
0322  E00D         LIT    =  @0D@.
0323  8389         CPCR   =  SMM-DEV-WT-LIT    -   1.
0324  E00A         LIT    =  @0A@.
0325  8389         CPCR   =  SMM-DEV-WT-LIT    -   1.
0326  8354         CPCR   =  SMM-SPACE-4    -   1.
0327  8349         CPCR   =  SMM-ENABLE-IN    -   1.
0328  F0A8         IF  LC1  SET  LC1  SKIP.
0329  835D         CPCR   =  SMM-ACCEPT-4    -   1.
```

```
032A  834C         CPCR   =  SMM-ENABLE-OUT    -   1.
032B  F0BF         IF  NOT  LC1  SKIP.
032C  836E         CPCR   =  SMM-PRINT-4    -   1.
032D  8354         CPCR   =  SMM-SPACE-4    -   1.
032E  F0D1         MAR1   =  A2.
032F  F0E7         MIR  =  B001.
0330  F0AB         IF  LC2  SET  LC2  ELSE  SKIP.
0331  F0F3         MW1.       WRITE  BEFORE  READ   PREVENT  PE
0332  F0F1         MR1.                                                              D
0333  F05F         B.                                                                D
0334  F0F9         WHEN  RDC  BEX.
0335  F033         A2  =  B.
0336  836E         CPCR   =  SMM-PRINT-4    -   1.
0337  8349         CPCR   =  SMM-ENABLE-IN    -   1.
           SMM-WHAT-TO-DO.
0338  8382         CPCR   =  SMM-DEV-RD   -   1.
0339  F0CB         LIT   EQV   B.
033A  E020         LIT    =  @20@.
033B  0340         AMPCR  =  SMM-NEW-CONTENT    -   1.
033C  F09B         IF   ABT   LUOP   JUMP.
033D  E01B         LIT    =  @1B@.
033E  F09D         IF   ABT   SKIP.
033F  4337         MPCR  =  SMM-WHAT-TO-DO    -   1.
0340  F018         SET   LC1.
           SMM-NEW-CONTENT.
0341  834C         CPCR   =  SMM-ENABLE-OUT    -   1.
0342  8354         CPCR   =  SMM-SPACE-4    -   1.
0343  8349         CPCR   =  SMM-ENABLE-IN    -   1.
0344  835D         CPCR   =  SMM-ACCEPT-4    -   1.
0345  F0DD         MIR  =  A2.
0346  F0F3         MW1.
0347  F0FB         WHEN  RMI  MAR1  =  BMAR  +  1.
0348  F035         A2  =  BMAR.
0349  4320         MPCR  =  SMM-NEW-ADDRESS    -   1.
           SMM-ENABLE-IN.
034A  F0FC         WHEN  SRQ  STEP.
034B  F0E7         MIR  =  B001.
034C  434D         MPCR  =  SMM-SEND-CW    -   1.
           SMM-ENABLE-OUT.
034D  F1D5         MIR  =  B001    +  1.
           SMM-SEND-CW.
034E  F05D         ASE.
034F  F080         B  =  BMAR.
0350  F16F         BR2  =  BITT.
0351  F098         DW2.
0352  F05F         B.
0353  F16E         BR2  =  B.
0354  F0C9         JUMP.
           SMM-SPACE-4.
0355  F007         A1  =  AMPCR.
0356  F05F         B.
0357  F05F         B.
0358  E020         LIT    =  @20@.
0359  8389         CPCR   =  SMM-DEV-WT-LIT    -   1.
035A  838A         CPCR   =  SMM-DEV-WT   -   1.
035B  838A         CPCR   =  SMM-DEV-WT   -   1.
035C  838A         CPCR   =  SMM-DEV-WT   -   1.
035D  437F         MPCR  =  SMM-JUMP-A1    -   1.
           SMM-ACCEPT-4.
035E  F007         A1  =  AMPCR.
035F  F0CA         LCTR.
0360  CC02         SAR  =  12,    LIT   =  2.
0361  F034         A2  =  B000.
           SMM-ACCEPT-LOOP.
0362  F026         A2  =  A2  L.
0363  8382         CPCR   =  SMM-DEV-RD   -   1.
0364  F0CC         LIT  -  B.
0365  E040         LIT    =  @40@.
0366  F09E         IF  AOV  SKIP.
0367  F083         B  =  LIT   +  B.
0368  E009         LIT    =  9.
```

```
0369  F086          B = LIT AND B.
036A  E00F          LIT = @0F@.
036B  F031          A2 = A2 + B.
036C  F0C8          INC IF COV SKIP.
036D  4361          MPCR = SMM-ACCEPT-LOOP - 1.
036E  437F          MPCR = SMM-JUMP-A1 - 1.
                SMM-PRINT-4.
036F  F007          A1 = AMPCR.
0370  F0CA          LCTR.
0371  CC02          SAR = 12, LIT = 2.
                SMM-PRINT-LOOP.
0372  F025          A2 = A2 C.
0373  F06D          B = A2 AND LIT.
0374  E00F          LIT = @0F@.
0375  F0CC          LIT - B.
0376  E009          LIT = 9.
0377  F09E          IF AOV SKIP.
0378  F083          B = LIT + B.
0379  E007          LIT = @07@.
037A  F0ED          MIR = LIT + B.
037B  E030          LIT = @30@.
037C  838A          CPCR = SMM-DEV-WT - 1.
037D  F0C8          INC IF COV SKIP.
037E  4371          MPCR = SMM-PRINT-LOOP - 1.
037F  437F          MPCR = SMM-JUMP-A1 - 1.
                SMM-JUMP-A1.
0380  F05C          AMPCR = A1.
0381  F05F          B.
0382  F0C9          JUMP.
                SMM-DEV-RD.
0383  F1AE          IF NOT URQ SKIP.
0384  438F          MPCR = SMM-STINTS - 1.
0385  F0C5          IF SRQ DR2 BEX SKIP.
0386  4382          MPCR = SMM-DEV-RD - 1.
0387  F086          B = LIT AND B.
0388  E07F          LIT = @7F@.
0389  F0C9          JUMP.
                SMM-DEV-WT-LIT.
038A  F0EA          MIR = LIT.
                SMM-DEV-WT.
038B  F1AE          IF NOT URQ SKIP.
038C  438F          MPCR = SMM-STINTS - 1.
038D  F0C6          IF SRQ DW2 SKIP.
038E  438A          MPCR = SMM-DEV-WT - 1.
038F  F0C9          JUMP.
                SMM-STINTS.
0390  F05D          ASE.
0391  F035          A2 = BMAR.
0392  F08E          BR2 = A2 OR B100.
0393  F097          DR2 BEX.
0394  F07D          B = B C.
0395  D300          SAR = 3.        ERROR STATUS TO LSB, E-O-M TO MSB
0396  F090          BR2 = A2.
0397  F05F          B.
                *
                * PUSH INPUT-REQUEST TO RESET LC2 (NORMAL OPERATION
                *                    BEFORE ERROR WAS PUSHED)
                * PUSH ERROR TO SET LC2 (WRITE BEFORE READ FLAG)
                * PUSH END-OF-MESSAGE TO EXIT SPO-MEMORY-MODIFY
0398  F0C4          IF NOT MST SKIP.
0399  439E          MPCR = SMM-EXIT - 1.    E-O-M STATUS
039A  F019          SET LC2.        WRITE-BEFORE-READ FLAG
039B  F05F          B.
039C  F0B2          IF LST SKIP.
039D  431D          MPCR = SPO-MEM-MOD - 1.     INPUT-REQUEST STATUS
039E  431E          MPCR = SPO-MEM-MOD.  ERROR STATUS (LEAVE LC2 SET)
                SMM-EXIT.
                * SPO-MEM-MOD USES LC1 AND LC2
039F  F0A5          IF LC1 STEP.
03A0  F0A9          IF LC2 STEP.
03A1  4043          MPCR = TESTSELECT - 1.
```

```
                /
                TESTTABLE.
03A2  43C2          MPCR = TEST-0 - 1.
03A3  43CA          MPCR = TEST-1 - 1.
03A4  43DD          MPCR = TEST-2 - 1.
03A5  43E3          MPCR = TEST-3 - 1.
03A6  43CE          MPCR = TEST-4 - 1.
03A7  43D3          MPCR = TEST-5 - 1.
03A8  43E9          MPCR = TEST-6 - 1.
03A9  43F0          MPCR = TEST-7 - 1.
03AA  43D8          MPCR = TEST-8 - 1.
03AB  4764          MPCR = TEST-9 - 1.
03AC  484E          MPCR = TEST-10 - 1.
03AD  4955          MPCR = TEST-11 - 1.
03AE  4AE7          MPCR = TEST-12 - 1.
03AF  4B64          MPCR = TEST-13 - 1.
03B0  4958          MPCR = TEST-14 - 1.
03B1  498E          MPCR = TEST-15 - 1.
03B2  43F7          MPCR = TEST-16 - 1.
03B3  462D          MPCR = TEST-17 - 1.
03B4  464F          MPCR = TEST-18 - 1.
03B5  4684          MPCR = TEST-19 - 1.
03B6  4AA1          MPCR = TEST-20 - 1.
03B7  4BA1          MPCR = TEST-21 - 1.
03B8  46A1          MPCR = TEST-22 - 1.
03B9  46AB          MPCR = TEST-23 - 1.
03BA  46CE          MPCR = TEST-24 - 1.
03BB  46D8          MPCR = TEST-25 - 1.
03BC  46E2          MPCR = TEST-26 - 1.
03BD  46E4          MPCR = TEST-27 - 1.
03BE  46E9          MPCR = TEST-28 - 1.
03BF  46EE          MPCR = TEST-29 - 1.
03C0  4B69          MPCR = TEST-30 - 1.
03C1  4B73          MPCR = TEST-31 - 1.
03C2  4BAF          MPCR = TEST-32 - 1.
                * ADD TESTS AS NEEDED
                * PROGRAM JUMPS TO LABELS TEST-0,TEST-1, ETC PER
                * TEST-NUMBERS ENTERED IN THE CONTROLLER
                * PROGRAM JUMPS TO MEMORY-MODIFY FOR ANY TEST-NUMBER,
                * IF STINT IS ON
                /
                TEST-0.         WRITE DRIVE 0,F0
03C3  F108          ASR BEX.
03C4  F0FF          0 EQV B.
03C5  F09D          IF ABT SKIP.
03C6  F000          WAIT.     PORT SELECT FAILURE F101
03C7  F058          A3 = LIT.
03C8  E000          LIT = 0.
03C9  F0F6          SET GC2.                LAST SECTOR FLAG - 31
03CA  4421          MPCR = SKNWTK - 1.      GO TO SEEK NEW TRACK
                TEST-1.         WRITE DRIVE 0,F1
03CB  F058          A3 = LIT.
03CC  E010          LIT = @10@.
03CD  F0F6          SET GC2.
03CE  4421          MPCR = SKNWTK - 1.
                TEST-4.         READ DRIVE 0,F0
03CF  F058          A3 = LIT.
03D0  E000          LIT = 0.
03D1  F0F6          SET GC2.                LAST SECTOR FLAG 31
03D2  F018          SET LC1.                READ FLAG
03D3  4421          MPCR = SKNWTK - 1.
                TEST-5.         READ DRIVE 0,F1
03D4  F058          A3 = LIT.
03D5  E010          LIT = @10@.
03D6  F0F6          SET GC2.
03D7  F018          SET LC1.
03D8  4421          MPCR = SKNWTK - 1.
                TEST-8.         LOCATE AND VERIFY
03D9  F058          A3 = LIT.
03DA  E000          LIT = 0.
```

```
03DB  F0F6          SET  GC2.                        LAST  SECTOR  FLAG   31
03DC  F019          SET  LC2.                        LOC  &  VERIFY  FLAG
03DD  4421          MPCR = SKNWTK  -  1.
                TEST-2.          WRITE  DRIVE  1,F0
03DE  F0CA          LCTR.
03DF  E0BF          LIT  = @BF@.
03E0  F05A          A3  = Z.
03E1  E000          LIT  = 0.
03E2  F0F6          SET  GC2.
03E3  4421          MPCR = SKNWTK  -  1.
                TEST-3.          WRITE  DRIVE  1,F1
03E4  F0CA          LCTR.
03E5  E0BF          LIT  = @BF@.
03E6  F05A          A3  = Z.
03E7  E010          LIT  = @10@.
03E8  F0F6          SET  GC2.
03E9  4421          MPCR = SKNWTK  -  1.
                TEST-6.          READ  DRIVE  1,F0
03EA  F0CA          LCTR.
03EB  E0BF          LIT  = @BF@.
03EC  F05A          A3  = Z.
03ED  E000          LIT  = 0.
03EE  F0F6          SET  GC2.
03EF  F018          SET  LC1.
03F0  4421          MPCR = SKNWTK  -  1.
                TEST-7.          READ  DRIVE  1,F1
03F1  F0CA          LCTR.
03F2  E0BF          LIT  = @BF@.
03F3  F05A          A3  = Z.
03F4  E010          LIT  = @10@.
03F5  F0F6          SET  GC2.
03F6  F018          SET  LC1.
03F7  4421          MPCR = SKNWTK  -  1.
                TEST-16.         SEEK  ALL  TRKS  -  TOP  DRIVE
03F8  F058          A3  = LIT.
03F9  E001          LIT  = @01@.
03FA  F05F          B.
03FB  E0E6          LIT  = @E6@.
03FC  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
03FD  E0CD          LIT  = @CD@.
03FE  F0CA          LCTR.
03FF  F05F          B.
0400  E061          LIT  = @61@.
0401  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0402  E0C1          LIT  = @C1@.
0403  F128          A2  = Z.
                SKCONT0.
0404  F0DE          MIR  = A3.
0405  F099          DW1.                             SEND  SEEK
0406  F04E          A3  = A3  +  LIT.                ADD  1  TO  DISK  ADDRESS
0407  E020          LIT  = @20@.
0408  F068          B  = A2.
0409  F03C          A3  EQV  B.                      LAST  TRACK
040A  F0B5          IF  NOT  ABT  SKIP.
040B  F018          SET  LC1.
040C  D400          SAR  = 4.
040D  F0F5          SAVE.
040E  F096          DR1  BEX.
040F  F017          A1  = B.
0410  F10B          A1  = A1  C.
0411  F001          A1.
0412  F0B1          IF  LST  JUMP.
0413  F0BD          IF  NOT  IRQ  SKIP.
0414  4417          MPCR = ENDSEEK  -  1.            END  SEEK  TEST
0415  F014          IF  LC1  SKIP.
0416  4403          MPCR = SKCONT0  -  1.
0417  43F7          MPCR = TEST-16  -  1.
                ENDSEEK.
0418  F032          A2  = A3.
0419  F027          A2  = A2  R.
041A  DE00          SAR  = 14.
```

```
041B  F12D          A3  = A2  C.
041C  D200          SAR  = 2.
041D  F0E0          MIR  = A3  OR  LIT.
041E  E001          LIT  = @01@.
041F  F099          DW1.                             SEEK  TRACK  0
0420  F0A5          IF  LC1  STEP.
0421  4043          MPCR = TESTSELECT  -  1.
                SKNWTK.
0422  F0CA          LCTR.
0423  E080          LIT  = @80@.
0424  F0F5          SAVE.
0425  F030          INC.
0426  F0B9          IF  NOT  COV  JUMP.
0427  F0E0          MIR  = A3  OR  LIT.
0428  E001          LIT  = @01@.
0429  F099          DW1.                                        SEND  SEEK
042A  F05F          B.
042B  F05F          B.
042C  F1AE          IF  NOT  URQ  SKIP.
042D  4432          MPCR = STINDET  -  1.
042E  F18E          IF  IRQ  SKIP.
042F  4437          MPCR = FILNOTOP  -  1.
0430  F108          ASR  BEX.
0431  F0E1          MIR  = B.
0432  F000          WAIT.                            IRQ  DETECTED
              **********          ERROR  #  E4
                STINDET.
0433  F096          DR1  BEX.                        READ  DEVICE  STATUS
0434  F0E1          MIR  = B.
0435  F000          WAIT.                            STATUS  INTERUPT
              **********          ERROR  #  E3
              *     TO  RESTART  TEST  FORCE  STEP.
0436  F0A5          IF  LC1  STEP.
0437  4043          MPCR = TESTSELECT  -  1.
                FILNOTOP.
0438  F096          DR1  BEX.                        READ  DEVICE  STATUS
0439  F05F          B.
043A  D800          SAR  = 8.
043B  F017          A1  = B.
043C  F10B          A1  = A1  C.
043D  F001          A1.
043E  F0C4          IF  NOT  MST  SKIP.
043F  F000          WAIT.                            FILE  NOT  OP  BIT  SET
              *                                      BUT  NO  STINT  DETECTED
              **********          FAILURE  #  F16  &  F19
0440  D400          SAR  = 4.
0441  F017          A1  = B.
0442  F10B          A1  = A1  C.
0443  F001          A1.
0444  F0C3          IF  NOT  LST  SKIP.
0445  4448          MPCR = SKERTST  -  1.
0446  F000          WAIT.                            SEEK  NOT  COMPLETE  BIT  =  0
              **********          ERROR  #  E5
0447  F0A5          IF  LC1  STEP.
0448  4043          MPCR = TESTSELECT  -  1.
                SKERTST.
0449  F017          A1  = B.
044A  F10B          A1  = A1  C.
044B  D300          SAR  = 3.
044C  F001          A1.
044D  F0C3          IF  NOT  LST  SKIP.
044E  F000          WAIT.                            SEEK  ERROR
              **********          ERROR  #  E6
044F  D400          SAR  = 4.
0450  E00C          LIT  = @0C@.
0451  F01D          A1  = LIT.
0452  F10B          A1  = A1  C.
                SKTMOUT.                             SEEK  TIME  OUT
0453  F096          DR1  BEX.                              READ  DEVICE  STATUS
0454  F012          A1  = A1  +  1.
0455  F001          A1.
```

```
0456  F0B5        IF  NOT ABT SKIP.
0457  F000        WAIT.                                   NO SEEK  COMPLETE
            ************        ERROR # E7
0458  F07D        B = B C.
0459  F05F        B.
045A  F0C3        IF  NOT LST SKIP.
045B  4452        MPCR = SKTMOUT - 1.
045C  F0C0        IF  NOT LC2 SKIP.
045D  45C0        MPCR = LOCVFY - 1.
045E  F0E0        MIR = A3 OR LIT.
045F  E005        LIT = @05@.
0460  F099        DW1.                                    SEMD ENABLE  MARKS
0461  F0CA        LCTR.
0462  E001        LIT = @01@.
0463  F115        A1 = Z.
0464  E0BF        LIT = @BF@.
0465  F0F5        SAVE.
0466  F012        A1 = A1 + 1.
0467  F1AE        IF  NOT URQ SKIP.
0468  446B        MPCR = SMKTST - 1.
0469  F001        A1.
046A  F0B4        IF  NOT ABT JUMP.
046B  F000        WAIT.
            ************        ERROR # E8
            ************URQ       NOT SET  BY IMK OR SMK
 SMKTST.
046C  F096        DR1 BEX.                                CLEAR STATUS  REG
046D  F0CA        LCTR.
046E  E0DF        LIT = @DF@.
046F  F1B5        IF  URQ SKIP.
0470  4476        MPCR = IMKTST - 1.
0471  F000        WAIT.           SMK OR ENST  ERROR
            *********       ERROR # E19
0472  F0F5        SAVE.
0473  F096        DR1 BEX.
0474  F05F        B.
0475  F05F        B.
0476  F0C9        JUMP.
 IMKTST.
0477  D500        SAR = 5.
0478  F07D        B = B C.
0479  F05F        B.
047A  F0B2        IF  LST SKIP.
047B  4482        MPCR = READMKS - 1.
047C  F0FD        WHEN URQ STEP.
047D  F096        DR1 BEX.
047E  F07D        B = B C.
047F  F05F        B.
0480  F0B2        IF  LST SKIP.
0481  4482        MPCR = READMKS - 1.
0482  F000        WAIT.           INK  OCCURRING  TOO SOON
            *********       ERROR # E 9
 READMKS.
0483  F0FD        WHEN URQ STEP.
            ************        ERROR # E8
0484  F096        DR1 BEX.                                READ DEVICE  STATUS
0485  F07D        B = B C.
0486  D600        SAR = 6.
0487  F05F        B.
0488  F0B2        IF  LST SKIP.
0489  F000        WAIT.
            ************        FAILURE  # F34
048A  F07D        B = B C.
048B  DF00        SAR = 15.
048C  F05F        B.
048D  F0C3        IF  NOT LST SKIP.
048E  44CA        MPCR = STTKADR - 1.
048F  F1AE        IF  NOT URQ SKIP.
0490  F000        WAIT.                                   URQ NOT RESET  BY STATUS  RD
            ************        ERROR # E16
0491  F030        INC.                                    ADD 1 TO SEC  COUNT
0492  F0B8        IF  NOT COV SKIP.
0493  F000        WAIT.                                   NO INDEX  MK DETECTED
            ************        ERROR # E9
0494  4482        MPCR = READMKS - 1.
 WTNXSC.
0495  E004        LIT = @04@.
0496  F0E0        MIR = A3 OR LIT.
0497  F099        DW1.                                            SEND WRT NEXT SECT.
0498  F05F        B.
0499  F05F        B.
049A  F05F        B.
049B  F1B5        IF  URQ SKIP.
049C  449F        MPCR = WTPRMBL - 1.
049D  F096        DR1 BEX.
049E  F0E1        MIR = B.
049F  F000        WAIT.                                   STINT  DETECTED
            ************        ERROR # E11
 WTPRMBL.
04A0  F0CA        LCTR.
04A1  E010        LIT = @10@.
04A2  F07B        B = B000.
04A3  F0E1        MIR = B.
04A4  F1AD        IF  NOT SRQ SKIP.
04A5  44A6        MPCR = WTPREAM - 1.
04A6  F000        WAIT.
            ************        ERROR # E10     SRQ NOT DETECTED
 WTPREAM.
04A7  F098        DW2.
04A8  F030        INC.                                            ADD 1 TO WD COUNT
04A9  F05F        B.
04AA  F1AD        IF  NOT SRQ SKIP.
04AB  F000        WAIT.                                   DINT  NOT RESET  BY WRT DATA
            ************        FAILURE  # F72
04AC  F0F5        SAVE.
04AD  F0FC        WHEN SRQ STEP.
            ************        ERROR #E 15
04AE  F098        DW2.
04AF  F030        INC.
04B0  F05F        B.
04B1  F05F        B.
04B2  F05F        B.
04B3  F05F        B.
04B4  F05F        B.
04B5  F1AD        IF  NOT SRQ SKIP.
04B6  F000        WAIT.                                   DINT  SET  TOO SOON
            ************        FAILURE  # F64
04B7  F05F        B.
04B8  F05F        B.
04B9  F05F        B.
04BA  F1AD        IF  NOT SRQ SKIP.
04BB  F0F7        SKIP.
04BC  F000        WAIT.                                   DINT  SET  LATE
            ************        FAILURE  # F64
04BD  F098        DW2.
04BE  F030        INC.
04BF  F0F5        SAVE.
04C0  F0FC        WHEN SRQ STEP.
04C1  F098        DW2.
04C2  F030        INC.
04C3  F0B9        IF  NOT COV JUMP.
04C4  F0EA        MIR = LIT.
04C5  E01E        LIT = @1E@.
04C6  F0FC        WHEN SRQ STEP.
04C7  F098        DW2.
04C8  F0BC        IF  NOT GC2 SKIP.
04C9  44D3        MPCR = WTNTAD - 1.              WRITE  NEW TRACK ADDR
04CA  44D7        MPCR = WTADDR - 1.              WRITE  TRACK ADDRESS
 STTKADR.
04CB  F072        B = A3 R.
04CC  D400        SAR = 4.
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04CD  F017          A1  =  B.
04CE  F10B          A1  =  A1  C.
04CF  DB00          SAR  =  11.
04D0  F05F          B.
04D1  F0BF          IF  NOT  LC1  SKIP.
04D2  4554          MPCR  =  RDNXSC  -  1.
04D3  4494          MPCR  =  WTNXSC  -  1.
                WTNTAD.
04D4  F01F          RESET  GC2.
04D5  F024          A2  =  A1.
04D6  F029          A2  =  A2  +  LIT.
04D7  E01F          LIT  =  @1F@.
                WTADDR.
04D8  F0BB          IF  NOT  GC1  SKIP.
04D9  44E2          MPCR  =  WTSEC0  -  1.
04DA  F012          A1  =  A1  +  1.
04DB  F0DB          MIR  =  A1.
04DC  F066          B  =  A1.
04DD  F0FC          WHEN SRQ  STEP.
04DE  F098          DW2.
04DF  F116          A2  EQV  B.
04E0  F0B5          IF  NOT  ABT  SKIP.
04E1  F006          SET  GC1.
04E2  44EB          MPCR  =  WTDATA  -  1.
                WTSEC0.
04E3  F00C          RESET  GC1.
04E4  F0F6          SET  GC2.
04E5  F00A          A1  =  A1  -  LIT.
04E6  E01F          LIT  =  @1F@.
04E7  F0DB          MIR  =  A1.
04E8  F0FC          WHEN SRQ  STEP.
04E9  F098          DW2.
04EA  F05F          B.
04EB  44EB          MPCR  =  WTDATA  -  1.
                WTDATA.
04EC  F0CA          LCTR.
04ED  E05A          LIT  =  @5A@.
04EE  F0F5          SAVE.
04EF  F0FC          WHEN SRQ  STEP.
04F0  F098          DW2.
04F1  F030          INC.                                ADD  1  TO  BYTE  COUNT
04F2  F0B9          IF  NOT  COV  JUMP.
04F3  F076          B  =  B111.
04F4  F0E1          MIR  =  B.
04F5  F0FC          WHEN SRQ  STEP.
04F6  F098          DW2.
04F7  F0E0          MIR  =  A3  OR  LIT.
04F8  E008          LIT  =  @08@.
04F9  F0FC          WHEN SRQ  STEP.
04FA  F05E          ASR.
04FB  F05F          B.
04FC  F0FC          WHEN SRQ  STEP.     ASR  CAUSED  DESELECT
                **********FAILURE       #  102
04FD  F099          DW1.
04FE  F0CA          LCTR.
04FF  E004          LIT  =  @04@.
0500  F0F5          SAVE.
0501  F030          INC.
0502  F0B9          IF  NOT  COV  JUMP.
0503  F1AD          IF  NOT  SRQ  SKIP.
0504  F000          WAIT.
                ************FAILURE         #  F95
0505  F0A2          IF  GC2  SKIP.
0506  4494          MPCR  =  WTNXSC  -  1.
                CHKLSTTRK.
0507  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0508  4525          MPCR  =  CHKDDLSTRK  -  1.
0509  F04E          A3  =  A3  +  LIT.                  ADD  1  TO  TRACK  ADDRESS
050A  E020          LIT  =  @20@.
050B  F01F          RESET  GC2.
050C  F0CA          LCTR.
050D  E0E6          LIT  =  @E6@.
050E  F08A          B  =  Z.
050F  E060          LIT  =  @60@.
0510  F03C          A3  EQV  B.                 DOES  A3  =  LAST  TRK,  D0,  F0
0511  F0B5          IF  NOT  ABT  SKIP.
0512  4592          MPCR  =  ENDRWTST  -  1.
0513  F0F6          SET  GC2.
0514  F08A          B  =  Z.                        B  =  TRK  203  FACE  1
0515  E070          LIT  =  @70@.
0516  F03C          A3  EQV  B.                 DOES  A3  =  LAST  TRK  ,  D0,  F1
0517  F0B5          IF  NOT  ABT  SKIP.
0518  4542          MPCR  =  SKILTK  -  1.      GO  TO  SEEK  ILLEGAL  TRACK
0519  F0CA          LCTR.
051A  E0A6          LIT  =  @A6@.
051B  F08A          B  =  Z.
051C  E060          LIT  =  @60@.
051D  F03C          A3  EQV  B.                 DOES  A3  =  LAST  TRK,  D1.  F0
051E  F0B5          IF  NOT  ABT  SKIP.
051F  4592          MPCR  =  ENDRWTST  -  1.
0520  F08A          B  =  Z.
0521  E070          LIT  =  @70@.
0522  F03C          A3  EQV  B.                 DOES  A3  =  LAST  TRK,  D1,  F1
0523  F0B5          IF  NOT  ABT  SKIP.
0524  4592          MPCR  =  ENDRWTST  -  1.
0525  4421          MPCR  =  SKNWTK  -  1.
                CHKDDLSTRK.
0526  F04E          A3  =  A3  +  LIT.
0527  E020          LIT  =  @20@.
0528  F01F          RESET  GC2.
0529  F0CA          LCTR.
052A  E0CD          LIT  =  @CD@.
052B  F08A          B  =  Z.
052C  E0C0          LIT  =  @C0@.
052D  F03C          A3  EQV  B.                 DOES  A3=LAST  TRK,  D0,  F0
052E  F0B5          IF  NOT  ABT  SKIP.
052F  458E          MPCR  =  ENDRWTSTDD  -  1.
0530  F0F6          SET  GC2.
0531  F08A          B  =  Z.                    B  =  TRK  406  FACE  1
0532  E0D0          LIT  =  @D0@.
0533  F03C          A3  EQV  B.                 DOES  A3=LAST  TRK  D0,  F1
0534  F0B5          IF  NOT  ABT  SKIP.
0535  4542          MPCR  =  SKILTK  -  1.      GO  TO  SEEK  ILLEGAL  TRK
0536  F0CA          LCTR.
0537  E08D          LIT  =  @8D@.
0538  F08A          B  =  Z.
0539  E0C0          LIT  =  @C0@.
053A  F03C          A3  EQV  B.                 DOES  A3=LAST  TRK,  D1,  F0
053B  F0B5          IF  NOT  ABT  SKIP.
053C  458E          MPCR  =  ENDRWTSTDD  -  1.
053D  F08A          B  =  Z.
053E  E0D0          LIT  =  @D0@.
053F  F03C          A3  EQV  B.                 DOES  A3=LAST  TRK,  D1,  F1
0540  F0B5          IF  NOT  ABT  SKIP.
0541  458E          MPCR  =  ENDRWTSTDD  -  1.
0542  4421          MPCR  =  SKNWTK  -  1.
                SKILTK.
0543  F0E0          MIR  =  A3  OR  LIT.
0544  E001          LIT  =  @01@.
0545  F0CA          LCTR.
0546  E054          LIT  =  @54@.
0547  F0F5          SAVE.
0548  F030          INC.                        DELAY  FOR  TERM.  TO  END
0549  F0B9          IF  NOT  COV  JUMP.
054A  F099          DW1.                        SEND  ILLEGAL  SEEK
054B  F05F          B.
054C  F096          DR1  BEX.                       READ  DEVICE  STAUS
054D  D200          SAR  =  2.
054E  F07D          B  =  B  C.
054F  F05F          B.
0550  F0B2          IF  LST  SKIP.
0551  F000          WAIT.                       ILLEGAL  TRACK  BIT  NOT  SET
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                ************        ERROR # E12
0552  F0AF          IF LC3 SET LC3 ELSE SKIP.
0553  458E          MPCR = ENDRWTSTDD - 1.
0554  4592          MPCR = ENDRWTST - 1.
              RDNXSC.
0555  F018          SET LC1.
0556  F0E0          MIR = A3 OR LIT.
0557  E002          LIT = @02@.
0558  F099          DW1.                              SEND READ NEXT SECTOR
0559  F0BC          IF NOT GC2 SKIP.
055A  455B          MPCR = RDNTAD - 1.
055B  4561          MPCR = RDADDR - 1.
              RDNTAD.
055C  F01F          RESET GC2.
055D  F024          A2 = A1.                          A2 = NEW TRACK , SECT 0
055E  F011          A1 = A1 + LIT.
055F  E01F          LIT = @1F@.
0560  F05F          B.
0561  4561          MPCR = RDADDR - 1.
              RDADDR.
0562  F02A          A2 = A2 + 1.
0563  F068          B = A2.
0564  F0BB          IF NOT GC1 SKIP.
0565  45B5          MPCR = RDSEC0 - 1.
0566  F003          A1 EQV B.                         TEST FOR LAST SECTOR
0567  F0B5          IF NOT ABT SKIP.
0568  F006          SET GC1.
0569  F0FC          WHEN SRQ STEP.
                ************        ERROR # E13
056A  F097          DR2 BEX.
056B  F116          A2 EQV B.
056C  F0B5          IF NOT ABT SKIP.
056D  4571          MPCR = RDDATA - 1.
056E  F0DD          MIR = A2.                         EXPECTED
056F  F000          WAIT.
                ************        ERROR # E14     FIRST WORD BAD-ADDRESS WORD
0570  F0E1          MIR = B.                          ACTUAL
0571  F000          WAIT.
              RDDATA.
0572  F0CA          LCTR.
0573  E05A          LIT = @5A@.                           CTR = A5 = 165
0574  F0F5          SAVE.
0575  F0FC          WHEN SRQ STEP.
0576  F097          DR2 BEX.
0577  F116          A2 EQV B.                         CHECK DATA
0578  F0B5          IF NOT ABT SKIP.
0579  457D          MPCR = CHKMORD - 1.
057A  F0DD          MIR = A2.                         EXPECTED
057B  F000          WAIT.                             DATA ERROR
                ************        ERROR # E14
057C  F0E1          MIR = B.                          ACTUAL
057D  F000          WAIT.
              CHKMORD.
057E  F030          INC.
057F  F0B9          IF NOT COV JUMP.
0580  F0FC          WHEN SRQ STEP.
0581  F097          DR2 BEX.                          READ LRC
0582  F05F          B.
0583  F0B5          IF NOT ABT SKIP.
0584  4587          MPCR = GOREAD - 1.
0585  F0E1          MIR = B.
0586  F000          WAIT.                             LAST WORD BAD MIR = FFFF
                ************FAILURE        # F78
0587  4043          MPCR = TESTSELECT - 1.
              GOREAD.
0588  F0E0          MIR = A3 OR LIT.
0589  E008          LIT = @08@.
058A  F0FC          WHEN SRQ STEP.
058B  F099          DW1.
058C  F0A2          IF GC2 SKIP.
058D  4554          MPCR = RDNXSC - 1.
058E  4506          MPCR = CHKLSTTRK - 1.
              ENDRWTSTDD.
058F  C832          LIT = @32@ SAR = 8.
0590  F082          B = LIT L.
0591  F131          A3 = A3 - B.
0592  4596          MPCR = ENDRWTST1 - 1.
              ENDRWTST.
0593  D800          SAR = 8.
0594  F082          B = LIT L.
0595  E019          LIT = @19@.
0596  F131          A3 = A3 - B.
              ENDRWTST1.
0597  F0E0          MIR = A3 OR LIT.
0598  E001          LIT = @01@.
0599  F0CA          LCTR.
059A  E054          LIT = @54@.
059B  F0F5          SAVE.
059C  F030          INC.
059D  F0B9          IF NOT COV JUMP.
059E  F10F          A1 = 0.
059F  F099          DW1.                              SEND SEEK
05A0  F0F5          SAVE.
05A1  F012          A1 = A1 + 1.
05A2  F001          A1.
05A3  F09D          IF ABT SKIP.
05A4  F0C9          JUMP.
05A5  F096          DR1 BEX.
05A6  F017          A1 = B.
05A7  F10B          A1 = A1 C.
05A8  D400          SAR = 4.
05A9  F080          B = BMAR.
05AA  F078          B = BOTT.
05AB  F0EA          MIR = LIT.
05AC  E008          LIT = @08@.
05AD  F001          A1.
05AE  F0C3          IF NOT LST SKIP.
05AF  F000          WAIT.                             SEEK NOT COMPLETE
                ************        ERROR # E17
05B0  F099          DW1.                              SEND TERMINATE
05B1  F017          A1 = B.
05B2  F10B          A1 = A1 C.
05B3  DC00          SAR = 12.
05B4  F0A5          IF LC1 STEP.
05B5  4043          MPCR = TESTSELECT - 1.
              RDSEC0.
05B6  F00C          RESET GC1.                            LAST SECT BEING READ
05B7  F0F6          SET GC2.                              END OF TRACK
05B8  F024          A2 = A1.
05B9  F11F          A2 = A2 - LIT.
05BA  E01F          LIT = @1F@.
05BB  F0FC          WHEN SRQ STEP.
05BC  F097          DR2 BEX.
05BD  F116          A2 EQV B.
05BE  F09D          IF ABT SKIP.
05BF  F000          WAIT.                             ADDR ERROR SECT 0
                ************        ERROR # E14
05C0  4571          MPCR = RDDATA - 1.
              LOCVFY.
05C1  F032          A2 = A3.
05C2  F025          A2 = A2 C.                            A2 = ADDR
*                                                         VER WORD SECTOR = 0
05C3  DF00          SAR = 15.
              LVNXSC.                                     LOC & VER NEXT SECTOR
05C4  F0E0          MIR = A3 OR LIT.
05C5  E006          LIT = @06@.
05C6  F05F          B.
05C7  F099          DW1.                              SEND LOC & VERIFY
05C8  F05F          B.
05C9  F0DD          MIR = A2.                             MIR = ADDR VER WORD
05CA  F0FC          WHEN SRQ STEP.
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05CB  F098          DW2.                                SEND  ADDR  VER  WORD
05CC  D800          SAR  =  8.
05CD  F01D          A1  =  LIT.
05CE  E0C0          LIT  =  @C0@.
05CF  F00B          A1  =  A1  L.
05D0  F0F5          SAVE.
05D1  F1AE          IF  NOT  URQ  SKIP.
05D2  4629          MPCR  =  URQERR2  -  1.
05D3  F1AD          IF  NOT  SRQ  SKIP.
05D4  45D7          MPCR  =  RDLVAD  -  1.
05D5  F012          A1  =  A1  +  1.
05D6  F0B4          IF  NOT  ABT  JUMP.
05D7  F000          WAIT.                               CANNOT  LOC  &  VER  ADDR
                  **********FAILURE          #  F94
                  RDLVAD.
05D8  F097          DR2  BEX.
05D9  F116          A2  EQV  B.                               CHECK  ADDR  VER  WORD
05DA  F09D          IF  ABT  SKIP.
05DB  F000          WAIT.
                  **********FAILURE          #  F94
05DC  F029          A2  =  A2  +  LIT.
05DD  E002          LIT  =  @02@.
05DE  F0CA          LCTR.
05DF  E0FF          LIT  =  @FF@.
05E0  F0F5          SAVE.
05E1  F05F          B.
05E2  F05F          B.
05E3  F05F          B.
05E4  F1AE          IF  NOT  URQ  SKIP.
05E5  45ED          MPCR  =  RDNXVS  -  1.
05E6  F030          INC.
05E7  F02E          IF  COV  SKIP.
05E8  F0C9          JUMP.
05E9  F0EA          MIR  =  LIT.
05EA  E008          LIT  =  @08@.
05EB  F099          DW1.                                SEND  TERMINATE
05EC  F000          WAIT.                               URQ  NOT  SET  AFTER  VERIFY
                  **********ERROR          #  E16
05ED  4043          MPCR  =  TESTSELECT  -  1.
                  RDNXVS.
05EE  F0CA          LCTR.
05EF  E05B          LIT  =  @5B@.
05F0  F0EA          MIR  =  LIT.
05F1  E002          LIT  =  @02@.
05F2  F099          DW1.                                SEND  READ  NEXT  SECTOR
05F3  F013          A1  =  A2.
05F4  F05F          B.
05F5  45F5          MPCR  =  DATVER  -  1.
                  DATVER.                                       DATA  VER  ROUTINE
05F6  F0FC          WHEN SRQ  STEP.
                  **********FAILURE          #  F90
05F7  F097          DR2  BEX.                           READ  DATA  WORT  INTO  B
05F8  F003          A1  EQV  B.
05F9  F09D          IF  ABT  SKIP  ELSE  STEP.
05FA  F000          WAIT.
                  **********FAILURE          #  F94
05FB  F030          INC.
05FC  F02E          IF  COV  SKIP  ELSE  STEP.          COV  =  LAST  DATA  WORD
05FD  45F5          MPCR  =  DATVER  -  1.              GO  TO  READ  NEXT  DATA  WORD
05FE  F0FC          WHEN SRQ  STEP.
05FF  F097          DR2  BEX.
0600  F0E0          MIR  =  A3  OR  LIT.
0601  E008          LIT  =  @08@.
0602  F0FC          WHEN SRQ  STEP.
0603  F099          DW1.
0604  F05F          B.
0605  F09D          IF  ABT  SKIP.
0606  4626          MPCR  =  LRCERR  -  1.              GO  TO  LRC  ERROR  ROUTINE
0607  F096          DR1  BEX.
0608  F02A          A2  =  A2  +  1.                              INCR  SECTOR  COUNT
0609  F068          B  =  A2.
060A  F016          A1  =  A3.
060B  F10B          A1  =  A1  C.
060C  DF00          SAR  =  15.
060D  F011          A1  =  A1  +  LIT.
060E  E01E          LIT  =  @1E@.
060F  F003          A1  EQV  B.
0610  F09D          IF  ABT  SKIP.
0611  45C3          MPCR  =  LVNXSC  -  1.              GO  TO  LOC  &  VER  NEXT  SECT
0612  F04E          A3  =  A3  +  LIT.                            ADD  3  TO  TRACK  ADDR
0613  E020          LIT  =  @20@.
0614  F05F          B.
0615  E0E6          LIT  =  @E6@.
0616  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0617  E0CD          LIT  =  @CD@.
0618  F0CA          LCTR.
0619  F05F          B.
061A  E060          LIT  =  @60@.
061B  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
061C  E0C0          LIT  =  @C0@.
061D  F08A          B  =  Z.
061E  F019          SET  LC2.
061F  F03C          A3  EQV  B.
0620  F09D          IF  ABT  SKIP  ELSE  STEP.
0621  4421          MPCR  =  SKNWTK  -  1.              GO  TO  SEEK  NEW  TRACK
0622  F0A5          IF  LC1  STEP.
0623  F0A9          IF  LC2  STEP.
0624  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0625  458E          MPCR  =  ENDRWTSTDD  -  1.
0626  4592          MPCR  =  ENDRWTST  -  1.
                  LRCERR.                                       LRC  ERROR  ROUTINE
0627  F0E1          MIR  =  B.                                    ACTUAL  LRC
0628  F000          WAIT.
                  **********FAILURE          #  F78
0629  4043          MPCR  =  TESTSELECT  -  1.
                  URQERR2.
062A  F096          DR1  BEX.                           READ  DEVICE  STATUS
062B  F0E1          MIR  =  B.
062C  F000          WAIT.
                  **********FAILURE          #  F73
062D  4043          MPCR  =  TESTSELECT  -  1.
                  TEST-17.          SEEK  ALL  TRKS  -  BOTTOM  DRIVE
062E  F0CA          LCTR.
062F  E0BF          LIT  =  @BF@.
0630  F05A          A3  =  Z.
0631  E001          LIT  =  @01@.
0632  F05F          B.
0633  E0A6          LIT  =  @A6@.
0634  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0635  E08D          LIT  =  @8D@.
0636  F0CA          LCTR.
0637  F05F          B.
0638  E061          LIT  =  @61@.
0639  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
063A  E0C1          LIT  =  @C1@.
063B  F128          A2  =  Z.
                  SKCONT1.
063C  F0DE          MIR  =  A3.
063D  F099          DW1.
063E  F04E          A3  =  A3  +  LIT.
063F  E020          LIT  =  @20@.
0640  F068          B  =  A2.
0641  F03C          A3  EQV  B.
0642  F0B5          IF  NOT  ABT  SKIP.
0643  F018          SET  LC1.
0644  D400          SAR  =  4.
0645  F0F5          SAVE.
0646  F096          DR1  BEX.
0647  F017          A1  =  B.
0648  F10B          A1  =  A1  C.
0649  F001          A1.
```

```
064A  F0B1        IF  LST  JUMP.
064B  F0BD        IF  NOT  IRQ  SKIP.
064C  4417        MPCR = ENDSEEK  -  1.
064D  F014        IF  LC1  SKIP.
064E  463B        MPCR = SKCONT1  -  1.
064F  462D        MPCR = TEST-17  -  1.
              TEST-18.        LOOP  ON  WRITE
0650  F058        A3  = LIT.
0651  E001        LIT  = @01@.
0652  F0DE        MIR  = A3.
0653  F099        DW1.                          SEND  SEEK
0654  D400        SAR  = 4.
0655  F0F5        SAVE.
0656  F096        DR1  BEX.
0657  F017        A1  = B.
0658  F10B        A1  = A1  C.
0659  F001        A1.
065A  F0B1        IF  LST  JUMP.
065B  F058        A3  = LIT.
065C  E004        LIT  = @04@.
065D  F0CA        LCTR.
065E  E0AA        LIT  = @AA@.
065F  F115        A1  = Z.
0660  E055        LIT  = @55@.
0661  F0CA        LCTR.
0662  E055        LIT  = @55@.
0663  F128        A2  = Z.
0664  E0AA        LIT  = @AA@.
              LOWRTN.
0665  F0CA        LCTR.
0666  E010        LIT  = @10@.
0667  F0DE        MIR  = A3.
0668  F099        DW1.                          SEND  WRT NEXT  SECTOR
0669  F0E6        MIR  = B000.
066A  F0F5        SAVE.
066B  F0FC        WHEN SRQ  STEP.
066C  F098        DW2.
066D  F030        INC.
066E  F0B9        IF  NOT  COV  JUMP.
066F  F0EA        MIR  = LIT.
0670  E01E        LIT  = @1E@.
0671  F0FC        WHEN SRQ  STEP.
0672  F098        DW2.
0673  F0CA        LCTR.
0674  E032        LIT  = @32@.
0675  F0F5        SAVE.
0676  F0DB        MIR  = A1.
0677  F0FC        WHEN SRQ  STEP.
0678  F098          DW2.                          WRT DATA  = 5555
0679  F0DD        MIR  = A2.
067A  F0FC        WHEN SRQ  STEP.
067B  F098        DW2.                          WRT DATA  = AAAA
067C  F030        INC.
067D  F0B9        IF  NOT  COV  JUMP.
067E  F0EA        MIR  = LIT.
067F  E008        LIT  = @08@.
0680  F0FC        WHEN SRQ  STEP.
0681  F099        DW1.                          SEND  TERMINATE
0682  F0BD        IF  NOT  IRQ  SKIP.
0683  4417        MPCR = ENDSEEK  -  1.
0684  4664        MPCR = LOWRTN  -  1.
              TEST-19.        LOOP  ON  READ
0685  F058        A3  = LIT.
0686  E001        LIT  = @01@.
0687  F0DE        MIR  = A3.
0688  F099        DW1.
0689  D400        SAR  = 4.
068A  F0F5        SAVE.
068B  F096        DR1  BEX.
068C  F017        A1  = B.
068D  F10B        A1  = A1  C.
```

```
068E  F001        A1.
068F  F0B1        IF  LST  JUMP.
0690  F058        A3  = LIT.
0691  E002        LIT  = @02@.
              LORRTN.
0692  F0DE        MIR  = A3.
0693  F099        DW1.
0694  F0CA        LCTR.
0695  E032        LIT  = @32@.
0696  F0F5        SAVE.
0697  F0FC        WHEN SRQ  STEP.
0698  F097        DR2  BEX.
0699  F030        INC.
069A  F0B9        IF  NOT  COV  JUMP.
069B  F0EA        MIR  = LIT.
069C  E008        LIT  = @08@.
069D  F0FC        WHEN SRQ  STEP.
069E  F099        DW1.
069F  F0BD        IF  NOT  IRQ  SKIP.
06A0  4417        MPCR = ENDSEEK  -  1.
06A1  4691        MPCR = LORRTN  -  1.
              TEST-22.        HEAD  ALIGNMENT  -  DRIVE  0,F0
06A2  E0F4        LIT  = @F4@.
06A3  F0AF        IF  LC3  SET  LC3  ELSE  SKIP.
06A4  E0E9        LIT  = @E9@.
06A5  F0CA        LCTR.
06A6  F05F        B.
06A7  E041        LIT  = @41@.
06A8  F0AF        IF  LC3  SET  LC3  ELSE  SKIP.
06A9  E081        LIT  = @81@.
06AA  F05A        A3  = Z.
06AB  46B5        MPCR = NTRHDALN  -  1.
              TEST-23.        HEAD  ALIGNMENT  -  DRIVE  0,F1
06AC  E0F4        LIT  = @F4@.
06AD  F0AF        IF  LC3  SET  LC3  ELSE  SKIP.
06AE  E0E9        LIT  = @E9@.
06AF  F0CA        LCTR.
06B0  F05F        B.
06B1  E051        LIT  = @51@.
06B2  F0AF        IF  LC3  SET  LC3  ELSE  SKIP.
06B3  E091        LIT  = @91@.
06B4  F05A        A3  = Z.
06B5  46B5        MPCR = NTRHDALN  -  1.
              NTRHDALN.
06B6  F0DE        MIR  = A3.
06B7  F099        DW1.                          SEND  SEEK
06B8  D400        SAR  = 4.
06B9  F0F5        SAVE.
06BA  F096        DR1  BEX.
06BB  F017        A1  = B.
06BC  F10B        A1  = A1  C.
06BD  F001        A1.
06BE  F0B1        IF  LST  JUMP.
06BF  81DC        CPCR = READDATAKEYTOA1  -  1.
06C0  F109        A1  -  LIT  -  1.
06C1  E001        LIT  = @01@.
06C2  F0B7        IF  NOT  AOV  SKIP.
06C3  4417        MPCR = ENDSEEK  -  1.
06C4  F001        A1.
06C5  F0C3        IF  NOT  LST  SKIP.
06C6  46CA        MPCR = ADDTRK  -  1.
06C7  F04F        A3  = A3  -  LIT.
06C8  E020        LIT  = @20@.
06C9  F05F        B.
06CA  46B5        MPCR = NTRHDALN  -  1.
              ADDTRK.
06CB  F04E        A3  = A3  +  LIT.
06CC  E020        LIT  = @20@.
06CD  F05F        B.
06CE  46B5        MPCR = NTRHDALN  -  1.
```

```
                    TEST-24.        HEAD ALIGNMENT - DRIVE 1,F0
06CF  E0B4          LIT = @B4@.
06D0  F0AF          IF LC3 SET LC3 ELSE SKIP.
06D1  E0A9          LIT = @A9@.
06D2  F0CA          LCTR.
06D3  F05F          B.
06D4  E041          LIT = @41@.
06D5  F0AF          IF LC3 SET LC3 ELSE SKIP.
06D6  E081          LIT = @81@.
06D7  F05A          A3 = Z.
06D8  46B5          MPCR = NTRHDALN - 1.
                    TEST-25.        HEAD ALIGNMENT - DRIVE 1,F1
06D9  E0B4          LIT = @B4@.
06DA  F0AF          IF LC3 SET LC3 ELSE SKIP.
06DB  E0A9          LIT = @A9@.
06DC  F0CA          LCTR.
06DD  F05F          B.
06DE  E051          LIT = @51@.
06DF  F0AF          IF LC3 SET LC3 ELSE SKIP.
06E0  E091          LIT = @91@.
06E1  F05A          A3 = Z.
06E2  46B5          MPCR = NTRHDALN - 1.
                    TEST-26.        WRITE CURRENT TEST - DRIVE 0,F0
06E3  F054          A3 = B000.
06E4  46F4          MPCR = SECTCOUNT - 1.
                    TEST-27.        WRITE CURRENT TEST - DRIVE 0,F1
06E5  F055          A3 = B001.
06E6  F044          A3 = A3 C.
06E7  DC00          SAR = 12.
06E8  F05F          B.
06E9  46F4          MPCR = SECTCOUNT - 1.
                    TEST-28.        WRITE CURRENT TEST - DRIVE 1,F0
06EA  F055          A3 = B001.
06EB  F044          A3 = A3 C.
06EC  D200          SAR = 2.
06ED  F05F          B.
06EE  46F4          MPCR = SECTCOUNT - 1.
                    TEST-29.        WRITE CURRENT TEST - DRIVE 1,F1
06EF  F0CA          LCTR.
06F0  E0BF          LIT = @BF@.
06F1  F05F          B.
06F2  E010          LIT = @10@.
06F3  F05A          A3 = Z.
06F4  F05F          B.
                    SECTCOUNT.
06F5  F038          A2 = LIT.
06F6  E00F          LIT = 15.                   SECTOR CNT/2
06F7  F05F          B.
06F8  8715          CPCR = SEEKTRKZRO - 1.

06FC  8725          CPCR = WRTNEXSECT0 - 1.
06FD  8730          CPCR = DATAWRITE1 - 1.
06FE  8739          CPCR = TERMTRKZRO - 1.
06FF  8742          CPCR = SECTCHEK - 1.
0700  46F7          MPCR = SECTCOUNT + 2.
0701  8746          CPCR = TRMDELAY - 1.
                    SECTCOUNT2.
0702  F038          A2 = LIT.
0703  E00F          LIT = 15.
0704  F05F          B.
0705  8717          CPCR = SEEKTRK200 - 1.
0706  8727          CPCR = WRTNEXSECT2 - 1.
0707  872E          CPCR = DATAWRITE0 - 1.
0708  873B          CPCR = TERMTRK200 - 1.
0709  8727          CPCR = WRTNEXSECT2 - 1.
070A  8730          CPCR = DATAWRITE1 - 1.
070B  873B          CPCR = TERMTRK200 - 1.
070C  8742          CPCR = SECTCHEK - 1.
070D  4704          MPCR = SECTCOUNT2 + 2.
070E  8746          CPCR = TRMDELAY - 1.
                    READTRK.
070F  8715          CPCR = SEEKTRKZRO - 1.
0710  8756          CPCR = RDNEXSECTZRO - 1.
0711  875F          CPCR = READLOOP - 1.
0712  8717          CPCR = SEEKTRK200 - 1.
0713  8758          CPCR = RDNEXSECT200 - 1.
0714  875F          CPCR = READLOOP - 1.
0715  470E          MPCR = READTRK - 1.
                    SEEKTRKZRO.
0716  C800          LIT = 0 SAR = 8.                TRK ADDR 000
0717  471A          MPCR = SEEKTRK200 + 2.
                    SEEKTRK200.
0718  C819          LIT = @19@ SAR = 8.
0719  F0AF          IF LC3 SET LC3 ELSE SKIP.
071A  E032          LIT = @32@.
071B  F082          B = LIT L.              TRK 200 ADDR
071C  F158          B = BTT1.               SEEK OP CODE
071D  F0DF          MIR = A3 OR B.          SEEK CODE,ADDR,SURF & DR BITS
071E  F099          DW1.                    SEND SEEK TO TRACK
                    STATREAD.
071F  F05E          ASR.                    RESETS READY BUTTON
0720  D400          SAR = 4.
0721  F096          DR1 BEX.                READ STATUS OF SEEK
0722  F07F          B = B R.
0723  F05F          B.
0724  F0C2          IF NOT LST JUMP.
0725  4720          MPCR = STATREAD + 1.
                    WRTNEXSECT0.
0726  C800          LIT = 0 SAR = 8.            TRK ADDR 000
0727  472A          MPCR = WRTNEXSECT2 + 2.
                    WRTNEXSECT2.
0728  C819          LIT = @19@ SAR = 8.                 TRK ADDR 200
0729  F0AF          IF LC3 SET LC3 ELSE SKIP.
072A  E032          LIT = @32@.
072B  F082          B = LIT L.
072C  F087          B = LIT OR B.
072D  E004          LIT = @04@.
072E  4761          MPCR = CNTRLADDRS - 1.
                    DATAWRITE0.
072F  F0E6          MIR = B000.
0730  F0F7          SKIP.
                    DATAWRITE1.
0731  F0E8          MIR = B111.
0732  F0CA          LCTR.                   COUNT OF 120 WORDS
0733  E076          LIT = 118.                COUNT 120 WORDS/SECTOR
0734  F0FC          WHEN SRQ STEP.
0735  F098          DW2.
0736  F0C8          INC, IF COV SKIP.
0737  4733          MPCR = DATAWRITE1 + 2.
0738  F0FC          WHEN SRQ STEP.
0739  F0C9          JUMP.
                    TERMTRKZRO.
073A  C800          LIT = 0 SAR = 8.                TRK ADDR 000
073B  473E          MPCR = TERMTRK200 + 2.
                    TERMTRK200.
073C  C819          LIT = @19@ SAR = 8.                 TRK ADDR 200
073D  F0AF          IF LC3 SET LC3 ELSE SKIP.
073E  E032          LIT = @32@.
073F  F082          B = LIT L.
0740  F087          B = LIT OR B.           TRK ADDR & TERMINATE CODE
0741  E008          LIT = @08@.
0742  4761          MPCR = CNTRLADDRS - 1.
                    SECTCHEK.
0743  F02B          A2 = A2 - 1.            DECREMENT FOR SECTOR COUNT
0744  F0B7          IF NOT AOV SKIP.
0745  F0C9          JUMP.
0746  F1E7          RETN.
                    TRMDELAY.
0747  C700          LIT = 0 SAR = 7.
0748  4748          MPCR = COUNTER - 1.
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```
                    COUNTER.
0749  F023              A2 = AMPCR.
074A  F0CA              LCTR.                    SET # OF CYCLES
074B  F076              B = B111.
074C  F07C              B = B L.
074D  F0F5              SAVE.
074E  F07E              B = B + 1.
074F  F0B6              IF NOT AOV JUMP.
0750  F0BD              IF NOT IRQ SKIP.              READY BUTTON
0751  4417              MPCR = ENDSEEK - 1.
0752  F030              INC.
0753  F02E              IF COV SKIP.                  AT END OF 32 SEC SKIP
0754  474A              MPCR = COUNTER + 1.
0755  F102              AMPCR = A2.
0756  F0C9              JUMP.
                    RDNEXSECTZRO.
0757  C800              LIT = 0 SAR = 8.
0758  475B              MPCR = RDNEXSECT200 + 2.
                    RDNEXSECT200.
0759  C819              LIT = @19@ SAR = 8.
075A  F0AF              IF LC3 SET LC3 ELSE SKIP.
075B  E032              LIT = @32@.
075C  F082              B = LIT L.
075D  F087              B = LIT OR B.
075E  E002              LIT = @02@.                   OP CODE FOR READ NEXT SECT
075F  4761              MPCR = CNTRLADDRS - 1.              SEND READ NEXT SECT
                    READLOOP.
0760  C0E4              LIT = 228 SAR = 0.
0761  4748              MPCR = COUNTER - 1.
                    CNTRLADDRS.
0762  F0DF              MIR = A3 OR B.                SURF BIT,ADDR,DRIVE,OP COD
0763  F099              DW1.
0764  F0C9              JUMP.
                    TEST-9.          SERVICE LATE AND TIME OUT CHK
0765  F058              A3 = LIT.
0766  E001              LIT = @01@.
0767  F0DE              MIR = A3.
0768  F099              DW1.                          SEND SEEK TRK 0
0769  F0F5              SAVE.
076A  F096              DR1 BEX.
076B  F07F              B = B R.
076C  D400              SAR = 4.
076D  F05F              B.
076E  F0B1              IF LST JUMP.                  TEST FOR SEEK COMPLETE
076F  F0BB              IF NOT GC1 SKIP.
0770  47A0              MPCR = LAVLATE - 1.
0771  F0EA              MIR = LIT.
0772  E002              LIT = @02@.
0773  F099              DW1.                          SEND READ NEXT SECTOR
0774  F0F5              SAVE.
0775  F0FC              WHEN SRQ STEP.
0776  F097              DR2 BEX.
0777  F05F              B.
0778  F0B4              IF NOT ABT JUMP.
0779  F0CA              LCTR.
077A  E005              LIT = @05@.
077B  F0F5              SAVE.
077C  F05F              B.
077D  F030              INC.
077E  F0B9              IF NOT COV JUMP.
077F  F0EA              MIR = LIT.
0780  E002              LIT = @02@.
0781  F099              DW1.
0782  F05F              B.
0783  F05F              B.
0784  F05F              B.
0785  F1B5              IF URQ SKIP.
0786  F000              WAIT.                         STINT NOT SET BY LATE
            **********FAILURE          # F80
0787  F097              DR2 BEX.                      RESET DINT
0788  F05F              B.
```

```
0789  F096              DR1 BEX.
078A  F05F              B.
078B  F0B2              IF LST SKIP.
078C  F000              WAIT.                              LATE BIT NOT SET
            **********FAILURE          # F81
078D  F096              DR1 BEX.
078E  F0E1              MIR = B.
078F  F0FF              0 EQV B.
0790  F09D              IF ABT SKIP.
0791  F000              WAIT.                         LATE BIT NOT RESET BY STEN
            *********ERROR       # E21
0792  F0EA              MIR = LIT.
0793  E008              LIT = @08@.
0794  F05F              B.
0795  F0FC              WHEN SRQ STEP.
0796  F099              DW1.                               SEND TERMINATE
0797  F0CA              LCTR.
0798  E0C0              LIT = @C0@.
0799  F0F5              SAVE.
079A  F030              INC.
079B  F05F              B.
079C  F05F              B.
079D  F05F              B.
079E  F0B9              IF NOT COV JUMP.
079F  F006              SET GC1.
07A0  4764              MPCR = TEST-9 - 1.
                    LAVLATE.
07A1  F0EA              MIR = LIT.
07A2  E006              LIT = @06@.
07A3  F099              DW1.                               SEND LOC & VERIFY CW
07A4  F07B              B = B000.
07A5  F0FC              WHEN SRQ STEP.
07A6  F098              DW2.                               SEND LOC & VERIFY ADDRESS
07A7  F0CA              LCTR.
07A8  E008              LIT = @08@.
07A9  F115              A1 = Z.
07AA  E0FF              LIT = @FF@.
07AB  F0FC              WHEN SRQ STEP.
07AC  F097              DR2 BEX.
07AD  F0FD              WHEN URQ STEP.
07AE  F0F5              SAVE.
07AF  F012              A1 = A1 + 1.
07B0  F001              A1.
07B1  F0B4              IF NOT ABT JUMP.
07B2  F096              DR1 BEX.
07B3  F05F              B.
07B4  F0B2              IF LST SKIP.
07B5  F000              WAIT.                              LATE BIT NOT SET
            **********FAILURE          # F83
07B6  F0EA              MIR = LIT.
07B7  E000              LIT = 0.
07B8  F099              DW1.
07B9  F0EA              MIR = LIT.
07BA  E006              LIT = @06@.
07BB  F099              DW1.                               SEND LOC & VERIFY
07BC  F0EA              MIR = LIT.
07BD  E0FF              LIT = @FF@.
07BE  F0FC              WHEN SRQ STEP.
07BF  F098              DW2.                               SEND ADDR VER WORD
07C0  F07B              B = B000.
07C1  F017              A1 = B.
07C2  F0F5              SAVE.
07C3  F05F              B.
07C4  F012              A1 = A1 + 1.
07C5  F001              A1.
07C6  F0B4              IF NOT ABT JUMP.
07C7  F096              DR1 BEX.
07C8  F07D              B = B C.
07C9  DE00              SAR = 14.
07CA  F05F              B.
07CB  F0C3              IF NOT LST SKIP.
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```
07CC  F000    WAIT.                              TIME OUT BIT SET EARLY
              *************FAILURE       # F84
07CD  F0CA    LCTR.
07CE  E060    LIT = @60@.
07CF  F115    A1 = Z.
07D0  E0FF    LIT = @FF@.
07D1  F0F5    SAVE.
07D2  F012    A1 = A1 + 1.
07D3  F001    A1.
07D4  F0B4    IF NOT ABT JUMP.
07D5  F1B5    IF URQ SKIP.
07D6  F000    WAIT.                              STINT NOT SET BY TIME OUT
              *************FAILURE       # F84
07D7  F096    DR1 BEX.
07D8  F07D    B = B C.
07D9  F05F    B.
07DA  F0B2    IF LST SKIP.
07DB  F000    WAIT.                              T.O. BIT NOT IN STATUS WRD
              *************FAILURE       # F85
07DC  F07B    B = B000.
07DD  F0E1    MIR = B.
07DE  F080    B = BMAR.
07DF  F078    B = BOTT.
07E0  F033    A2 = B.
07E1  F017    A1 = B.
07E2  E00F    LIT = @0F@.
07E3  F08F    BR2 = LIT L.
07E4  D800    SAR = 8.
07E5  F05F    B.
07E6  F098    DW2.                               DESELECT DISK
07E7  F0F8    WHEN IRQ STEP.                     IRQ NOT SET BY STINT
              *********                  ERROR # E20
07E8  F108    ASR BEX.
07E9  F0CA    LCTR.
07EA  E0BF    LIT = @BF@.
07EB  F051    A3 = B.
07EC  F0E1    MIR = B.
07ED  F15A    B = CTR.
07EE  F028    A2 = A2 OR B.
07EF  F071    B = A3.
07F0  F116    A2 EQV B.
07F1  F09D    IF ABT SKIP.
07F2  F000    WAIT.                              STATUS WORD ERROR
              *************FAILURE       # F91
07F3  F066    B = A1.
07F4  F16E    BR2 = B.
07F5  F096    DR1 BEX.
07F6  F0FF    0 EQV B.
07F7  F09D    IF ABT SKIP.
07F8  F000    WAIT.                              T.O. BIT NOT RESET BY STEN
              *************FAILURE       # F85
               ENDASRTST.
07F9  F0EA    MIR = LIT.
07FA  E008    LIT = @08@.
07FB  F099    DW1.                   SEND TERMINATE
07FC  F0EA    MIR = LIT.
07FD  E002    LIT = @02@.
07FE  F099    DW1.                   SEND READ NEXT SECTOR
07FF  F0FC    WHEN SRQ STEP.
0800  F080    B = BMAR.
0801  D800    SAR = 8.
0802  F08F    BR2 = LIT L.
0803  E00F    LIT = @0F@.
0804  F098    DW2.
0805  F05F    B.
0806  F18E    IF IRQ SKIP.
0807  F000    WAIT.                       FAILURE # 107
0808  F05E    ASR.
0809  F000    WAIT.                  CHECK ENABLE STATUS LINES
              *************PORT      SELECT CARD-ENABLE STATUS GATING TEST
              *************       TO VERIFY ONLY THE DEVICE GENERATING AN
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              *************          INTERRUPT IS ADDRESSED BY ASR, METER THE
              *************          SIGNALS PERTAINING TO THE PARTICULAR
              *************          PORT SELECT CARDS IN THE SYSTEM.
              *************          ONLY THE SIGNAL CORRESPONDING TO THE
              *************          PORT NO. OF DISK SHOULD BE 0%
              *************          ALL OTHERS SHOULD BE 100%
              *************
              *************          IF YES:FORCE STEP
              *************          IF NO: FAILURE IS PS A5 B5 C5 C7
              **  METER ONLY THOSE SIGNALS PERTAINING TO THE
              **  PARTICULAR PORT SELECT CARDS IN THE SYSTEM.
              **     PORT         PS1-3
              **
              **      12       2J(PSENST12/)
              **      11       1J(PSENST11/)
              **      10       1K(PSENST10/)
              **       9       2B(PSENST09/)
              **                                PS1-2
              **
              **       8                     2J(PSENST8/)
              **       7                     1J(PSENST7/)
              **       6                     1K(PSENST6/)
              **       5                     2B(PSENST5/)
              **                                            PS1-1
              **
              **       4                                  2J(PSENST4/)
              **       3                                  1J(PSENST3/)
              **       2                                  1K(PSENST2/)
              **       1                                  2B(PSENST1/)
              **
              **
080A  F078       B = BOTT.
080B  F16E       BR2 = B.
080C  F0D5       MAR1 = B.
080D  F0F1       MR1.             DO MEM READ WITH OS LINES
              *          .        SET TO DEVICE ADDR TO VERIFY
080E  F058       A3 = LIT.        IT DOES NOT GENERATE A DEVICE READ
080F  C80F       LIT = 15 SAR = 8.
             CPSTST.        DO DATA READ ON ALL PORTS EXCEPT DISK
0810  F05D       ASE.             SELECT BR2
0811  F16D       BR2 = A3 L.      LOAD DECREMENTED ADDR
0812  F056       A3 = BMAR.       SAVE NEW ADDR
0813  F03C       A3 EQV B.        IF NEW ADDR IS THAT OF DISK
0814  F09D       IF ABT SKIP.     DO NOT DO DR
0815  F097       DR2 BEX.
0816  F05F       B.
0817  F18E       IF IRQ SKIP.
0818  F000       WAIT.                PORT SELECT ERROR
              *********               FAILURE # F106
0819  F05E       ASR.             SELECT BR1
081A  F080       B = BMAR.        RESTORE DISK ADDRESS
081B  F046       A3 = A3 R.       RIGHT JUSTIFY
081C  F04B       A3 = A3 - 1.     DECREMENT ADDRESS
081D  F0B7       IF NOT AOV SKIP.
081E  480F       MPCR = CPSTST - 1.
081F  F16E       BR2 = B.         RESTORE DEV ADDR  BR2 = INST/
0820  F07A       B = BITT.                          BR1 = INST
0821  F0D5       MAR1 = B.
0822  F096       DR1 BEX.         STATUS READ
0823  F05F       B.
0824  F0BD       IF NOT IRQ SKIP.
0825  F000       WAIT.            FAILURE F105  DO DR SELECT
0826  F0EA       MIR = LIT.
0827  E008       LIT = @08@.
0828  F099       DW1.             SEND TERMINATE
0829  F05F       B.                        B'S ARE NEEDED TO ALLOW
082A  F05F       B.                        TERMINATE TO COMPLETE
082B  F096       DR1 BEX.
             ASRPRIOR.
082C  8201       CPCR = SET-CONT-DINT - 1.
082D  F0EA       MIR = LIT.
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082E  E005          LIT  = @05@.
082F  F099          DW1.                    ENABLE  MARKS
0830  F0FD          WHEN URQ STEP.
0831  C80F          LIT  = @0F@  SAR  = 8.
0832  F08F          BR2  = LIT  L.
0833  F098          DW2.                    DESELECT
0834  F108          ASR  BEX.
0835  F033          A2  = B.
0836  F0CF          MAR1 = AMPCR.
0837  0153          AMPCR = CONTPORTADDRESS.
0838  F0F1          MR1.                    READ CONT.  ADDR.
0839  F0F9          WHEN RDC BEX.
083A  F116          A2 EQV B.
083B  F09D          IF  ABT  SKIP.
083C  F000          WAIT.             STATUS  ERROR
                *********FAILURE       #F103
083D  8211          CPCR = RESET-CONT-DINT    - 1.
083E  8201          CPCR = SET-CONT-DINT      - 1.          SELECT  CONTROLLER
083F  F18E          IF  IRQ  SKIP.
0840  F000          WAIT.             STINT  RESET  BY  ASR
                *********FAILURE       #F115
0841  F108          ASR  BEX.               DEVICE  ADDR.
0842  F078          B  = B0TT.
0843  F07F          B  = B  R.
0844  F07C          B  = B  L.
0845  F033          A2  = B.
0846  F0CF          MAR1 = AMPCR.
0847  0152          AMPCR = PORTADDRESS.
0848  F0F1          MR1.                    READ DEVICE  ADDRESS
0849  F0F9          WHEN RDC BEX.
084A  F116          A2 EQV B.
084B  F09D          IF  ABT  SKIP.
084C  F000          WAIT.             STATUS  WORD ERROR
                *********FAILURE       #F115
084D  F00C          RESET  GC1.
084E  4043          MPCR = TESTSELECT   - 1.
              TEST-10.          WRITE  INHIBIT,POSTAMBLE      TIME  -  ONE DRIVE
084F  F000          WAIT.
                *       PLACE  DISK  DRIVE  IN  STOP  MODE
                *       SET  WRITE  INHIBIT   PLUG  TO  'WRITE   INHIBIT'
                *       PLACE  DISK  DRIVE  IN  RUN  MODE
                *       OBSERVE  'WRITE  ENABLE'  INDICATOR  IS  OUT
                *       IF  DISAGREE  -  FAILURE  F96
                *       IF  AGREE  -  FORCE  STEP
0850  F018          SET  LC1.
0851  F01F          RESET  GC2.
0852  F054          A3  = B000.
              WRTINHCHK.
0853  F007          A1  = AMPCR.
0854  F0E0          MIR  = A3  OR  LIT.
0855  E001          LIT  = @01@.
0856  F099          DW1.                          SEND  SEEK  -  TRACK  0
0857  C001          LIT  = @01@  SAR  = 0.
0858  8748          CPCR = COUNTER  -  1.
0859  D400          SAR  = 4.
085A  F096          DR1  BEX.                     READ  STATUS
085B  F07D          B  = B  C.
085C  F05F          B.
085D  F0C3          IF  NOT  LST  SKIP.
085E  F000          WAIT.             SEEK  ERROR-RUN  TEST  #0.
              WRTINHCHKA.
085F  891C          CPCR = STWICHK  -  1.
0860  F05C          AMPCR = A1.
0861  F0AB          IF  LC2  SET  LC2  ELSE  SKIP.      (LC2  SET  AT  POSTTIME)
0862  F0C9          JUMP.
0863  F0E0          MIR  = A3  OR  LIT.
0864  C104          LIT  = @04@  SAR  = 1.
0865  F099          DW1.                          SEND  WRITE  NEXT  SECTOR
0866  F05F          B.
0867  F05F          B.
0868  F05F          B.
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0869  F1B5          IF  URQ SKIP.
086A  F000          WAIT.                          ERROR  E18
                *                                  NO STINT  FROM WRITE  INHIBIT
086B  F096          DR1  BEX.
086C  F07D          B  = B  C.
086D  F05F          B.
086E  F0B2          IF  LST  SKIP.
086F  F000          WAIT.                          WRITE  INHIBIT   BIT  NOT  SET
                *                                  FAILURE  #  F99
0870  F0CA          LCTR.
0871  C80F          LIT  = @0F@  SAR  = 8.         WILL  COUNT 32  BYTES
0872  F07B          B  = B000.
0873  F0E1          MIR  = B.                      SET  MIR  EQUAL  TO  ZERO
0874  F01D          A1  = LIT.              TIMER  FOR  DRIVES  WITHOUT  CONT  CL
0875  E0FE          LIT  = @FE@.
0876  F00B          A1  = A1  L.
0877  F0F5          SAVE.
0878  F1AD          IF  NOT  SRQ  SKIP.
0879  487D          MPCR = TRYWICK  -  1.
087A  F012          A1  = A1  + 1.
087B  F001          A1.
087C  F0B4          IF  NOT  ABT  JUMP.
087D  48AB          MPCR = ENDWICK  -  1.
              TRYWICK.
087E  F0F5          SAVE.
087F  F0FC          WHEN SRQ  STEP.
0880  F098          DW2.                           SEND  PREAMBLE   (  2-BYTES)
0881  F030          INC.
0882  F05F          B.
0883  F0B9          IF  NOT  COV  JUMP.
0884  F0EA          MIR  = LIT.                    MIR  =  SYNC  BYTES
0885  E01E          LIT  = @1E@.
0886  F0FC          WHEN SRQ  STEP.
0887  F098          DW2.                           WRITE  SYNC  BYTES
0888  F0E6          MIR  = B000.                   MIR  =  OOOO
0889  F0CA          LCTR.
088A  E05A          LIT  = @5A@.          COUNTER  WILL  COUNT  91  DATA  WORDS
088B  F0F5          SAVE.
088C  F0FC          WHEN SRQ  STEP.
088D  F098          DW2.                           SEND  DATA  (  2-BYTES)
088E  F030          INC.
088F  F10F          A1  = B000.
0890  F0B9          IF  NOT  COV  JUMP.
0891  F0E0          MIR  = A3  OR  LIT.
0892  E008          LIT  = @08@.
0893  F0FC          WHEN SRQ  STEP.
0894  F099          DW1.                           SEND  TERMINATE
0895  F0CA          LCTR.
0896  E0FF          LIT  = @FF@.
0897  F0F5          SAVE.
0898  F030          INC.
0899  F0B9          IF  NOT  COV  JUMP.
089A  891C          CPCR = STWICHK  -  1.          GO  LOCATE  AND  VERIFY
089B  F0E0          MIR  = A3  OR  LIT.
089C  E002          LIT  = @02@.
089D  F099          DW1.                           SEND  READ  NEXT  SECTOR
089E  F0CA          LCTR.
089F  E05A          LIT  = @5A@.          COUNTER  WILL  COUNT  91  DATA  WORDS
08A0  F0F5          SAVE.
08A1  F0FC          WHEN SRQ  STEP.
08A2  F097          DR2  BEX.                      READ  DATA  WORD  INTO  B
08A3  F003          A1  EQV  B.
08A4  F0B5          IF  NOT  ABT  SKIP.
08A5  4931          MPCR = WIERR  -  1.            GO  TO  WRITE  INIBIT   ERROR
08A6  F030          INC.
08A7  F0B9          IF  NOT  COV  JUMP.            TEST  FOR  LAST  WORD
08A8  F0E0          MIR  = A3  OR  LIT.
08A9  E008          LIT  = @08@.
08AA  F0FC          WHEN SRQ  STEP.
08AB  F099          DW1.                           SEND  TERMINATE
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                ENDWICK.
08AC  F058          A3  = LIT.
08AD  C840          LIT  = @40@  SAR  = 8.
08AE  F044          A3  = A3  C.
08AF  F0BF          IF  NOT  LC1  SKIP..
08B0  4852          MPCR  = WRTINHCHK  -  1.
                POSTTIME.
08B1  F008          IF  GC1  SKIP.
08B2  48F1          MPCR  = ONEDRVTIMER  -  1.
                POSTIMER1.
08B3  F000          WAIT.           POSTAMBLE  TIMING  TEST.  TO LOOK AT
                *                   POSTAMBLE  TIME  UNCONDITIONALLY  FOR
                *                   EACH  SURFACE,SET  EXT  SWITCH  AND PUSH
                *                   FST.  IF  ONLY  INTERESTED  IN  INCORRECT
                *                   TIMES  THEN  JUST  PUSH  FST.  IF  ALL
                *                   TIMES  ARE  CORRECT  THE  PROGRAM  WILL
                *                   RETURN  TO  TEST  SELECT,  IF  EXT  IS  OFF.
08B4  F019          SET  LC2.
08B5  884F          CPCR  = TEST-10.        SEEK,LOCATE,VERIFY
08B6  8939          CPCR  = MICROTIMER  -  1.
08B7  890E          CPCR  = POSTTIMECHK  -  1.
                POSTIMER2.
08B8  F019          SET  LC2.
08B9  F058          A3  = LIT.
08BA  E010          LIT  = @10@.    (SET  FOR  SEEK  TO  TOP  DRV  FACE1)
08BB  F05F          B.
08BC  8852          CPCR  = WRTINHCHK  -  1.
08BD  F0E0          MIR  = A3  OR  LIT.
08BE  CF06          LIT  = @06@  SAR  = 15.
08BF  F099          DW1.            SEND  LOCATE  AND  VERIFY    MIR=0016
08C0  F073          B  = A3  L.             (A3  = 0020)
08C1  F07A          B  = BITT.              B=8020
08C2  F0E1          MIR  = B.
08C3  F0FC          WHEN SRQ  STEP.
08C4  F098          DW2.            SEND  ADDRESS  VERIFY  WORD
08C5  F05F          B.
08C6  F05F          B.
08C7  F05F          B.
08C8  F05F          B.
08C9  F0FC          WHEN SRQ  STEP.
08CA  F097          DR2  BEX.
08CB  F0FD          WHEN URQ  STEP.
08CC  F096          DR1  BEX.
08CD  8939          CPCR  = MICROTIMER  -  1.
08CE  890E          CPCR  = POSTTIMECHK  -  1.
                POSTIMER3.
08CF  F0A5          IF  LC1  STEP.
08D0  F01F          RESET  GC2.
08D1  F019          SET  LC2.
08D2  C840          LIT  = @40@  SAR  = 8.
08D3  F057          A3  = LIT  L.           SEEK  TO  DR1  FACE0
08D4  8852          CPCR  = WRTINHCHK  -  1.
08D5  8939          CPCR  = MICROTIMER  -  1.
08D6  890E          CPCR  = POSTTIMECHK  -  1.
                POSTIMER4.
08D7  F019          SET  LC2.
08D8  F0CA          LCTR.
08D9  E0BF          LIT  = @BF@.
08DA  F05A          A3  = Z.
08DB  E010          LIT  = @10@.
08DC  F05F          B.
08DD  8852          CPCR  = WRTINHCHK  -  1.
08DE  F0E0          MIR  = A3  OR  LIT.
08DF  E006          LIT  = @06@.            A3=4010
08E0  F099          DW1.            SEND  LOCATE+VERIFY
08E1  F07B          B  = B000.
08E2  F0EC          MIR  = LIT  OR  B.
08E3  E020          LIT  = @20@.
08E4  F0FC          WHEN SRQ  STEP.
08E5  F098          DW2.            SEND  ADDR  VERIFY  WORD DR1  FC1
08E6  F05F          B.
08E7  F05F          B.
08E8  F05F          B.
08E9  F05F          B.
08EA  F0FC          WHEN SRQ  STEP.
08EB  F097          DR2  BEX.
08EC  F0FD          WHEN URQ  STEP.
08ED  F096          DR1  BEX.
08EE  8939          CPCR  = MICROTIMER  -  1.
08EF  890E          CPCR  = POSTTIMECHK  -  1.
08F0  F01F          RESET  GC2.
08F1  4043          MPCR  = TESTSELECT  -  1.
                ONEDRVTIMER.
08F2  F000          WAIT.           POSTAMBLE  TIMING  TEST  -  ONE DRIVE.
                *                   TO  LOOK  AT  POSTAMBLE  TIME  UNCONDI-
                *                   TIONALLY  FOR  EACH  SURFACE  SET  EXT
                *                   SWITCH  AND  PUSH  FST.  IF  ONLY  INTER-
                *                   ESTED  IN  INCORRECT  TIMES  THEN  JUST
                *                   PUSH  FST.  IF  TIMES  ARE  CORRECT  THE
                *                   PROGRAM  WILL  RETURN  TO  TEST  SELECT
                *                   IF  EXT  IS  OFF.
08F3  F019          SET  LC2.
08F4  8850          CPCR  = TEST-10  + 1.
08F5  8939          CPCR  = MICROTIMER  -  1.
08F6  890E          CPCR  = POSTTIMECHK  -  1.
08F7  F019          SET  LC2.
08F8  F058          A3  = LIT.
08F9  E010          LIT  = @10@.
08FA  F05F          B.
08FB  8852          CPCR  = WRTINHCHK  -  1.
08FC  F0E0          MIR  = A3  OR  LIT.
08FD  CF06          LIT  = @06@  SAR  = 15.
08FE  F099          DW1.                    SEND  LOCATE  + VERIFY
08FF  F073          B  = A3  L.             B  = 0020
0900  F0E1          MIR  = B.
0901  F0FC          WHEN SRQ  STEP.
0902  F098          DW2.            SEND  ADDR  VERIFY  , WORD
0903  F05F          B.
0904  F05F          B.
0905  F05F          B.
0906  F05F          B.
0907  F0FC          WHEN SRQ  STEP.
0908  F097          DR2  BEX.
0909  F0FD          WHEN URQ  STEP.
090A  F096          DR1  BEX.
090B  8939          CPCR  = MICROTIMER  -  1.
090C  890E          CPCR  = POSTTIMECHK  -  1.
090D  F01F          RESET  GC2.
090E  4043          MPCR  = TESTSELECT  -  1.
                POSTTIMECHK.
090F  E05A          LIT  = @5A@.            (90)
0910  F017          A1  = B.
0911  F109          A1  - LIT  -  1.
0912  F0B7          IF  NOT  AOV  SKIP.
0913  4917          MPCR  = POSTTIMECHKA  -  1.
0914  F000          WAIT.       OBSERVE  MIR  FOR  BINARY  VALUE  OF
                *                   UNACCEPTABLE  TIME.  PUSH  FST  BUTTON  FOR
                *                   INDICATION  OF  WHICH  SURFACE  IS  TESTED.
0915  F0DE          MIR  = A3.
0916  F000          WAIT.       OBSERVE  MIR  FOR  PARTICULAR  SURFACE
                *                       MIR  = 0000     -DRIVE   0,F0
                *                       MIR  = 0010     -DRIVE   0,F1
                *                       MIR  = 4000     -DRIVE   1,F0
                *                       MIR  = 4010     -DRIVE   1,F1
                *           FORCE  STEP  TO  CONTINUE  TESTS.
0917  F0C9          JUMP.
                POSTTIMECHKA.
0918  4935          MPCR  = EXTTST  -  1.
0919  F000          WAIT.       OBSERVE  MIR  FOR  BINARY  VALUE  OF
                *                   ACCEPTABLE  TIME.  PUSH  FST  BUTTON  FOR
                *                   INDICATION  OF  WHICH  SURFACE  IS  TESTED.
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091A  F0DE          MIR = A3.
091B  F000          WAIT.       OBSERVE  MIR  FOR  PARTICULAR  SURFACE
                  *                    MIR = 0000    -DRIVE   0,F0
                  *                    MIR = 0010    -DRIVE   0,F1
                  *                    MIR = 4000    -DRIVE   1,F0
                  *                    MIR = 4010    -DRIVE   1,F1
                  *                FORCE  STEP  TO  CONTINUE  TESTS.
091C  F0C9          JUMP.
                  STWICHK.
091D  F0BC          IF  NOT  GC2  SKIP.            GC2  USED  FOR  POSTIME
091E  F0C9          JUMP.
091F  F0E0          MIR = A3  OR  LIT.
0920  E006          LIT = @06@.
0921  F099          DW1.              SEND  LOCATE+VERIFY
0922  F0EE          MIR = LIT  L.
0923  C880          LIT = @80@  SAR = 8.
0924  F0A8          IF  LC1  SET  LC1  SKIP.
0925  F0E6          MIR = B000.
0926  F0FC          WHEN SRQ  STEP.              FAILURE  #F116
0927  F098          DW2.              SEND  ADDR  VERIFY  WORD
0928  F05F          B.
0929  F05F          B.
092A  F05F          B.
092B  F05F          B.
092C  F0FC          WHEN SRQ  STEP.     IF  ONLY  ONE  DISK  DRIVE  IN  UNIT,
                  *                     PRESS  FST.  IF  UNIT  HAS  TWO  DRIVES
                  *                     THERE  ARE  COMPATIABILITY  PROBLEMS
092D  F0C5          IF  SRQ  THEN  DR2  BEX  SKIP.
092E  4933          MPCR = ONEDRVFLG  -  1.
092F  F0FD          WHEN URQ  STEP.
0930  F096          DR1  BEX.
0931  F0C9          JUMP.
                  WIERR.
0932  F0DE          MIR = A3.
0933  F000          WAIT.             WRITE  NOT  INHIBITED-FAILURE      #F100.
                  ONEDRVFLG.
0934  F0A5          IF  LC1  STEP.
0935  485E          MPCR = WRTINHCHKA  -  1.
                  EXTTST.
0936  F0BA          IF  NOT  EXT  SKIP.
0937  F0A0          IF  EXT  SKIP.
0938  491B          MPCR = POSTTIMECHKA  + 3.
0939  4918          MPCR = POSTTIMECHKA.
                  MICROTIMER.
093A  F023          A2 = .AMPCR.
093B  F0E0          MIR = A3  OR  LIT.
093C  E002          LIT = @02@.
093D  F099          DW1.              SEND  READ  NEXT  SECTOR
093E  F0CA          LCTR.
093F  E05A          LIT = @5A@.
0940  F0F5          SAVE.
0941  F0FC          WHEN SRQ  STEP.
0942  F097          DR2  BEX.         READ  DATA  WORD
0943  F030          INC.
0944  F0B9          IF  NOT  COV  JUMP.    TEST  FOR  LRC  WORD
0945  F0E0          MIR = A3  OR  LIT.
0946  E005          LIT = @05@.
0947  F099          DW1.              SEND  ENABLE  MARKS  COMMAND
0948  F0CA          LCTR.
0949  C7FF          LIT = @FF@  SAR = 7.
094A  F096          DR1  BEX.         RESET  STINT  FROM  WIH
094B  F0F5          SAVE.
094C  F030          INC.
094D  F1B3          IF  URQ,  SET  GC2,  ELSE  JUMP.          LOOK  FOR  SECTOR  M
094E  F15A          B = CTR.
094F  F07F          B = B  R.
0950  F083          B = LIT  + B.
0951  E00A          LIT = @0A@.
0952  F0E1          MIR = B.          MIR  CONTAINS  TIME  IN  BINARY  VALUE
0953  F102          AMPCR = A2.
0954  F05F          B.
0955  F0C9          JUMP.
                  TEST-11.          WRITE  INHIBIT,POSTAMBLE      TIME  -  TWO DRIVES
0956  F000          WAIT.
                  *       PLACE  BOTH  DISK  DRIVES  IN  STOP  MODE
                  *       SET  WRITE  INHIBIT  PLUGS  TO  'WRITE  INHIBIT'
                  *       PLACE  TOP  DISK  CARTRDG  IN  BOTTOM  DRIVE
                  *       PLACE  BOTTOM  DISK  CARTRDG  IN  TOP  DRIVE
                  *       PLACE  BOTH  DISK  DRIVES  IN  RUN  MODE
                  *       OBSERVE  BOTH  'WRITE  ENABLE'  INDICATORS  ARE  OUT
                  *       IF  DISAGREE  -  FAILURE  F96
                  *       IF  AGREE  -  FORCE  STEP
0957  F006          SET  GC1.
0958  484F          MPCR = TEST-10.
                  TEST-14.          DISK  DETENT  TEST  -  TOP  DRIVE
0959  F000          WAIT.             DISK  DETENT  TEST.  TO  BEGIN  TEST  PRESS      D
                  *                   FORCE  STEP.  TEST  WILL  RUN  APPROXIMATELY     D
                  *                   8  MINUTES.  IF  LONGER  EXHAUSTIVE  TEST  IS    D
                  *                   DESIRED  SET  EXT  SWITCH.  TO  EXIT  THIS       D
                  *                   LONGER  TEST  PRESS  READY/INPUT  REQUEST.       D
095A  F0A5          IF  LC1  STEP.
095B  F0A9          IF  LC2  STEP.
095C  F10F          A1 = B000.
095D  F057          A3 = LIT  L.
095E  CB64          LIT = @64@  SAR = 11.
095F  F05F          B.
                  DTENT1.
0960  89C8          CPCR = SETCNTR  -  1.
0961  89CB          CPCR = SEEKANYTRK  -  1.
0962  89CF          CPCR = STATUSRD  -  1.
                  DTENT2.
0963  89D8          CPCR = RDNEXSECT  -  1.
0964  89E1          CPCR = CHKADDR  -  1.
0965  89EF          CPCR = TERMINATE  -  1.
0966  4962          MPCR = DTENT2  -  1.
                  DTENT2A.
0967  89EF          CPCR = TERMINATE  -  1.
0968  89F4          CPCR = CHNGTRK  -  1.
0969  F1A4          IF  NOT  LC1  SET  LC1,  SKIP.
096A  8A00          CPCR = SUBTRK  -  1.
096B  89FC          CPCR = ADDTRKS  -  1.
096C  495F          MPCR = DTENT1  -  1.
                  DSKDTENTII.
096D  F019          SET  LC2.
096E  F0A5          IF  LC1  STEP.
096F  F10F          A1 = B000.
                  SEEKBASE.
0970  F054          A3 = B000.
                  DTENT3.
0971  89C8          CPCR = SETCNTR  -  1.
0972  89CB          CPCR = SEEKANYTRK  -  1.
0973  89CF          CPCR = STATUSRD  -  1.
                  DTENT4.
0974  89D8          CPCR = RDNEXSECT  -  1.
0975  89E1          CPCR = CHKADDR  -  1.
0976  89EF          CPCR = TERMINATE  -  1.
0977  4973          MPCR = DTENT4  -  1.
                  DTENT5.
0978  89EF          CPCR = TERMINATE  -  1.
0979  F0A8          IF  LC1  SET  LC1,  SKIP.
097A  8A04          CPCR = CHNGTRKII  -  1.
097B  F1A4          IF  NOT  LC1  SET  LC1,  SKIP.
097C  496F          MPCR = SEEKBASE  -  1.
097D  89FC          CPCR = ADDTRKS  -  1.
097E  4970          MPCR = DTENT3  -  1.
                  DTENT6.
097F  89C8          CPCR = SETCNTR  -  1.
0980  89CB          CPCR = SEEKANYTRK  -  1.
0981  89CF          CPCR = STATUSRD  -  1.
```

```
                    DTENT7.
0982  8A2D              CPCR  =  RDSECTFIVE   -  1.
0983  89E1              CPCR  =  CHKADDR  -  1.
0984  89EF              CPCR  =  TERMINATE  -  1.
0985  4981              MPCR  =  DTENT7  -  1.
                    DTENT8.
0986  89EF              CPCR  =  TERMINATE  -  1.
0987  F0A8              IF  LC1  SET  LC1,  SKIP.
0988  8A27              CPCR  =  CHNGTRKFIVE  -  1.
0989  F1A4              IF  NOT  LC1  SET  LC1,  SKIP.
098A  8A4F              CPCR  =  SEEKBASE1  -  1.
098B  8A3B              CPCR  =  ADDTRKFIVE  -  1.
098C  F0BD              IF  NOT  IRQ  SKIP.
098D  4417              MPCR  =  ENDSEEK  -  1.
098E  497E              MPCR  =  DTENT6  -  1.
                    TEST-15.          DISK  DETENT  TEST  -  BOTTOM  DRIVE
098F  F000              WAIT.          DISK  DETENT  TEST.  TO BEGIN  TEST  PRESS      D
                    *                  FORCE  STEP.  TEST  WILL  RUN APPROXIMATELY    D
                    *                  8  MINUTES.  IF  LONGER  EXHAUSTIVE  TEST  IS  D
                    *                  DESIRED  SET  EXT  SWITCH.  TO EXIT  THIS      D
                    *                  LONGER  TEST  PRESS  READY/INPUT  REQUEST.     D
                    *                                                                 D
0990  F0A5              IF  LC1  STEP.
0991  F0A9              IF  LC2  STEP.
0992  F10F              A1  =  B000.
0993  F0CA              LCTR.
0994  E0B3              LIT  =  @B3@.
0995  F05A              A3  =  Z.          BTM  DR  TRK  100
0996  E080              LIT  =  @80@.
0997  F05F              B.
                    DTENT21.
0998  89C8              CPCR  =  SETCNTR  -  1.
0999  89CB              CPCR  =  SEEKANYTRK  -  1.
099A  89CF              CPCR  =  STATUSRD  -  1.
                    DTENT22.
099B  8A63              CPCR  =  RDSECTTWO  -  1.
099C  8A6C              CPCR  =  CHKADDR2  -  1.
099D  89EF              CPCR  =  TERMINATE  -  1.
099E  499A              MPCR  =  DTENT22  -  1.
                    DTENT23.
099F  89EF              CPCR  =  TERMINATE  -  1.
09A0  8A7A              CPCR  =  CHANGETRK2  -  1.
09A1  F1A4              IF  NOT  LC1  SET  LC1,  SKIP.
09A2  8A00              CPCR  =  SUBTRK  -  1.
09A3  89FC              CPCR  =  ADDTRKS  -  1.
09A4  4997              MPCR  =  DTENT21  -  1.
                    DSKDTENTIII.
09A5  F019              SET  LC2.
09A6  F0A5              IF  LC1  STEP.
09A7  F10F              A1  =  B000.
                    SEEKBASE2.
09A8  F057              A3  =  LIT  L.
09A9  C840              LIT  =  @40@  SAR  =  8.
09AA  F05F              B.
                    DTENT24.
09AB  89C8              CPCR  =  SETCNTR  -  1.
09AC  89CB              CPCR  =  SEEKANYTRK  -  1.
09AD  89CF              CPCR  =  STATUSRD  -  1.
                    DTENT25.
09AE  8A63              CPCR  =  RDSECTTWO  -  1.
09AF  8A6C              CPCR  =  CHKADDR2  -  1.
09B0  89EF              CPCR  =  TERMINATE  -  1.
09B1  49AD              MPCR  =  DTENT25  -  1.
                    DTENT26.
09B2  89EF              CPCR  =  TERMINATE  -  1.
09B3  F0A8              IF  LC1  SET  LC1,  SKIP.
09B4  8A82              CPCR  =  CHANGETRK3  -  1.
09B5  F1A4              IF  NOT  LC1  SET  LC1,  SKIP.
09B6  89A7              CPCR  =  SEEKBASE2  -  1.
09B7  89FC              CPCR  =  ADDTRKS  -  1.
09B8  49AA              MPCR  =  DTENT24  -  1.
```

```
                    DSKDTENTIV.
09B9  89C8              CPCR  =  SETCNTR  -  1.
09BA  89CB              CPCR  =  SEEKANYTRK  -  1.
09BB  89CF              CPCR  =  STATUSRD  -  1.
                    DTENT27.
09BC  8A34              CPCR  =  RDSECTFIVE2  -  1.
09BD  8A6C              CPCR  =  CHKADDR2  -  1.
09BE  89EF              CPCR  =  TERMINATE  -  1.
09BF  49BB              MPCR  =  DTENT27  -  1.
                    DTENT28.
09C0  89EF              CPCR  =  TERMINATE  -  1.
09C1  F0A8              IF  LC1  SET  LC1,  SKIP.
09C2  8A27              CPCR  =  CHNGTRKFIVE  -  1.
09C3  F1A4              IF  NOT  LC1  SET  LC1,  SKIP.
09C4  8A56              CPCR  =  SEEKBASE3  -  1.
09C5  8A43              CPCR  =  ADDTRKFIVE2  -  1.
09C6  F0BD              IF  NOT  IRQ  SKIP.
09C7  4417              MPCR  =  ENDSEEK  -  1.
09C8  49B8              MPCR  =  DSKDTENTIV  -  1.
                    SETCNTR.
09C9  F0CA              LCTR.
09CA  E05F              LIT  =  @5F@.
09CB  F0C9              JUMP.
                    SEEKANYTRK.
09CC  F0E0              MIR  =  A3  OR  LIT.
09CD  E001              LIT  =  @01@.
09CE  F099              DW1.              SEND  SEEK
09CF  F0C9              JUMP.
                    STATUSRD.
09D0  F05E              ASR.
09D1  D400              SAR  =  4.
09D2  F096              DR1  BEX.         READ  STATUS  OF  SEEK
09D3  F07D              B  =  B  C.
09D4  F05F              B.
09D5  F0C2              IF  NOT  LST  JUMP.
09D6  F0B3              IF  MST  SKIP.
09D7  49D1              MPCR  =  STATUSRD  +  1.
09D8  F000              WAIT.      SEEK  ERROR  -  DETENT  PROBLEM  IN  DRIVE
                    RDNEXSECT.
09D9  F0E0              MIR  =  A3  OR  LIT.
09DA  E002              LIT  =  @02@.
09DB  F099              DW1.              SEND  READ  NEXT  SECTOR
09DC  F030              INC.
09DD  F02E              IF  COV  SKIP.
09DE  F0C9              JUMP.
09DF  F0AC              IF  LC2  SET  LC2,  SKIP.
09E0  4966              MPCR  =  DTENT2A  -  1.
09E1  4977              MPCR  =  DTENT5  -  1.
                    CHKADDR.
09E2  F0FC              WHEN SRQ  STEP.
09E3  F097              DR2  BEX.
09E4  F078              B  =  B0TT.
09E5  F084              B  =  LIT  NRI  B.
09E6  C13F              LIT  =  @3F@  SAR  =  1.
09E7  F07F              B  =  B  R.
09E8  F03C              A3  EQV  B.
09E9  F0B5              IF  NOT  ABT  SKIP.
09EA  F0C9              JUMP.
09EB  F0DE              MIR  =  A3.       EXPECTED  TRACK
09EC  F000              WAIT.      ADDRESS  ERROR-PROBLEM  IN  DRIVE
09ED  F0E1              MIR  =  B.        ACTUAL  TRACK
09EE  F000              WAIT.
09EF  4417              MPCR  =  ENDSEEK  -  1.
                    TERMINATE.
09F0  F0E0              MIR  =  A3  OR  LIT.
09F1  E008              LIT  =  @08@.
09F2  F0FC              WHEN SRQ  STEP.
09F3  F099              DW1.              SEND  TERMINATE
09F4  F0C9              JUMP.
```

```
                    CHNGTRK.
09F5  F012              A1  =  A1  +  1.
09F6  C5C9              LIT  =  @C9@  SAR  =  5.
09F7  F111              A1  EQV  LIT.
09F8  F0B5              IF  NOT  ABT  SKIP.
09F9  496C              MPCR  =  DSKDTENTII  -  1.
09FA  F066              B  =  A1.
09FB  F046              A3  =  A3  R.
09FC  F0C9              JUMP.
                    ADDTRKS.
09FD  F04D              A3  =  A3  +  B.
09FE  F092              CSAR.
09FF  F045              A3  =  A3  L.
0A00  F0C9              JUMP.
                    SUBTRK.
0A01  F131              A3  =  A3  -  B.
0A02  F092              CSAR.
0A03  F045              A3  =  A3  L.
0A04  F1E7              RETN.
                    CHNGTRKII.
0A05  F012              A1  =  A1  +  1.
0A06  C5C9              LIT  =  @C9@  SAR  =  5.
0A07  F111              A1  EQV  LIT.
0A08  F0B5              IF  NOT  ABT  SKIP.
0A09  4A0C              MPCR  =  CHNGBASE  -  1.
0A0A  F066              B  =  A1.
0A0B  F046              A3  =  A3  R.
0A0C  F0C9              JUMP.
                    CHNGBASE.
0A0D  F046              A3  =  A3  R.
0A0E  D500              SAR  =  5.
0A0F  F04E              A3  =  A3  +  LIT.
0A10  E005              LIT  =  @05@.
0A11  F03E              A3  EQV  LIT.
0A12  E0C8              LIT  =  @C8@.
0A13  F0B5              IF  NOT  ABT  SKIP.
0A14  4A8A              MPCR  =  CHKEXTSWH  -  1.
0A15  F092              CSAR.
0A16  F045              A3  =  A3  L.
0A17  F10F              A1  =  B000.
0A18  497E              MPCR  =  DTENT6  -  1.
                    CHNGBASE2.
0A19  F046              A3  =  A3  R.
0A1A  D500              SAR  =  5.
0A1B  F04E              A3  =  A3  +  LIT.
0A1C  E005              LIT  =  @05@.
0A1D  F05F              B.
0A1E  F0CA              LCTR.
0A1F  E0FD              LIT  =  @FD@.
0A20  F03F              A3  EQV  Z.
0A21  E0C8              LIT  =  @C8@.
0A22  F0B5              IF  NOT  ABT  SKIP.
0A23  4A91              MPCR  =  CHKEXTSWH2  -  1.
0A24  F092              CSAR.
0A25  F045              A3  =  A3  L.
0A26  F10F              A1  =  B000.
0A27  49B8              MPCR  =  DSKDTENTIV  -  1.
                    CHNGTRKFIVE.
0A28  F011              A1  =  A1  +  LIT.
0A29  E005              LIT  =  @05@.
0A2A  F066              B  =  A1.
0A2B  F046              A3  =  A3  R.
0A2C  D500              SAR  =  5.
0A2D  F0C9              JUMP.
                    RDSECTFIVE.
0A2E  F0E0              MIR  =  A3  OR  LIT.
0A2F  E002              LIT  =  @02@.
0A30  F099              DW1.                SEND  READ  NEXT  SECTOR
0A31  F030              INC.
0A32  F02E              IF  COV  SKIP.
0A33  F0C9              JUMP.
0A34  4985              MPCR  =  DTENT8  -  1.
                    RDSECTFIVE2.
0A35  F0E0              MIR  =  A3  OR  LIT.
0A36  E002              LIT  =  @02@.
0A37  F099              DW1.
0A38  F030              INC.
0A39  F02E              IF  COV  SKIP.
0A3A  F0C9              JUMP.
0A3B  49BF              MPCR  =  DTENT28  -  1.
                    ADDTRKFIVE.
0A3C  F04D              A3  =  A3  +  B.
0A3D  F03E              A3  EQV  LIT.
0A3E  E0CD              LIT  =  @CD@.
0A3F  F0B5              IF  NOT  ABT  SKIP.
0A40  4A5D              MPCR  =  RESTOREBASE  -  1.
0A41  F092              CSAR.
0A42  F045              A3  =  A3  L.
0A43  F0C9              JUMP.
                    ADDTRKFIVE2.
0A44  F04D              A3  =  A3  +  B.
0A45  F05F              B.
0A46  F0CA              LCTR.
0A47  E0FD              LIT  =  @FD@.
0A48  F05F              B.
0A49  E0CD              LIT  =  @CD@.
0A4A  F03F              A3  EQV  Z.
0A4B  F0B5              IF  NOT  ABT  SKIP.
0A4C  4A60              MPCR  =  RESTORE2  -  1.
0A4D  F092              CSAR.
0A4E  F045              A3  =  A3  L.
0A4F  F0C9              JUMP.
                    SEEKBASE1.
0A50  F066              B  =  A1.
0A51  F046              A3  =  A3  R.
0A52  D500              SAR  =  5.
0A53  F131              A3  =  A3  -  B.
0A54  F092              CSAR.
0A55  F045              A3  =  A3  L.
0A56  F1E7              RETN.
                    SEEKBASE3.
0A57  F066              B  =  A1.
0A58  F046              A3  =  A3  R.
0A59  D500              SAR  =  5.
0A5A  F131              A3  =  A3  -  B.
0A5B  F092              CSAR.
0A5C  F045              A3  =  A3  L.
0A5D  F1E7              RETN.
                    RESTOREBASE.
0A5E  F131              A3  =  A3  -  B.
0A5F  F05F              B.
0A60  4A0E              MPCR  =  CHNGBASE  +  1.
                    RESTORE2.
0A61  F131              A3  =  A3  -  B.
0A62  F05F              B.
0A63  4A1A              MPCR  =  CHNGBASE2  +  1.
                    RDSECTTWO.
0A64  F0E0              MIR  =  A3  OR  LIT.
0A65  E002              LIT  =  @02@.
0A66  F099              DW1.
0A67  F030              INC.
0A68  F02E              IF  COV  SKIP.
0A69  F0C9              JUMP.
0A6A  F0AC              IF  LC2  SET  LC2,  SKIP.
0A6B  499E              MPCR  =  DTENT23  -  1.
0A6C  49B1              MPCR  =  DTENT26  -  1.
                    CHKADDR2.
0A6D  F0FC              WHEN SRQ  STEP.
0A6E  F097              DR2  BEX.
0A6F  F07A              B  =  BITT.
0A70  F084              B  =  LIT  NRI  B.
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0A71  C13F          LIT  = @3F@  SAR  = 1.
0A72  F07F          B = B R.
0A73  F03C          A3  EQV  B.
0A74  F0B5          IF  NOT  ABT  SKIP.
0A75  F0C9          JUMP.
0A76  F0DE          MIR  = A3.        EXPECTED  TRACK
0A77  F000          WAIT.      ADDRESS  ERROR-PROBLEM  IN  DRIVE
0A78  F0E1          MIR  = B.
0A79  F000          WAIT.              ACTUAL  TRACK
0A7A  4417          MPCR  = ENDSEEK  -  1.
                CHANGETRK2.
0A7B  F012          A1  = A1  + 1.
0A7C  C5C9          LIT  = @C9@  SAR  = 5.
0A7D  F111          A1  EQV  LIT.
0A7E  F0B5          IF  NOT  ABT  SKIP.
0A7F  49A4          MPCR  = DSKDTENTIII     -  1.
0A80  F066          B = A1.
0A81  F046          A3  = A3  R.
0A82  F0C9          JUMP.
                CHANGETRK3.
0A83  F012          A1  = A1  + 1.
0A84  C5C9          LIT  = @C9@  SAR  = 5.
0A85  F111          A1  EQV  LIT.
0A86  F0B5          IF  NOT  ABT  SKIP.
0A87  4A18          MPCR  = CHNGBASE2  -  1.
0A88  F066          B = A1.
0A89  F046          A3  = A3  R.
0A8A  F0C9          JUMP.
                CHKEXTSWH.
0A8B  4A99          MPCR  = EXTTSTII  -  1.
0A8C  F054          A3  = B000.
0A8D  F0E0          MIR  = A3  OR  LIT.
0A8E  E001          LIT  = @01@.
0A8F  F099          DW1.
0A90  F000          WAIT.              TEST  COMPLETED  FST.
0A91  4043          MPCR  = TESTSELECT  -  1.
                CHKEXTSWH2.
0A92  4A9D          MPCR  = EXTTSTIII     -  1.
0A93  F057          A3  = LIT  L.
0A94  C840          LIT  = @40@  SAR  = 8.
0A95  F0E0          MIR  = A3  OR  LIT.
0A96  E001          LIT  = @01@.
0A97  F099          DW1.
0A98  F000          WAIT.              TEST  COMPLETED  FST
0A99  4043          MPCR  = TESTSELECT  -  1.
                EXTTSTII.
0A9A  F0BA          IF  NOT  EXT  SKIP.
0A9B  F0A0          IF  EXT  SKIP.
0A9C  4A8B          MPCR  = CHKEXTSWH.
0A9D  495C          MPCR  = TEST-14  +  3.
                EXTTSTIII.
0A9E  F0BA          IF  NOT  EXT  SKIP.
0A9F  F0A0          IF  EXT  SKIP.
0AA0  4A92          MPCR  = CHKEXTSWH2.
0AA1  4992          MPCR  = TEST-15  +  3.
                TEST-20.          DISCRIMINATOR  ADJUSTMENT
0AA2  F0CA          LCTR.
0AA3  E0F3          LIT  = @F3@.
0AA4  F05A          A3  = Z.
0AA5  E080          LIT  = @80@.
0AA6  8B0D          CPCR  = SEEK  -  1.
0AA7  C001          LIT  = @01@  SAR  = 0.
0AA8  8748          CPCR  = COUNTER  -  1.
0AA9  8B11          CPCR  = STATUS  -  1.
0AAA  8B18          CPCR  = MARKS  -  1.
0AAB  F01D          A1  = LIT.
0AAC  E060          LIT  = @60@.
0AAD  F0F5          SAVE.
0AAE  F0FD          WHEN URQ  STEP.
0AAF  F096          DR1  BEX.
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0AB0  F003          A1  EQV  B.
0AB1  F09D          IF  ABT  SKIP.
0AB2  F0C9          JUMP.
0AB3  F0CA          LCTR.
0AB4  E0E6          LIT  = @E6@.
0AB5  F128          A2  = Z.
0AB6  E001          LIT  = @01@.
0AB7  F0E0          MIR  = A3  OR  LIT.
0AB8  E002          LIT  = @02@.
0AB9  F099          DW1.                          SEND  READ  NEXT  SECTOR
0ABA  F0CA          LCTR.
0ABB  E05B          LIT  = @5B@.
0ABC  F0F5          SAVE.
0ABD  F0FC          WHEN SRQ  STEP.
0ABE  F097          DR2  BEX.
0ABF  F116          A2  EQV  B.
0AC0  F09D          IF  ABT  SKIP.
0AC1  4AE2          MPCR  = DISADJERR  -  1.
0AC2  F030          INC.
0AC3  F02E          IF  COV  SKIP.
0AC4  F0C9          JUMP.
0AC5  F0FC          WHEN SRQ  STEP.
0AC6  F097          DR2  BEX.                     READ  LRC
0AC7  F05F          B.
0AC8  F09D          IF  ABT  SKIP.
0AC9  4AE2          MPCR  = DISADJERR  -  1.      LRC  ERROR
0ACA  F0EA          MIR  = LIT.
0ACB  E008          LIT  = @08@.
0ACC  F0FC          WHEN SRQ  STEP.
0ACD  F099          DW1.
0ACE  F0CA          LCTR.
0ACF  E057          LIT  = @57@.
0AD0  F0F5          SAVE.
0AD1  F030          INC.
0AD2  F02E          IF  COV  SKIP.
0AD3  F0C9          JUMP.
0AD4  F18E          IF  IRQ  SKIP.
0AD5  4AA1          MPCR  = TEST-20  -  1.
0AD6  F108          ASR  BEX.
0AD7  F017          A1  = B.
0AD8  F10B          A1  = A1  C.
0AD9  D100          SAR  = 1.
0ADA  F001          A1.
0ADB  F0C3          IF  NOT  LST  SKIP.
0ADC  4417          MPCR  = ENDSEEK  -  1.
0ADD  F10B          A1  = A1  C.
0ADE  D200          SAR  = 2.
0ADF  F001          A1.
0AE0  F0C3          IF  NOT  LST  SKIP.
0AE1  4417          MPCR  = ENDSEEK  -  1.
0AE2  4AA1          MPCR  = TEST-20  -  1.
                DISADJERR.
0AE3  F0E0          MIR  = A3  OR  LIT.
0AE4  E008          LIT  = @08@.
0AE5  F099          DW1.        SEND  TERMINATE
0AE6  80B9          CPCR  = ALARM  -  1.
0AE7  4AA1          MPCR  = TEST-20  -  1.
                TEST-12.          RPM  TIME  TEST  -  TOP  DRIVE
0AE8  F00C          RESET  GC1.
0AE9  F0A5          IF  LC1  STEP.
0AEA  F054          A3  = B000.
0AEB  8B0D          CPCR  = SEEK  -  1.
0AEC  C001          LIT  = @01@  SAR  = 0.
0AED  8748          CPCR  = COUNTER  -  1.
0AEE  8B11          CPCR  = STATUS  -  1.
0AEF  8B18          CPCR  = MARKS  -  1.
0AF0  F01D          A1  = LIT.
0AF1  E00F          LIT  = @0F@.
0AF2  F096          DR1  BEX.
```

```
                    READY.
0AF3  C700              LIT  = @00@  SAR  = 7.
0AF4  F0FD              WHEN URQ STEP.
0AF5  8748              CPCR = COUNTER - 1.
0AF6  F096              DR1 BEX.
0AF7  8B1C              CPCR = SECTORTIME  - 1.
                    READY1.
0AF8  F0A8              IF LC1 SET LC1,  SKIP.
0AF9  8B2A              CPCR = SETUPA3  - 1.
0AFA  8B2F              CPCR = MEMWRITE - 1.
0AFB  8B3B              CPCR = COUNTSECTORS  - 1.
0AFC  4AF2              MPCR = READY - 1.
0AFD  8B5C              CPCR = STOPMARKS - 1.
0AFE  8B2A              CPCR = SETUPA3  - 1.
                    TESTLIMITS.
0AFF  F0CA              LCTR.
0B00  E0FB              LIT  = @FB@.
0B01  F128              A2 = Z.
0B02  E0D1              LIT  = @D1@.
0B03  F05F              B.
0B04  F0CA              LCTR.
0B05  E0FB              LIT  = @FB@.
0B06  F115              A1 = Z.
0B07  E0F3              LIT  = @F3@.
0B08  8B3F              CPCR = TIMECHECK  - 1.
0B09  F024              A2 = A1.
                    DISPLYRETN.
0B0A  8B4F              CPCR = CHKMEMADDR - 1.
0B0B  4AFE              MPCR = TESTLIMITS  - 1.
0B0C  F01F              RESET  GC2.
0B0D  4043              MPCR = TESTSELECT  - 1.
                    SEEK.
0B0E  F0E0              MIR = A3 OR LIT.
0B0F  E001              LIT  = @01@.
0B10  F099              DW1.
0B11  F0C9              JUMP.
                    STATUS.
0B12  D400              SAR = 4.
0B13  F096              DR1 BEX.
0B14  F07D              B = B C.
0B15  F05F              B.
0B16  F0C3              IF NOT LST SKIP.
0B17  F000              WAIT.            SEEK ERROR-RUN TST #0
0B18  F0C9              JUMP.
                    MARKS.
0B19  F0E0              MIR = A3 OR LIT.
0B1A  E005              LIT  = @05@.          SEND MARKS
0B1B  F099              DW1.
0B1C  F0C9              JUMP.
                    SECTORTIME.
0B1D  F0CA              LCTR.
0B1E  C7FF              LIT  = @FF@ SAR = 7.
0B1F  F0F5              SAVE.
0B20  F030              INC.
0B21  F1B3              IF URQ, SET GC2,  ELSE JUMP.
0B22  F15A              B = CTR.
0B23  F07F              B = B R.
0B24  F0CA              LCTR.
0B25  E0FB              LIT  = @FB@.
0B26  F128              A2 = Z.          1048  MS
0B27  E018              LIT  = @18@.
0B28  F06B              B = A2 + B.
0B29  F0E1              MIR = B.
0B2A  4AF7              MPCR = READY1 - 1.
                    SETUPA3.
0B2B  F055              A3 = B001.
0B2C  F044              A3 = A3 C.          4096
0B2D  D400              SAR = 4.
0B2E  F018              SET LC1.
0B2F  F0C9              JUMP.
```

```
                    MEMWRITE.
0B30  F04C              A3 = A3 + 1.
0B31  F0D2              MAR1 = A3.
0B32  F0F3              MW1.
0B33  F05F              B.
0B34  F05D              ASE.
0B35  F080              B = BMAR.
0B36  F07A              B = B1TT.
0B37  F0D5              MAR1 = B.
0B38  F0CE              LMAR.
0B39  E000              LIT  = 0.
0B3A  F096              DR1 BEX.          RESET
0B3B  F0C9              JUMP.
                    COUNTSECTORS.
0B3C  F00F              A1 = A1 - 1.
0B3D  F09E              IF AOV SKIP.
0B3E  F1E7              RETN.
0B3F  F0C9              JUMP.
                    TIMECHECK.
0B40  F04C              A3 = A3 + 1.
0B41  F0D2              MAR1 = A3.
0B42  F0F1              MR1.
0B43  F0F9              WHEN RDC BEX.
0B44  F119              A2 - B.
0B45  F0B7              IF NOT AOV SKIP.
0B46  4B57              MPCR = DISPLAYTIME  - 1.
0B47  F09A              EXEC.
0B48  F119              A2 - B.
0B49  F09E              IF AOV SKIP.
0B4A  4B57              MPCR = DISPLAYTIME  - 1.
0B4B  F0BA              IF NOT EXT SKIP.
0B4C  F0A0              IF EXT SKIP.
0B4D  F0F7              SKIP.
0B4E  4B57              MPCR = DISPLAYTIME  - 1.
0B4F  F1E7              RETN.
                    CHKMEMADDR.
0B50  F0CA              LCTR.
0B51  E0EF              LIT  = @EF@.
0B52  F05F              B.
0B53  E010              LIT  = @10@.
0B54  F03F              A3 EQV Z.
0B55  F0B5              IF NOT ABT SKIP.
0B56  F1E7              RETN.
0B57  F0C9              JUMP.
                    DISPLAYTIME.
0B58  F0DE              MIR = A3.
0B59  F000              WAIT.  MIR CONTAINS MEMORY LOCATION ADDRESS.  THE
                    *          LEAST SIGNIFICANT  DIGIT CORRESPONDS TO THE
                    *          NUMBER OF SECTORS THAT HAVE PASSED.  FST
                    *          FOR THE TIME OF THE LAST SECTOR READ.
0B5A  F0E1              MIR = B.
0B5B  F000              WAIT.  MIR NOW CONTAINS THIS SECTOR TIME IN MICRO
                    *          SECS.  THIS TIME MUST BE AT LEAST 1233  AND
                    *          NO GREATER THAN 1267  MICRO SECS.  FST FOR
                    *          THE TIME CHECK OF THE NEXT SECTOR.
0B5C  4B09              MPCR = DISPLYRETN  - 1.
                    STOPMARKS.
0B5D  F057              A3 = LIT  L.
0B5E  C840              LIT  = @40@  SAR  = 8.
0B5F  F008              IF GC1 SKIP.
0B60  F054              A3 = B000.
0B61  F0E0              MIR = A3 OR LIT.
0B62  E008              LIT  = @08@.
0B63  F099              DW1.      TERMINATE
0B64  F0C9              JUMP.
                    TEST-13.        RPM TIME TEST - BOTTOM DRIVE
0B65  F0A5              IF LC1 STEP.
0B66  F057              A3 = LIT  L.
0B67  C840              LIT  = @40@  SAR  = 8.
0B68  F006              SET GC1.
0B69  4AEA              MPCR = TEST-12   + 2.
```

```
                    TEST-30.        POSITIONER    TIMING  -  TOP  DRIVE
0B6A  F058              A3  =  LIT.                       A3  =  SEEK  TRK  0,   D0
0B6B  E001              LIT  =  @01@.
0B6C  F05F              B.
0B6D  E0E6              LIT  =  @E6@.
0B6E  F0AF              IF  LC3  SET  LC3  ELSE  SKIP.
0B6F  E0CD              LIT  =  @CD@.
0B70  F0CA              LCTR.
0B71  F128              A2  =  Z.                         A2  =  SEEK  TRK  200,    D0
0B72  E001              LIT  =  @01@.
0B73  4B82              MPCR  =  NTRTMG  -  1.
                    TEST-31.        POSITIONER    TIMING  -  BOTTOM  DRIVE
0B74  F0CA              LCTR.
0B75  E0BF              LIT  =  @BF@.
0B76  F05A              A3  =  Z.                         A3  =  SEEK  TRK  0,   D1
0B77  E001              LIT  =  @01@.
0B78  F05F              B.
0B79  E0A6              LIT  =  @A6@.
0B7A  F0AF              IF  LC3  SET  LC3  ELSE  SKIP.
0B7B  E08D              LIT  =  @8D@.
0B7C  F0CA              LCTR.
0B7D  F128              A2  =  Z.                         A2  =  SEEK  TRK  200,    D1
0B7E  E001              LIT  =  @01@.
0B7F  4B82              MPCR  =  NTRTMG  -  1.
                    RSTTMG.                               RESTART  TIMING  TEST
0B80  F014              IF  LC1  SKIP.
0B81  4B82              MPCR  =  NTRTMG  -  1.
0B82  4B84              MPCR  =  NTRTMG  +  1.
                    NTRTMG.                               ENTER  TIMING  TEST
0B83  F018              SET  LC1.
0B84  F0DE              MIR  =  A3.
0B85  F10F              A1  =  0.
0B86  F099              DW1.
0B87  F0F5              SAVE.
0B88  F012              A1  =  A1  +  1.
0B89  F001              A1.
0B8A  F09D              IF  ABT  SKIP.                    DELAY  260  MS
0B8B  F0C9              JUMP.
0B8C  F096              DR1  BEX.
0B8D  F07D              B  =  B  C.
0B8E  D400              SAR  =  4.
0B8F  F05F              B.
0B90  F0C3              IF  NOT  LST  SKIP.               TEST  SEEK  COMPLETE
0B91  F000              WAIT.                             SEEK  NOT  COMPLETE
0B92  F0DD              MIR  =  A2.
0B93  F18E              IF  IRQ  SKIP.
0B94  4B7F              MPCR  =  RSTTMG  -  1.
0B95  F108              ASR  BEX.
0B96  F017              A1  =  B.
0B97  F10B              A1  =  A1  C.
0B98  D100              SAR  =  1.
0B99  F001              A1.
0B9A  F0C3              IF  NOT  LST  SKIP.
0B9B  4417              MPCR  =  ENDSEEK  -  1.
0B9C  F10B              A1  =  A1  C.
0B9D  D200              SAR  =  2.
0B9E  F001              A1.
0B9F  F0C3              IF  NOT  LST  SKIP.
0BA0  4417              MPCR  =  ENDSEEK  -  1.
0BA1  4B7F              MPCR  =  RSTTMG  -  1.
                    TEST-21.        LOOP  ON  SEEK  TEST.
0BA2  F058              A3  =  LIT.
0BA3  E001              LIT  =  @01@.
                    LPRTN.
0BA4  F05F              B.
0BA5  F0CA              LCTR.
0BA6  E02F              LIT  =  @2F@.
0BA7  F0DE              MIR  =  A3.
0BA8  F099              DW1.
0BA9  F0F5              SAVE.
0BAA  F030              INC.
0BAB  F02E              IF  COV  SKIP.
0BAC  F0C9              JUMP.
0BAD  F18E              IF  IRQ  SKIP.
0BAE  4BA3              MPCR  =  LPRTN  -  1.
0BAF  4417              MPCR  =  ENDSEEK  -  1.
                    TEST-32.        DOUBLE  TRACK  FLAG
0BB0  F01A              SET  LC3.
0BB1  4043              MPCR  =  TESTSELECT  -  1.
```

MANUAL PROCEDURES

E0	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR = 0081	F86	2	
2	OBSERVE MIR	MIR = 0082	F87	3	
3	OBSERVE MIR	MIR = 0083	F88	4	
4	OBSERVE MIR	MIR = 0084	F89	E1	
E1	OPERATOR ACTION	MACHINE ACTION			
	IF DIRECTED TO E1 FROM FEMTMTR PROCEED TO E22, ELSE CONTINUE TO STEP 1 OF E1				
1	OBSERVE MIR	BIT A8 IS ON	2	4	
2	PUT MTR METER ON DC3-2W (D1DIN)	METER READING 0%	3	F3	
3	PUT MTR METER ON DC3-2G (D1RDAT/)	METER READING 100%	F2	F4	
4	OBSERVE MIR	BIT A4 IS ON	5	6	
5	PUT MTR METER ON DC3-2G (D1RDAT/)	METER READING 100%	F5	F4	
6	OBSERVE MIR	BIT A2 OR A1 IS ON	F6	7	
7	OBSERVE MIR	BIT B8,B4,B2 OR B1 ON	F7	8	
8	OBSERVE MIR	BIT C8 IS ON	9	10	
9	PUT MTR METER ON DC1-1V (ENST/)	METER READING 100%	F8	F9	
10	OBSERVE MIR	BIT C4, C2 OR C1 IS ON	F10	F11	
E2	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	DIGIT B = DISK PORT # - 1 2	F1		F
2	PUT MTR METER ON DC1-2N (DINT/)	METER READING 100%	F13	3	F
3	PUT MTR METER ON DC1-1H #CGCLEAR(N) OR CDCLEAR(N)! HOLDING CLEAR PUSHBUTTON	METER READING 100%	F12	F122	F F F F
E3	OPERATOR ACTION	MACHINE ACTION	A	D	E
1	OBSERVE MIR	BIT D1 IS ON	F15	2	E
2	OBSERVE MIR	BIT C8 IS ON	F16	F17	E E E E
E4	OPERATOR ACTION	MACHINE ACTION	A	B	
1	OBSERVE MIR	DIGIT B = PORT # - 1	F18	F1	
E5	OPERATOR ACTION	MACHINE ACTION	A	B	
1	PRESS SYSTEM CLEAR PRESS READY/INPUT REQ.,PRESS PK TO SELECT DISK, THEN PRESS NUMERIC #21 PUT MTR METER ON DC1-2X (PSWRITE/)	METER READING .5-.8% (USE INV 10X SCALE)	2	F20	C C
2	PUT MTR METER ON DC1-1U (INST)	METER READING 100%	3	F21	
3	PUT MTR METER ON DC1-1D (D1INWT)	METER READING .5-.8%	4	F22	
4	PUT MTR METER ON DC1-1B (SCLK)	METER READING 4.5-5.0%	5	F23	
5	PUT METER ON DC1-3Y FP (1NSF)	METER READING 0.5-0.8%	6	8	F F F
6	PUT MTR METER ON DC2-2L (D2SK/)	METER READING 0.5-0.8% (USE INV 10X SCALE)	7	F25	
7	PUT MTR METER ON DC2-1I (DSC/)	METER READING 100%	F26	F24	
8	PUT MTR METER ON DC1-1H #CGCLEAR(N) OR CDCLEAR(N)!	METER READING 0%	F92	F122	F F F F
E6	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON DC2-2X (SER/)	METER READING 100%	F27	F28	
E7	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON DC2-1I (DSC/)	METER READING 0%	2	F30	
2	PRESS SYSTEM CLEAR PRESS READY/INPUT REQ.,PRESS PROPER PK TO SELECT DISK THEN PRESS NUMERIC #16 PUT MTR METER ON DC2-2M (D2T0/)	METER READING 50-60%	3	F69	C C
3	PUT MTR METER ON DC2-2K (D2T1/)	METER READING 45-60%	4	F69	
4	PUT MTR METER ON DC2-1K (D2T2/)	METER READING 40-70%	5	F69	
5	PUT MTR METER ON DC3-2J (D3T3/)	METER READING 40-75%	6	F70	
6	PUT MTR METER ON DC3-1L (D3T4/)	METER READING PULSATING BETWEEN 20-80 & 100%	7	F70	
7	PUT MTR METER ON DC3-2K (D3T5/)	METER READING PULSATING BETWEEN 5-95%	8	F70	
8	PUT MTR METER ON DC3-1J (D3T6/)	METER READING PULSATING BETWEEN 0-100-45-100%	9	F70	
9	PUT MTR METER ON DC3-2T (D3T7/)	METER READING PULSATING 0 TO 100% AT V. SLOW RATE	10	F71	B B B

10	PUT MTR METER ON DC3-1U (D3T8/)	METER READING SWITCHES 0-100% AT VERY SLOW RATE	F29	F71	B B
E8	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT SCOPE ON DC1-1C (SMK/)	750NS + OR - 250NS 1.25 MS REP. RATE	2	F31	
2	PUT MTR METER ON DC1-2Y (D1SINT/)	METER READING 100%	F79	F33	
E9	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT SCOPE ON DC2-2R (IM/)	750NS + OR - 250NS 40MS REP. RATE	2	F31	B B B B
2	PUT MTR METER ON DC3-1N (D3CEND/)	METER READING 100%	F32	F36	
E10	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON DC2-2N (D2WTENF)	METER READING 100%	2	F37	B B
2	PUT MTR METER ON DC2-1P (WIH/)	METER READING 0%	F112	3	B B B B
3	PUT MTR METER ON DC1-1N (DINT/)	METER READING 0%	F40	F41	B B B
E11	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	BIT D1 IS ON	F42	2	
2	PUT MTR METER ON DC2-1H (D3CEND/)	METER READING 0%	F93	3	
3	PUT MTR METER ON DC2-1P (WI/)	METER READING 100%	F43	F44	
E12	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON DC2-1X (ILA/)	METER READING 0%	F45	F46	
E13	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON DC2-1L (D2RDENF)	METER READING 3-4% (USE INV 10X SCALE)	2	F52	
2	PUT MTR METER ON DC3-1Y (D3RDEN/)	METER READING 3-4%	3	F53	
3	PRESS CLEAR PUSHBUTTON, PRESS READY/INPUT REQ.,PRESS PROPER PK FOR DISK,THEN PRESS NUMERIC 18				C C
	PUT MTR METER ON DC3-2Y (D3DTD/)	METER READING 63-67%	5	4	A A
4	PUT MTR METER ON DC3-2C (D2SR9/)	METER READING 10-15%	F54	F55	A
5	PRESS READY BUTTON THEN PRESS NUMERIC 19 AND				C
	PUT MTR METER ON DC4-1I (D4LDOR/)	METER READING 2.5-3.0% (USE INV 10X SCALE)	6	F76	A A
6	PUT MTR METER ON DC4-1F (DFD/)	METER READING 55-60%	F57	F56	A A
E14	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS CLEAR PUSHBUTTON,PRESS PROPER PK TO SELECT DISK IS ON PRESS NUMERIC 18	READY,SELECT THE ,WHEN THE NUMERIC LIGHT	2	F1	C C C
2	PUT MTR METER ON DC1-2B (D1LDIR)	METER READING 5.0-7.0%	3	F65	A A
3	PUT MTR METER ON DC2-2T (D1SR9)	METER READING 10-16%	4	F55	A A
4	PUT MTR METER ON DC3-2Y (D3DTD/)	METER READING 62-68%	5	F54	A
5	PRESS READY BUTTON THEN PRESS NUMERIC 19				C
	PUT MTR METER ON DC3-1Y (D3RDEN/)	METER READING 3-4 %	6	F66	A A
6	PUT MTR METER ON DC4-1F (DFD/)	METER READING 55-60%	7	F56	A A
7	PUT MTR METER ON DC2-2T (D1SR9)	METER READING 42-48%	8	F67	A A A A
8	PUT MTR METER ON DC4-1I (D4LDOR/)	METER READING 2.5-3.0% (USE INV 10X SCALE)	9	F68	A B B
9	PUT MTR METER ON THE FOLLOWING POINTS: DC2-1U, 2U,2V,1V (EXT9/ - EXT12/)	METER READING 1.8-2.4% (USE INV 10X SCALE)	9A	F58	B B B B B
9A	PUT MTR METER ON THE FOLLOWING POINTS: DC2-2W, 2S,1W,1S (EXT13/ - EXT16/)	METER READING 1.8-2.4% (USE INV 10X SCALE)	10	F108	B B B A A
10	PUT MTR METER ON THE FOLLOWING POINTS: DC3-1W,(2X,1S,2I,1K,2L,2M (EXT1/ - EXT8/)	METER READING 1.7-2.3% USE INV 10X SCALE)	11	F59	A
11	PRESS READY BUTTON, PRESS NUMERIC 16, THEN				
	PUT MTR METER ON DC2-2M (D2T0/)	METER READING 50-60%	12	F69	
12	PUT MTR METER ON DC2-2K (D2T1/)	METER READING 45-60%	13	F69	
13	PUT MTR METER ON DC2-1K (D2T2/)	METER READING 40-70%	14	F69	
14	PUT MTR METER ON DC3-2J (D3T3/)	METER READING 40-75%	15	F70	
15	PUT MTR METER ON DC3-1L (D3T4/)	METER READING-PULSATING BETWEEN 20-80&100%	16	F70	

16	PUT MTR METER ON DC3-2K (D3T5/)	METER READING 5-95% (PULSATING)	17	F70	
17	PUT MTR METER ON DC3-1J (D3T6/)	METER READING-PULSATING (0-100-45-100%)	18	F70	
18	PUT MTR METER ON DC3-2T (D3T7/)	METER READING-PULSATING (0-100% AT V.SLOW RATE)	19	F71	
19	PUT MTR METER ON DC3-1U (D3T8/)	METER READING SWITCHES 0-100% AT VERY SLOW RATE	F72	F71	
E15	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON DC2-IN (D2WRTEN/)	METER READING 0%	3	2	
2	PUT MTR METER ON DC2-2N (D2WTENF/)	METER READING 100%	F109	F110	
3	PUT MTR METER ON DC4-1Q (D4DIRQ/)	METER READING 3.0-4.0%	F47	4	
4	PUT MTR METER ON DC4-2G (DCLK/)	METER READING 80-86%	5	F48	
5	PUT MTR METER ON DC4-1H (D4LDSR/)	METER READING 3.0-4.0%	F49	F50	
E16	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT SCOPE ON DC1-1C (SMK/)	750NS + OR - 250NS 1.25MS REP RATE	F38	F39	
E17	OBSERVE HEAD POSITION	HEAD AT TRACK 3	F61	F60	
E18	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON DC2-1P (WI/)	METER READING 0%	F97	F98	
E19	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT SCOPE ON DC1-IC (SMK/)	75/NS + OR - 25/NS 1.25MS REP. RATE	2	F39	
2	PRESS FORCE STEP THEN PUT MTR METER ON DC1-1V (ENST/)	METER READING 20-30%	F38	F9	
E20	OPERATOR ACTION	MACHINE ACTION	A	D	
1	DEVICE IS IN PORT 1-4,PS1-1 IN PORT 9-11,PS1-3.	;IN PORT 5-8,PS1-2;			
2	PUT MTR METER ON PS1-1Q (PSURQ/)	METER READING 100%	F90	F113	
E21	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	MIR = 0001	F82	F111	
E22	OPERATOR ACTION (FEMTST MTR INDICATES DISK EXT BUSS ERROR)	MACHINE ACTION	A	D	
1	EXT BIT # = 9-16		2	4	
2	PUT MTR METER ON DC2-T4 (D1STEN)	METER READING 0%	3	F117	
3	PUT MTR METER ON DC2-Y3 (D1RDES/)	METER READING 0%	F118	F117	
4	EXT BIT # = 1-4		5	8	
5	PUT MTR METER ON DC3-2W (D1DIN)	METER READING 0%	6	F117	
6	PUT MTR METER ON DC3-2G (D1RDAT/)	METER READING 100%	7	F119	
7	PUT MTR METER ON DC1-T3 (D1STEN)	METER READING 0%	F120	F117	
8	PUT MTR METER ON DC3-2G (D1RDAT/)	METER READING 100%	F121	F119	

FAILURE DICTIONARY

NOTE: FAILURES CONCERNING PORT SELECT CARD REFER TO BACKPLANE MAP TO DETERMINE WHICH PS1 CARD.

FAILURE	SUSPECT CHIPS OR FAULT
F1	NOT DIAGNOSABLE WITH THIS MTR
F2	DC3- F5, F7, B5 DC1 B7
F3	DC1 E5, E7
F4	DC1- D1, E5, D7 PS1- D1
F5	DC3- F5, B5 DC1- D5, E3
F6	DC3- F5, B5
F7	DC3 B5, C5
F8	DC1- E7 DC2- E5, F7, A7, B5 DC3 B5
F9	PS1- C7, B5, C5
F10	DC2- E5, F7, A7 PS1- C7, B5, C5
F11	DC2- E1, F3, A7 PS1- C7, B5, C5
F12	DC1- B7, D1, C3, D7 DC2 A3, A1, D7
F13	DC1- B5, F5, E5, E3, D7, B7, D5 DC2 A1 DC3 D1
F14	DC2- F1, B3
F15	DC1- B7, D7, C5, F3, E1 B3 F7 DC4- E3, B3
F16	FILE NOT OPERATIONAL (F0) FROM DISK
F17	DC2- F1, E1, E5, F3, F7 DC1- E7, E5, D7 PS1- E7, F7
F18	PS1- F7, E7, E5, A3, C1, A5, B5, C3
F19	DC2- F1 DC1- B5, D7, F5 PS1- D7, C1, E3
F20	PS1- E7, F7 DC4- F7 DC1- C5 DC3- F3
F21	PS1- D1
F22	DC1- D7, C3, E7, B5
F23	NO SCLK TO THIS DDP
F24	DC2 A5 OR PROBLEM IN SEEK LOGIC OF DISK DRIVE
F25	DC2- C5, B5, D5, A3, B3, A1, A7, C1 DC4 B3, DC1 F7
F26	DC2- F7, E5 DC1- E5, E7 DC3- A7, D7, E7 PS1- F7, E7
F27	DC1- E1, F3 DC3 C7
F28	DC2 F5 OR SEEK ERROR (SER/) FROM DISK DRIVE
F29	DC2- B5, F7, A3 DC4 D7, A7, E5, B5, C5 DC1 F7
F30	POSITIONER SETTLED NOT TRUE DC3 B5 DC2 B7, B5 DC1 A5, A7, B3, B5, C3
F31	NO SECTOR MARKS FROM DISK DRIVE
F32	DC2- A7, A1, D1, F1, A3, B3 DC1- F5, B5, B1
F33	PS1- D7, D1, B3, C1, A3, E5
F34	DC2- E5, F7 PS1- F7
F35	DC2 A5, D1, F1, E5
F36	DC3- A1, C1, D1
F37	DC2- C1, A1, A3, B3 DC1- C1
F38	DC1 A7, B5, E7, B1 DC2 D1, A7, F1 DC3- D1, C1

F39 DC2 A5
SECTOR MARK (SMK/) FROM DISK INCORRECT

F40 PS1- E3, C1, D7

F41 DC1- D1, C5, C3
DC4 F7

F42 DC1 C5
DC4 D7, E7, F7, E5, C5, B3, D5, A7
DC3 F7, A1

F43 DC3 F1
DC4 B3, D3, E7, F5, E3, C3, A3, B5
DC2 B3

F44 WRITE INHIBIT SIGNAL FROM DISK (TOP DRIVE)

F45 DC2- E1, F3
DC1- E1

F46 ILLEGAL TRACK ADDRESS NOT DETECTED BY DISK (TOP DRIVE)

F47 DC1- C5

F48 DC4 A5
OR NO DISK CLOCK (DCLK/) FROM DISK (TOP DRIVE)

F49 DC4- B3, E3, D3, A3, B5, A7, C3
DC1 F7

F50 DC4 A5, E3, D3, E7, F5, F7, D7, E5, B3, C3
DC1 F7

F51 DC4- B3
DC1- C5, F7

F52 DC2 C1, B1, A3, B3, F3, B5
DC4 F5
DC1 F3
DC3 F7

F53 DC3 F7, D5, E3, A1, D1
DC4 B3, D3, F5, E3
DC2 B1

F54 DC3 F7, A5, E3, B3, A3, D3, A7, D5, A1, B1
DC4- B3

F55 DC2 D3, B3, A7
DC4 E3, C3, B3, D3, C7, F7, C5

F56 NO DATA BEING READ FROM DISK
DC4 A5, D7, C7, C5
DC3 D3
DC2 B3

F57 DC4- C5, B3, C7, D5, F5, D3
DC3- A1 C1

F58 DC2 E5, F7, E7, F5
DC1 E7, E5
DC4 D7

F59 DC1 D1, C3
DC3- C3, C5, F3, F5, B5, A7, D5, C1

F60 DISK DRIVE DID NOT RESPOND TO SEEK AT TRK 202

F61 HEAD TRAVEL TIME FROM TRK 202 TO TRK 3 LONGER THAN 200MS

F62 DC3- A1, B1, D1, C1
DC4 C5, D3, A7, F5, E3, C3

F63 DC2 A1, D1, A7
DC3- D1, C1, A1
DC4 C5

F64 DC4 E3, D3, F7, E7, D7, C3
DC3 A1, C1
DC1 F7

F65 DC1 D1,F7
DC3 C7

F66 DC4 D7, C7, F7, F5, E3, C5, D5
DC1 E1, F3
DC2 C1, B1, B5, A5
DC3 F7

F67 DC4 D7
DC3 B3

F68 DC4 D5
DC2 E3
DC1 D1

F69 DC2- C5, B7, B5
PS1- E7

F70 DC3 C7, B7, B5, A7

F71 DC3 E7, D7, D5

F72 DC1- B7, C3
DC2 A1, D5
DC4 A7, D3
DC3 E7, D7, D5, F7

F73 DC4- B3, A7, C5
DC3 B1, A1, C1, D1, F7
DC1 C3

F76 DC4 A5, F7, E5, C5, D5, E3, D3
DC1 A7
DC2 C1, A1

F77 DC4 E7

F78 DC3 D3, C5, F3, F5, D5, C3

F79 DC2 A1, F1, D1
DC1 A7, B5, B1

F80 DC1- C5, B7, F3, A7
DC2 F1
PS1- E7

F81 DC2 F3

F82	DC1 B7, C5, F3	
F83	DC1 B3, E1, C5, F3 DC2 A1	
F84	DC1 A5, E3, F5, E5, D5	
F85	DC1 D5	
F86	MPM PARITY ERROR RUN FE MEMORY TEST	
F87	DPM PARITY ERROR RUN FE MEMORY TEST	
F88	NANO PARITY ERROR RUN FE MEMORY TEST	
F89	ADDRESS LIMIT ERROR RUN MCUMTR	
F90	PS1- D5, C3, D3, E3	
F91	PS1- B7, C5, D3, B5, C7, D5, C3, A5, B3 ALSO B5 OF CONTROLLER PS1 CARD DC1- E7	
F92	DC1 A5, B5, B3, A7	
F93	DC3 A1, C1, D1 DC4 C7, C5, B5, A3, A7, D5 DC1 F7	
F94	DC3 A1, B1, C1, D1 DC1 A7 DC4 C5, A3, A7, E3, F5, D3	
F95	DC4 F7, F5, B5, B3, A7, A3 DC1 A3, F7	
F96	CHECK WRITE INHIBIT MICRO SWITCH ADJUSTMENT AND/OR WRITE INHIBIT CIRCUITS IN DISK DRIVE	
F97	DC2- F1, B3 DC1- D1, D3	
F98	WRITE INHIBIT SIGNAL (WI/) IS NOT TRUE (LOW = TRUE) CHECK TOP DRIVE IF MIR = 0000, LOWER DRIVE IF MIR = 4000	
F99	DC2- F3	
F100	DC2- A7 OR WRITE INHIBIT FAULT IN DISK OR BOTH	
F101	PS1- D3, B3	
F102	PS1- A5, B5	
F103	IF DEVICE IS IN SAME PORT SELECT GROUP AS CONTROLLER; PS1- A5, B5, C5, C7 IF DEVICE IS IN A LOWER PS1 GROUP; B5 OF CONTROLLER PS1 B3 OF DEVICE PS1 IF DEVICE IS IN LOWEST OF THREE PS1 GROUPS B5 OF CONTROLLER PS1 B3 OF DEVICE PS1 B5, B3 OF REMAINING PS1	
	ALSO DC2- F5	
F105	PS1- A5, B5, C3	
F106	PS1- F7, E7, D5	
F107	PS1- D5	
F108	DC2 E1, F3, E3, A1, D5, F5	
F109	DC2 A7, D5, F5	
F110	DC2 C1, A1 DC1 C1	
F111	DC2 F5	
F112	DC2 A5	
F113	PS1- E5, A3, C1	
F115	PS1- A5, B5, C5, C7	
F116	DC1 D1	
F117	DC1 E5, E7	
F118	DC2 E1, E5, F3, F7	
F119	DC1 D1, E5	
F120	DC3 B5, F5, F7 DC1 D5	
F121	DC3 B5, C5	
F122	CG1 C1 (FOR B721 CG2 C3 & CD2 A5)	

CR80MTR CARD READER (80 COL.)
9114 CARD READER
B 111 I/O CONTROL

```
          PROGRAM-ID   CR80MTR.
        * CONTROLLER
              TESTNUMBERLIMIT   VALUE IS  7.
0000  85BE          CPCR  =  BUSSTEST1   -  1.
*********ERROR       F2.
*************************************************************
*  NOTE:  THIS   MTR APPLIES   TO -                         *
*                      CARD READER  MODEL  #9114.           *
*                      DDP  #  B311                         *
*                      TEST  DECK  #1448-7524.              *
*  *  *  *  *  CARD  READER  MTR SET-UP   INSTRUCTIONS  *  *  *  *  *
*  *                                                       *  *
*  *    PLACE  MTR-MEM  SWITCH  IN  MTR POSITION.          *  *
*  *                                                       *  *
*  *    PLACE  IRQ-EXT   SWITCH  IN  CENTER  POSITION.     *  *
*  *                                                       *  *
*  *    PLACE  NORMAL-LOAD  SWITCH  IN  LOAD  POSITION.    *  *
*  *                                                       *  *
*  *    LOAD  MTR TAPE  1448   7011.                       *  *
*  *                                                       *  *
*  *    PLACE  NORMAL-LOAD  SWITCH  IN  NORM POSITION.     *  *
*  *                                                       *  *
*  *    PRESS  SYSTEM  CLEAR.                              *  *
*  *                                                       *  *
*  *                              NOTES                    *  *
*  *    ANY DISAGREEMENT  WITH  SET-UP   INSTRUCTIONS      *  *
*  *    SEE  INCREMENTER  ADDRESS  FOR  FURTHER  ACTION.   *  *
*  *                                                       *  *
*  *    ABBREVIATIONS   IN  OPERATOR  INSTRUCTIONS   ARE   *  *
*  *    DEFINED  AS  FOLLOWS:                              *  *
*  *       CON  =  SERIES   L  TYPE  OPERATOR  CONSOLE.    *  *
*  *       SPO  =  TELETYPE  STYLE  OPERATOR  KEYBOARD.    *  *
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*  *    PLACE  TEST  DECK  #  1448-7524      INTO  INPUT  HOPPER.*  *
*  *                                                       *  *
*  *    IF  CARDS  FEED  AS  SOON  AS  THEY  ARE  PLACED  IN  THE*  *
*  *    CARD  READER  GO  TO  E1.                          *  *
*  *                                                       *  *
*  *    PRESS  SYSTEM  CLEAR.                              *  *
*  *                                                       *  *
*  *                                                       *  *
*  *    IF  ONE  CARD  FEEDS  AFTER  PRESSING   CLEAR  GO  TO   *  *
*  *    FAILURE  #F57.                                     *  *
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*  *    IF  MTR  IS  RESTARTED  TEST  DECK  MUST  BE  RELOADED.*  *
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*          1        INCR  =  0016   VERIFY  MIR  =  SYS  CONFIG.      *
*                                    YES  -  PRESS  CON READY OR SPO  *
*                                            INPUT  REQUEST.          *
*                                    NO   -  SEE  INCR  FOR  INST.    *
*
*          2        CON  -  PK'S  ON   PRESS  PK  OF  READER  PORT  NO*
*                   SPO  -  RDY ON     PRESS  TWO  NUMERIC  KEYS     *
*                                      FOR  READER  PORT  NO.        *
*
*          3        CON  -  NUM ON     PRESS  TWO  NUMERIC  KEYS  FOR*
*                   SPO  -  RDY ON     SELECTION   OF  CARD  READER  *
*                                      TESTS.                        *
*                                      AFTER  EACH                   *
*                                      SUCCESSFULL   TEST  THE  LIGHT*
*                                      WILL  COME  ON  AGAIN  INDI-  *
*                                      CATING  THE  SYSTEM  IS  READY*
*                                      FOR  THE  NEXT  TEST.         *
*
*                                NOTE                               *
*          TEST  DECK  MUST  REMAIN  IN  PROPER  SEQUENCE.          *
*          FOR  REFERENCE   SEE  TEST  DECK  DESCRIPTION            *
*          IN  SECTION  4.                                          *
*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*
*
*  OPERATOR  INSTRUCTIONS
*
*  PROG  STEP    INCR       OPERATOR  ACTION
*
*                                 IF  AFTER  PRESSING  01  ON      *
*                                 NUM KYBD  ONLY  TWO  CARDS       *
*                                 FEED  GO  TO  F61.               *
*
*        1       0009       TEST-SELECT   KEY  01  ON  NUM KYBD.   *
*                           (READ  AND  CHECK  SEQ  DATA).         *
*        1A      0485       PRESS  RESTART  PUSHBUTTON.            *
*
*        2       0009       TEST-SELECT   KEY  02  ON  NUM KYBD.   *
*                           (READ  AND  CHECK  ALL  ONES  DATA).   *
*
*
*        3       0009       TEST-SELECT   KEY  03  ON  NUM KYBD.   *
*                           (READ  AND  CHECK  ALL  ZEROS  DATA).* *
*
*
*        4       0009       TEST-SELECT   KEY  02  ON  NUM KYBD.   *
*
*
*        5       0009       TEST-SELECT   KEY  03  ON  NUM KYBD.   *
*
*
*        6       0009       TEST-SELECT   KEY  04  ON  NUM KYBD.   *
*                           (READ  AND  CHECK  CHKER  BRD  DATA).* *
*
*
*        7       0009       TEST-SELECT   KEY  00  ON  NUM KYBD.   *
*                           (NO  FEED  TEST).                      *
*
*
*        8       0417       PLACE  NO  FEED  SWITCH  ON  CARD  RDR*
*                           IN  THE  OFF  POSITION   THEN  PRESS   *
*                           FST  1  TIME.                          *
*
*
*        9       0422       PLACE  NO  FEED  SWITCH  ON  CARD  RDR*
*                           IN  THE  ON  POSITION   THEN  PRESS    *
*                           FST  1  TIME.                          *
*
*
*       10       042A       PRESS  RESTART  PUSHBUTTON  THEN       *
*                           PRESS  FST  1  TIME.                   *
*
*
*       11       0454       PORT-SELECT   CARD  ENABLE  STATUS     *
*                           GATING  TEST.   SEE  INCR  ADDRESS     *
*                           IN  LISTING   OR  PRESS  FST  1  TIME  *
*
*     IF  THE  TESTS   LISTED   ABOVE  WERE  COMPLETED             *
*     SUCCESSFULLY,    THE  CARD  READER  AND  DDP  ARE            *
*     ERROR  FREE.   THE  FOLLOWING   TESTS   ARE  FOR             *
*     SIGNAL   TRACING.                                            *
*
*
*  DIAGNOSTIC   TEST       TEST-SELECT   KEY  05  ON  NUM KYBD.   *
*                          (READ  ALL  CARDS).                     *
*
```

```
*                                                                       *
*  DIAGNOSTIC    TEST          TEST-SELECT    KEY 06   ON NUM KYBD.    *
*                              (LOOP   ON WRITE).                       *
*                                                                       *
*                                                                       *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
 STARTCONTROLLER.          START   FROM SYSTEM   CLEAR
```

PROGRAM LISTING

```
0001  F05F          B.
0002  F18E          IF  IRQ  SKIP.          TEST  FOR  ERROR  IRQ
0003  400D          MPCR = IRQOFF  -  1.
0004  F108          ASR  BEX.
0005  F0E1          MIR  =  B.
0006  F000          WAIT.      UNEXPECTED  IRQ,  ADDRESS  IN  MIR
                    *
                    ********ERROR      #E2.
                    *
                    *
                     SELECTPORT.
                    *
                    *
0007  F0DE          MIR  =  A3.      CONTROLLER  ADDRESS  (ASR  AFTER  IRQ)
0008  F0FC          WHEN SRQ  STEP.
                    *  CONTROLLER  ADDRESS  IS  DISPLAYED  IN  MIR
                    *  IF  CONTROLLER  ADDRESS  IS  NOT CORRECT,  RUN SPO  OR
                    *                                          CONSOLE  MTR
                    *  IF  CONTROLLER  ADDRESS  IS  CORRECT,  ENTER  PORT  NUMBER
                    *        OF  DEVICE  THAT  IS  BEING  TESTED
                    *    FOR  CONSOLE  SYSTEMS
                    *         PRESS  PK  UNDER  LIGHTED  A  AND  B  INDICATORS
                    *         (LEFT   TO  RIGHT)   FOR  PORTS  1  THROUGH  12
                    *    FOR  SPO  SYSTEMS
                    *         PRESS  2  NUMERIC  KEYS  FOR  PORTS  01  THROUGH  12
                    *         'PORT'   IS  PRINTED
                    *
                    *  NOTE-IF   AN  INVALID   PORT  NUMBER  IS  ENTERED,   THE  MTR
                    *       SOUNDS  THE  ALARM  AND  RETURNS  FOR  ANOTHER  PORT
                    *       NUMBER.   (ONLY   THE  LOWER  4  BITS   OF  EACH
                    *       CHARACTER  ARE  USED  IN  THIS  CHECK-PRESS   CORRECT
                    *       KEYS)
                    *
                    *
                     SELECTTEST.
0009  F0FC          WHEN SRQ  STEP.
                    *  PRESS  2  NUMERIC  KEYS  TO  SELECT   TEST
                    *    FOR  CONSOLE  SYSTEMS
                    *         PRESS   KEYS  ON  NUMERIC  KEYBOARD
                    *    FOR  SPO  SYSTEMS
                    *         'TEST'   IS  PRINTED
                    *         PRESS   NUMERIC  KEYS
                    *
                    *
                    *  NOTE-IF   AN  INVALID   TEST  NUMBER  IS  ENTERED,   THE  MTR
                    *       SOUNDS  THE  ALARM  AND  RETURNS  FOR  ANOTHER  TEST
                    *       NUMBER.   (ONLY   THE  LOWER  4  BITS   OF  EACH
                    *       CHARACTER  ARE  USED  IN  THIS  CHECK-PRESS   CORRECT
                    *       KEYS)
                    *
                    *
000A  F097          DR2  BEX.
000B  F086          B  =  LIT  AND  B.      STRIP   UPPER  DIGIT
000C  E00F          LIT   =  @0F@.
000D  F0C9          JUMP.
                    *
                    *
                     IRQOFF.
000E  F17D          DLD.                    READ  CONFIGURATION   CARD
000F  F0F9          WHEN RDC  BEX.
0010  F0E1          MIR  =  B.       SYSTEM  CONFIGURATION   IN  MIR
0011  F017          A1   =  B.
0012  F0F9          WHEN RDC  BEX.
0013  F0FF          0  EQV  B.
0014  F09D          IF  ABT  SKIP.
0015  F000          WAIT.            CONFIG  FF  NOT  RESET  BY  BEX-
                    **********       FAILURE  IS  CON1  CHIP  D7
                    *
0016  F0F8          WHEN IRQ  STEP.
                    *  VERIFY  CORRECT  SYSTEM  CONFIGURATION   DISPLAYED   IN  MIR
                    *  IF  YES,  PUSH  READY  BUTTON  ON  CONSOLE  OR
```

```
                *           INPUT  REQUEST  ON SPO.    IF  PROGRAM HANGS HERE
                *           (NO  RESPONSE  TO INPUT  REQUEST  OR READY
                *           BUTTON)  RUN SPO  OR CONSOLE  MTR
                * IF  NO,  PRESS  FST
                *
                * METER  CON1  PIN  2K
                *  IF  0%  REPLACE  CHIPS  D5,D3,C7,D7      ON CON1  CARD
                *  IF  NOT  0%  REPLACE  CHIPS  D5,A5,A7,F5,F7        ON CON1  CARD
                *
0017  F18E        IF  IRQ  SKIP.
0018  407A        MPCR = CON1LOOP  - 1.
0019  814E        CPCR = BUSSTEST  - 1.     FIRST  BUSS  TEST  WITH  IRQ  ON
                * IF  BUSS  TEST  FAILS  HERE,  FAILURE  IS  CONTROLLER  PORT
                *    SELECT  CARD  B7
                *
001A  F108        ASR  BEX.
001B  F051        A3 = B.          SAVE  CONTROLLER  ADDRESS
001C  F07A        B = BITT.        SET  STATUS  WORD DATA  REQUEST  BIT
001D  C820        SAR = 8  LIT  = @20@.
001E  F07F        B = B  R.
001F  F036        A2 = B  L.       CLEAR  BITS  9-16
0020  F066        B = A1.  SYSTEM  CONFIGURATION  FOR SPO-CONSOLE  CHECK
0021  F0C3        IF  NOT  LST  SKIP.     SPO-CONSOLE  CHECK
0022  E000        LIT  = 0.                SPO  ON  SYSTEM
0023  F1CC        MIR = A2  OR  LIT.
                * FOR  SPO  CONTPORTADDRESS          = 1000XXXX00000000
                * FOR  CONSOLE  CONTPORTADDRESS    = 1000XXXX00100000
0024  F0CF        MAR1 = AMPCR.
0025  014E        AMPCR = CONTPORTADDRESS.
0026  F0F3        MW1.             STORE  CONTROLLER  PORT  ADDRESS
0027  8101        CPCR = CLEARFLAGS  - 1.     CLEAR  ALL  FLAGS
0028  8118        CPCR = SETCONTADDRS  - 1.
0029  819B        CPCR = INITMAINSTACK  - 1.     SET  MAIN  STACK  ADDRESS
002A  81A3        CPCR = INITFLOSTACK  - 1.   SET  FLOW  STACK  ADDRESS
002B  0031        AMPCR = CONSPORTSELECT  - 1.
                **
002C  F0DE        MIR = A3.
002D  F066        B = A1.  SYSTEM  CONFIGURATION  FOR SPO-CONSOLE  CHECK
                **
002E  F0C2        IF  NOT  LST  JUMP.
002F  C001        SAR = 0  LIT  = 1.
                * SET  FLAG  0  IN  FLAG  WORD 1  TO 1  FOR SPO,  0  FOR CONSOLE
0030  81CE        CPCR = SETFLAGW1  - 1.
0031  407F        MPCR = SPOPORTSELECTP  - 1.
                *
                 CONSPORTSELECT.
                * CONSOLE  ON SYSTEM
                * PORT  SELECT,  OPERATOR  ENTERS  PK 1-12  TO INDICATE-
                * THE  PORT  NUMBER  OF  THE  DEVICE  TO BE  TESTED
                *
0032  8118        CPCR = SETCONTADDRS  - 1.
0033  F1D5        MIR = B001  + 1.     ENABLE  KEYBOARD.
0034  F099        DW1.
0035  8126        CPCR = LITEINDA  - 1.
0036  E0FF        LIT  = @FF@.              LIGHT  PK 1-8
0037  812C        CPCR = LITEINDB  - 1.
0038  E00F        LIT  = @0F@.              LIGHT  PK 9-12
                * GET  PORT  NUMBER (PK  KEY 1-12)
0039  8006        CPCR = SELECTPORT  - 1.
003A  F017        A1 = B.          SAVE  PORT  ADDRESS
003B  8126        CPCR = LITEINDA  - 1.
003C  E000        LIT  = 0.                 TURN  OFF  PK 1-8
003D  812C        CPCR = LITEINDB  - 1.
003E  E000        LIT  = 0.                 TURN  OFF  PK 9-11
003F  F066        B = A1.          PORT  ADDRESS  TO B FOR SAVEPORT
               STOREPORT.          FROM SPO  PORT  SELECT
0040  813A        CPCR = CSAVEPORT  - 1.   SAVE  PORT  ADDRESS
0041  CF01        SAR = 15  LIT  = 1.      SET  FLAG  15  TO INDICATE-
0042  81CE        CPCR = SETFLAGW1  - 1.   PORT  HAS  BEEN  SELECTED
                * PRINT  TEST  SELECT  MESSAGE  FOR FIRST  ENTRY  TO SPO-
                * TEST  SELECT
0043  C001        SAR = 0  LIT  = 1.
0044  81F1        CPCR = TESTFLAGW1  - 1.  TEST  SPO-CONSOLE  FLAG
0045  409A        MPCR = SPOTESTSELECTP  - 1.  TRUE  RETURN  SPO
                *
                 TESTSELECTCLEAR.          PROGRAM JUMPS  HERE  TO CLEAR-
                * MEMORY  FLAG  WORDS  2,3,AND  4  BEFORE  ALLOWING  THE-
                * OPERATOR  TO SELECT  A TEST.    MEMORY  FLAG  WORD 1  AND-
                * THE  PORT  ADDRESS  ARE  NOT  CHANGED.
0046  810A        CPCR = CLEARFW2-3-4  - 1.
                 TESTSELECT.              PROGRAM JUMPS  HERE  TO ALLOW  THE-
                *              OPERATOR  TO SELECT  A TEST.    THE  MEMORY-
                *              FLAG  WORDS  2,3,4    ARE  NOT  CHANGED
                * CLEAR  ERROR  FLAG,  IF  ON IT  REFERS  TO LAST  TEST
0047  C100        SAR = 1  LIT  = 0.
0048  81CE        CPCR = SETFLAGW1  - 1.
0049  8118        CPCR = SETCONTADDRS  - 1.
004A  F096        DR1  BEX.        RESET  STATUS  INTERRUPT
004B  807D        CPCR = TESTSPO-CONSOLE  - 1.
004C  409C        MPCR = SPOTESTSELECT  - 1.   SPO  ON SYSTEM
                *
                * CONSOLE  ON SYSTEM
                *
004D  812C        CPCR = LITEINDB  - 1.
004E  E000        LIT  = 0.                 CLEAR  B INDICATORS
004F  F1D5        MIR = B001  + 1.     ENABLE  KEYBOARD
0050  F099        DW1.
                *
0051  812E        CPCR = LITEINDS  - 1.
0052  E008        LIT  = 8.                 LIGHT  NUMERIC  INDICATOR
                *
                *
                * GET  FIRST  DIGIT  OF TEST  NUMBER (10  S DIGIT)
0053  8008        CPCR = SELECTTEST  - 1.
0054  F051        A3 = B.          SAVE  (10  S DIGIT)
                *
                * GET  SECOND  DIGIT  OF TEST  NUMBER (1  S DIGIT)
0055  8008        CPCR = SELECTTEST  - 1.
                *
0056  812E        CPCR = LITEINDS  - 1.
0057  E000        LIT  = 0.                 TURN  OFF  NUMERIC  INDICATOR
                * IF  STATUS  INT.  GO TO MEMORY-MODIFY  FOR ANY TEST  #
0058  F1AE        IF  NOT  URQ SKIP.          CONSOLE  URQ TEST
0059  428B        MPCR = MEMORY-MODIFY  - 1.
                *
                 TENSLOOPCHECK.
                * TEST  TENS  DIGIT  FOR 0  THRU 9
005A  E00A        LIT  = 10.
005B  F032        A2 = A3.
005C  F11B        A2 - LIT.
005D  F0B7        IF  NOT  AOV  SKIP.
005E  40AF        MPCR = INVALIDTEST  - 1.
                * TEST  ONES  DIGIT  FOR 0  THRU 9
005F  F033        A2 = B.
0060  F11B        A2 - LIT.
0061  F0B7        IF  NOT  AOV  SKIP.
0062  40AF        MPCR = INVALIDTEST  - 1.
                *
                 TENSLOOP.
0063  F04B        A3 = A3  - 1.
0064  E00A        LIT  = 10.
0065  F09E        IF  AOV  SKIP.
0066  4068        MPCR = ENDTENSLOOP  - 1.
0067  F083        B = LIT  + B.
0068  4062        MPCR = TENSLOOP  - 1.
                *
                 ENDTENSLOOP.
0069  F017        A1 = B.                   SAVE  TEST  NUMBER
                * INSURE  THAT TEST  NUMBER IS  NOT GREATER  THAN THE UPPER
                * LIMIT  FOR THIS  MTR (SEE  DEFINE  TESTNUMBERLIMIT)
006A  E007        LIT  = TESTNUMBERLIMIT.
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006B  F109        A1 - LIT - 1.
006C  F0B7        IF NOT AOV SKIP.
006D  40AF        MPCR = INVALIDTEST - 1.        ILLEGAL TEST NUMBER
                  *
                  * DISPLAY TEST NUMBER IN A INDICATORS
006E  F082        B = LIT L.
006F  C890        SAR = 8 LIT = @90@.
0070  F0DC        MIR = A1 + B.
0071  F098        DW2.
                  * DISABLE SYSTEM CONTROLLER (SPO OR CONSOLE)
0072  F0E6        MIR = 0.
0073  F099        DW1.
                  * INSURE THAT BOTH STATUS AND DATA INTERRUPTS FROM SPO-
                  * OR CONSOLE ARE CLEARED BEFORE JUMPING TO MTR
0074  F096        DR1 BEX.        RESET STATUS INTERRUPT
0075  F097        DR2 BEX.        RESET DATA INTERRUPT
                  *
0076  8130        CPCR = SETPORTADDR - 1.   BR1 = INST.  BR2 = DATA
0077  040F        AMPCR = TESTTABLE - 1.
0078  F100        AMPCR = A1 + AMPCR.
0079  F05F        B.
007A  F0C9        JUMP.
                  / SUBROUTINES
                  * LOOP USED TO METER PIN 2K (TP 92) ON CON1 CARD
                  CON1LOOP.
007B  F17D        DLD.
007C  F0F9        WHEN RDC BEX.
007D  407A        MPCR = CON1LOOP - 1.
                  *
                  TESTSPO-CONSOLE.
007E  C001        SAR = 0 LIT = 1.   SPO-CONSOLE FLAG (1 = SPO)
007F  41F1        MPCR = TESTFLAGW1 - 1.
                  *
                  *
                  SPOPORTSELECTP.
                  * ENTER HERE TO PRINT SELECT PORT MESSAGE
0080  80DB        CPCR = SPOPRINT - 1.
0081  01C7        AMPCR = PORTPRINT.
                  SPOPORTSELECT.
                  * ENTER HERE TO AVOID PRINTING
0082  8118        CPCR = SETCONTADDRS - 1.
0083  F0E7        MIR = B001.
0084  F099        DW1.            ENABLE SPO INPUT
                  * SELECT PORT # PER NUMERIC KEYS (01 THRU 12)
0085  8006        CPCR = SELECTPORT - 1.        FOR TENS DIGIT
0086  F017        A1 = B.                       SAVE TENS DIGIT
0087  8006        CPCR = SELECTPORT - 1.        FOR ONES DIGIT
                  *     ONES DIGIT IS IN B
                  * OPERATOR ENTERS PORT NUMBER (1 THROUGH 12)
0088  F0E6        MIR = 0.
0089  F099        DW1.            DISABLE SPO INPUT
                  * TEST TENS DIGIT FOR 0 OR 1
008A  E001        LIT = 1.
008B  F109        A1 - LIT - 1.
008C  F0B7        IF NOT AOV SKIP.
008D  4148        MPCR = INVALIDPORT - 1.       TENS DIGIT > 1
                  * TEST ONES DIGIT FOR 0 THRU 9
008E  E00A        LIT = 10.
008F  F033        A2 = B.                       ONES DIGIT IN A2
0090  F11B        A2 - LIT.
0091  F0B7        IF NOT AOV SKIP.
0092  4148        MPCR = INVALIDPORT - 1.       ONES DIGIT > 9
                  *
0093  E00A        LIT = 10.
0094  F066        B = A1.
0095  F0C3        IF NOT LST SKIP.
0096  F029        A2 = A2 + LIT.
0097  F068        B = A2.                  PORT ADDRESS IN B
                  * SUBSTRACT 1 FROM PORT NUMBER TO GET PORT ADDRESS
0098  F162        B = 0 - B.
0099  F163        B = 0 - B - 1.
009A  803F        CPCR = STOREPORT - 1.
                  *
                  SPOTESTSELECTP.
009B  80DB        CPCR = SPOPRINT - 1.     PRINT SELECT TEST MESSAGE
009C  01CB        AMPCR = TESTPRINT.       ADDRESS OF MESSAGE
                  *
                  SPOTESTSELECT.
                  * ENTRY POINT FOR NO PRINTING
009D  8118        CPCR = SETCONTADDRS - 1.
009E  F0E7        MIR = B001.
009F  F099        DW1.            ENABLE SPO INPUT
                  * SELECT TEST # PER NUMERIC KEYS (00 THRU 99)
00A0  8008        CPCR = SELECTTEST - 1.        FOR TENS DIGIT
00A1  F051        A3 = B.                       SAVE TENS DIGIT
00A2  8008        CPCR = SELECTTEST - 1.        FOR ONES DIGIT
                  *     ONES DIGIT IN B
00A3  F0E6        MIR = 0.
00A4  F099        DW1.            DISABLE SPO INPUT
00A5  F033        A2 = B.         SAVE ONES DIGIT
                  * IF STINT GO TO SPO MEMORY MODIFY
00A6  F1B5        IF URQ SKIP.
00A7  40A9        MPCR = CSPACEP - 1.
                  *
00A8  F096        DR1 BEX.        RESET STINT
00A9  438C        MPCR = SPO-MEM-MOD - 1.
                  *
                  CSPACEP.
00AA  80DB        CPCR = SPOPRINT - 1.     SPACE AFTER TESTNUMBER
00AB  00AF        AMPCR = SPACEPRINT.      ADDRESS OF PRINT MESSAGE
00AC  8118        CPCR = SETCONTADDRS - 1.
00AD  F068        B = A2.         ONES DIGIT TO B.
00AE  4059        MPCR = TENSLOOPCHECK - 1.
                  *
                  SPACEPRINT.
00AF  2080        CNST = @2080@.        - STOP
                  *
                  INVALIDTEST.
00B0  80B8        CPCR = ALARM - 1.        SOUND BELL
00B1  4046        MPCR = TESTSELECT - 1.
                  *
                  /
                  INDICATE-ERROR.
                  * SPO SYSTEMS- SOUND ALARM
                  * CONSOLE SYSTEMS- SOUND ALARM AND TURN ERROR LIGHT ON
                  *
00B2  F0DA        MIR = AMPCR.
00B3  F05F        B.
00B4  8156        CPCR = STACK - 1. SAVE AMPCR, A1, A2, A3
                  * SET FLAG 1 IN FLAG WORD 1 TO 1 TO INDICATE ERROR
00B5  C101        SAR = 1 LIT = 1.
00B6  81CE        CPCR = SETFLAGW1 - 1.
00B7  80B8        CPCR = ALARM - 1.        SOUND ALARM
00B8  4178        MPCR = UNSTACKRESTOREA - 1. RETURN TO MTR
                  *
                  ALARM.
                  *
00B9  F0DA        MIR = AMPCR.
00BA  F05F        B.
00BB  8156        CPCR = STACK - 1.
00BC  8118        CPCR = SETCONTADDRS - 1.
00BD  807D        CPCR = TESTSPO-CONSOLE - 1.
00BE  40CF        MPCR = SPOALARM - 1.     SPO ON SYSTEM
                  * CONSOLE ON SYSTEM
00BF  E008        LIT = @08@.
00C0  F0EA        MIR = LIT.
00C1  F099        DW1.
00C2  C207        SAR = 2 LIT = 7.
00C3  F089        B = LIT.
00C4  F0E2        MIR = B C.    ALARM DATA WORD FOR CONSOLE
00C5  F0FC        WHEN SRQ STEP.
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00C6  F098          DW2.
00C7  F05F          B.
00C8  F0FC          WHEN SRQ STEP.
                  * TURN ERROR LIGHT ON, IF ERROR FLAG IS ON
00C9  C100          SAR = 1 LIT = 0.
00CA  81F1          CPCR = TESTFLAGW1 - 1.
00CB  40D7          MPCR = CALARM - 1.          ERROR FLAG IS OFF
                  * ERROR FLAG IS ON
00CC  812E          CPCR = LITEINDS - 1.
00CD  E004          LIT = @04@.                 ERROR LIGHT
00CE  40D7          MPCR = CALARM - 1.
                  *
00CF  40D7          MPCR = CALARM - 1.
                  *
                    SPOALARM.       SPO ON SYSTEM
00D0  F1D5          MIR = B001 + 1.             ENABLE OUTPUT
00D1  F099          DW1.
00D2  F0EA          MIR = LIT.
00D3  E007          LIT = @07@.     RING BELL
00D4  F0FC          WHEN SRQ STEP.
00D5  F098          DW2.
00D6  F05F          B.
00D7  F0FC          WHEN SRQ STEP.
                  *
                    CALARM.
00D8  F0E6          MIR = 0.        DISABLE SPO OR CONSOLE
00D9  F099          DW1.
00DA  8130          CPCR = SETPORTADDR - 1. BR1 = INST.  BR2 = DATA
00DB  4178          MPCR = UNSTACKRESTOREA - 1. RETURN
                  *
                  *
                  *
                    SPOPRINT.
                  * SPO PRINT FROM MEMORY
                  *
00DC  F0DA          MIR = AMPCR.
00DD  F05F          B.
00DE  8156          CPCR = STACK - 1.           STACK AMPCR AND A REGISTERS
00DF  8118          CPCR = SETCONTADDRS - 1.    SELECT SPO
00E0  81BB          CPCR = RDSTACKAMPCRTOB - 1.
00E1  F05B          AMPCR = B.      RETURN AMPCR FOR EXEC
00E2  F05F          B.
00E3  F09A          EXEC.     ADDRESS OF MESSAGE TO AMPCR
00E4  F0EA          MIR = LIT.
00E5  C802          SAR = 8 LIT = @02@.
00E6  F099          DW1.                        ENABLE SPO PRINTER
                    SPOREADY.
00E7  F096          DR1 BEX.                    READ SPO STATUS
00E8  F05F          B.
00E9  F0C3          IF NOT LST SKIP.            CHECK FOR READY
00EA  40E6          MPCR = SPOREADY - 1.
                  *
00EB  F0CF          MAR1 = AMPCR.               BR1 = ADDRESS OF MESSAGE
                    SPOFETCH.
00EC  F0F1          MR1.
00ED  F0FA          WHEN RDC BEX MAR1 = BMAR + 1.
00EE  F07D          B = B C.
00EF  F0C4          IF NOT MST SKIP.            MST = STOP CODE
00F0  40FA          MPCR = SPOSTOP - 1.         END PRINT
00F1  F0FC          WHEN SRQ STEP.              WAIT FOR PRINTER INTERRUPT
00F2  F0E1          MIR = B.
00F3  F098          DW2.                        WRITE FIRST CHARACTER
00F4  F07D          B = B C.
00F5  F0C4          IF NOT MST SKIP.            MST = STOP CODE
00F6  40FA          MPCR = SPOSTOP - 1.         END PRINT
00F7  F0E1          MIR = B.
00F8  F0FC          WHEN SRQ STEP.              WAIT FOR PRINTER INTERRUPT
00F9  F098          DW2.                        WRITE SECOND CHARACTER
00FA  40EB          MPCR = SPOFETCH - 1.
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                    SPOSTOP.
00FB  F0FC          WHEN SRQ STEP.      WAIT FOR LAST CHARACTER TO PRINT
00FC  81DB          CPCR = RSTBR1 - 1.          RESTORE BR1
00FD  F096          DR1 BEX.                    RESET STINT
00FE  F0E6          MIR = B000.
00FF  F099          DW1.                        DISABLE SPO OUTPUT
0100  8130          CPCR = SETPORTADDR - 1.     RESTORE DEVICE PORT ADDRS
0101  4178          MPCR = UNSTACKRESTOREA - 1. RETURN
                  *
                    CLEARFLAGS.
0102  F023          A2 = AMPCR.                 SAVE RETURN
0103  F0E6          MIR = 0.
0104  F0CF          MAR1 = AMPCR.
0105  014D          AMPCR = PORTADDRESS.
0106  F0F3          MW1.                        CLEAR PORT ADDRESS
0107  F0CF          MAR1 = AMPCR.
0108  020D          AMPCR = MEMFLAGW1.
0109  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 1
010A  F102          AMPCR = A2.                 RESTORE RETURN
                    CLEARFW2-3-4.
010B  F023          A2 = AMPCR.                 SAVE RETURN
010C  F0E6          MIR = 0.
010D  F0CF          MAR1 = AMPCR.
010E  020E          AMPCR = MEMFLAGW2.
010F  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 2
0110  F0CF          MAR1 = AMPCR.
0111  020F          AMPCR = MEMFLAGW3.
0112  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 3
0113  F0CF          MAR1 = AMPCR.
0114  0210          AMPCR = MEMFLAGW4.
0115  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 4
0116  F102          AMPCR = A2.                 RESTORE RETURN
0117  F05F          B.
0118  F0C9          JUMP.
                  *
                    SETCONTADDRS.
0119  F060          B = AMPCR.          SAVE RETURN
011A  F0CF          MAR1 = AMPCR.
011B  014E          AMPCR = CONTPORTADDRESS.
011C  F05B          AMPCR = B.          RESTORE RETURN
011D  D800          SAR = 8.
011E  F0F1          MR1.
011F  F0F9          WHEN RDC BEX.       CONTROLLER ADDRESS TO B
0120  F07F          B = B R.
0121  F07C          B = B L.      CLEAR ALL BITS EXCEPT 5,6,7,8
0122  F078          B = B0TT.
0123  F16E          BR2 = B.            BR2 = 0000XXXX  DATA
0124  F07A          B = B1TT.
0125  F0D5          MAR1 = B.           BR1 = 1000XXXX  INSTRUCTION
0126  F0C9          JUMP.
                  *
                    LITEINDA.           LIGHT A INDICATORS
0127  E06F          LIT = @6F@.
0128  F0CA          LCTR.
0129  F09A          EXEC.               LOAD VARIABLE LIT
012A  F0EF          MIR = Z.
012B  F098          DW2.
012C  F0C9          JUMP.
                    LITEINDB.           LIGHT B INDICATORS
012D  E077          LIT = @77@.
012E  4127          MPCR = LITEINDA.
                  *
                    LITEINDS.                   LIGHT. S INDICATORS
012F  E07E          LIT = @7E@.
0130  4127          MPCR = LITEINDA.
                  *
                    SETPORTADDR.
0131  F060          B = AMPCR.          SAVE RETURN
0132  F0CF          MAR1 = AMPCR.
0133  014D          AMPCR = PORTADDRESS.
0134  F05B          AMPCR = B.          RESTORE RETURN
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0135  F0F1          MR1.
0136  F0F9          WHEN RDC BEX.          PORT ADDRESS TO B
0137  F16E          BR2 = B.          BR2 FOR DATA
0138  F07A          B = BITT.
0139  F0D5          MAR1 = B.          BR1 FOR INSTRUCTION
013A  F0C9          JUMP.
                *
                *
                CSAVEPORT.                    SAVE PORT ADDRESS (DATA IN B)
                * TEST PORT ADDRESS FOR PORT 12 OR LESS
013B  E00B          LIT = 11.
013C  F017          A1 = B.
013D  F109          A1 - LIT - 1.
013E  F0B7          IF NOT AOV SKIP.
013F  4148          MPCR = INVALIDPORT - 1.          PORT ADDRESS > 12
                * CLEAR ALL BITS EXCEPT 5,6,7,8
0140  F07C          B = B L.
0141  D400          SAR = 4.
0142  F0E5          MIR = B R.
0143  F060          B = AMPCR.          SAVE RETURN
0144  F0CF          MAR1 = AMPCR.
0145  014D          AMPCR = PORTADDRESS.
0146  F05B          AMPCR = B.          RESTORE RETURN
0147  F0F3          MW1.
0148  F0C9          JUMP.
                *
                INVALIDPORT.
                *
0149  80B8          CPCR = ALARM - 1.          SOUND BELL
                *
014A  807D          CPCR = TESTSPO-CONSOLE - 1.
014B  4081          MPCR = SPOPORTSELECT - 1.
014C  4031          MPCR = CONSPORTSELECT - 1.
                PORTADDRESS.
014D  0000          CNST = @0000@.
                CONTPORTADDRESS.
014E  0000          CNST = @0000@.
                *
                BUSSTEST.                    EXTERNAL BUSS TEST
014F  F0F9          WHEN RDC BEX.
0150  F0FF          0 EQV B.
0151  F09C          IF ABT JUMP.
0152  F0DA          MIR = AMPCR.
0153  F000          WAIT.
                *********OBSERVE MIR
                *********GO TO INCREMENTER ADDRESS DISPLAYED IN MIR
0154  F0E1          MIR = B.
0155  F000          WAIT.
0156  7FFF          MPCR = STARTCONTROLLER - 2.                    B
                /
                STACK.
                *UNCONDITIONAL SAVE A1, A2, A3, AMPCR IN MEMORY STACK
                *DISTROYS - B, SAR, LIT, MIR
                *ASSUMES BR1, BR2 DIFFER BY INST BIT ONLY
0157  F079          B = B100.
0158  D300          SAR = 3.
0159  F07F          B = B R.
015A  F0D5          MAR1 = B.          STACK POINTER = 4096
                STACKW3.
015B  F0F1          MR1.
015C  F0F9          WHEN RDC BEX.          FETCH POINTER
015D  F083          B = LIT + B.          INCRAMENT POINTER
015E  E004          LIT = 4.
015F  F08C          BMI MIR = B.
0160  F0F3          MW1.          RESTORE NEW POINTER
0161  F08C          BMI MIR = B.
0162  F0D5          MAR1 = B.          NEW STACK ADDRESS
0163  F0F3          MW1.          STORE AMPCR TOP OF STACK
0164  F0DB          MIR = A1.
0165  F089          B = LIT.
0166  E003          LIT = 3.
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0167  F01C          A1 = BMAR.
0168  F064          B = A1 - B.
0169  F0D5          MAR1 = B.          OLD TOP OF STACK ADDRESS + 1.
016A  F08D          BMI.
016B  F017          A1 = B.          RESTORE A1
016C  F0F3          MW1.          SAVE A1
016D  F0D7          MAR1 = BMAR + 1.
016E  F0DD          MIR = A2.
016F  F0F3          MW1.          SAVE A2
0170  F0D7          MAR1 = BMAR + 1.
0171  F0DE          MIR = A3.
0172  F0F3          MW1.          SAVE A3
0173  F05F          B.
0174  41DB          MPCR = RSTBR1 - 1.          RESTORE BR1 EXIT
                UNSTACK.
                *RESTORE AMPCR FROM TOP OF MEMORY STACK
                *A REGISTERS REMAIN UNCHANGED
0175  8188          CPCR = STACKR - 1.
0176  F05B          AMPCR = B.          RESTORE AMPCR
0177  F05F          B.
0178  41DB          MPCR = RSTBR1 - 1.          RESTORE BR1 EXIT
                UNSTACKRESTOREA.
                *RESTORE AMPCR AND A REGISTERS FROM TOP OF STACK
0179  8188          CPCR = STACKR - 1.
017A  F05B          AMPCR = B.          RESTORE AMPCR
017B  F08D          BMI. (ADDRESS - 1) OF STORED A1
017C  F0D6          MAR1 = B + 1.
017D  F0F1          MR1.          FETCH A1
017E  F0F9          WHEN RDC BEX.
017F  F0D7          MAR1 = BMAR + 1.
0180  F017          A1 = B.          RESTORE A1
0181  F0F1          MR1.          FETCH A2
0182  F0F9          WHEN RDC BEX.
0183  F0D7          MAR1 = BMAR + 1.
0184  F033          A2 = B.          RESTORE A2
0185  F0F1          MR1.          FETCH A3
0186  F0F9          WHEN RDC BEX.
0187  F051          A3 = B.          RESTORE A3
0188  41DB          MPCR = RSTBR1 - 1.          RESTORE BR1 AND EXIT
                STACKR.
0189  F079          B = B100.
018A  D300          SAR = 3.
018B  F07F          B = B R.
018C  F0D5          MAR1 = B.          STACK POINTER = 4096
                STACKR1.
018D  F0F1          MR1.
018E  F0F9          WHEN RDC BEX.          FETCH POINTER
018F  F0DD          MIR = A2.          SAVE A2
0190  F033          A2 = B.
0191  E004          LIT = 4.
0192  F146          B = A2 - LIT.          DECRAMENT STACK POINTER
0193  F08C          BMI, MIR = B.          EXCHANGE MIR & B
0194  F033          A2 = B.          RESTORE A2
0195  F08D          BMI.          POINTER ADDRESS TO B
0196  F0F3          MW1.          RESTORE POINTER
0197  F083          B = LIT + B. ADDRESS OF SAVED AMPCR TO B
                STACKR2.
0198  F0D5          MAR1 = B.
0199  F0F1          MR1.          FETCH AMPCR FROM STACK
019A  F0F9          WHEN RDC BEX.
019B  F0C9          JUMP.
                INITMAINSTACK.          INITIALIZE STACK POINTER
019C  F079          B = B100.
019D  D300          SAR = 3.
019E  F07F          B = B R.
019F  F0D5          MAR1 = B.
01A0  F0E1          MIR = B.
01A1  F0F3          MW1.          POINTER = 4096
01A2  F05F          B.
01A3  41DB          MPCR = RSTBR1 - 1.          RESTORE BR1 EXIT
```

```
                INITFLOSTACK.                       INITIALIZE     FLO  POINTER
01A4  F082          B = LIT  L.
01A5  C70C          SAR = 7  LIT  = @0C@.
01A6  F0D5          MAR1 = B.
01A7  F0E1          MIR = B.
01A8  F0F3          MW1.              POINTER  = 6144
01A9  41DB          MPCR = RSTBR1  - 1.          RESTORE  BR1  EXIT
                MARKFLOSTACK.
              *SAVE  AMPCR  FROM  MAIN  PROGRAM  FLOW-FOR  GLOBAL  RETURN
              *ASSUMES  B,  MIR,  SAR,  LIT  CAN  BE  DISTROYED  AND  THAT
              *BR1,   BR2  DIFFER  BY  INST  BIT  ONLY
01AA  F0DA          MIR = AMPCR.
01AB  F082          B = LIT  L.
01AC  C70C          SAR = 7  LIT  = @0C@.
01AD  F0D5          MAR1 = B.              FLO  POINTER  = 6144
01AE  415A          MPCR = STACKW3  - 1.       WRITE  AMPCR  TO  STACK
                FLOSTACKRDDEC.
              *RESTORE  AMPCR  FROM  TOP  OF  FLOW  STACK  AND  DECRAMENT
              *STACK  POINTER
01AF  F082          B = LIT  L.
01B0  C70C          SAR = 7  LIT  = @0C@.
01B1  F0D5          MAR1 = B.              FLOW  STACK  POINTER  = 6144
01B2  818C          CPCR = STACKR1  - 1.       READ  POINTER  AND  AMPCR
01B3  4175          MPCR = UNSTACK.            OPTIONAL  NO  A  WD  RESTORE
                FLOSTACKRD.
              *RESTORE  AMPCR  FROM  TOP  OF  FLOW  STACK  WITHOUT
              *DECRAMENTING  FLOW  STACK  POINTER.
01B4  F082          B = LIT  L.
01B5  C70C          SAR = 7  LIT  = @0C@.
01B6  F0D5          MAR1 = B.              FLO  STACK  POINTER  = 6144
01B7  F0F1          MR1.
01B8  F0F9          WHEN RDC BEX.              FETCH  POINTER
01B9  F05F          B.
01BA  8197          CPCR = STACKR2  - 1.       READ  TOP  OF  STACK
01BB  4175          MPCR = UNSTACK.            OPTIONAL  NO  A  WD  RESTORE
                RDSTACKAMPCRTOB.
              *READ  TOP  AMPCR  IN  STACK  TO  B  REG  -  USE  FOR
              *NESTED  EXEC.
01BC  F079          B = B100.
01BD  D300          SAR = 3.
01BE  F07F          B = B R.
01BF  F0D5          MAR1 = B.              POINTER  ADDRESS  = 4096
01C0  F0F1          MR1.                   FETCH  POINTER
01C1  F0F9          WHEN RDC BEX.
01C2  F0D5          MAR1 = B.              TOP  OF  STACK  ADDRESS
01C3  F0F1          MR1.
01C4  F0F9          WHEN RDC BEX.                  B = AMPCR  FROM  STACK
01C5  F05F          B.
01C6  41DB          MPCR = RSTBR1  - 1.        RESTORE  BR1  EXIT
              /
                PORTPRINT.
01C7  0D0A          CNST = @0D0A@.             CR  LF
01C8  504F          CNST = @504F@.         PO
01C9  5254          CNST = @5254@.         RT
01CA  2080          CNST = @2080@.         - STOP
                TESTPRINT.
01CB  0D0A          CNST = @0D0A@.             CRLF
01CC  5445          CNST = @5445@.         TE
01CD  5354          CNST = @5354@.         ST
01CE  2080          CNST = @2080@.         - STOP
              /
              *  TEST  FLAG  AND  SET  FLAG  ROUTINES
              *
                SETFLAGW1.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
01CF  F060          B = AMPCR.     SAVE  RETURN
01D0  F0CF          MAR1 = AMPCR.          ADDRESS  OF  FLAG  WORD  1  TO  MAR1
01D1  020D          AMPCR = MEMFLAGW1.
              *
                SETFLAGS.              COMMON  POINT  TO  SETFLAGW1-2-3-4
01D2  F0F1          MR1.
01D3  F05B          AMPCR = B.     RESTORE  RETURN
01D4  F0F9          WHEN RDC BEX.          FLAG  WORD  TO  B
01D5  F092          CSAR.              CHANGE  VALUE  TO  SHIFT  FLAG  TO  LSB
01D6  F172          CSAR  B = B C.         MOVE  FLAG  IN  B  TO  LSB
01D7  F075          B = BTT0.
01D8  F087          B = LIT  OR  B.        SET  FLAG  PER  LIT
01D9  F07D          B = B C.           SHIFT  FLAGS  BACK  TO  POSITION
01DA  F0E1          MIR = B.           MODIFIED  FLAG  WORD  TO  MIR
01DB  F0F3          MW1.               FLAG  WORD  TO  MEMORY
              *
                RESTORE-BR1.
                RSTBR1.                COMMON  POINT  FROM  ABOVE  AND -
              *                        AND  TESTFLAGW1-2-3-4
01DC  F0E1          MIR = B.               SAVE  B
01DD  F05D          ASE.               SELECT  BR2
01DE  F080          B = BMAR.
              *  GENERATE  NEW  BR1   (MSB  INST-DATA   SET  OPPOSITE   BR2)
01DF  F159          B = BFTF.
01E0  D800          SAR = 8.
01E1  F07F          B = B R.
01E2  F07C          B = B L.           CLEAR  MAR  (DO  NOT  USE  LIT  HERE)
01E3  F0D5          MAR1 = B.
01E4  F08D          BMI.                   RESTORE  B
01E5  F0C9          JUMP.              RETURN
              *
                SETFLAGW2.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
01E6  F060          B = AMPCR.     SAVE  RETURN
01E7  F0CF          MAR1 = AMPCR.          ADDRESS  OF  FLAG  WORD  2  TO  MAR1
01E8  020E          AMPCR = MEMFLAGW2.
01E9  41D1          MPCR = SETFLAGS  - 1.
              *
                SETFLAGW3.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
01EA  F060          B = AMPCR.     SAVE  RETURN
01EB  F0CF          MAR1 = AMPCR.          ADDRESS  OF  FLAG  WORD  3  TO  MAR1
01EC  020F          AMPCR = MEMFLAGW3.
01ED  41D1          MPCR = SETFLAGS  - 1.
              *
                SETFLAGW4.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
01EE  F060          B = AMPCR.     SAVE  RETURN
01EF  F0CF          MAR1 = AMPCR.          ADDRESS  OF  FLAG  WORD  4  TO  MAR1
01F0  0210          AMPCR = MEMFLAGW4.
01F1  41D1          MPCR = SETFLAGS  - 1.
              *
                TESTFLAGW1.            FLAG  NO.  IN  SAR,  STATE  IN  LIT
01F2  F060          B = AMPCR.     SAVE  RETURN
01F3  F0CF          MAR1 = AMPCR.          ADDRESS  OF  FLAG  WORD  1  TO  MAR1
01F4  020D          AMPCR = MEMFLAGW1.
              *
                TESTFLAGS.             COMMON  POINT  TO  TESTFLAGW1-2-3-4
01F5  F0F1          MR1.
01F6  F05B          AMPCR = B.     RESTORE  RETURN
01F7  F0F9          WHEN RDC BEX.          FLAG  WORD  TO  B
01F8  F092          CSAR.
01F9  F07F          B = B R.           SHIFT  FLAG  TO  LSB
01FA  F157          B = BT0T.
01FB  F078          B = B0TT.
01FC  F05F          B.
01FD  F0CB          LIT  EQV  B.
01FE  F09D          IF  ABT  SKIP.
01FF  F105          AMPCR = AMPCR  + 1.        SET  AMPCR  FOR  FALSE  RETURN
0200  41DB          MPCR = RSTBR1  - 1.
              *
                TESTFLAGW2.            FLAG  NO.  IN  SAR,  STATE  IN  LIT
0201  F060          B = AMPCR.     SAVE  RETURN
0202  F0CF          MAR1 = AMPCR.          ADDRESS  OF  FLAG  WORD  2  TO  MAR1
0203  020E          AMPCR = MEMFLAGW2.
0204  41F4          MPCR = TESTFLAGS  - 1.
              *
                TESTFLAGW3.            FLAG  NO.  IN  SAR,  STATE  IN  LIT
0205  F060          B = AMPCR.     SAVE  RETURN
0206  F0CF          MAR1 = AMPCR.          ADDRESS  OF  FLAG  WORD  3  TO  MAR1
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0207  020F          AMPCR = MEMFLAGW3.
0208  41F4          MPCR = TESTFLAGS - 1.
                  *
                  TESTFLAGW4.          FLAG NO. IN SAR, STATE IN LIT
0209  F060          B = AMPCR.     SAVE RETURN
020A  F0CF          MAR1 = AMPCR.        ADDRESS OF FLAG WORD 4 TO MAR11
020B  0210          AMPCR = MEMFLAGW4.
020C  41F4          MPCR = TESTFLAGS - 1.
                  *
                  * MEMORY WORDS FOR PROGRAM FLAGS
                  MEMFLAGW1.
020D  0000          CNST = @0000@.       FLAGS 1 THRU 16 OF WORD 1
                  MEMFLAGW2.
020E  0000          CNST = @0000@.       FLAGS 1 THRU 16 OF WORD 2
                  MEMFLAGW3.
020F  0000          CNST = @0000@.       FLAGS 1 THRU 16 OF WORD 3
                  MEMFLAGW4.
0210  0000          CNST = @0000@.       FLAGS 1 THRU 16 OF WORD 4
                  * END OF FLAG ROUTINES
                  *
                  READDATAKEYTOA1.
                  * SUB-ROUTINE TO READ 1 DATA CHARACTER FROM SPO OR -
                  *  CONSOLE AND RETURN WITH CHARACTER IN A1
                  *  A2 AND A3 ARE SAVED
                  *  ALL OTHER REGISTERS ARE DESTROYED
                  *
0211  F0DA          MIR = AMPCR.
0212  F05F          B.
0213  8156          CPCR = STACK - 1. SAVE AMPCR FOR RETURN
0214  8118          CPCR = SETCONTADDRS - 1.
0215  807D          CPCR = TESTSPO-CONSOLE - 1.
0216  4226          MPCR = SPOKEY - 1.       SPO ON SYSTEM
                  *
                  * CONSOLE ON SYSTEM
0217  F1D5          MIR = B001 + 1.      ENABLE KEYBOARD
0218  F099          DW1.
0219  812E          CPCR = LITEINDS - 1.
021A  E008          LIT = 8.       LIGHT NUMERIC INDICATOR
021B  F0FC          WHEN SRQ STEP.
021C  F097          DR2 BEX.
021D  F017          A1 = B.        SAVE DATA CHARACTER IN A1.
021E  F009          A1 = A1 AND LIT.     USE ONLY LOWER DIGIT
021F  E00F          LIT = @0F@.
                  * DISPLAY LOWER DIGIT IN B INDICATORS
0220  F082          B = LIT L .
0221  C888          SAR = 8 LIT = @88@.
0222  F0DC          MIR = A1 + B.
0223  F098          DW2.
0224  812E          CPCR = LITEINDS - 1.
0225  E000          LIT = 0.       TURN NUMERIC INDICATOR OFF
0226  422D          MPCR = EXITDKEY - 1.
                  *
                  SPOKEY.       SPO ON SYSTEM
0227  F0E7          MIR = B001.
0228  F099          DW1.      ENABLE SPO INPUT
0229  F0FC          WHEN SRQ STEP.
022A  F097          DR2 BEX.
022B  F017          A1 = B.        SAVE DATA CHARACTER IN A1
022C  F009          A1 = A1 AND LIT.     USE ONLY LOWER DIG
022D  E00F          LIT = @0F@.
                  *
                  EXITDKEY.
022E  F0E6          MIR = 0.
022F  F099          DW1.      DISABLE SPO OR CONSOLE
0230  8130          CPCR = SETPORTADDR - 1.       RESTORE BR1 AND BR2
0231  8174          CPCR = UNSTACK - 1.      RETURN (CHARACTER IN A1)
                  *
                  / SIMULATED REGISTERS     SIMREG1,    SIMREG2,    SIMREG3
                  ZROSREG1.
0232  F0E6          MIR = B000.
                  WRSREG1.
0233  F060          B = AMPCR.
0234  F0CF          MAR1 = AMPCR.
0235  0271          AMPCR = SIMREG1.
                  ZROSREG1A.
0236  F05B          AMPCR = B.
0237  F0F3          MW1.
0238  F05F          B.
0239  425C          MPCR = INCSREG1A - 1.
                  ZROSREG2.
023A  F0E6          MIR = B000.
                  WRSREG2.
023B  F060          B = AMPCR.
023C  F0CF          MAR1 = AMPCR.
023D  0272          AMPCR = SIMREG2.
023E  4235          MPCR = ZROSREG1A - 1.
                  ZROSREG3.
023F  F0E6          MIR = B000.
                  WRSREG3.
0240  F060          B = AMPCR.
0241  F0CF          MAR1 = AMPCR.
0242  0273          AMPCR = SIMREG3.
0243  4235          MPCR = ZROSREG1A - 1.
                  RDSREG1.
0244  F060          B = AMPCR.
0245  F0CF          MAR1 = AMPCR.
0246  0271          AMPCR = SIMREG1.
                  RDSREG1A.
0247  F05B          AMPCR = B.
0248  F0F1          MR1.
0249  F0F9          WHEN RDC BEX.
024A  F0E1          MIR = B.
024B  425C          MPCR = INCSREG1A - 1.
                  RDSREG2.
024C  F060          B = AMPCR.
024D  F0CF          MAR1 = AMPCR.
024E  0272          AMPCR = SIMREG2.
024F  4246          MPCR = RDSREG1A - 1.
                  RDSREG3.
0250  F060          B = AMPCR.
0251  F0CF          MAR1 = AMPCR.
0252  0273          AMPCR = SIMREG3.
0253  4246          MPCR = RDSREG1A - 1.
                  INCSREG1.
0254  F060          B = AMPCR.
0255  F0CF          MAR1 = AMPCR.
0256  0271          AMPCR = SIMREG1.
                  INCSREG1B.
0257  F05B          AMPCR = B.
0258  F0F1          MR1.
0259  F0F9          WHEN RDC BEX.
025A  F07E          B = B + 1.
025B  F0E1          MIR = B.
025C  F0F3          MW1.
                  INCSREG1A.
025D  41DB          MPCR = RESTORE-BR1 - 1.
                  INCSREG2.
025E  F060          B = AMPCR.
025F  F0CF          MAR1 = AMPCR.
0260  0272          AMPCR = SIMREG2.
0261  4256          MPCR = INCSREG1B - 1.
                  INCSREG3.
0262  F060          B = AMPCR.
0263  F0CF          MAR1 = AMPCR.
0264  0273          AMPCR = SIMREG3.
0265  4256          MPCR = INCSREG1B - 1.
                  DECSREG2.
0266  F060          B = AMPCR.
0267  F0CF          MAR1 = AMPCR.
0268  0272          AMPCR = SIMREG2.
0269  F05B          AMPCR = B.
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026A  F0F1          MR1.
026B  F0F9          WHEN RDC  BEX.
026C  F162          B = 0 - B.
026D  F163          B = 0 - B - 1.
026E  F0E1          MIR = B.
026F  F0F3          MW1.
0270  425C          MPCR = INCSREG1A  - 1.
                  SIMREG1.
0271  0000          CNST = @0000@.
                  SIMREG2.
0272  0000          CNST = @0000@.
                  SIMREG3.
0273  0000          CNST = @0000@.
                  SET-CONT-DINT.
                * SET CONTROLLER DATA INTERRUPT,  RESTORE PORT ADDRESS
                * IN BR1 AND BR2 THEN JUMP
0274  F0DA          MIR = AMPCR.
0275  F05F          B.
0276  8156          CPCR = STACK - 1. SAVE AMPCR, A1,A2,A3    IN STACK
0277  8118          CPCR = SETCONTADDRS - 1.
0278  807D          CPCR = TESTSPO-CONSOLE    - 1.
0279  427B          MPCR = SCDINT - 1.        SPO ON SYSTEM
                *
                * CONSOLE ON SYSTEM
027A  E004          LIT = @04@.    ENABLE CONSOLE PRINTER DINT
027B  F0F7          SKIP.
                  SCDINT.
027C  E002          LIT = @02@.    ENABLE SPO OUTPUT
027D  F0EA          MIR = LIT.
027E  F099          DW1.
027F  F0FC          WHEN SRQ STEP.
                ********      STOP HERE IF CONTROLLER ENABLE DOES NOT CAUSE
                *               SRQ   (NOTE- SPO SRQ HAS BEEN USED PRIOR TO
                *                       THIS STOP
                *             RUN SPO OR CONSOLE MTR
                *
                  RSCDINT.
0280  8130          CPCR = SETPORTADDR - 1.       RESTORE BR1 AND BR2
0281  4178          MPCR = UNSTACKRESTOREA - 1.   RETURN
                *
                *
                  RESET-CONT-DINT.
                * DISABLE CONTROLLER, RESTORE PORT ADDRESS IN BR1 AND
                * BR2, THEN JUMP
0282  F0DA          MIR = AMPCR.
0283  F05F          B.
0284  8156          CPCR = STACK - 1. SAVE AMPCR,A1,A2,A3    IN STACK
0285  8118          CPCR = SETCONTADDRS - 1.
0286  F0E6          MIR = 0.
0287  F099          DW1.
0288  F05F          B.
0289  427F          MPCR = RSCDINT - 1.
                *
                /
                  MEM-MOD-SETLC3.     SET WRITE-BEFORE-READ    FLAG
                * JUMP TO ABOVE LABEL FROM UPPER CASE RESET KEY CODE
                * ALLOWS WRITE-BEFORE-READ    OF FIRST ADDRESS
028A  F01A          SET LC3.
028B  F0F7          SKIP.
                  MEMORY-MODIFY.
028C  F0AD          IF LC3 STEP.
028D  F01F          RESET  GC2.
028E  F0A9          IF LC2  STEP.
028F  8118          CPCR = SETCONTADDRS - 1.
                * RETURNS WITH BR1 = INSTRUCTION,   BR2 = DATA
0290  F0EA          MIR = LIT.
0291  C881          SAR = 8 LIT = @81@.
0292  F082          B = LIT L.
0293  F0EC          MIR = LIT OR B.
0294  E009          LIT = 9.
0295  F098          DW2.
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0296  E010          LIT = @10@.
0297  F099          DW1.
0298  F082          B = LIT L.
0299  C803          SAR = 8,   LIT = @03@.
029A  F0E1          MIR = B.
029B  F0FC          WHEN SRQ STEP.
029C  F098          DW2.                                    READY · THE     R
029D  F0EA          MIR = LIT.
029E  E008          LIT = @08@.
029F  F0FC          WHEN SRQ STEP.
02A0  F099          DW1.
02A1  F082          B = LIT L.
02A2  E0C0          LIT = @C0@.
02A3  F0ED          MIR = LIT + B.
02A4  E004          LIT = @04@.
02A5  F0FC          WHEN SRQ STEP.
02A6  F098          DW2.
02A7  0345          AMPCR = MM-POSITION - 1.
02A8  F01D          A1 = LIT.
02A9  E00A          LIT = @0A@.
02AA  F091          CALL.                                   POSITION  RIG
                  MM-LIST-NEXT.
02AB  0334          AMPCR = MM-ADVANCE - 1.
02AC  F091          CALL.                                   ADVANCE  I L  E
02AD  F018          SET LC1.
02AE  F019          SET LC2.
02AF  F0CA          LCTR.
02B0  E003          LIT = @03@.
02B1  02E3          AMPCR = MM-KYBD - 1.
02B2  F091          CALL.                                   ACCEPT AND P  N
02B3  F0D1          MAR1 = A2.
02B4  F0E7          MIR = B001.
02B5  F0AF          IF LC3 SET LC3 ELSE SKIP.
02B6  F0F3          MW1.     WRITE BEFORE TO PREVENT PE.
                *  DELAY REQUIRED HERE FOR WRITE BEFORE READ ON 711
02B7  F0F1          MR1.
02B8  F0F9          WHEN RDC BEX.                           GET THE CONT  T
02B9  F033          A2 = B.
02BA  E003          LIT = @03@.
02BB  02C3          AMPCR = MM-CONTENTS - 1.
02BC  F041          A3 = AMPCR.
02BD  F0CA          LCTR.
02BE  0345          AMPCR = MM-POSITION - 1.
02BF  F01D          A1 = LIT.
02C0  E003          LIT = @03@.
02C1  F091          CALL.
02C2  0357          AMPCR = MM-PRINT - 1.
02C3  F0C9          JUMP.                                   PRINT THE CO  E
                  MM-CONTENTS.
02C4  F0CA          LCTR.
02C5  E000          LIT = @00@.
02C6  F00C          RESET GC1.
02C7  F0AD          IF LC3 STEP.        RESET WRITE-BEFORE-READ    FLAG
02C8  02CD          AMPCR = RESET-GC1LC3   - 1. FOR RETURN FROM MM-KYBD
02C9  42E3          MPCR = MM-KYBD - 1.
                *
                * MM-KYBD JUMPS HERE FOR OCK I,II,III      KEYS
                  SET-LC3GC1.
02CA  F01A          SET LC3.
                  SET-GC1.
02CB  F006          SET GC1.
02CC  F0F7          SKIP.
                  SET-LC3.
02CD  F01A          SET LC3.
                  RESET-GC1LC3.
02CE  F0CA          LCTR.
02CF  E003          LIT = @03@.
02D0  0345          AMPCR = MM-POSITION - 1.
02D1  F01D          A1 = LIT.
02D2  F091          CALL.
02D3  F018          SET LC1.
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02D4  02E3        AMPCR  =  MM-KYBD  -  1.
02D5  F091        CALL.                                          ACCEPT AND P  N
02D6  F0DD        MIR  =  A2.
02D7  F0F3        MW1.
02D8  028C        AMPCR = MEMORY-MODIFY.
02D9  F19C        IF  NOT GC1  JUMP.
02DA  F019        SET  LC2.                                      POS  TO  LEFT.
02DB  F01D        A1  = LIT.
02DC  E012        LIT  =  @12@.
02DD  0345        AMPCR  =  MM-POSITION  -  1.
02DE  F0D7        MAR1  = BMAR  + 1.
02DF  F035        A2  = BMAR.
02E0  F091        CALL.
02E1  02AA        AMPCR  =  MM-LIST-NEXT  -  1.
02E2  F0F6        SET  GC2.
02E3  F0C9        JUMP.
              MM-KYBD.
02E4  F041        A3  =  AMPCR.                                  SAVE  RETURN  D
02E5  F081        B  =  NOT  CTR  R.
02E6  D800        SAR  =  8.
02E7  0357        AMPCR  = MM-PRINT  -  1.
02E8  F0A2        IF  GC2  SKIP.
02E9  42EB        MPCR  =  MM-NANO-SAVE  -  1.
02EA  F01F        RESET  GC2.
02EB  F0C9        JUMP.
              MM-NANO-SAVE.
02EC  F017        A1  =  B.
02ED  F05D        ASE.  SELECT  BR2
02EE  F080        B = BMAR.
02EF  F16F        BR2  = B1TT.  BR2  = CONTROL  PORT
02F0  F1DB        MIR  =  0  +  Z.
02F1  E002        LIT  =  @02@.
02F2  F098        DW2.                                           ENABLE  KBD D  A
02F3  F034        A2  =  B000.
02F4  F05D        ASE.  SELECT  BR2
02F5  F080        B = BMAR.
02F6  F078        B = B0TT.
02F7  F16E        BR2  = B.  BR2  = DATA  PORT
              MM-KYBD-LOOP.
02F8  F0C5        IF  SRQ  DR2  BEX  SKIP.
02F9  42F7        MPCR = MM-KYBD-LOOP  -  1.
02FA  028C        AMPCR = MEMORY-MODIFY.
02FB  F0CB        LIT  EQV  B.
02FC  E01F        LIT  = @1F@.  RESET  KEY  LOWER  SHIFT  MECHANICAL
02FD  F09B        IF  ABT  LUOP  JUMP.  RESET  KEY  START  OVER
02FE  E0AB        LIT  = @AB@.  RESET  KEY  LOWER  SHIFT  ELECTRONIC
02FF  F09B        IF  ABT  LUOP  JUMP.  RESET  KEY  START  OVER
0300  0289        AMPCR = MEM-MOD-SETLC3  -  1.
0301  E09F        LIT  = @9F@.  RESET  KEY  UPPER  SHIFT  MECHANICAL
0302  F09B        IF  ABT  LUOP  JUMP.
0303  E08B        LIT  = @8B@.  RESET  KEY  UPPER  SHIFT  ELECTRONIC
0304  F09B        IF  ABT  LUOP  JUMP.
0305  0386        AMPCR = MICRO-TOOL  -  1.
0306  E04C        LIT  = @4C@.  OCK  IIII  KEY  MECHANICAL
0307  F09B        IF  ABT  LUOP  JUMP.  OCK  IIII  KEY  GO  TO  END
0308  E0A0        LIT  = @A0@.  OCK  IIII  KEY  ELECTRONIC
0309  F09B        IF  ABT  LUOP  JUMP.  OCK  IIII  KEY  GO  TO  END
030A  02C9        AMPCR = SET-LC3GC1  -  1.
030B  E0CE        LIT  = @CE@.  OCK  II  UPPER  SHIFT  MECHANICAL
030C  F09B        IF  ABT  LUOP  JUMP.
030D  E083        LIT  = @83@.  OCK  II  UPPER  SHIFT  ELECTRONIC
030E  F09B        IF  ABT  LUOP  JUMP.
030F  02CA        AMPCR = SET-GC1  -  1.
0310  E04E        LIT  = @4E@.  OCK  II  LOWER  SHIFT  MECHANICAL
0311  F09B        IF  ABT  LUOP  JUMP.
0312  E0A3        LIT  = @A3@.  OCK  II  LOWER  SHIFT  ELECTRONIC
0313  F09B        IF  ABT  LUOP  JUMP.
0314  02CC        AMPCR = SET-LC3  -  1.
0315  E0CD        LIT  = @CD@.  OCK  I  UPPER  SHIFT  MECHANICAL
0316  F09B        IF  ABT  LUOP  JUMP.
0317  E081        LIT  = @81@.  OCK  I  UPPER  SHIFT  ELECTRONIC
0318  F09B        IF  ABT  LUOP  JUMP.
0319  F0E1        MIR  = B.
031A  F07F        B  = B  R.
031B  C400        SAR  = 4  LIT  = 0.
031C  0323        AMPCR = ABCDEF-KEY  -  1.
031D  E004        LIT  = @04@.  UPPER  DIGIT  FOR  ALPHA  ELECTRONIC
031E  F0CB        LIT  EQV  B.
031F  F09B        IF  ABT  LUOP  JUMP.
0320  E005        LIT  = @05@.  UPPER  DIGIT  FOR  ALPHA  MECHANICAL
0321  F09B        IF  ABT  LUOP  JUMP.
0322  E000        LIT  = 0.
0323  F0F7        SKIP.  NUMERIC  KEY  ENTERED
          ABCDEF-KEY.  ALPHA  KEY  ENTERED
0324  E009        LIT  = @09@.
0325  F08D        BMI.  RESTORE  B (CHARACTER  ENTERED)
0326  F083        B  = LIT  + B.  ADD 9  IF  ALPHA  KEY
0327  F086        B  = LIT  AND  B.
0328  CC0F        SAR  = 12,  LIT  = @0F@.
0329  F025        A2  =  A2  C.
032A  F031        A2  =  A2  +  B.                               CONCATENATE
032B  02F7        AMPCR  =  MM-KYBD-LOOP  -  1.
032C  F030        INC.
032D  F0B9        IF  NOT COV  JUMP.                             TEST  FOR  A
032E  F066        B  =  A1.
032F  F095        CTR  =  B.                                     RESTORE  COUN  R
0330  0357        AMPCR  =  MM-PRINT  -  1.
0331  F0A6        IF  LC1  JUMP.                                 PRINT  FLAG.
0332  F101        AMPCR  =  A3.
0333  F05F        B.
0334  F0C9        JUMP.
              MM-ADVANCE.
0335  F05D        ASE.  SELECT  BR2
0336  F080        B = BMAR.
0337  F16F        BR2  = B1TT.  BR2  = CONTROL  PORT
0338  F0EA        MIR  =  LIT.
0339  E008        LIT  =  @08@.
033A  F098        DW2.                                           ENABLE  FORM  I
033B  F082        B = LIT  L.
033C  E0C0        LIT  =  @C0@.
033D  F0ED        MIR  =  LIT  + B.
033E  E050        LIT  =  @50@.
033F  F05D        ASE.  SELECT  BR2
0340  F080        B = BMAR.
0341  F078        B = B0TT.
0342  F16E        BR2  = B.  BR2  = DATA  PORT
0343  F0FC        WHEN SRQ  STEP.
0344  F098        DW2.
0345  F0C9        JUMP.
              MM-POSITION.
0346  F05D        ASE.  SELECT  BR2
0347  F080        B = BMAR.
0348  F16F        BR2  = B1TT.  BR2  = CONTROL  PORT
0349  F0EA        MIR  =  LIT.
034A  C810        SAR  = 8,  LIT  = @10@.
034B  F098        DW2.                                           ENABLE  CARRI
034C  E001        LIT  = @01@.                                   LEFT  POSITIO  P
034D  F015        IF  LC2  SKIP.
034E  E000        LIT  = @00@.                                   RIGHT  POSITI
034F  F082        B = LIT  L.
0350  F0DC        MIR  =  A1  + B.
0351  F05D        ASE.  SELECT  BR2
0352  F080        B = BMAR.
0353  F078        B = B0TT.
0354  F16E        BR2  = B.  BR2  = DATA  PORT
0355  F0FC        WHEN SRQ  STEP.
0356  F098        DW2.
0357  F0C9        JUMP.
              MM-PRINT.
0358  F0A5        IF  LC1  STEP.
0359  F1DB        MIR  =  0  +  Z.
035A  E004        LIT  =  @04@.
```

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035B  F05D        ASE.      SELECT   BR2
035C  F080        B  =  BMAR.
035D  F16F        BR2  =  BITT.             BR2  =  CONTROL  PORT
035E  F098        DW2.                                               ENABLE  PRINT
035F  C84B        SAR  =  8,   LIT   =  @4B@.
0360  F015        IF  LC2  SKIP.                                     LC2  MEANS  RE      R
0361  C849        SAR  =  8,   LIT   =  @49@.
0362  F089        B   =   LIT.
0363  F01B        A1  =  B  L.
0364  F081         B   =   NOT   CTR    R.
0365  F07C        B   =  B   L.
0366  DE00        SAR   =  14.
0367  F05F        B.
0368  F0F4        SAR   =  B.
0369  F025        A2  =  A2  C.
036A  F05D        ASE.      SELECT   BR2
036B  F080        B  =  BMAR.
036C  F078        B  =  B0TT.
036D  F16E        BR2  =  B.                BR2  =  DATA  PORT
    MM-PRINT-LOOP.
036E  F147        B   =   A2    C.
036F  D400        SAR   =   4.
0370  F07F        B   =   B   R.
0371  DC00        SAR  =  12.                                        ISOLATE   NEXT     I
0372  F0CC         LIT   -   B.
0373  E009         LIT   =   @09@.
0374  F09E        IF  AOV  SKIP.
0375  F018        SET   LC1.                                         UNDIGIT
0376  E037        LIT    =    @37@.
0377  F014        IF   LC1   SKIP.
0378  E030        LIT    =    @30@.
0379  F083        B  =  LIT   +  B.                                  PUT  ZONE  ON.
037A  F0DC        MIR  =  A1   +  B.
037B  F0FC        WHEN  SRQ  STEP.
037C  F098         DW2.
037D  F030         INC.
037E  F0C5        IF  SRQ  DR2  BEX  SKIP.
037F  F101        AMPCR    =    A3.
    MM-NANO-DUMB.
0380  F0C5        IF  SRQ  DR2  BEX  SKIP.
0381  437F        MPCR  =  MM-NANO-DUMB  -  1.
0382  F09F        IF    COV  JUMP.                                   END  OF  PRINT
0383  F025        A2     =    A2     C.
0384  DC00        SAR  =  12.                                        LINE   UP  NEXT     I
0385  036D        AMPCR   =    MM-PRINT-LOOP       -    1.
0386  F0C9        JUMP.
  ******************************************************                                   *
    MICRO-TOOL.                          PRESS   OCK  IIII
  *  MEMORY-MODIFY   USES   LC1,LC2,LC3,GC1,GC2
0387  F0AD        IF  LC3  STEP.
0388  F0A5        IF  LC1  STEP.
0389  F0A9        IF  LC2  STEP.
038A  F00C        RESET  GC1.
038B  F01F        RESET  GC2.
038C  4046        MPCR  =  TESTSELECT    -  1.
  /
    SPO-MEM-MOD.
038D  F0A9        IF  LC2  STEP.   RESET   WRITE-BEFORE-READ      FLAG
038E  8118        CPCR   =  SETCONTADDRS   -   1.
  *   RETURN  WITH  BR1  =  INST,    BR2  =  DATA
038F  F0A5        IF  LC1.
    SMM-NEW-ADDRESS.
0390  83BA        CPCR  =  SMM-ENABLE-OUT    -   1.
0391  E00D        LIT   =  @0D@.
0392  83F7        CPCR  =  SMM-DEV-WT-LIT     -   1.
0393  E00A        LIT   =  @0A@.
0394  83F7        CPCR  =  SMM-DEV-WT-LIT     -  1.
0395  83C2        CPCR  =  SMM-SPACE-4    -   1.
0396  83B7        CPCR  =  SMM-ENABLE-IN     -   1.
0397  F0A8        IF  LC1  SET  LC1  SKIP.
0398  83CB        CPCR  =  SMM-ACCEPT-4     -  1.
0399  83BA        CPCR  =  SMM-ENABLE-OUT    -   1.
039A  F0BF        IF  NOT  LC1  SKIP.
039B  83DC        CPCR  =  SMM-PRINT-4     -  1.
039C  83C2        CPCR  =  SMM-SPACE-4     -  1.
039D  F0D1        MAR1  =  A2.
039E  F0E7        MIR  =  B001.
039F  F0AB        IF  LC2  SET  LC2  ELSE  SKIP.
03A0  F0F3        MW1.      WRITE  BEFORE  READ    PREVENT  PE
        *   DELAY  REQUIRED  HERE  FOR  WRITE  BEFORE  READ  ON  711
03A1  F0F1        MR1.
03A2  F0F9        WHEN  RDC  BEX.
03A3  F033        A2  =  B.
03A4  83DC        CPCR  =  SMM-PRINT-4     -  1.
03A5  83B7        CPCR  =  SMM-ENABLE-IN     -  1.
    SMM-WHAT-TO-DO.
03A6  83F0        CPCR  =  SMM-DEV-RD    -  1.
03A7  F0CB        LIT  EQV  B.
03A8  E020        LIT   =  @20@.
03A9  03AE        AMPCR  =  SMM-NEW-CONTENT   -  1.
03AA  F09B        IF  ABT  LUOP  JUMP.
03AB  E01B        LIT   =  @1B@.
03AC  F09D        IF  ABT  SKIP.
03AD  43A5        MPCR  =  SMM-WHAT-TO-DO     -  1.
03AE  F018        SET  LC1.
    SMM-NEW-CONTENT.
03AF  83BA        CPCR  =  SMM-ENABLE-OUT    -  1.
03B0  83C2        CPCR  =  SMM-SPACE-4    -  1.
03B1  83B7        CPCR  =  SMM-ENABLE-IN     -  1.
03B2  83CB        CPCR  =  SMM-ACCEPT-4     -  1.
03B3  F0DD        MIR  =  A2.
03B4  F0F3        MW1.
03B5  F0FB        WHEN RMI  MAR1  =  BMAR  +  1.
03B6  F035        A2  =  BMAR.
03B7  438F        MPCR  =  SMM-NEW-ADDRESS    -  1.
    SMM-ENABLE-IN.
03B8  F0FC        WHEN  SRQ  STEP.
03B9  F0E7        MIR  =  B001.
03BA  43BB        MPCR  =  SMM-SEND-CW    -  1.
    SMM-ENABLE-OUT.
03BB  F1D5        MIR  =  B001    +  1.
    SMM-SEND-CW.
03BC  F05D        ASE.
03BD  F080        B  =  BMAR.
03BE  F16F        BR2  =  BITT.
03BF  F098        DW2.
03C0  F05F        B.
03C1  F16E        BR2   =  B.
03C2  F0C9        JUMP.
    SMM-SPACE-4.
03C3  F007        A1   =  AMPCR.
03C4  F05F        B.
03C5  F05F        B.
03C6  E020        LIT   =  @20@.
03C7  83F7        CPCR   =  SMM-DEV-WT-LIT     -  1.
03C8  83F8        CPCR   =  SMM-DEV-WT   -  1.
03C9  83F8        CPCR   =  SMM-DEV-WT   -  1.
03CA  83F8        CPCR   =  SMM-DEV-WT   -  1.
03CB  43ED        MPCR  =  SMM-JUMP-A1    -  1.
    SMM-ACCEPT-4.
03CC  F007        A1   =  AMPCR.
03CD  F0CA        LCTR.
03CE  CC02        SAR  =  12,    LIT   =  2.
03CF  F034        A2  =  B000.
    SMM-ACCEPT-LOOP.
03D0  F026        A2  =  A2  L.
03D1  83F0        CPCR  =  SMM-DEV-RD   -  1.
03D2  F0CC        LIT  -  B.
03D3  E040        LIT   =  @40@.
03D4  F09E        IF  AOV  SKIP.
03D5  F083        B  =  LIT   +  B.
03D6  E009        LIT   =  9.
```

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03D7  F086          B = LIT AND B.
03D8  E00F          LIT = @0F@.
03D9  F031          A2 = A2 + B.
03DA  F0C8          INC IF COV SKIP.
03DB  43CF          MPCR = SMM-ACCEPT-LOOP - 1.
03DC  43ED          MPCR = SMM-JUMP-A1 - 1.
                SMM-PRINT-4.
03DD  F007          A1 = AMPCR.
03DE  F0CA          LCTR.
03DF  CC02          SAR = 12, LIT = 2.
                SMM-PRINT-LOOP.
03E0  F025          A2 = A2 C.
03E1  F06D          B = A2 AND LIT.
03E2  E00F          LIT = @0F@.
03E3  F0CC          LIT - B.
03E4  E009          LIT = 9.
03E5  F09E          IF AOV SKIP.
03E6  F083          B = LIT + B.
03E7  E007          LIT = @07@.
03E8  F0ED          MIR = LIT + B.
03E9  E030          LIT = @30@.
03EA  83F8          CPCR = SMM-DEV-WT - 1.
03EB  F0C8          INC IF COV SKIP.
03EC  43DF          MPCR = SMM-PRINT-LOOP - 1.
03ED  43ED          MPCR = SMM-JUMP-A1 - 1.
                SMM-JUMP-A1.
03EE  F05C          AMPCR = A1.
03EF  F05F          B.
03F0  F0C9          JUMP.
                SMM-DEV-RD.
03F1  F1AE          IF NOT URQ SKIP.
03F2  43FD          MPCR = SMM-STINTS - 1.
03F3  F0C5          IF SRQ DR2 BEX SKIP.
03F4  43F0          MPCR = SMM-DEV-RD - 1.
03F5  F086          B = LIT AND B.
03F6  E07F          LIT = @7F@.
03F7  F0C9          JUMP.
                SMM-DEV-WT-LIT.
03F8  F0EA          MIR = LIT.
                SMM-DEV-WT.
03F9  F1AE          IF NOT URQ SKIP.
03FA  43FD          MPCR = SMM-STINTS - 1.
03FB  F0C6          IF SRQ DW2 SKIP.
03FC  43F8          MPCR = SMM-DEV-WT - 1.
03FD  F0C9          JUMP.
                SMM-STINTS.
03FE  F05D          ASE.
03FF  F035          A2 = BMAR.
0400  F08E          BR2 = A2 OR B100.
0401  F097          DR2 BEX.
0402  F07D          B = B C.
0403  D300          SAR = 3.        ERROR STATUS TO LSB, E-O-M TO MSB
0404  F090          BR2 = A2.
0405  F05F          B.
                *
                * PUSH INPUT-REQUEST TO RESET LC2 (NORMAL OPERATION
                *                    BEFORE ERROR WAS PUSHED)
                * PUSH ERROR TO SET LC2 (WRITE BEFORE READ FLAG)
                * PUSH END-OF-MESSAGE TO EXIT SPO-MEMORY-MODIFY
0406  F0C4          IF NOT MST SKIP.
0407  440C          MPCR = SMM-EXIT - 1.    E-O-M STATUS
0408  F019          SET LC2.        WRITE-BEFORE-READ FLAG
0409  F05F          B.
040A  F0B2          IF LST SKIP.
040B  438C          MPCR = SPO-MEM-MOD - 1.     INPUT-REQUEST STATUS
040C  438D          MPCR = SPO-MEM-MOD.  ERROR STATUS (LEAVE LC2 SET)
                SMM-EXIT.
                * SPO-MEM-MOD USES LC1 AND LC2
040D  F0A5          IF LC1 STEP.
040E  F0A9          IF LC2 STEP.
040F  4046          MPCR = TESTSELECT - 1.
                /
                TESTTABLE.
0410  4416          MPCR = TEST-0 - 1.
0411  4463          MPCR = TEST-1 - 1.
0412  4466          MPCR = TEST-2 - 1.
0413  446A          MPCR = TEST-3 - 1.
0414  446E          MPCR = TEST-4 - 1.
0415  4472          MPCR = TEST-5 - 1.
0416  4475          MPCR = TEST-6 - 1.
                START.
                TEST-0.
                NOFDTST.
0417  F000          WAIT.
                **********PLACE     NO FEED SWITCH ON CARD READER IN
                **********THE     OFF POSITION THEN PRESS FST PUSHBUTTON
0418  F096          DR1 BEX.
0419  F05F          B.
041A  F0C3          IF NOT LST SKIP.
041B  F000          WAIT.                   RDY BIT NOT RESET BY NOFD
                **********FAILURE     # F58
041C  F07D          B = B C.
041D  D100          SAR = 1.
041E  F05F          B.
041F  F0B2          IF LST SKIP.
0420  F000          WAIT.                   NOFD BIT NOT IN STATUS WORD
                **********FAILURE     # F60
0421  F05F          B.
0422  F000          WAIT.
                **********PLACE     NO FEED SWITCH ON CARD READER IN
                **********THE     ON POSITION THEN PRESS FST
0423  F096          DR1 BEX.
0424  F05F          B.
0425  F0C3          IF NOT LST SKIP.
0426  F000          WAIT.                   RDY BIT SET BY NOFD SWITCH
                **********FAILURE     # F59
0427  F07D          B = B C.
0428  F0C3          IF NOT LST SKIP.
0429  F000          WAIT.                   NO FEED BIT NOT RESET
                **********ERROR     # E15
042A  F000          WAIT.                   PRESS RESTART PUSHBUTTON
                *                           THEN FORCE STEP.
042B  F1B5          IF URQ SKIP.
042C  F000          WAIT.                   ERROR PORT SELECT
042D  F01C          A1 = BMAR.              STORE PRESENT ADDRESS
042E  F080          B = BMAR.
042F  F078          B = B0TT.
0430  F0D5          MAR1 = B.
0431  F0F1          MR1.
0432  F0F9          WHEN RDC BEX.
0433  F05E          ASR.
0434  F1B5          IF URQ SKIP.
0435  F000          WAIT.                   ERROR-PORT SELECT #F68
0436  F079          B = B100.
0437  F0D5          MAR1 = B.
0438  F039          A2 = LIT L.
0439  D800          SAR = 8.
043A  E001          LIT = @01@.
043B  F057          A3 = LIT L.
043C  E08F          LIT = @8F@.
                PSTEST.
043D  F003          A1 EQV B.
043E  F09D          IF ABT SKIP.
043F  F096          DR1 BEX.
0440  F080          B = BMAR.
0441  F06B          B = A2 + B.
0442  F0D5          MAR1 = B.
0443  F03C          A3 EQV B.
0444  F09D          IF ABT SKIP.
0445  443C          MPCR = PSTEST - 1.
0446  F0D0          MAR1 = A1.
0447  F098          DW2.
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0448  F05F          B.
0449  F1B5          IF  URQ  SKIP.
044A  F000          WAIT.                       ERROR-PORT   SELECT   #F68
044B  F0EA          MIR  =  LIT.
044C  E002          LIT  =  @02@.
044D  F099          DW1.
044E  F0FC          WHEN SRQ  STEP.
044F  F01C          A1  =  BMAR.
0450  F00F          A1  =  A1  -  1.
0451  F0D0          MAR1  =  A1.
0452  F096          DR1  BEX.
0453  F05E          ASR.
0454  F000          WAIT.
                *     PORT  SELECT  CARD-ENABLE  STATUS  GATING  TEST.
                *                   TO  VERIFY  ONLY  THE  DEVICE  GENERATING  AN
                *                   INTERRUPT  IS  ADDRESSED  BY  ASR.  METER  THE
                *                   FOLLOWING  SIGNALS.
                *                   ONLY  THE  SIGNAL  CORRESPONDING  TO  THE  POR
                *                   NUMBER  OF  THE  CARD  READER  SHOULD  BE  0%.
                *                   ALL  OTHERS  SHOULD  BE  100%.
                *
                *     PORT          PS1-3
                *
                *      12       2J(PSENST12/)
                *      11       1J(PSENST11/)
                *      10       1K(PSENST10/)
                *       9       2B(PSENST09/)
                *                                  PS1-2
                *
                *       8                      2J(PSENST8/)
                *       7                      1J(PSENST7/)
                *       6                      1K(PSENST6/)
                *       5                      2B(PSENST5/)
                *                                                 PS1-3
                *
                *       4                                      2J(PSENST4/)
                *       3                                      1J(PSENST3/)
                *       2                                      1K(PSENST2/)
                *       1                                      2B(PSENST1/)
                *
                *                 AGREE  -  FORCE  STEP
                *                 DISAGREE  -  A5,B5,C5,C7      OF
                *                              PS1    CARD  BEING  METERED.
                *
                *       NOTE  -  SYSTEM  MAY  HAVE  1-2  OR  3  PS1  CARDS.
                *
                *
0455  F012          A1  =  A1  +  1.
0456  F0D0          MAR1  =  A1.
0457  F0EA          MIR  =  LIT.
0458  E001          LIT  =  @01@.
0459  F099          DW1.
045A  F05F          B.
045B  F05F          B.
045C  E000          LIT  =  0.
045D  F108          ASR  BEX.
045E  F0CB          LIT  EQV  B.
045F  F09D          IF  ABT  SKIP.
0460  F000          WAIT.                       ERROR-PORT   SELECT   #F69
0461  F080          B  =  BMAR.
0462  F05F          B.
0463  8046          CPCR  =  TESTSELECT   -  1.
              TEST-1.
              RDSEQCHK.
0464  F058          A3  =  LIT.
0465  E002          LIT  =  @02@.
0466  4484          MPCR  =  NTRRDCHK  -  1.
              TEST-2.
              RDONECHK.
0467  F058          A3  =  LIT.
0468  E002          LIT  =  @02@.
0469  F0F6          SET  GC2.
046A  4495          MPCR  =  STRTRD  -  1.
              TEST-3.
              RDZERCHK.
046B  F058          A3  =  LIT.
046C  E002          LIT  =  @02@.
046D  F018          SET  LC1.
046E  4495          MPCR  =  STRTRD  -  1.
              TEST-4.
              RDCKRCHK.
046F  F058          A3  =  LIT.
0470  E002          LIT  =  @02@.
0471  F019          SET  LC2.
0472  4495          MPCR  =  STRTRD  -  1.
              TEST-5.
              RDCARDS.
0473  F058          A3  =  LIT.
0474  E002          LIT  =  @02@.
0475  456B          MPCR  =  RDALCDS  -  1.
              TEST-6.
              LOPONWRT.
0476  F07B          B  =  B000.
0477  F0E1          MIR  =  B.
              LOOPRTN.
0478  F0CA          LCTR.
0479  E03F          LIT  =  @3F@.
047A  F099          DW1.
047B  F0F5          SAVE.
047C  F096          DR1  BEX.
047D  F0F5          SAVE.
047E  F0C8          INC  IF  COV  SKIP.
047F  F0C9          JUMP.
0480  F18E          IF  IRQ  SKIP.
0481  4477          MPCR  =  LOOPRTN  -  1.
0482  F05E          ASR.
0483  F080          B  =  BMAR.
0484  8046          CPCR  =  TESTSELECT   -  1.
              NTRRDCHK.
0485  F0F8          WHEN IRQ  STEP.
              **********PRESS          RESTART  PUSHBUTTON  ON  CARD  READER
              **********IF          INCR  DOES  NOT  STEP  -  ERROR  #E3
0486  F108          ASR  BEX.
0487  F017          A1  =  B.
0488  F080          B  =  BMAR.
0489  F078          B  =  B0TT.
048A  F037          A2  =  B  R.
048B  D800          SAR  =  8.
048C  F147          B  =  A2  C.
048D  F03A          A2  =  LIT  +  B.
048E  E001          LIT  =  @01@.
048F  F068          B  =  A2.
0490  F003          A1  EQV  B.
0491  F0B5          IF  NOT  ABT  SKIP.
0492  4495          MPCR  =  STRTRD  -  1.
0493  F0DB          MIR  =  A1.
0494  F000          WAIT.                       STATUS  WORD  ERROR
              **********          ERROR  #  E4
0495  8046          CPCR  =  TESTSELECT   -  1.
              STRTRD.
0496  F0DE          MIR  =  A3.
0497  F099          DW1.                        SEND  PICK  COMMAND
0498  F0A0          IF  EXT  SKIP.
0499  F05F          B.
049A  D400          SAR  =  4.
049B  F0CA          LCTR.
049C  E003          LIT  =  @03@.
049D  F096          DR1  BEX.
049E  F05F          B.
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049F  F0B2          IF  LST  SKIP.
04A0  44A3          MPCR = EFCHK  -  1.
04A1  F0E1          MIR  = B.
04A2  F000          WAIT.                          RDY BIT  NOT RESET  BY PICK
            ************ERROR        # E5
04A3  8046          CPCR = TESTSELECT   -  1.
 EFCHK.
04A4  F096          DR1  BEX.
04A5  F017          A1   = B.
04A6  F10B          A1   = A1  C.
04A7  F001          A1.
04A8  F0C3          IF  NOT  LST  SKIP.
04A9  44AF          MPCR = LECCHK  -  1.
04AA  F0A0          IF  EXT  SKIP.
04AB  44A3          MPCR = EFCHK  -  1.
04AC  F030          INC.
04AD  F0B8          IF  NOT  COV  SKIP.
04AE  4586          MPCR = CDFDERR  -  1.
04AF  44A3          MPCR = EFCHK  -  1.
 LECCHK.
04B0  D800          SAR  = 8.
04B1  F125          A2   = LIT  C.
04B2  E030          LIT  = @30@.
04B3  F0F5          SAVE.
04B4  F096          DR1  BEX.
04B5  F017          A1   = B.
04B6  F10B          A1   = A1  C.
04B7  D300          SAR  = 3.
04B8  F001          A1.
04B9  F0C3          IF  NOT  LST  SKIP.
04BA  44BF          MPCR = TRBLCHK  -  1.
04BB  F02A          A2   = A2  +  1.
04BC  F09D          IF  ABT  SKIP.
04BD  F0C9          JUMP.
04BE  F0E1          MIR  = B.
04BF  F000          WAIT.                          LEC  ERROR
            ************FAILURE      # F33
 TRBLCHK.
04C0  D800          SAR  = 8.
04C1  F125          A2   = LIT  C.
04C2  E0B1          LIT  = @B1@.
04C3  F0F5          SAVE.
04C4  F012          A1   = A1  +  1.
04C5  F09D          IF  ABT  SKIP.
04C6  F0C9          JUMP.
04C7  F0CA          LCTR.
04C8  E031          LIT  = @31@.
04C9  F0F5          SAVE.
04CA  F096          DR1  BEX.
04CB  F017          A1   = B.
04CC  F10B          A1   = A1  C.
04CD  D300          SAR  = 3.
04CE  F001          A1.
04CF  F0C3          IF  NOT  LST  SKIP.
04D0  44EE          MPCR = TRBLERR  -  1.
04D1  F030          INC.
04D2  F02E          IF  COV  SKIP.
04D3  F0C9          JUMP.
04D4  F0FC          WHEN SRQ  STEP.                NO DINT  DETECTED
            ************ERROR        # E6
04D5  F096          DR1  BEX.
04D6  F05F          B.
04D7  F1AD          IF  NOT  SRQ  SKIP.
04D8  F0F7          SKIP.
04D9  F000          WAIT.
            ************FAILURE      # F45
04DA  F05F          B.
04DB  F0C4          IF  NOT  MST  SKIP.
04DC  44DF          MPCR = CHKRDYB  -  1.
04DD  F0E1          MIR  = B.
04DE  F000          WAIT.                          DINT  NOT SET  IN  STAT  WRD
            ************FAILURE      # F39
04DF  8046          CPCR = TESTSELECT   -  1.
 CHKRDYB.
04E0  F05F          B.
04E1  F0B2          IF  LST  SKIP.
04E2  44E5          MPCR = SELWDAT  -  1.
04E3  F0E1          MIR  = B.
04E4  F000          WAIT.                          RDY BIT  SET  BY DINT
            ************FAILURE      # F40
04E5  8046          CPCR = TESTSELECT   -  1.
 SELWDAT.
04E6  F0BB          IF  NOT  GC1  SKIP.
04E7  450F          MPCR = RDCDDAT1  -  1.
04E8  F0BC          IF  NOT  GC2  SKIP.
04E9  452E          MPCR = RDCDDAT2  -  1.
04EA  F0BF          IF  NOT  LC1  SKIP.
04EB  4542          MPCR = RDCDDAT3  -  1.
04EC  F0C0          IF  NOT  LC2  SKIP.
04ED  4556          MPCR = RDCDDAT4  -  1.
04EE  44F6          MPCR = RDCDDAT0  -  1.
 TRBLERR.
04EF  F058          A3   = LIT.
04F0  E004          LIT  = @04@.
04F1  F099          DW1.                           SEND  CLEAR
04F2  F0E1          MIR  = B.
04F3  F000          WAIT.                          TROUBLE  INDICATION
            ************       ERROR  # E8
04F4  F080          B = BMAR.
04F5  F05F          B.
04F6  8046          CPCR = TESTSELECT   -  1.
 RDCDDAT0.
04F7  F10F          A1   = B000.
04F8  F038          A2   = LIT.
04F9  E050          LIT  = @50@.
04FA  F0FC          WHEN SRQ  STEP.                DINT  RESET  BY STATUS  READ
04FB  F097          DR2  BEX.
04FC  F012          A1   = A1  +  1.
04FD  F1AD          IF  NOT  SRQ  SKIP.            DINT  NOT RESET  BY DATA READ
04FE  F000          WAIT.
            ************       FAILURE  # F46
04FF  F0F5          SAVE.
0500  F0FC          WHEN SRQ  STEP.                DINT  NOT SET  AFTER  READ
            ************       ERROR  # E16
0501  F097          DR2  BEX.
0502  F012          A1   = A1  +  1.
0503  F0DB          MIR  = A1.
0504  F068          B    = A2.
0505  F003          A1   EQV  B.
0506  F09D          IF  ABT  SKIP.
0507  F0C9          JUMP.
0508  F1AD          IF  NOT  SRQ  SKIP.
0509  F000          WAIT.                          DINT  SET  AFTER  CTR=80
            ************       ERROR  # E18
050A  F096          DR1  BEX.
050B  F05F          B.
050C  F0B2          IF  LST  SKIP.                 TEST  FOR  READY  BIT
050D  F000          WAIT.                          RDY NOT SET  AFTER  COL  80
            ************       FAILURE  # F50
050E  F006          SET  GC1.
050F  4495          MPCR = STRTRD  -  1.
 RDCDDAT1.
0510  F10F          A1   = B000.
0511  F054          A3   = B000.
0512  F038          A2   = LIT.
0513  E050          LIT  = @50@.
0514  F0F5          SAVE.
0515  F0FC          WHEN SRQ  STEP.
0516  F097          DR2  BEX.
0517  F04C          A3   = A3  +  1.
0518  F012          A1   = A1  +  1.
0519  F003          A1   EQV  B.                   CHECK  DATA
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051A  F09D          IF  ABT  SKIP.
051B  458C          MPCR = DATERR1  - 1.
051C  F068          B = A2.
051D  F003          A1  EQV  B.                    CHECK  LAST  CHAR
051E  F09D          IF  ABT  SKIP.
051F  F0C9          JUMP.
0520  F058          A3 = LIT.
0521  E002          LIT = @02@.
0522  F05F          B.
0523  4495          MPCR = STRTRD  - 1.
                ENDCDRD.
0524  F0EA          MIR = LIT.
0525  E001          LIT = @01@.
0526  F0FC          WHEN SRQ STEP.                 SEND  TERMINATE
0527  F099          DW1.
0528  F05F          B.
0529  F05F          B.
052A  F1AD          IF  NOT SRQ SKIP.
052B  F000          WAIT.                          DINT  DETECTED  AFTER  TERM.
              **********FAILURE          # F62
052C  F080          B = BMAR.
052D  F05F          B.
052E  8046          CPCR = TESTSELECT   - 1.
                RDCDDAT2.
052F  F01D          A1 = LIT.
0530  E0FF          LIT = @FF@.
0531  F038          A2 = LIT.
0532  E050          LIT = @50@.
0533  F054          A3 = B000.
0534  F0F5          SAVE.
0535  F0FC          WHEN SRQ STEP.
0536  F097          DR2 BEX.
0537  F04C          A3 = A3 + 1.
0538  F003          A1  EQV  B.                    CHECK  DATA  CHAR.
0539  F09D          IF  ABT  SKIP.
053A  4599          MPCR = DATERR2  - 1.
053B  F068          B = A2.
053C  F03C          A3  EQV  B.
053D  F09D          IF  ABT  SKIP.
053E  F0C9          JUMP.
053F  F058          A3 = LIT.
0540  E002          LIT = @02@.
0541  F05F          B.
0542  4495          MPCR = STRTRD  - 1.
                RDCDDAT3.
0543  F10F          A1 = B000.
0544  F038          A2 = LIT.
0545  E050          LIT = @50@.
0546  F054          A3 = B000.
0547  F0F5          SAVE.
0548  F0FC          WHEN SRQ STEP.
0549  F097          DR2 BEX.
054A  F04C          A3 = A3 + 1.
054B  F003          A1  EQV  B.
054C  F09D          IF  ABT  SKIP.
054D  45A6          MPCR = DATERR3  - 1.
054E  F068          B = A2.
054F  F03C          A3  EQV  B.
0550  F09D          IF  ABT  SKIP.
0551  F0C9          JUMP.
0552  F018          SET LC1.
0553  F058          A3 = LIT.
0554  E002          LIT = @02@.
0555  F05F          B.
0556  4495          MPCR = STRTRD  - 1.
                RDCDDAT4.
0557  F01D          A1 = LIT.
0558  E055          LIT = @55@.
0559  F038          A2 = LIT.
055A  E050          LIT = @50@.
055B  F054          A3 = B000.
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055C  F0F5          SAVE.
055D  F0FC          WHEN SRQ STEP.
055E  F097          DR2 BEX.
055F  F04C          A3 = A3 + 1.
0560  F003          A1  EQV  B.
0561  F09D          IF  ABT  SKIP.
0562  45B2          MPCR = DATERR4  - 1.
0563  F068          B = A2.
0564  F03C          A3  EQV  B.
0565  F09D          IF  ABT  SKIP.
0566  F0C9          JUMP.
0567  F019          SET LC2.
0568  F058          A3 = LIT.
0569  E002          LIT = @02@.
056A  F05F          B.
056B  4495          MPCR = STRTRD  - 1.
                RDALCDS.
056C  F0DE          MIR = A3.
056D  F0CA          LCTR.
056E  E003          LIT = @03@.
056F  F099          DW1.                           SEND  PICK  COMMAND
0570  F0F5          SAVE.
0571  F05F          B.
0572  F05F          B.
0573  F0A0          IF  EXT  SKIP.
0574  F0C9          JUMP.
0575  F030          INC.
0576  F02E          IF  COV  SKIP.
0577  F0C9          JUMP.
0578  F1AD          IF  NOT SRQ SKIP.
0579  F0F7          SKIP.
057A  457D          MPCR = ENDRDAC  - 1.
057B  F0EA          MIR = LIT.
057C  E001          LIT = @01@.
057D  F099          DW1.                           SEND  TERMINATE
                ENDRDAC.
057E  F18E          IF  IRQ  SKIP.
057F  456B          MPCR = RDALCDS  - 1.
0580  F0EA          MIR = LIT.
0581  E001          LIT = @01@.
0582  F099          DW1.
0583  F05E          ASR.
0584  F05F          B.
0585  F080          B = BMAR.
0586  8046          CPCR = TESTSELECT   - 1.
                CDFDERR.
0587  F096          DR1 BEX.
0588  F0E1          MIR = B.
0589  F000          WAIT.                          EFC  NOT  DETECTED
              **********ERROR          # E10
058A  F080          B = BMAR.
058B  F05F          B.
058C  8046          CPCR = TESTSELECT   - 1.
                DATERR1.
058D  F00C          RESET GC1.
058E  F01D          A1 = LIT.
058F  E07F          LIT = @7F@.
0590  F003          A1  EQV  B.
0591  F0B5          IF  NOT ABT SKIP.
0592  4523          MPCR = ENDCDRD  - 1.
0593  D800          SAR = 8.
0594  F044          A3 = A3 C.
0595  F1D2          MIR = A3 + B.
0596  F000          WAIT.                          SEQUENTIAL  DATA  ERROR.
              **********MIR          DIGITS   A&B = BUFFER  ADDRESS
              **********MIR          DIGITS   C&D = DATA (SAME  AS  BUF  ADDR)
              **********          ERROR # E11
0597  F080          B = BMAR.
0598  F05F          B.
0599  8046          CPCR = TESTSELECT   - 1.
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                DATERR2.
059A  F01F          RESET  GC2.
059B  F01D          A1  = LIT.
059C  E07F          LIT  = @7F@.
059D  F003          A1  EQV  B.
059E  F0B5          IF  NOT  ABT  SKIP.
059F  4523          MPCR = ENDCDRD - 1.
05A0  D800          SAR = 8.
05A1  F044          A3 = A3  C.
05A2  F1D2          MIR = A3 + B.
05A3  F000          WAIT.                          ALL ONES DATA ERROR
              **********MIR        DIGITS   A&B = BUFFER ADDRESS
              **********MIR        DIGITS   C&D = DATA (HEX FF)
              **********ERROR        # E12
05A4  F080          B = BMAR.
05A5  F05F          B.
05A6  8046          CPCR = TESTSELECT  - 1.
                DATERR3.
05A7  F01D          A1 = LIT.
05A8  E07F          LIT = @7F@.
05A9  F003          A1 EQV B.
05AA  F0B5          IF NOT ABT SKIP.
05AB  4523          MPCR = ENDCDRD - 1.
05AC  D800          SAR = 8.
05AD  F044          A3 = A3 C.
05AE  F1D2          MIR = A3 + B.
05AF  F000          WAIT.                          ALL ZEROS DATA ERROR
              **********MIR        DIGITS   A&B = BUFFER ADDRESS
              **********MIR        DIGITS   C&D = DATA (HEX 00)
              **********ERROR        # E12
05B0  F080          B = BMAR.
05B1  F05F          B.
05B2  8046          CPCR = TESTSELECT  - 1.
                DATERR4.
05B3  F01D          A1 = LIT.
05B4  E07F          LIT = @7F@.
05B5  F003          A1 EQV B.
05B6  F0B5          IF NOT ABT SKIP.
05B7  4523          MPCR = ENDCDRD - 1.
05B8  D800          SAR = 8.
05B9  F044          A3 = A3 C.
05BA  F1D2          MIR = A3 + B.
05BB  F000          WAIT.                          CHECKER BRD DATA ERROR
              **********MIR        DIGITS   A&B = BUFFER ADDRESS
              **********MIR        DIGITS   C&D = DATA (HEX 55)
              **********ERROR        # E12
05BC  F080          B = BMAR.
05BD  F05F          B.
05BE  8046          CPCR = TESTSELECT  - 1.
              BUSSTEST1.                         EXTERNAL BUSS TEST.
05BF  F0F9          WHEN RDC BEX.
05C0  F0FF          0 EQV B.
05C1  F09C          IF ABT JUMP.
05C2  F0E1          MIR = B.
05C3  F000          WAIT.
              *********EXTERNAL      BUSS FAILURE OR PARITY ERROR
              *********ERROR     #E1.
05C4  F0DA          MIR = AMPCR.
05C5  F000          WAIT.
05C6  7FFF          MPCR = STARTCONTROLLER  - 2.
```

MANUAL PROCEDURES

E1	OPERATOR ACTION	MACHINE ACTION	A	D	C
1	PUT MTR METER ON CR4-1U (RC1/)	METER READING 100%	F31	F32	
E2	OPERATOR ACTION	MACHINE ACTION	A	D	
	METER CR4-2Q (CGCLEARN) PRESS CLR PB	METER READING 100%	2	F70	C C C C C C C
2	OBSERVE MIR	DIGIT B= PORT NO BEING USED BY CARD READER	3	F3	
3	OBSERVE MIR	BIT A8 IS ON	F4	F5	C
E3	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON CR3-2T (GO/)	METER READING 100%	2	F6	
2	READ MTR METER WHILE PRESSING RESTART SWITCH	METER READING 0%	3	F6	
3	PUT MTR METER ON CR4-2I (SINT/)	METER READING 0%	F7	4	
4	PUT MTR METER ON CR3-1N (BSY/)	METER READING 100%	5	6	C C
5	PUT MTR METER ON CR3-2G (READY)	METER READING 0%	7	F10	C
6	PUT MTR METER ON CR4-1I (SPICK/)	METER READING 100%	F8	F11	C C
7	METER CR4-2Q (CGCLEARN)	0%	F9	F70	C
E4	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	BIT D1 IS ON	3	2	
2	PUT MTR METER ON CR4-1N (ENST/)	METER READING 100%	3	F12	
3	OBSERVE MIR	BIT D2 IS ON	4	5	
4	PUT MTR METER ON CR3-1R (NOFD)	METER READING 0%	F13	F14	
5	OBSERVE MIR	BIT D4 IS ON	F15	6	
6	OBSERVE MIR	BIT D8 IS ON	7	8	
7	PUT MTR METER ON CR4-2T (LEC/)	METER READING 0%	F16	F17	
8	OBSERVE MIR	BIT C1 IS ON	9	10	
9	PUT MTR METER ON CR4-1E (EFC/)	METER READING 0%	F18	F19	

10	OBSERVE MIR	DOES DIGIT B EQUAL THE PORT NO. BEING USED BY THE CARD READER	F21	F20

E5	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE CARD READER	NO CARDS WERE FED	2	6	A
2	PUT MTR METER ON CR4-1U (RC1/)	0%	F24	E19	A A A A A
3	PRESS CLEAR AND RESTART MTR WHEN INCR = 0009 (TEST-SELECT) KEY 06 ON NUMERIC KYBD. METER CR4-1S (PSINST)	100%	4	F22	A
4	PUT MTR METER ON CR4-1Y (WRITE/)	4-6%	5	F23	A A A A A
5	PUT MTR METER ON CR4-1B	3-5%	F25	F27	A
6	OBSERVE CARD READER	ONLY ONE CARD FED	F26	F28	

E6	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT MTR METER ON CR4-2L (DINT/)	METER READING 0%	F43	2	
2	PUT MTR METER ON CR3-2B (CTRCLR/)	METER READING 100%	3	F36	
3	PUT MTR METER ON CR3-1V (CT=80/)	METER READING 100%	4	F37	
4	PUT MTR METER ON CR4-C4 FRONTPLANE (DATATR)	METER READING 100%	5	F42	A
5	PRESS CLEAR AND RESTART MTR WHEN INCR = 0009 (TEST-SELECT) KEY 05 ON NUMERIC KYBD. METER CR3-2U (SC123)	5-10%	F38	F44	A A A

E8	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CARD READER	CARDS STOPPED FEEDING	F34	F35

E10	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CARD READER	NO CARDS FED	2	3
2	PUT MTR METER ON CR4-1U (RC1/)	METER READING 0%	F24	F29
3	OBSERVE CARD READER	ONLY ONE CARD FED	F30	F28

E11	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	DIGITS C&D = 00	F51	2
2	OBSERVE MIR DIGITS A & B	BETWEEN 00 - 0F	F52	3
3	OBSERVE MIR DIGITS A & B	BETWEEN 10 - 1F	F53	4
4	OBSERVE MIR DIGITS A & B	BETWEEN 20 - 2F	F54	5
5	OBSERVE MIR DIGITS A & B	BETWEEN 30 - 3F	F55	F56

E12	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR DIGITS A & B	BETWEEN 00 - 0F	F63	2
2	OBSERVE MIR DIGITS A & B	BETWEEN 10 - 1F	F64	3
3	OBSERVE MIR DIGITS A & B	BETWEEN 20 - 2F	F65	4
4	OBSERVE MIR DIGITS A & B	BETWEEN 30 - 3F	F66	F67

E16	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON CR1-1X (CT=80/)	METER READING 100%	F47	F48

E18	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT MTR METER ON CR1-1X (CT=80/)	METER READING 0%	F49	F48

E19	OPERATOR ACTION	MACHINE ACTION	A	D
	PRESS CLEAR, RESTART MTR KEY 06 ON NUMERIC KYBD METER CR4-1Y (PSWRITE)	INCR = 0009 (TEST SELECT) INV X10 SCALE 4-6%	F29	F68

E20	OPERATOR ACTION	MACHINE ACTION	A	D	
	PRESS CLEAR, RESTART MTR KEY 06 ON NUMERIC KYBD METER CR4-1R (PSREAD)	INCR = 0009 (TEST SELECT) INV X10 SCALE 4-6%	F30	F68	A A A

NOTE

PS = PORT SELECT CARD.
IF CARD READER IS IN PORT 1-4 PS1-1
IF CARD READER IS IN PORT 5-8 PS1-2
IF CARD READER IS IN PORT 9-12PS1-3

FAILURE DICTIONARY

F1 NOT DIAGNOSABLE WITH THIS MTR

F2 CR1 D7
CR2 F5, F7, E7, C7, E5
CR4 C7
A

F3 PS A3,B3,B5,B7,C1,C3,C5,D3,E3,F7 A

F4 CR1 B5
CR4 D7, B5, C5, A5, C3, C1
CR3 B3

F5 CR4 D7, D3, C1
CR3 B7, E5, D7, F5, C7, F7, E7

F6 CHECK RESTART SWITCH ON CARD READER
CR4 F7, E7
OR PORT SELECT ERROR-CHIP E5
A

F7 PS A3,C1,C3,D3,D5,E3,F7 A

F8 CR4 C5, D7, C1, B5, E7, F7, B3, D3
CR3 F5, D7

F9 CR4 D7, D3, C1
CR3 D7, B7, A7, E5, E7, F7, C7

F10 CR3 C7, C5, D5, E5, B7, D7
CR4 D7, D3

F11 CR4 C7, A1
A

F12 PS A5,B3,C3,C5,C7,D3 A
CR4 D3, D5
CR3 C5, C1, D7, A7, E7
CR2 C7

F13 CR3 D7, B7
CR2 F7

F14 'NO FEED'INDICATION FROM CARD READER

F15 CR3 F5, D7, C7
CR4 C1
CR2 F7

F16 LEADING EDGE SIGNAL (LEC/) ALWAYS TRUE
FROM CARD READER

F17 CR4 D3, A3, A1, D1, C1
CR2 F7

F18 EARLY FEED SIGNAL (EFC/) ALWAYS TRUE FROM CARD READER

F19 CR4 A1, A3, C1, D1, E5, D5
CR2 C7
A

F20 PS B3,B5,B7,C3,C5,D3,D5 A

F21 CR3 B3, CR4 D5
CR1 B5
CR4 D5

F22 PS D1 A
CR4 E5
A

F23 PS B5,C1,E5,E7,F7 A

F24 SIGNAL RC1/ IS TRUE BUT IS NOT ENERGIZING THE FEED
SOLENOID IN THE CARD READER
CR4 A1, C1, E5, A7, B3
OR PORT SELECT ERROR-CHIP E7

F25 CR3 C1, C5, A7
CR4 E5, D5, C5, C1, C7, D7, A7

F26 CR3 C1, C5, E7
CR4 D1, B5, E3

F27 NO CLK (SCLK) TO THIS DDP

F28 CR4 B3, A1, D1, C7, E7, E3
CR3 E7 OR NO EARLY FEED CELL SIGNAL (EFC/) FROM
CARD READER

F29 CR4 A1, B3, E7, A7, E3, C1, D1, E5

F30 CR2 C7
CR4 A1, A3, C1, D1, A7, E5, D5
OR PORT SELECT ERROR-CHIP E7

F31 FEED SOLENOID IS PICKED BUT SIGNAL RC1/ NOT TRUE

F32 CR4 E7, E3, F7, B3, C1, A1, C7

F33 CR2 F7
CR4 A1, A3, A7, C1, D1, D3

F34 CR4 D1, C7, C1, A3, A5, C3, C5, E3

F35 CR4 D1, B3, E7, D3, C7, A1

F36 CR4 C1, E7, F7, D5
CR3 D3, F5, C5, D5

F37 CR1 A5
CR3 C1, C3, D3, B3, E7, F5, A5, B5
CR4 E7

F38 CR3 A5, A7, B5, E7, F5
CR4 C5, B5, D7, D5

F39 CR1 B5, D7
CR4 D5, E5
PS F7,E7 A
MU4 D5,E3 A

F40 CR1 D5
CR3 D5, D3, C5, C1
CR4 E7, F7, A1, D1, D7, C7, E3

F41 CR2 F7
CR3 E7
A

F43 PS A3,A5,B3,B5,C1,D1,D7,E3,E5 A

F42 CR4 C5, F7, E7, B5, A1, A7, E3, C1, D7
A

F43 PS E3,C1,D7,D1,B3,A5,A3,E5,B5 A

F44 NO SC123 SIGNAL FROM CARD READER

```
F45     CR4   D5,   E5
F46     CR4   B5,   C5,   D5,   E5

F47     CR4   E3,   D7,   F7,   A1,   E5,   B5,   C5,   D5
        CR3   F5,   A5,   B3,   D3
        CR1   C7,   D5

F48     CR1   D5,   C7,   B7,   A5,
        CR3   C3,   B3,   D3,   B5,   A5,   F5,   C1,   E7
        CR4   D7

F49     CR3   B3

F50     CR3   D5,   C1

F51     CR3   C1,   D3,   D7
        CR4   C7,   B5
        CR2   F3,   E5,   F7,   E1,   D7,   A3,   E7,   C5
        CR1   B3,   C1,   E1,   A3,   C5,   D5

F52     CR1   C7,   E1,   C1,   B3,   B7,   C5,   B5,   D5,   A3
        CR2   C5,   F3,   F5,   E5,   F7,   A3,   B3,
        CR3   C3,   C1,   D7,   D3
        CR4   C7,   C1,   E5,   D7

F53     CR1   C3,   C5,   B5,   C7,   D7
        CR2   B3,   C5,   E5,   E7,   A3

F54     CR1   D3,   C5,   B5,   A3,   C7
        CR2   C3,   F3,   E5,   E7,   C5
        CR3   C1,   D7

F55     CR1   E3,   D5,   C7
        CR2   D3

F56     CR1   F3,   D5,   C7
        CR2   E3,   C5,   E5,   E7,   D3,   F3
        CR3   B7,   B3
        CR4   D5

F57     CR3   B7,   B5
        CR4   C1,   C7,   D5

F58     CR3   C1,   D7

F59     CR3   B7,   D7

F60     CR2   F7
        CR3   B7,   D7
        OR  PORT  SELECT  ERROR-CHIP  E7

F61     CR3   B5
        CR4   C1,   B3

F62     CR3   D3,   D5,   C5
        CR4   F7,   E7,   E3,   C5

F63     CR1   B3
        CR2   A3
F64     CR1   C3
        CR2   B3

F65     CR1   D3
        CR2   C3

F66     CR1   E3
        CR2   D3

F67     CR1   F3
        CR2   E3
```

```
F68     PS    A5,B5,C1,E5,E7,F7                                  A
        MU4   D5,E3                                              A

F69     IF  DEVICE  IS  IN  PORT  1-4
        PS1-1       D3,B3
        IF  DEVICE  IS  IN  PORT  5-8
        PS1-2       D3,B3
                                                                 C
                                                                 C
F70     CG1  C1  (IF   B721   CG2  C3  CD2  A5)                  C
```

ILLUSTRATIONS

TEST DECK MUST REMAIN IN NOTE PROPER SEQUENCE.

CARD 1-13
COL.1, 9,17,25,33,41,49,57,65,73 PUNCH ROW 1
COL.2,10,18,26,34,42,50,58,66,74 PUNCH ROW 2
COL.3,11,19,27,35,43,51,59,67,75 PUNCH ROW 3
COL.4,12,20,28,36,44,52,60,68,76 PUNCH ROW 4
COL.5,13,21,29,37,45,53,61,69,77 PUNCH ROW 5
COL.6,14,22,30,38,46,54,62,70,78 PUNCH ROW 6
COL.7,15,23,31,39,47,55,63,71,79 PUNCH ROW 7
COL.8-15,24-31,40-47,56-63,72-79 PUNCH ROW 8

COL. 16 31, 48 63, 80 PUNCH ROW 9

COL. 32 63 PUNCH ROW 0

COL. 64-80 PUNCH ROW 11

CARD 14.
COL.1 PUNCH ROW 1.COL.2 PUNCH ROW 2.COL.3 PUNCH ROW 3.
COL.4 PUNCH ROW 4.COL.5 PUNCH ROW 5.COL.6 PUNCH ROW 6.
COL.7 PUNCH ROW 7.COL.8 MULTIPUNCH ROWS 11,0,7,8,9.

CARDS 15-20
COL.1-80 MULTIPUNCH ROWS 12,11,0,7,8,9.

CARD 21
COL.1-34 MULTIPUNCH ROWS 12,11,0,7,8,9.
COL.35 MULTIPUNCH ROWS 11,0,7,8,9.

CARDS 22-26 BLANK

CARD 27
COL.50 MULTIPUNCH ROWS 11,0,7,8,9.
COL.1-49 AND COL.51-80 BLANK.

CARD 28
COL.1-80 MULTIPUNCH ROWS 12,11,0,7,8,9.

CARD 29
COL.1-34 MULTIPUNCH ROWS 12,11,0,7,8,9.
COL.35 MULTIPUNCH ROW 11,0,7,8,9.

CARDS 30-35 BLANK.

CARD 36
COL.50 MULTIPUNCH ROWS 11,0,7,8,9

CARDS 37-41
COL.1-80 MULTIPUNCH ROWS 11,5,9.

CARD 42
COL.1-35 MULTIPUNCH ROWS 11,5,9.
COL.36 MULTIPUNCH ROWS 11,0,7,8,9

CARD 43 BLANK

CR91MTR CARD READER (80 COL.)
9115 CARD READER
B 115 I/O CONTROL

```
PROGRAM-ID   CR91MTR.
     TESTNUMBERLIMIT   VALUE IS  5.
```

NOTE: THIS MTR APPLIES TO -
CARD READER MODEL # 9115
DDP # B115
TEST DECK #2601-7608.

*** * * * CARD READER MTR SET-UP INSTRUCTIONS * * * ***

PLACE MTR-MEM SWITCH IN MTR POSITION.

PLACE IRQ-EXT SWITCH IN CENTER POSITION.

PLACE NORMAL/LOAD SWITCH IN LOAD POSITION.

LOAD MTR PROGRAM #2601-4274 INTO INPUT HOPPER OF CARD READER.
PRESS SYSTEM CLEAR.
INSURE CARD READER POWER IS ON.

DEPRESS START BUTTON ON CARD READER.

PLACE NORM/LOAD SWITCH IN NORM POSITION.

PRESS SYSTEM CLEAR.

NOTES

ANY DISAGREEMENT WITH SET-UP INSTRUCTIONS SEE INCREMENTER ADDRESS FOR FURTHER ACTION.

ABBREVIATIONS IN OPERATOR INSTRUCTIONS ARE DEFINED AS FOLLOWS:
CON = SERIES L TYPE OPERATOR CONSOLE.
SPO = TELETYPE STYLE OPERATOR KEYBOARD.

IF MTR IS RESTARTED THE TEST DECK MUST BE RELOADED.

TO REMOVE A CARD FROM THE READ STATION PRESS STOP AND START BUTTONS SIMULTANEOUSLY.

1	INCR = 000E	VERIFY MIR = SYS CONFIG. YES - PRESS CON READY OR SPO INPUT REQUEST. NO - SEE INCR FOR INST.
2	CON - PK'S ON SPO - RDY ON	PRESS PK OF READER PORT NO PRESS TWO NUMERIC KEYS FOR READER PORT NO.
3	CON - NUM ON SPO - RDY ON	PRESS TWO NUMERIC KEYS FOR SELECTION OF CARD READER TESTS. SELECT TEST 00 THRU 06 SEQUENTIALLY FOR DIAGNOSIS. AFTER EACH SUCCESSFUL TEST THE LIGHT WILL COME ON AGAIN INDICATING THE SYSTEM IS READY FOR THE NEXT TEST. NOTE. TEST DECK MUST REMAIN IN PROPER SEQUENCE. FOR REFERENCE SEE TEST DECK DESCRIPTION IN SECTION 4.

INCR	OPERATOR ACTION	
0135	TEST-SELECT KEY 00 ON NUMERIC KYBD.	
041C	PLACE SYSTEM TEST DECK 2601-7608 IN INPUT HOPPER. TURN POWER ON, NOT READY SHOULD LIGHT. DEPRESS START BUTTON - A CARD SHOULD BE MOVED FROM THE HOPPER TO THE READY STATION AND NOT READY LIGHT SHOULD GO OFF. IF DISAGREE SEE INCR.	B
0432	DEPRESS STOP SWITCH.	
0457	DEPRESS START SWITCH.	
0569	DEPRESS STOP SWITCH.	
0135	TEST-SELECT KEY 01 ON NUMERIC KYBD.	
0578	DEPRESS START SWITCH. 1 CARD SHOULD HAVE FED INTO STACKER	
0488	PORT-SELECT GATING TEST.	
0569	DEPRESS STOP SWITCH.	
0578	DEPRESS START SWITCH.	
0494	DID CARD FEED INTO STACKER IF YES FST IF NO REFER TO M11.	
0569	DEPRESS STOP SWITCH.	
0578	DEPRESS START SWITCH.	
049B	DID CARD FEED INTO STACKER IF YES FST IF NO REFER TO M11.	
0569	DEPRESS STOP SWITCH.	
0135	TEST-SELECT KEY 02 ON NUMERIC KYBD.	
0578	DEPRESS START SWITCH. 1 CARD SHOULD HAVE FED INTO STACKER	
0553	DEPRESS STOP SWITCH.	
0556	DEPRESS START SWITCH. 1 CARD SHOULD HAVE FED INTO STACKER	
05A0	DEPRESS STOP SWITCH.	
0135	TEST-SELECT KEY 03 ON NUMERIC KYBD.	
0578	DEPRESS START SWITCH. 1 CARD SHOULD HAVE FED INTO STACKER	
0135	TEST-SELECT KEY 04 ON NUMERIC KYBD. 1 CARD SHOULD HAVE FED INTO STACKER	
0135	TEST-SELECT KEY 05 ON NUMERIC KYBD.	
0135	DID CARD RDR GO NOT READY IF NO RESTART MTR. IF YES	

END OF CR91MTR

PROGRAM LISTING

```
                STARTCONTROLLER.          START  FROM SYSTEM  CLEAR
0000  814D            CPCR  = BUSSTEST  - 1.      TEST  EXTERNAL  BUSS
                *
0001  F18E            IF  IRQ  SKIP.            TEST  FOR  ERROR  IRQ
0002  4005            MPCR  = IRQOFF  - 1.
0003  F108            ASR  BEX.
0004  F0E1            MIR  = B.
0005  F000            WAIT.       UNEXPECTED  IRQ,  ADDRESS  IN  MIR
                *
                *********ERROR       #M35.
                *
                IRQOFF.
0006  F17D            DLD.                      READ  CONFIGURATION  CARD
0007  F0F9            WHEN RDC  BEX.
0008  F0E1            MIR  = B.          SYSTEM  CONFIGURATION  IN  MIR
0009  F017            A1  = B.
000A  F0F9            WHEN RDC  BEX.
000B  F0FF            0  EQV  B.
000C  F09D            IF  ABT  SKIP.
000D  F000            WAIT.                CONFIG  FF  NOT  RESET  BY  BEX-
                **********                 FAILURE  IS  CON1  CHIP  D7
                *
000E  F0F8            WHEN IRQ  STEP.
                *  IF  PROGRAM HANGS HERE  RUN SPO  OR CONSOLE  MTR
                *  VERIFY  CORRECT  SYSTEM  CONFIGURATION  DISPLAYED  IN  MIR
                *  IF  YES,  PUSH  READY  BUTTON  ON CONSOLE  OR
                *  INPUT  REQUEST  ON SPO
                *  IF  NO,  PRESS  FST
                *
                *  METER  CON1  PIN  2K
                *   IF  0%  REPLACE  CHIPS  D5,D3,C7,D7       ON CON1  CARD
                *   IF  NOT  0%  REPLACE  CHIPS  D5,A5,A7,F5,F7          ON CON1  CARD
                *
000F  F18E            IF  IRQ  SKIP.
0010  4072            MPCR  = CON1LOOP  - 1.
0011  8155            CPCR  = PSADB7  - 1.
                *********ERROR       - CONTROLLER  PS  CHIP  B7.
0012  F108            ASR  BEX.
0013  F051            A3  = B.          SAVE  CONTROLLER  ADDRESS
0014  F07A            B  = B1TT.        SET  STATUS  WORD DATA  REQUEST  BIT
0015  C820            SAR  = 8  LIT  = @20@.
0016  F07F            B  = B  R.
0017  F036            A2  = B  L.       CLEAR  BITS  9-16
0018  F066            B  = A1.  SYSTEM  CONFIGURATION  FOR SPO-CONSOLE  CHECK
0019  F0C3            IF  NOT  LST  SKIP.      SPO-CONSOLE  CHECK
001A  E000            LIT  = 0.                SPO  ON  SYSTEM
001B  F1CC            MIR  = A2  OR  LIT.
                *  FOR  SPO  CONTPORTADDRESS          = 1000XXXX00000000
                *  FOR  CONSOLE  CONTPORTADDRESS      = 1000XXXX00100000
001C  F0CF            MAR1  = AMPCR.
001D  014D            AMPCR  = CONTPORTADDRESS.
001E  F0F3            MW1.              STORE  CONTROLLER  PORT  ADDRESS
001F  80F9            CPCR  = CLEARFLAGS  - 1.      CLEAR  ALL  FLAGS
0020  8110            CPCR  = SETCONTADDRS  - 1.
0021  819A            CPCR  = INITMAINSTACK  - 1.      SET  MAIN  STACK  ADDRESS
0022  81A2            CPCR  = INITFLOSTACK  - 1.    SET  FLOW  STACK  ADDRESS
0023  0029            AMPCR  = CONSPORTSELECT  - 1.
                **
0024  F0DE            MIR  = A3.
0025  F066            B  = A1.  SYSTEM  CONFIGURATION  FOR SPO-CONSOLE  CHECK
                **
0026  F0C2            IF  NOT  LST  JUMP.
0027  C001            SAR  = 0  LIT  = 1.
                *  SET  FLAG  0  IN  FLAG  WORD  1  TO  1  FOR  SPO,  0  FOR  CONSOLE
0028  81CC            CPCR  = SETFLAGW1  - 1.
0029  4077            MPCR  = SPOPORTSELECTP  - 1.
                *
                CONSPORTSELECT.
                *  CONSOLE  ON SYSTEM
                *  PORT  SELECT,  OPERATOR  ENTERS  PK  1-12  TO  INDICATE-
                *  THE  PORT  NUMBER  OF  THE  DEVICE  TO  BE  TESTED
                *
002A  8110            CPCR  = SETCONTADDRS  - 1.
002B  F1D5            MIR  = B001  + 1.      ENABLE  KEYBOARD.
002C  F099            DW1.
002D  811E            CPCR  = LITEINDA  - 1.
002E  E0FF            LIT  = @FF@.                LIGHT  PK  1-8
002F  8124            CPCR  = LITEINDB  - 1.
0030  E00F            LIT  = @0F@.          LIGHT  PK  9-12
                *  GET  PORT  NUMBER  (PK  KEY  1-12)
0031  8132            CPCR  = SELECTPORT  - 1.
0032  F017            A1  = B.          SAVE  PORT  ADDRESS
0033  811E            CPCR  = LITEINDA  - 1.
0034  E000            LIT  = 0.                   TURN  OFF  PK  1-8
0035  8124            CPCR  = LITEINDB  - 1.
0036  E000            LIT  = 0.                   TURN  OFF  PK  9-11
0037  F066            B  = A1.          PORT  ADDRESS  TO  B  FOR  SAVEPORT
                STOREPORT.              FROM  SPO  PORT  SELECT
0038  8139            CPCR  = CSAVEPORT  - 1.    SAVE  PORT  ADDRESS
0039  CF01            SAR  = 15  LIT  = 1.       SET  FLAG  15  TO  INDICATE-
003A  81CC            CPCR  = SETFLAGW1  - 1.    PORT  HAS  BEEN  SELECTED
                *  PRINT  TEST  SELECT  MESSAGE  FOR  FIRST  ENTRY  TO  SPO-
                *  TEST  SELECT
003B  C001            SAR  = 0  LIT  = 1.
003C  81EF            CPCR  = TESTFLAGW1  - 1.  TEST  SPO-CONSOLE  FLAG
003D  4092            MPCR  = SPOTESTSELECTP  - 1.  TRUE  RETURN  SPO
                *
                TESTSELECTCLEAR.          PROGRAM  JUMPS  HERE  TO  CLEAR-
                *  MEMORY  FLAG  WORDS  2,3,AND  4  BEFORE  ALLOWING  THE-
                *  OPERATOR  TO  SELECT  A  TEST.    MEMORY  FLAG  WORD  1  AND-
                *  THE  PORT  ADDRESS  ARE  NOT  CHANGED.
003E  8102            CPCR  = CLEARFW2-3-4  - 1.
                TESTSELECT.               PROGRAM  JUMPS  HERE  TO  ALLOW  THE-
                *                 OPERATOR  TO  SELECT  A  TEST.    THE  MEMORY-
                *                 FLAG  WORDS  2,3,4    ARE  NOT  CHANGED
                *  CLEAR  ERROR  FLAG,  IF  ON  IT  REFERS  TO  LAST  TEST
003F  C100            SAR  = 1  LIT  = 0.
0040  81CC            CPCR  = SETFLAGW1  - 1.
0041  8110            CPCR  = SETCONTADDRS  - 1.
0042  F096            DR1  BEX.         RESET  STATUS  INTERRUPT
0043  8075            CPCR  = TESTSPO-CONSOLE  - 1.
0044  4094            MPCR  = SPOTESTSELECT  - 1.    SPO  ON  SYSTEM
                *
                *  CONSOLE  ON SYSTEM
                *
0045  8124            CPCR  = LITEINDB  - 1.
0046  E000            LIT  = 0.                   CLEAR  B  INDICATORS
0047  F1D5            MIR  = B001  + 1.      ENABLE  KEYBOARD
0048  F099            DW1.
                *
0049  8126            CPCR  = LITEINDS  - 1.
004A  E008            LIT  = 8.                   LIGHT  NUMERIC  INDICATOR
                *
                *
                *  GET  FIRST  DIGIT  OF  TEST  NUMBER  (10  S  DIGIT)
004B  8134            CPCR  = SELECTTEST  - 1.
004C  F051            A3  = B.          SAVE  (10  S  DIGIT)
                *
                *  GET  SECOND  DIGIT  OF  TEST  NUMBER  (1  S  DIGIT)
004D  8134            CPCR  = SELECTTEST  - 1.
                *
004E  8126            CPCR  = LITEINDS  - 1.
004F  E000            LIT  = 0.                   TURN  OFF  NUMERIC  INDICATOR
                *  IF  STATUS  INT.  GO  TO  MEMORY-MODIFY  FOR  ANY  TEST  #
0050  F1AE            IF  NOT  URQ  SKIP.              CONSOLE  URQ  TEST
0051  4289            MPCR  = MEMORY-MODIFY  - 1.
                *
```

```
                    TENSLOOPCHECK.
                  * TEST  TENS  DIGIT  FOR  0  THRU  9
0052  E00A              LIT  = 10.
0053  F032              A2  = A3.
0054  F11B              A2  -  LIT.
0055  F0B7              IF  NOT  AOV  SKIP.
0056  40A7              MPCR  =  INVALIDTEST  -  1.
                  * TEST  ONES  DIGIT  FOR  0  THRU  9
0057  F033              A2  = B.
0058  F11B              A2  -  LIT.
0059  F0B7              IF  NOT  AOV  SKIP.
005A  40A7              MPCR  =  INVALIDTEST  -  1.
                  *
                    TENSLOOP.
005B  F04B              A3  = A3  -  1.
005C  E00A              LIT  = 10.
005D  F09E              IF  AOV  SKIP.
005E  4060              MPCR  =  ENDTENSLOOP  -  1.
005F  F083              B  = LIT  + B.
0060  405A              MPCR  =  TENSLOOP  -  1.
                  *
                    ENDTENSLOOP.
0061  F017              A1  = B.                    SAVE  TEST  NUMBER
                  * INSURE  THAT  TEST  NUMBER  IS  NOT  GREATER  THAN  THE  UPPER
                  * LIMIT  FOR  THIS  MTR (SEE  DEFINE  TESTNUMBERLIMIT)
0062  E005              LIT  = TESTNUMBERLIMIT.
0063  F109              A1  -  LIT  -  1.
0064  F0B7              IF  NOT  AOV  SKIP.
0065  40A7              MPCR  =  INVALIDTEST  -  1.        ILLEGAL  TEST  NUMBER
                  *
                  * DISPLAY  TEST  NUMBER  IN  A  INDICATORS
0066  F082              B  = LIT  L.
0067  C890              SAR  = 8  LIT  = @90@.
0068  F0DC              MIR  = A1  + B.
0069  F098              DW2.
                  * DISABLE  SYSTEM  CONTROLLER  (SPO  OR  CONSOLE)
006A  F0E6              MIR  = 0.
006B  F099              DW1.
                  * INSURE  THAT  BOTH  STATUS  AND  DATA  INTERRUPTS  FROM  SPO-
                  * OR  CONSOLE  ARE  CLEARED  BEFORE  JUMPING  TO  MTR
006C  F096              DR1  BEX.        RESET  STATUS  INTERRUPT.
006D  F097              DR2  BEX.        RESET  DATA  INTERRUPT
                  *
006E  8128              CPCR  =  SETPORTADDR  -  1.    BR1  =  INST.   BR2  =  DATA
006F  040E              AMPCR  =  TESTTABLE  -  1.
0070  F100              AMPCR  =  A1  +  AMPCR.
0071  F05F              B.
0072  F0C9              JUMP.
                  / SUBROUTINES
                  * LOOP  USED  TO  METER  PIN  2K  (TP  92)  ON  CON1  CARD
                    CON1LOOP.
0073  F17D              DLD.
0074  F0F9              WHEN  RDC  BEX.
0075  4072              MPCR  =  CON1LOOP  -  1.
                  *
                    TESTSPO-CONSOLE.
0076  C001              SAR  = 0  LIT  = 1.    SPO-CONSOLE  FLAG  (1  = SPO)
0077  41EF              MPCR  =  TESTFLAGW1  -  1.
                  *
                  *
                    SPOPORTSELECTP.
                  * ENTER  HERE  TO  PRINT  SELECT  PORT  MESSAGE
0078  80D3              CPCR  =  SPOPRINT  -  1.
0079  01C5              AMPCR  =  PORTPRINT.
                    SPOPORTSELECT.
                  * ENTER  HERE  TO  AVOID  PRINTING
007A  8110              CPCR  =  SETCONTADDRS  -  1.
007B  F0E7              MIR  =  B001.
007C  F099              DW1.              ENABLE  SPO  INPUT
```

```
                  * SELECT  PORT  #  PER  NUMERIC  KEYS  (01  THRU  12)
007D  8132              CPCR  =  SELECTPORT  -  1.          FOR  TENS  DIGIT
007E  F017              A1  = B.                            SAVE  TENS  DIGIT
007F  8132              CPCR  =  SELECTPORT  -  1.          FOR  ONES  DIGIT
                  *         ONES  DIGIT  IS  IN  B
                  * OPERATOR  ENTERS  PORT  NUMBER  (1  THROUGH  12)
0080  F0E6              MIR  = 0.
0081  F099              DW1.              DISABLE  SPO  INPUT
                  * TEST  TENS  DIGIT  FOR  0  OR  1
0082  E001              LIT  = 1.
0083  F109              A1  -  LIT  -  1.
0084  F0B7              IF  NOT  AOV  SKIP.
0085  4147              MPCR  =  INVALIDPORT  -  1.         TENS  DIGIT  > 1
                  * TEST  ONES  DIGIT  FOR  0  THRU  9
0086  E00A              LIT  = 10.
0087  F033              A2  = B.                            ONES  DIGIT  IN  A2
0088  F11B              A2  -  LIT.
0089  F0B7              IF  NOT  AOV  SKIP.
008A  4147              MPCR  =  INVALIDPORT  -  1.         ONES  DIGIT  > 9
                  *
008B  E00A              LIT  = 10.
008C  F066              B  = A1.
008D  F0C3              IF  NOT  LST  SKIP.
008E  F029              A2  = A2  + LIT.
008F  F068              B  = A2.                    PORT  ADDRESS  IN  B
                  * SUBSTRACT  1  FROM  PORT  NUMBER  TO  GET  PORT  ADDRESS
0090  F162              B  = 0  -  B.
0091  F163              B  = 0  -  B  -  1.
0092  8037              CPCR  =  STOREPORT  -  1.
                  *
                    SPOTESTSELECTP.
0093  80D3              CPCR  =  SPOPRINT  -  1.      PRINT  SELECT  TEST  MESSAGE
0094  01C9              AMPCR  =  TESTPRINT.          ADDRESS  OF  MESSAGE
                  *
                    SPOTESTSELECT.
                  * ENTRY  POINT  FOR  NO  PRINTING
0095  8110              CPCR  =  SETCONTADDRS  -  1.
0096  F0E7              MIR  =  B001.
0097  F099              DW1.              ENABLE  SPO  INPUT
                  * SELECT  TEST  #  PER  NUMERIC  KEYS  (00  THRU  99)
0098  8134              CPCR  =  SELECTTEST  -  1.          FOR  TENS  DIGIT
0099  F051              A3  = B.                            SAVE  TENS  DIGIT
009A  8134              CPCR  =  SELECTTEST  -  1.          FOR  ONES  DIGIT
                  *         ONES  DIGIT  IN  B
009B  F0E6              MIR  = 0.
009C  F099              DW1.              DISABLE  SPO  INPUT
009D  F033              A2  = B.                            SAVE  ONES  DIGIT
                  *  IF  STINT  GO  TO  SPO  MEMORY  MODIFY
009E  F1B5              IF  URQ  SKIP.
009F  40A1              MPCR  =  CSPACEP  -  1.
                  *
00A0  F096              DR1  BEX.         RESET  STINT
00A1  438B              MPCR  =  SPO-MEM-MOD  -  1.
                  *
                    CSPACEP.
00A2  80D3              CPCR  =  SPOPRINT  -  1.      SPACE  AFTER  TESTNUMBER
00A3  00A7              AMPCR  =  SPACEPRINT.         ADDRESS  OF  PRINT  MESSAGE
00A4  8110              CPCR  =  SETCONTADDRS  -  1.
00A5  F068              B  = A2.          ONES  DIGIT  TO  B.
00A6  4051              MPCR  =  TENSLOOPCHECK  -  1.
                  *
                    SPACEPRINT.
00A7  2080              CNST  =  @2080@.          -  STOP
                  *
                    INVALIDTEST.
00A8  80B0              CPCR  =  ALARM  -  1.         SOUND  BELL
00A9  403E              MPCR  =  TESTSELECT  -  1.
                  *
```

```
                    /
                     INDICATE-ERROR.
                    * SPO SYSTEMS-  SOUND ALARM
                    * CONSOLE SYSTEMS-  SOUND ALARM AND TURN ERROR LIGHT ON
                    *
00AA  F0DA               MIR = AMPCR.
00AB  F05F               B.
00AC  8159               CPCR = STACK - 1.  SAVE AMPCR, A1, A2, A3
                    * SET FLAG 1 IN FLAG WORD 1 TO 1 TO INDICATE ERROR
00AD  C101               SAR = 1 LIT = 1.
00AE  81CC               CPCR = SETFLAGW1 - 1.
00AF  80B0               CPCR = ALARM - 1.          SOUND ALARM
00B0  4178               MPCR = UNSTACKRESTOREA - 1.  RETURN TO MTR
                    *
                     ALARM.
                    *
00B1  F0DA               MIR = AMPCR.
00B2  F05F               B.
00B3  8159               CPCR = STACK - 1.
00B4  8110               CPCR = SETCONTADDRS - 1.
00B5  8075               CPCR = TESTSPO-CONSOLE - 1.
00B6  40C7               MPCR = SPOALARM - 1.     SPO ON SYSTEM
                    * CONSOLE ON SYSTEM
00B7  E008               LIT = @08@.
00B8  F0EA               MIR = LIT.
00B9  F099               DW1.
00BA  C207               SAR = 2 LIT = 7.
00BB  F089               B = LIT.
00BC  F0E2               MIR = B C.     ALARM DATA WORD FOR CONSOLE
00BD  F0FC               WHEN SRQ STEP.
00BE  F098               DW2.
00BF  F05F               B.
00C0  F0FC               WHEN SRQ STEP.
                    * TURN ERROR LIGHT ON, IF ERROR FLAG IS ON
00C1  C100               SAR = 1 LIT = 0.
00C2  81EF               CPCR = TESTFLAGW1 - 1.
00C3  40CF               MPCR = CALARM - 1.        ERROR FLAG IS OFF
                    * ERROR FLAG IS ON
00C4  8126               CPCR = LITEINDS - 1.
00C5  E004               LIT = @04@.            ERROR LIGHT
00C6  40CF               MPCR = CALARM - 1.
                    *
00C7  40CF               MPCR = CALARM - 1.
                    *
                     SPOALARM.     SPO ON SYSTEM
00C8  F1D5               MIR = B001 + 1.     ENABLE OUTPUT
00C9  F099               DW1.
00CA  F0EA               MIR = LIT.
00CB  E007               LIT = @07@.     RING BELL
00CC  F0FC               WHEN SRQ STEP.
00CD  F098               DW2.
00CE  F05F               B.
00CF  F0FC               WHEN SRQ STEP.
                    *
                     CALARM.
00D0  F0E6               MIR = 0.        DISABLE SPO OR CONSOLE
00D1  F099               DW1.
00D2  8128               CPCR = SETPORTADDR - 1.  BR1 = INST.  BR2 = DATA
00D3  4178               MPCR = UNSTACKRESTOREA - 1.  RETURN
                    *
                    *
                    *
                     SPOPRINT.
                    * SPO PRINT FROM MEMORY
                    *
00D4  F0DA               MIR = AMPCR.
00D5  F05F               B.
00D6  8159               CPCR = STACK - 1.          STACK AMPCR AND A REGISTERS
00D7  8110               CPCR = SETCONTADDRS - 1.       SELECT SPO
00D8  81BA               CPCR = RDSTACKAMPCRTOB - 1.
00D9  F05B               AMPCR = B.     RETURN AMPCR FOR EXEC
00DA  F05F               B.
00DB  F09A               EXEC.     ADDRESS OF MESSAGE TO AMPCR
00DC  F0EA               MIR = LIT.
00DD  C802               SAR = 8 LIT = @02@.
00DE  F099               DW1.                    ENABLE SPO PRINTER
                     SPOREADY.
00DF  F096               DR1 BEX.              READ SPO STATUS
00E0  F05F               B.
00E1  F0C3               IF NOT LST SKIP.     CHECK FOR READY
00E2  40DE               MPCR = SPOREADY - 1.
                    *
00E3  F0CF               MAR1 = AMPCR.        BR1 = ADDRESS OF MESSAGE
                     SPOFETCH.
00E4  F0F1               MR1.
00E5  F0FA               WHEN RDC BEX MAR1 = BMAR + 1.
00E6  F07D               B = B C.
00E7  F0C4               IF NOT MST SKIP.          MST = STOP CODE
00E8  40F2               MPCR = SPOSTOP - 1.       END PRINT
00E9  F0FC               WHEN SRQ STEP.       WAIT FOR PRINTER INTERRUPT
00EA  F0E1               MIR = B.
00EB  F098               DW2.                 WRITE FIRST CHARACTER
00EC  F07D               B = B C.
00ED  F0C4               IF NOT MST SKIP.          MST = STOP CODE
00EE  40F2               MPCR = SPOSTOP - 1.       END PRINT
00EF  F0E1               MIR = B.
00F0  F0FC               WHEN SRQ STEP.       WAIT FOR PRINTER INTERRUPT
00F1  F098               DW2.                 WRITE SECOND CHARACTER
00F2  40E3               MPCR = SPOFETCH - 1.
                    *
                     SPOSTOP.
00F3  F0FC               WHEN SRQ STEP.       WAIT FOR LAST CHARACTER TO PRINT
00F4  81D9               CPCR = RSTBR1 - 1.        RESTORE BR1
00F5  F096               DR1 BEX.                  RESET STINT
00F6  F0E6               MIR = B000.
00F7  F099               DW1.                      DISABLE SPO OUTPUT
00F8  8128               CPCR = SETPORTADDR - 1.  RESTORE DEVICE PORT ADDRS
00F9  4178               MPCR = UNSTACKRESTOREA - 1.  RETURN
                    *
                     CLEARFLAGS.
00FA  F023               A2 = AMPCR.               SAVE RETURN
00FB  F0E6               MIR = 0.
00FC  F0CF               MAR1 = AMPCR.
00FD  014C               AMPCR = PORTADDRESS.
00FE  F0F3               MW1.                      CLEAR PORT ADDRESS
00FF  F0CF               MAR1 = AMPCR.
0100  020B               AMPCR = MEMFLAGW1.
0101  F0F3               MW1.                      CLEAR MEMORY FLAG WORD 1
0102  F102               AMPCR = A2.               RESTORE RETURN
                     CLEARFW2-3-4.
0103  F023               A2 = AMPCR.               SAVE RETURN
0104  F0E6               MIR = 0.
0105  F0CF               MAR1 = AMPCR.
0106  020C               AMPCR = MEMFLAGW2.
0107  F0F3               MW1.                      CLEAR MEMORY FLAG WORD 2
0108  F0CF               MAR1 = AMPCR.
0109  020D               AMPCR = MEMFLAGW3.
010A  F0F3                MW1.                      CLEAR MEMORY FLAG WORD 3
010B  F0CF               MAR1 = AMPCR.
010C  020E               AMPCR = MEMFLAGW4.
010D  F0F3               MW1.                      CLEAR MEMORY FLAG WORD 4
010E  F102               AMPCR = A2.               RESTORE RETURN
010F  F05F               B.
0110  F0C9               JUMP.

                     SETCONTADDRS.
0111  F060               B = AMPCR.           SAVE RETURN
0112  F0CF               MAR1 = AMPCR.
0113  014D               AMPCR = CONTPORTADDRESS.
0114  F05B               AMPCR = B.           RESTORE RETURN
0115  D800               SAR = 8.
0116  F0F1               MR1.
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0117  F0F9          WHEN RDC BEX.          CONTROLLER ADDRESS TO B
0118  F07F          B = B R.
0119  F07C          B = B L.          CLEAR ALL BITS EXCEPT 5,6,7,8
011A  F078          B = B0TT.
011B  F16E          BR2 = B.                BR2 = 0000XXXX   DATA
011C  F07A          B = B1TT.
011D  F0D5          MAR1 = B.               BR1 = 1000XXXX   INSTRUCTION
011E  F0C9          JUMP.
                *
                LITEINDA.                   LIGHT A INDICATORS
011F  E06F          LIT = @6F@.
0120  F0CA          LCTR.
0121  F09A          EXEC.                   LOAD VARIABLE LIT
0122  F0EF          MIR = Z.
0123  F098          DW2.
0124  F0C9          JUMP.
                LITEINDB.                   LIGHT B INDICATORS
0125  E077          LIT = @77@.
0126  411F          MPCR = LITEINDA.
                *
                LITEINDS.                       LIGHT S INDICATORS
0127  E07E          LIT = @7E@.
0128  411F          MPCR = LITEINDA.
                *
                SETPORTADDR.
0129  F060          B = AMPCR.              SAVE RETURN
012A  F0CF          MAR1 = AMPCR.
012B  014C          AMPCR = PORTADDRESS.
012C  F05B          AMPCR = B.              RESTORE RETURN
012D  F0F1          MR1.
012E  F0F9          WHEN RDC BEX.          PORT ADDRESS TO B
012F  F16E          BR2 = B.          BR2 FOR DATA
0130  F07A          B = B1TT.
0131  F0D5          MAR1 = B.         BR1 FOR INSTRUCTION
0132  F0C9          JUMP.
                *
                SELECTPORT.
0133  F0DE          MIR = A3.       CONTROLLER ADDRESS (ASR AFTER IRQ)
                * CONTROLLER ADDRESS IS DISPLAYED IN MIR
                * IF CONTROLLER ADDRESS IS NOT CORRECT, RUN SPO OR
                * CONSOLE MTR
0134  F0FC          WHEN SRQ STEP.         ENTER PORT ADDRESS
                SELECTTEST.
0135  F0FC          WHEN SRQ STEP.         ENTER TEST NUMBER
0136  F097          DR2 BEX.
0137  F086          B = LIT AND B.         STRIP UPPER DIGIT
0138  E00F          LIT = @0F@.
0139  F0C9          JUMP.
                *
                *
                *
                CSAVEPORT.                  SAVE PORT ADDRESS (DATA IN B)
                * TEST PORT ADDRESS FOR PORT 12 OR LESS
013A  E00B          LIT = 11.
013B  F017          A1 = B.
013C  F109          A1 - LIT - 1.
013D  F0B7          IF NOT AOV SKIP.
013E  4147          MPCR = INVALIDPORT - 1.        PORT ADDRESS > 12
                * CLEAR ALL BITS EXCEPT 5,6,7,8
013F  F07C          B = B L.
0140  D400          SAR = 4.
0141  F0E5          MIR = B R.
0142  F060          B = AMPCR.      SAVE RETURN
0143  F0CF          MAR1 = AMPCR.
0144  014C          AMPCR = PORTADDRESS.
0145  F05B          AMPCR = B.      RESTORE RETURN
0146  F0F3          MW1.
0147  F0C9          JUMP.
                *
                INVALIDPORT.
                *
0148  80B0          CPCR = ALARM - 1.          SOUND BELL
                *
0149  8075          CPCR = TESTSPO-CONSOLE - 1.
014A  4079          MPCR = SPOPORTSELECT - 1.
014B  4029          MPCR = CONSPORTSELECT - 1.
                PORTADDRESS.
014C  0000          CNST = @0000@.
                CONTPORTADDRESS.
014D  0000          CNST = @0000@.
                *
                BUSSTEST.               EXTERNAL BUSS TEST
014E  F0F9          WHEN RDC BEX.
014F  F0FF          0 EQV B.
0150  F09C          IF ABT JUMP.
0151  F0E1          MIR = B.
0152  F000          WAIT.
                *********EXTERNAL       BUSS FAILURE OR PARITY ERROR
                *********ERROR      # E 1
0153  F0DA          MIR = AMPCR.
0154  F000          WAIT.
0155  7FFF          MPCR = STARTCONTROLLER - 1.
                PSADB7.
0156  F0F9          WHEN RDC BEX.
0157  F0FF          0 EQV B.
0158  F09C          IF ABT JUMP.
0159  461E          MPCR = TSTSTAT - 1.
                *********INCORRECT       ADDRESS FROM CONTROL PS.
                *********ERROR      #M33.
                /
                STACK.
                *UNCONDITIONAL SAVE A1, A2, A3, AMPCR IN MEMORY STACK
                *DISTROYS - B, SAR, LIT, MIR
                *ASSUMES BR1, BR2 DIFFER BY INST BIT ONLY
015A  F082          B = LIT L.                                          C
015B  C401          SAR = 4 LIT = 1.                                    C
015C  F0D5          MAR1 = B.                    STACK POINTER 4096     C
                STACKW3.
015D  F0F1          MR1.
015E  F0F9          WHEN RDC BEX.          FETCH POINTER
015F  F083          B = LIT + B.             INCRAMENT POINTER
0160  E004          LIT = 4.
0161  F08C          BMI MIR = B.
0162  F0F3          MW1.                     RESTORE NEW POINTER
0163  F08C          BMI MIR = B.
0164  F0D5          MAR1 = B.                NEW STACK ADDRESS
0165  F0F3          MW1.                     STORE AMPCR TOP OF STACK
0166  F0DB          MIR = A1.
0167  F089          B = LIT.
0168  E003          LIT = 3.
0169  F01C          A1 = BMAR.
016A  F064          B = A1 - B.
016B  F0D5          MAR1 = B.       OLD TOP OF STACK ADDRESS + 1.
016C  F0F3          MW1.                     SAVE A1
016D  F0D7          MAR1 = BMAR + 1.
016E  F0DD          MIR = A2.
016F  F0F3          MW1.                     SAVE A2
0170  F0D7          MAR1 = BMAR + 1.
0171  F0DE          MIR = A3.
0172  F0F3          MW1.                     SAVE A3
0173  F05F          B.
0174  41D9          MPCR = RSTBR1 - 1.       RESTORE BR1 EXIT
                UNSTACK.
                *RESTORE AMPCR FROM TOP OF MEMORY STACK
                *A REGISTERS REMAIN UNCHANGED
0175  8188          CPCR = STACKR - 1.
0176  F05B          AMPCR = B.               RESTORE AMPCR
0177  F05F          B.
0178  41D9          MPCR = RSTBR1 - 1.       RESTORE BR1 EXIT
```

```
                UNSTACKRESTOREA.
               *RESTORE   AMPCR AND A REGISTERS    FROM TOP  OF  STACK
0179  8188           CPCR  = STACKR  -  1.
017A  F05B           AMPCR = B.                    RESTORE  AMPCR
017B  F08D           BMI.  (ADDRESS   -  1)   OF  STORED  A1
017C  F0D6           MAR1  = B  + 1.
017D  F0F1           MR1.                          FETCH  A1
017E  F0F9           WHEN RDC BEX.
017F  F0D7           MAR1  = BMAR  + 1.
0180  F017           A1    = B.                    RESTORE  A1
0181  F0F1           MR1.                          FETCH  A2
0182  F0F9           WHEN RDC BEX.
0183  F0D7           MAR1  = BMAR  + 1.
0184  F033           A2    = B.                    RESTORE  A2
0185  F0F1           MR1.                          FETCH  A3
0186  F0F9           WHEN RDC BEX.
0187  F051           A3    = B.                    RESTORE  A3
0188  41D9           MPCR  = RSTBR1   -  1.        RESTORE  BR1  AND EXIT
               STACKR.
0189  F082           B = LIT  L.                                                C
018A  C401           SAR = 4  LIT  = 1.                                         C
018B  F0D5           MAR1 = B.                          STACK  POINTER  4096    C
               STACKR1.
018C  F0F1           MR1.
018D  F0F9           WHEN RDC BEX.                 FETCH  POINTER
018E  F0DD           MIR = A2.       SAVE  A2
018F  F033           A2  = B.
0190  E004           LIT = 4.
0191  F146           B = A2  -  LIT.         DECRAMENT  STACK  POINTER
0192  F08C           BMI,  MIR  = B.         EXCHANGE  MIR  & B
0193  F033           A2  = B.                RESTORE  A2
0194  F08D           BMI.       POINTER  ADDRESS  TO  B
0195  F0F3           MW1.                          RESTORE  POINTER
0196  F083           B = LIT  + B.  ADDRESS  OF  SAVED  AMPCR  TO  B
               STACKR2.
0197  F0D5           MAR1 = B.
0198  F0F1           MR1.                          FETCH  AMPCR  FROM  STACK
0199  F0F9           WHEN RDC BEX.
019A  F0C9           JUMP.
               INITMAINSTACK.                      INITIALIZE     STACK  POINTER
019B  F079           B = B100.
019C  D300           SAR = 3.
019D  F07F           B = B R.
019E  F0D5           MAR1 = B.
019F  F0E1           MIR = B.
01A0  F0F3           MW1.                          POINTER  = 4096
01A1  F05F           B.
01A2  41D9           MPCR = RSTBR1   -  1.         RESTORE  BR1  EXIT
               INITFLOSTACK.                       INITIALIZE     FLO  POINTER
01A3  F082           B = LIT  L.
01A4  C70C           SAR = 7  LIT  = @0C@.
01A5  F0D5           MAR1 = B.
01A6  F0E1           MIR = B.
01A7  F0F3           MW1.                POINTER  = 6144
01A8  41D9           MPCR = RSTBR1   -  1.         RESTORE  BR1  EXIT
               MARKFLOSTACK.
              *SAVE  AMPCR FROM MAIN PROGRAM FLOW-FOR  GLOBAL  RETURN
              *ASSUMES  B,  MIR,  SAR,  LIT  CAN BE  DISTROYED   AND THAT
              *BR1,    BR2  DIFFER   BY  INST   BIT   ONLY
01A9  F0DA           MIR = AMPCR.
01AA  F082           B = LIT  L.
01AB  C70C           SAR = 7  LIT  = @0C@.
01AC  F0D5           MAR1 = B.                FLO  POINTER  = 6144
01AD  415C           MPCR = STACKW3  -  1.         WRITE  AMPCR  TO  STACK
               FLOSTACKRDDEC.
              *RESTORE   AMPCR FROM TOP  OF  FLOW STACK  AND DECRAMENT
              *STACK   POINTER
01AE  F082           B = LIT  L.
01AF  C70C           SAR = 7  LIT  = @0C@.
01B0  F0D5           MAR1 = B.                FLOW STACK  POINTER  = 6144
01B1  818B           CPCR = STACKR1  -  1.         READ  POINTER   AND AMPCR
01B2  4175           MPCR = UNSTACK.               OPTIONAL   NO  A WD RESTORE
               FLOSTACKRD.
              *RESTORE   AMPCR FROM TOP  OF  FLOW STACK  WITHOUT
              *DECRAMENTING   FLOW STACK  POINTER.
01B3  F082           B = LIT  L.
01B4  C70C           SAR = 7  LIT  = @0C@.
01B5  F0D5           MAR1 = B.                FLO  STACK  POINTER  = 6144
01B6  F0F1           MR1.
01B7  F0F9           WHEN RDC BEX.                 FETCH  POINTER
01B8  F05F           B.
01B9  8196           CPCR = STACKR2  -  1.         READ  TOP  OF  STACK
01BA  4175           MPCR = UNSTACK.               OPTIONAL   NO  A WD RESTORE
               RDSTACKAMPCRTOB.
              *READ  TOP  AMPCR IN  STACK  TO  B REG  -  USE  FOR
              *NESTED   EXEC.
01BB  F082           B = LIT  L.                                                C
01BC  C401           SAR = 4  LIT  = 1.                                         C
01BD  F0D5           MAR1 = B.                          STACK  POINTER  4096    C
01BE  F0F1           MR1.                          FETCH  POINTER
01BF  F0F9           WHEN RDC BEX.
01C0  F0D5           MAR1 = B.                     TOP  OF  STACK  ADDRESS
01C1  F0F1           MR1.
01C2  F0F9           WHEN RDC BEX.                      B = AMPCR FROM STACK
01C3  F05F           B.
01C4  41D9           MPCR = RSTBR1   -  1.         RESTORE  BR1  EXIT
               /
               PORTPRINT.
01C5  0D0A           CNST  = @0D0A@.               CR  LF
01C6  504F           CNST  = @504F@.          PO
01C7  5254           CNST  = @5254@.          RT
01C8  2080           CNST  = @2080@.          -  STOP
               TESTPRINT.
01C9  0D0A           CNST  = @0D0A@.               CRLF
01CA  5445           CNST  = @5445@.          TE
01CB  5354           CNST  = @5354@.          ST
01CC  2080           CNST  = @2080@.          -  STOP
               /
               *  TEST   FLAG  AND SET  FLAG  ROUTINES
               *
               SETFLAGW1.                FLAG  NO.  IN  SAR,  STATE  IN  LIT
01CD  F060           B = AMPCR.          SAVE  RETURN
01CE  F0CF           MAR1 = AMPCR.             ADDRESS  OF  FLAG  WORD  1  TO  MAR1
01CF  020B           AMPCR = MEMFLAGW1.
               *
               SETFLAGS.                 COMMON POINT   TO  SETFLAGW1-2-3-4
01D0  F0F1           MR1.
01D1  F05B           AMPCR = B.          RESTORE  RETURN
01D2  F0F9           WHEN RDC BEX.             FLAG  WORD  TO  B
01D3  F092           CSAR.               CHANGE  VALUE  TO  SHIFT   FLAG  TO  LSB
01D4  F172           CSAR  B = B C.            MOVE  FLAG  IN  B  TO  LSB
01D5  F075           B = BTT0.
01D6  F087           B = LIT  OR B.            SET  FLAG  PER  LIT
01D7  F07D           B = B C.            SHIFT   FLAGS  BACK  TO  POSITION
01D8  F0E1           MIR = B.            MODIFIED   FLAG  WORD  TO  MIR
01D9  F0F3           MW1.                FLAG  WORD  TO  MEMORY
               *
               RESTORE-BR1.
               RSTBR1.                   COMMON POINT   FROM  ABOVE  AND  -
               *                         AND  TESTFLAGW1-2-3-4
01DA  F0E1           MIR = B.                  SAVE  B
01DB  F05D           ASE.                SELECT   BR2
01DC  F080           B = BMAR.
              *  GENERATE   NEW BR1    (MSB   INST-DATA    SET  OPPOSITE    BR2)
01DD  F159           B = BFTF.
01DE  D800           SAR = 8.
01DF  F07F           B = B R.
01E0  F07C           B = B L.            CLEAR  MAR  (DO   NOT  USE  LIT   HERE)
01E1  F0D5           MAR1 = B.
01E2  F08D           BMI.                      RESTORE  B
01E3  F0C9           JUMP.               RETURN
               *
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                SETFLAGW2.              FLAG  NO. IN SAR,  STATE  IN  LIT
01E4  F060          B = AMPCR.      SAVE  RETURN
01E5  F0CF          MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 2  TO  MAR1
01E6  020C          AMPCR = MEMFLAGW2.
01E7  41CF          MPCR = SETFLAGS   -  1.
                *
                SETFLAGW3.              FLAG  NO. IN SAR,  STATE  IN  LIT
01E8  F060          B = AMPCR.      SAVE  RETURN
01E9  F0CF          MAR1 = AMPCR.       ADDRESS  OF  FLAG  WORD 3  TO  MAR1
01EA  020D          AMPCR = MEMFLAGW3.
01EB  41CF          MPCR = SETFLAGS   -  1.
                *
                SETFLAGW4.              FLAG  NO. IN SAR,  STATE  IN  LIT
01EC  F060          B = AMPCR.      SAVE  RETURN
01ED  F0CF          MAR1 = AMPCR.       ADDRESS  OF  FLAG  WORD 4  TO  MAR1
01EE  020E          AMPCR = MEMFLAGW4.
01EF  41CF          MPCR = SETFLAGS   -  1.
                *
                TESTFLAGW1.             FLAG  NO. IN SAR,  STATE  IN  LIT
01F0  F060          B = AMPCR.      SAVE  RETURN
01F1  F0CF          MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 1  TO  MAR1
01F2  020B          AMPCR = MEMFLAGW1.
                *
                TESTFLAGS.              COMMON POINT  TO  TESTFLAGW1-2-3-4
01F3  F0F1          MR1.
01F4  F05B          AMPCR = B.      RESTORE  RETURN
01F5  F0F9          WHEN RDC BEX.           FLAG  WORD TO B
01F6  F092          CSAR.
01F7  F07F          B = B R.        SHIFT  FLAG  TO  LSB
01F8  F157          B = BT0T.
01F9  F078          B = B0TT.
01FA  F05F          B.
01FB  F0CB          LIT  EQV  B.
01FC  F09D          IF  ABT  SKIP.
01FD  F105          AMPCR = AMPCR + 1.          SET  AMPCR FOR FALSE  RETURN
01FE  41D9          MPCR = RSTBR1   -  1.
                *
                TESTFLAGW2.             FLAG  NO. IN SAR,  STATE  IN  LIT
01FF  F060          B = AMPCR.      SAVE  RETURN
0200  F0CF          MAR1 = AMPCR.       ADDRESS  OF  FLAG  WORD 2  TO  MAR1
0201  020C          AMPCR = MEMFLAGW2.
0202  41F2          MPCR = TESTFLAGS   -  1.
                *
                TESTFLAGW3.             FLAG  NO. IN SAR,  STATE  IN  LIT
0203  F060          B = AMPCR.      SAVE  RETURN
0204  F0CF          MAR1 = AMPCR.       ADDRESS  OF  FLAG  WORD 3  TO  MAR1
0205  020D          AMPCR = MEMFLAGW3.
0206  41F2          MPCR = TESTFLAGS   -  1.
                *
                TESTFLAGW4.             FLAG  NO. IN SAR,  STATE  IN  LIT
0207  F060          B = AMPCR.      SAVE  RETURN
0208  F0CF          MAR1 = AMPCR.       ADDRESS  OF  FLAG  WORD 4  TO  MAR11
0209  020E          AMPCR = MEMFLAGW4.
020A  41F2          MPCR = TESTFLAGS   -  1.
                *
                *  MEMORY WORDS FOR PROGRAM FLAGS
                MEMFLAGW1.
020B  0000          CNST  = @0000@.         FLAGS  1  THRU  16  OF  WORD 1
                MEMFLAGW2.
020C  0000          CNST  = @0000@.         FLAGS  1  THRU  16  OF  WORD 2
                MEMFLAGW3.
020D  0000          CNST  = @0000@.         FLAGS  1  THRU  16  OF  WORD 3
                MEMFLAGW4.
020E  0000          CNST  = @0000@.         FLAGS  1  THRU  16  OF  WORD 4
                *  END OF FLAG ROUTINES
                *
                READDATAKEYTOA1.
                *  SUB-ROUTINE   TO READ 1 DATA CHARACTER  FROM SPO  OR -
                *    CONSOLE  AND RETURN WITH CHARACTER  IN  A1
                *    A2  AND A3  ARE SAVED
                *    ALL  OTHER REGISTERS   ARE DESTROYED
                *
```

```
020F  F0DA          MIR  = AMPCR.
0210  F05F          B.
0211  8159          CPCR  = STACK  -  1.  SAVE  AMPCR FOR RETURN
0212  8110          CPCR  = SETCONTADDRS   -  1.
0213  8075          CPCR  = TESTSPO-CONSOLE     -  1.
0214  4224          MPCR  = SPOKEY  -  1.         SPO  ON SYSTEM
                *
                *  CONSOLE  ON SYSTEM
0215  F1D5          MIR  = B001   + 1.      ENABLE  KEYBOARD
0216  F099          DW1.
0217  8126          CPCR  = LITEINDS   -  1.
0218  E008          LIT  = 8.         LIGHT  NUMERIC  INDICATOR
0219  F0FC          WHEN SRQ  STEP.
021A  F097          DR2  BEX.
021B  F017          A1  = B.          SAVE  DATA CHARACTER  IN  A1.
021C  F009          A1  = A1  AND LIT.     USE  ONLY  LOWER DIGIT
021D  E00F          LIT  = @0F@.
                *  DISPLAY   LOWER DIGIT   IN  B INDICATORS
021E  F082          B = LIT  L .
021F  C888          SAR  = 8  LIT   = @88@.
0220  F0DC          MIR  = A1  + B.
0221  F098          DW2.
0222  8126          CPCR  = LITEINDS   -  1.
0223  E000          LIT  = 0.         TURN  NUMERIC  INDICATOR   OFF
0224  422B          MPCR  = EXITDKEY   -  1.
                *
                  SPOKEY.       SPO  ON SYSTEM
0225  F0E7          MIR  = B001.
0226  F099          DW1.      ENABLE  SPO  INPUT
0227  F0FC          WHEN SRQ  STEP.
0228  F097          DR2  BEX.
0229  F017          A1  = B.          SAVE  DATA CHARACTER  IN  A1
022A  F009          A1  = A1  AND LIT.     USE  ONLY  LOWER DIG
022B  E00F          LIT  = @0F@.
                *
                  EXITDKEY.
022C  F0E6          MIR  = 0.
022D  F099          DW1.      DISABLE   SPO  OR CONSOLE
022E  8128          CPCR  = SETPORTADDR   -  1.         RESTORE  BR1  AND BR2
022F  8174          CPCR  = UNSTACK  -  1.        RETURN   (CHARACTER  IN  A1)
                *
                / SIMULATED  REGISTERS     SIMREG1,   SIMREG2,   SIMREG3
                ZROSREG1.
0230  F0E6          MIR  = B000.
                WRSREG1.
0231  F060          B = AMPCR.
0232  F0CF          MAR1  = AMPCR.
0233  026F          AMPCR  = SIMREG1.
                ZROSREG1A.
0234  F05B          AMPCR  = B.
0235  F0F3          MW1.
0236  F05F          B.
0237  425A          MPCR  = INCSREG1A   -  1.
                ZROSREG2.
0238  F0E6          MIR  = B000.
                WRSREG2.
0239  F060          B = AMPCR.
023A  F0CF          MAR1  = AMPCR.
023B  0270          AMPCR  = SIMREG2.
023C  4233          MPCR  = ZROSREG1A   -  1.
                ZROSREG3.
023D  F0E6          MIR  = B000.
                WRSREG3.
023E  F060          B = AMPCR.
023F  F0CF          MAR1  = AMPCR.
0240  0271          AMPCR  = SIMREG3.
0241  4233          MPCR  = ZROSREG1A   -  1.
                RDSREG1.
0242  F060          B = AMPCR.
0243  F0CF          MAR1  = AMPCR.
0244  026F          AMPCR  = SIMREG1.
```

```
                    RDSREG1A.
0245  F05B              AMPCR = B.
0246  F0F1              MR1.
0247  F0F9              WHEN RDC BEX.
0248  F0E1              MIR = B.
0249  425A              MPCR = INCSREG1A - 1.
                    RDSREG2.
024A  F060              B = AMPCR.
024B  F0CF              MAR1 = AMPCR.
024C  0270              AMPCR = SIMREG2.
024D  4244              MPCR = RDSREG1A - 1.
                    RDSREG3.
024E  F060              B = AMPCR.
024F  F0CF              MAR1 = AMPCR.
0250  0271              AMPCR = SIMREG3.
0251  4244              MPCR = RDSREG1A - 1.
                    INCSREG1.
0252  F060              B = AMPCR.
0253  F0CF              MAR1 = AMPCR.
0254  026F              AMPCR = SIMREG1.
                    INCSREG1B.
0255  F05B              AMPCR = B.
0256  F0F1              MR1.
0257  F0F9              WHEN RDC BEX.
0258  F07E              B = B + 1.
0259  F0E1              MIR = B.
025A  F0F3              MW1.
                    INCSREG1A.
025B  41D9              MPCR = RESTORE-BR1 - 1.
                    INCSREG2.
025C  F060              B = AMPCR.
025D  F0CF              MAR1 = AMPCR.
025E  0270              AMPCR = SIMREG2.
025F  4254              MPCR = INCSREG1B - 1.
                    INCSREG3.
0260  F060              B = AMPCR.
0261  F0CF              MAR1 = AMPCR.
0262  0271              AMPCR = SIMREG3.
0263  4254              MPCR = INCSREG1B - 1.
                    DECSREG2.
0264  F060              B = AMPCR.
0265  F0CF              MAR1 = AMPCR.
0266  0270              AMPCR = SIMREG2.
0267  F05B              AMPCR = B.
0268  F0F1              MR1.
0269  F0F9              WHEN RDC BEX.
026A  F162              B = 0 - B.
026B  F163              B = 0 - B - 1.
026C  F0E1              MIR = B.
026D  F0F3              MW1.
026E  425A              MPCR = INCSREG1A - 1.
                    SIMREG1.
026F  0000              CNST = @0000@.
                    SIMREG2.
0270  0000              CNST = @0000@.
                    SIMREG3.
0271  0000              CNST = @0000@.
                    SET-CONT-DINT.
                  * SET CONTROLLER DATA INTERRUPT, RESTORE PORT ADDRESS
                  * IN BR1 AND BR2 THEN JUMP
0272  F0DA              MIR = AMPCR.
0273  F05F              B.
0274  8159              CPCR = STACK - 1. SAVE AMPCR, A1,A2.A3 IN STACK
0275  8110              CPCR = SETCONTADDRS - 1.
0276  8075              CPCR = TESTSPO-CONSOLE - 1.
0277  4279              MPCR = SCDINT - 1. SPO ON SYSTEM
                  *
                  * CONSOLE ON SYSTEM
0278  E004              LIT = @04@. ENABLE CONSOLE PRINTER DINT
0279  F0F7              SKIP.
                    SCDINT.
027A  E002              LIT = @02@. ENABLE SPO OUTPUT
027B  F0EA              MIR = LIT.
027C  F099              DW1.
027D  F0FC              WHEN SRQ STEP.
                  ******** STOP HERE IF CONTROLLER ENABLE DOES NOT CAUSE
                  *         SRQ (NOTE- SPO SRQ HAS BEEN USED PRIOR TO
                  *                THIS STOP
                  *         RUN SPO OR CONSOLE MTR
                  *
                    RSCDINT.
027E  8128              CPCR = SETPORTADDR - 1. RESTORE BR1 AND BR2
027F  4178              MPCR = UNSTACKRESTOREA - 1. RETURN
                  *
                  *
                    RESET-CONT-DINT.
                  * DISABLE CONTROLLER, RESTORE PORT ADDRESS IN BR1 AND
                  * BR2, THEN JUMP
0280  F0DA              MIR = AMPCR.
0281  F05F              B.
0282  8159              CPCR = STACK - 1. SAVE AMPCR,A1,A2,A3 IN STACK
0283  8110              CPCR = SETCONTADDRS - 1.
0284  F0E6              MIR = 0.
0285  F099              DW1.
0286  F05F              B.
0287  427D              MPCR = RSCDINT - 1.
                  *
                  /
                    MEM-MOD-SETLC3. SET WRITE-BEFORE-READ FLAG
                  * JUMP TO ABOVE LABEL FROM UPPER CASE RESET KEY CODE
                  * ALLOWS WRITE-BEFORE-READ OF FIRST ADDRESS
0288  F01A              SET LC3.
0289  F0F7              SKIP.
                    MEMORY-MODIFY.
028A  F0AD              IF LC3 STEP.
028B  F01F              RESET GC2.
028C  F0A9              IF LC2 STEP.
028D  8110              CPCR = SETCONTADDRS - 1.
                  * RETURNS WITH BR1 = INSTRUCTION, BR2 = DATA
028E  F0EA              MIR = LIT.
028F  C881              SAR = 8 LIT = @81@.
0290  F082              B = LIT L.
0291  F0EC              MIR = LIT OR B.
0292  E009              LIT = 9.
0293  F098              DW2.
0294  E010              LIT = @10@.
0295  F099              DW1.
0296  F082              B = LIT L.
0297  C803              SAR = 8, LIT = @03@.
0298  F0E1              MIR = B.
0299  F0FC              WHEN SRQ STEP.
029A  F098              DW2.                                    READY THE R
029B  F0EA              MIR = LIT.
029C  E008              LIT = @08@.
029D  F0FC              WHEN SRQ STEP.
029E  F099              DW1.
029F  F082              B = LIT L.
02A0  E0C0              LIT = @C0@.
02A1  F0ED              MIR = LIT + B.
02A2  E004              LIT = @04@.
02A3  F0FC              WHEN SRQ STEP.
02A4  F098              DW2.
02A5  0344              AMPCR = MM-POSITION - 1.
02A6  F01D              A1 = LIT.
02A7  E00A              LIT = @0A@.
02A8  F091              CALL.                                   POSITION RIG
                    MM-LIST-NEXT.
02A9  0333              AMPCR = MM-ADVANCE - 1.
02AA  F091              CALL.                                   ADVANCE 1 L E
02AB  F018              SET LC1.
02AC  F019              SET LC2.
```

```
02AD  F0CA        LCTR.
02AE  E003        LIT   =   @03@.
02AF  02E2        AMPCR =   MM-KYBD   -   1.
02B0  F091        CALL.                                          ACCEPT  AND P    N
02B1  F0D1        MAR1  =   A2.
02B2  F0E7        MIR   =   B001.
02B3  F0AF        IF  LC3   SET   LC3   ELSE   SKIP.
02B4  F0F3        MW1.      WRITE   BEFORE   TO   PREVENT   PE.
02B5  F05F        B.
02B6  F0F1        MR1.
02B7  F0F9        WHEN RDC  BEX.                                 GET  THE  CONT   T
02B8  F033        A2    =   B.
02B9  E003        LIT   =   @03@.
02BA  02C2        AMPCR =   MM-CONTENTS   -   1.
02BB  F041          A3  =   AMPCR.
02BC  F0CA        LCTR.
02BD  0344        AMPCR =   MM-POSITION   -   1.
02BE  F01D        A1    =   LIT.
02BF  E003        LIT   =   @03@.
02C0  F091        CALL.
02C1  0356        AMPCR =   MM-PRINT  -   1.
02C2  F0C9        JUMP.                                          PRINT  THE  CO   E
              MM-CONTENTS.
02C3  F0CA        LCTR.
02C4  E000        LIT   =   @00@.
02C5  F00C        RESET   GC1.
02C6  F0AD        IF  LC3   STEP.          RESET   WRITE-BEFORE-READ     FLAG
02C7  02CC        AMPCR =   RESET-GC1LC3    -   1.   FOR  RETURN  FROM  MM-KYBD
02C8  42E2        MPCR  =   MM-KYBD   -   1.
                  *
                  *  MM-KYBD  JUMPS  HERE  FOR  OCK  I,II,III       KEYS
              SET-LC3GC1.
02C9  F01A        SET   LC3.
              SET-GC1.
02CA  F006        SET   GC1.
02CB  F0F7        SKIP.
              SET-LC3.
02CC  F01A        SET   LC3.
              RESET-GC1LC3.
02CD  F0CA        LCTR.
02CE  E003        LIT   =   @03@.
02CF  0344        AMPCR =   MM-POSITION   -   1.
02D0  F01D          A1  =   LIT.
02D1  F091        CALL.
02D2  F018        SET   LC1.
02D3  02E2        AMPCR =   MM-KYBD   -   1.
02D4  F091        CALL.                                          ACCEPT  AND P    N
02D5  F0DD        MIR   =   A2.
02D6  F0F3        MW1.
02D7  028A        AMPCR =   MEMORY-MODIFY.
02D8  F19C        IF  NOT GC1   JUMP.
02D9  F019        SET   LC2.                                     POS  TO  LEFT.
02DA  F01D        A1    =   LIT.
02DB  E012        LIT   =   @12@.
02DC  0344        AMPCR =   MM-POSITION   -   1.
02DD  F0D7        MAR1  =   BMAR  +   1.
02DE  F035        A2    =   BMAR.
02DF  F091        CALL.
02E0  02A8        AMPCR =   MM-LIST-NEXT   -   1.
02E1  F0F6        SET   GC2.
02E2  F0C9        JUMP.
              MM-KYBD.
02E3  F041        A3    =   AMPCR.                               SAVE  RETURN     D
02E4  F081        B     =   NOT CTR   R.
02E5  D800        SAR   =   8.
02E6  0356        AMPCR =   MM-PRINT   -   1.
02E7  F0A2        IF  GC2   SKIP.
02E8  42EA        MPCR  =   MM-NANO-SAVE   -   1.
02E9  F01F        RESET   GC2.
02EA  F0C9        JUMP.
```

```
              MM-NANO-SAVE.
02EB  F017        A1    =   B.
02EC  F05D        ASE.      SELECT   BR2
02ED  F080        B  =  BMAR.
02EE  F16F        BR2   =   B1TT.          BR2   =   CONTROL   PORT
02EF  F1DB        MIR   =   0   +   Z.
02F0  E002        LIT   =     @02@.
02F1  F098        DW2.                                           ENABLE  KBD  D    A
02F2  F034        A2    =   B000.
02F3  F05D        ASE.      SELECT   BR2
02F4  F080        B  =  BMAR.
02F5  F078        B  =  B0TT.
02F6  F16E        BR2   =   B.             BR2   =   DATA   PORT


              MM-KYBD-LOOP.
02F7  F0C5        IF  SRQ   DR2   BEX   SKIP.
02F8  42F6        MPCR  =   MM-KYBD-LOOP   -   1.
02F9  028A        AMPCR =   MEMORY-MODIFY.
02FA  F0CB        LIT   EQV   B.
02FB  E01F        LIT   =   @1F@.     RESET   KEY   LOWER   SHIFT   MECHANICAL
02FC  F09B        IF  ABT   LUOP   JUMP.   RESET   KEY   START   OVER
02FD  E0AB        LIT   =   @AB@.     RESET   KEY   LOWER   SHIFT   ELECTRONIC
02FE  F09B        IF  ABT   LUOP   JUMP.   RESET   KEY   START   OVER
02FF  0287        AMPCR =   MEM-MOD-SETLC3   -   1.


0300  E09F        LIT   =   @9F@.     RESET   KEY   UPPER   SHIFT   MECHANICAL
0301  F09B        IF  ABT   LUOP   JUMP.
0302  E08B        LIT   =   @8B@.     RESET   KEY   UPPER   SHIFT   ELECTRONIC
0303  F09B        IF  ABT   LUOP   JUMP.
0304  0385        AMPCR =   MICRO-TOOL   -   1.
0305  E04C        LIT   =   @4C@.          OCK  IIII    KEY   MECHANICAL
0306  F09B        IF  ABT   LUOP   JUMP.   OCK  IIII    KEY    GO  TO  END
0307  E0A0        LIT   =   @A0@.          OCK  IIII    KEY   ELECTRONIC
0308  F09B        IF  ABT   LUOP   JUMP.   OCK  IIII    KEY    GO  TO  END
0309  02C8        AMPCR =   SET-LC3GC1     -   1.
030A  E0CE        LIT   =   @CE@.          OCK  II   UPPER   SHIFT   MECHANICAL
030B  F09B        IF  ABT   LUOP   JUMP.
030C  E083        LIT   =   @83@.          OCK  II   UPPER   SHIFT   ELECTRONIC
030D  F09B        IF  ABT   LUOP   JUMP.
030E  02C9        AMPCR =   SET-GC1   -   1.
030F  E04E        LIT   =   @4E@.          OCK  II   LOWER   SHIFT   MECHANICAL


0310  F09B        IF  ABT   LUOP   JUMP.
0311  E0A3        LIT   =   @A3@.          OCK  II   LOWER   SHIFT   ELECTRONIC
0312  F09B        IF  ABT   LUOP   JUMP.
0313  02CB        AMPCR =   SET-LC3   -   1.
0314  E0CD        LIT   =   @CD@.          OCK  I    UPPER   SHIFT   MECHANICAL
0315  F09B        IF  ABT   LUOP   JUMP.
0316  E081        LIT   =   @81@.          OCK  I    UPPER   SHIFT   ELECTRONIC
0317  F09B        IF  ABT   LUOP   JUMP.
0318  F0E1        MIR   =   B.
0319  F07F        B  =  B  R.
031A  C400        SAR   =   4   LIT   =   0.
031B  0322        AMPCR =   ABCDEF-KEY   -   1.
031C  E004        LIT   =   @04@.     UPPER   DIGIT   FOR  ALPHA  ELECTRONIC
031D  F0CB        LIT   EQV   B.
031E  F09B        IF  ABT   LUOP   JUMP.
031F  E005        LIT   =   @05@.     UPPER   DIGIT   FOR  ALPHA  MECHANICAL


0320  F09B        IF  ABT   LUOP   JUMP.
0321  E000        LIT   =   0.
0322  F0F7        SKIP.                    NUMERIC  KEY  ENTERED
```

```
                ABCDEF-KEY.                         ALPHA  KEY  ENTERED
0323   E009          LIT    = @09@.
0324   F08D          BMI.            RESTORE  B  (CHARACTER   ENTERED)
0325   F083          B  = LIT   + B.  ADD 9  IF  ALPHA  KEY
0326   F086          B   = LIT    AND  B.
0327   CC0F          SAR    =  12,     LIT     = @0F@.
0328   F025          A2     =   A2    C.
0329   F031          A2     =   A2    +   B.                          CONCATENATE
032A   02F6          AMPCR    =    MM-KYBD-LOOP      -    1.
032B   F030          INC.
032C   F0B9           IF  NOT  COV      JUMP.                          TEST   FOR   A
032D   F066          B    =    A1.
032E   F095          CTR      =     B.                                 RESTORE   COUN    R
032F   0356          AMPCR    =       MM-PRINT     -    1.
0330   F0A6          IF     LC1       JUMP.                            PRINT   FLAG.
0331   F101          AMPCR    =     A3.
0332   F05F          B.
0333   F0C9          JUMP.
                 MM-ADVANCE.
0334   F05D          ASE.          SELECT   BR2
0335   F080          B  =  BMAR.
0336   F16F          BR2   =  BITT.             BR2   =  CONTROL   PORT
0337   F0EA          MIR     =    LIT.
0338   E008          LIT      =     @08@.
0339   F098          DW2.                                              ENABLE      FORM     I
033A   F082          B  =  LIT    L.
033B   E0C0          LIT      =     @C0@.
033C   F0ED           MIR     =      LIT     +  B.
033D   E050          LIT      =     @50@.
033E   F05D          ASE.          SELECT   BR2
033F   F080          B  =  BMAR.
0340   F078          B  =  B0TT.
0341   F16E          BR2   =  B.                BR2   =  DATA   PORT
0342   F0FC          WHEN  SRQ  STEP.
0343   F098          DW2.
0344   F0C9          JUMP.
                   MM-POSITION.
0345   F05D          ASE.          SELECT   BR2
0346   F080          B  =  BMAR.
0347   F16F          BR2   =  BITT.             BR2   =  CONTROL   PORT
0348   F0EA           MIR     =     LIT.
0349   C810          SAR   =  8,    LIT     =  @10@.
034A   F098          DW2.                                              ENABLE  CARRI
034B   E001          LIT    =  @01@.                                   LEFT   POSITIO        P
034C   F015          IF    LC2    SKIP.
034D   E000          LIT    =  @00@.                                   RIGHT    POSITI
034E   F082          B  =  LIT    L.
034F   F0DC          MIR      =     A1     +  B.
0350   F05D          ASE.          SELECT   BR2
0351   F080          B  =  BMAR.
0352   F078          B  =  B0TT.
0353   F16E          BR2   =  B.                BR2   =  DATA   PORT
0354   F0FC           WHEN  SRQ  STEP.
0355   F098          DW2.
0356   F0C9           JUMP.
                 MM-PRINT.
0357   F0A5           IF    LC1       STEP.
0358   F1DB          MIR      =      0     +      Z.
0359   E004          LIT      =      @04@.
035A   F05D          ASE.          SELECT   BR2
035B   F080          B  =  BMAR.
035C   F16F          BR2   =  BITT.             BR2   =  CONTROL   PORT
035D   F098          DW2.                                              ENABLE   PRINT
035E   C84B          SAR   =  8,    LIT     =  @4B@.
035F   F015          IF    LC2    SKIP.                                LC2    MEANS   RE       R
0360   C849          SAR   =  8,    LIT     =  @49@.
0361   F089          B     =     LIT.
0362   F01B          A1    =  B   L.
0363   F081           B      =     NOT     CTR      R.
0364   F07C          B    =  B     L.
0365   DE00          SAR      =  14.

0366   F05F          B.
0367   F0F4          SAR     =  B.
0368   F025          A2   =  A2   C.
0369   F05D          ASE.         SELECT    BR2
036A   F080          B  =  BMAR.
036B   F078          B  =  B0TT.
036C   F16E          BR2   =  B.                   BR2   =  DATA   PORT
                MM-PRINT-LOOP.
036D   F147          B     =     A2      C.
036E   D400          SAR     =     4.
036F   F07F          B     =     B     R.
0370   DC00          SAR   =  12.                                        ISOLATE    NEXT      I
0371   F0CC           LIT     -     B.
0372   E009           LIT      =      @09@.
0373   F09E          IF   AOV  SKIP.
0374   F018          SET     LC1.                                        UNDIGIT
0375   E037          LIT      =     @37@.
0376   F014          IF     LC1     SKIP.
0377   E030          LIT      =     @30@.
0378   F083          B  =  LIT    +  B.                                  PUT  ZONE  ON.
0379   F0DC          MIR   =  A1   +  B.
037A   F0FC          WHEN  SRQ  STEP.
037B   F098           DW2.
037C   F030           INC.
037D   F0C5          IF   SRQ   DR2   BEX   SKIP.
037E   F101           AMPCR     =     A3.
                MM-NANO-DUMB.
037F   F0C5          IF   SRQ   DR2   BEX   SKIP.
0380   437E          MPCR  =  MM-NANO-DUMB  -  1.
0381   F09F          IF     COV   JUMP.                                  END  OF  PRINT
0382   F025          A2      =     A2       C.
0383   DC00          SAR   =  12.                                        LINE   UP  NEXT      I
0384   036C          AMPCR     =     MM-PRINT-LOOP       -     1.
0385   F0C9          JUMP.
               *****************************************************                    *
                MICRO-TOOL.                         PRESS   OCK   IIII
               *  MEMORY-MODIFY   USES   LC1,LC2,LC3,GC1,GC2
0386   F0AD          IF   LC3   STEP.
0387   F0A5          IF   LC1   STEP.
0388   F0A9          IF   LC2   STEP.
0389   F00C          RESET   GC1.
038A   F01F          RESET   GC2.
038B   403E          MPCR  =  TESTSELECT     -  1.
               /
                SPO-MEM-MOD.
038C   F0A9          IF   LC2   STEP.   RESET   WRITE-BEFORE-READ      FLAG
038D   8110          CPCR   =  SETCONTADDRS   -   1.
               *   RETURN  WITH  BR1  =  INST,    BR2   =  DATA
038E   F0A5          IF   LC1.
                SMM-NEW-ADDRESS.
038F   83B9          CPCR   =  SMM-ENABLE-OUT     -   1.
0390   E00D          LIT    =  @0D@.
0391   83F6          CPCR   =  SMM-DEV-WT-LIT     -   1.
0392   E00A          LIT    =  @0A@.
0393   83F6          CPCR   =  SMM-DEV-WT-LIT     -   1.
0394   83C1          CPCR   =  SMM-SPACE-4     -   1.
0395   83B6          CPCR   =  SMM-ENABLE-IN     -   1.
0396   F0A8          IF   LC1   SET   LC1   SKIP.
0397   83CA          CPCR   =  SMM-ACCEPT-4     -   1.
0398   83B9          CPCR   =  SMM-ENABLE-OUT     -   1.
0399   F0BF          IF   NOT   LC1   SKIP.
039A   83DB          CPCR   =  SMM-PRINT-4     -   1.
039B   83C1          CPCR   =  SMM-SPACE-4     -   1.
039C   F0D1          MAR1   =  A2.
039D   F0E7          MIR    =  B001.
039E   F0AB          IF   LC2   SET   LC2   ELSE   SKIP.
039F   F0F3          MW1.      WRITE   BEFORE   READ     PREVENT   PE
03A0   F0F1          MR1.
03A1   F0F9          WHEN  RDC  BEX.
03A2   F033          A2   =  B.
03A3   83DB          CPCR   =  SMM-PRINT-4     -   1.
03A4   83B6          CPCR   =  SMM-ENABLE-IN     -   1.
```

```
                    SMM-WHAT-TO-DO.
03A5  83EF              CPCR  = SMM-DEV-RD   - 1.
03A6  F0CB              LIT   EQV B.
03A7  E020              LIT   = @20@.
03A8  03AD              AMPCR = SMM-NEW-CONTENT   - 1.
03A9  F09B              IF  ABT  LUOP  JUMP.
03AA  E01B              LIT   = @1B@.
03AB  F09D              IF  ABT  SKIP.
03AC  43A4              MPCR  = SMM-WHAT-TO-DO    - 1.
03AD  F018              SET  LC1.
                    SMM-NEW-CONTENT.
03AE  83B9              CPCR  = SMM-ENABLE-OUT    - 1.
03AF  83C1              CPCR  = SMM-SPACE-4       - 1.
03B0  83B6              CPCR  = SMM-ENABLE-IN     - 1.
03B1  83CA              CPCR  = SMM-ACCEPT-4      - 1.
03B2  F0DD              MIR   = A2.
03B3  F0F3              MW1.
03B4  F0FB              WHEN RMI  MAR1 = BMAR + 1.
03B5  F035              A2    = BMAR.
03B6  438E              MPCR  = SMM-NEW-ADDRESS   - 1.
                    SMM-ENABLE-IN.
03B7  F0FC              WHEN SRQ  STEP.
03B8  F0E7              MIR   = B001.
03B9  43BA              MPCR  = SMM-SEND-CW   - 1.
                    SMM-ENABLE-OUT.
03BA  F1D5              MIR   = B001   + 1.
                    SMM-SEND-CW.
03BB  F05D              ASE.
03BC  F080              B  = BMAR.
03BD  F16F              BR2   = B1TT.
03BE  F098              DW2.
03BF  F05F              B.
03C0  F16E              BR2   = B.
03C1  F0C9              JUMP.
                    SMM-SPACE-4.
03C2  F007              A1    = AMPCR.
03C3  F05F              B.
03C4  F05F              B.
03C5  E020              LIT   = @20@.
03C6  83F6              CPCR  = SMM-DEV-WT-LIT    - 1.
03C7  83F7              CPCR  = SMM-DEV-WT    - 1.
03C8  83F7              CPCR  = SMM-DEV-WT    - 1.
03C9  83F7              CPCR  = SMM-DEV-WT    - 1.
03CA  43EC              MPCR  = SMM-JUMP-A1   - 1.
                    SMM-ACCEPT-4.
03CB  F007              A1    = AMPCR.
03CC  F0CA              LCTR.
03CD  CC02              SAR   = 12,    LIT   = 2.
03CE  F034              A2    = B000.
                    /
                    SMM-ACCEPT-LOOP.
03CF  F026              A2    = A2  L.
03D0  83EF              CPCR  = SMM-DEV-RD    - 1.
03D1  F0CC              LIT   - B.
03D2  E040              LIT   = @40@.
03D3  F09E              IF  AOV  SKIP.
03D4  F083              B  = LIT   + B.
03D5  E009              LIT   = 9.
03D6  F086              B  = LIT   AND B.
03D7  E00F              LIT   = @0F@.
03D8  F031              A2    = A2  + B.
03D9  F0C8              INC  IF  COV  SKIP.
03DA  43CE              MPCR  = SMM-ACCEPT-LOOP   - 1.
03DB  43EC              MPCR  = SMM-JUMP-A1   - 1.
                    SMM-PRINT-4.
03DC  F007              A1    = AMPCR.
03DD  F0CA              LCTR.
03DE  CC02              SAR   = 12,    LIT   = 2.
                    SMM-PRINT-LOOP.
03DF  F025              A2    = A2  C.
03E0  F06D              B  = A2  AND  LIT.
03E1  E00F              LIT   = @0F@.
03E2  F0CC              LIT   - B.
03E3  E009              LIT   = 9.
03E4  F09E              IF  AOV  SKIP.
03E5  F083              B  = LIT   + B.
03E6  E007              LIT   = @07@.
03E7  F0ED              MIR   = LIT   + B.
03E8  E030              LIT   = @30@.
03E9  83F7              CPCR  = SMM-DEV-WT    - 1.
03EA  F0C8              INC  IF  COV  SKIP.
03EB  43DE              MPCR  = SMM-PRINT-LOOP    - 1.
03EC  43EC              MPCR  = SMM-JUMP-A1   - 1.
                    SMM-JUMP-A1.
03ED  F05C              AMPCR = A1.
03EE  F05F              B.
03EF  F0C9              JUMP.
                    SMM-DEV-RD.
03F0  F1AE              IF  NOT  URQ  SKIP.
03F1  43FC              MPCR  = SMM-STINTS    - 1.
03F2  F0C5              IF  SRQ  DR2  BEX  SKIP.
03F3  43EF              MPCR  = SMM-DEV-RD    - 1.
03F4  F086              B  = LIT   AND B.
03F5  E07F              LIT   = @7F@.
03F6  F0C9              JUMP.
                    SMM-DEV-WT-LIT.
03F7  F0EA              MIR   = LIT.
                    SMM-DEV-WT.
03F8  F1AE              IF  NOT  URQ  SKIP.
03F9  43FC              MPCR  = SMM-STINTS    - 1.
03FA  F0C6              IF  SRQ  DW2  SKIP.
03FB  43F7              MPCR  = SMM-DEV-WT    - 1.
03FC  F0C9              JUMP.
                    SMM-STINTS.
03FD  F05D              ASE.
03FE  F035              A2    = BMAR.
03FF  F08E              BR2   = A2  OR  B100.
0400  F097              DR2   BEX.
0401  F07D              B  = B  C.
0402  D300              SAR   = 3.          ERROR  STATUS  TO LSB,   E-O-M   TO MSB
0403  F090              BR2   = A2.
0404  F05F              B.
                    *
                    *  PUSH  INPUT-REQUEST    TO RESET  LC2  (NORMAL  OPERATION
                    *                    BEFORE  ERROR  WAS PUSHED)
                    *  PUSH  ERROR TO SET  LC2  (WRITE   BEFORE  READ  FLAG)
                    *  PUSH  END-OF-MESSAGE    TO EXIT  SPO-MEMORY-MODIFY
0405  F0C4              IF  NOT  MST  SKIP.
0406  440B              MPCR  = SMM-EXIT   - 1.      E-O-M   STATUS
0407  F019              SET  LC2.          WRITE-BEFORE-READ      FLAG
0408  F05F              B.
0409  F0B2              IF  LST  SKIP.
040A  438B              MPCR  = SPO-MEM-MOD   - 1.          INPUT-REQUEST     STATUS
040B  438C              MPCR  = SPO-MEM-MOD.    ERROR  STATUS  (LEAVE   LC2  SET)
                    SMM-EXIT.
                    *  SPO-MEM-MOD   USES  LC1  AND LC2
040C  F0A5              IF  LC1  STEP.
040D  F0A9              IF  LC2  STEP.
040E  403E              MPCR  = TESTSELECT    - 1.
                    /
                    TESTTABLE.
040F  4414              MPCR  = TEST-00    - 1.
0410  4479              MPCR  = TEST-01    - 1.
0411  449E              MPCR  = TEST-02    - 1.
0412  44AA              MPCR  = TEST-03    - 1.
0413  44CC              MPCR  = TEST-04    - 1.
0414  44FE              MPCR  = TEST-05    - 1.
                    TEST-00.
                    RDRDY.
0415  E000              LIT   = @00@.                    CHECK  STATUS.
0416  863D              CPCR  = STATCHK2   - 1.
0417  861E              CPCR  = TSTSTAT    - 1.
                    *********STATUS         FAILURE.
                    *********ERROR          #M3.
```

```
                RDRDYA.
0418    F0EA            MIR = LIT.
0419    E010            LIT = @10@.                     ENBL INT.
041A    F099            DW1.
041B    F05F            B.
041C    F0FD            WHEN URQ.
                ********FIRST       ATTEMPT TO SET STINT FAILED.
                * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                *                           NOTE 1                      *
                *                                                       *
                *  PLACE SYSTEM TEST DECK IN INPUT HOPPER. TURN POWER   *
                *ON NOT READY SHOULD LIGHT. DEPRESS START BUTTON - A     *
                *CARD SHOULD BE MOVED FROM THE INPUT HOPPER TO THE       *
                *READY STATION AND NOT READY LIGHT SHOULD GO OFF.        *
                *  IF CARD OR CARDS ARE FED INTO THE OUTPUT STACKER      *
                *REFER TO M26.                                          *
                *IF INCR FAILS TO MOVE SEE M5.                          *
                *(FIRST ATTEMPT TO SET STINT FAILED)                    *
                * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                *                                                       *
041D    F1B5            IF URQ SKIP.
041E    45A7            MPCR = CHECKLOOP - 1.
041F    F1AD            IF NOT SRQ SKIP.            DATA INTERRUPT.
0420    861D            CPCR = STATSR - 1.
                *********DINT        SET WHEN RDR WENT READY.
                *********ERROR       #M4.
0421    0417            AMPCR = RDRDYA - 1.
                RDRDYB.
0422    8642            CPCR = DESEL - 1.
0423    F18E            IF IRQ SKIP.
0424    F000            WAIT.
                *********IRQ         NOT SET BY STINT.
                *********ERROR       #M27.
0425    8155            CPCR = PSADB7 - 1.
                *********ERROR       - CONTROLLER PS CHIP B7.
0426    F1AE            IF NOT URQ SKIP.
0427    F000            WAIT.
                *********URQ         WHILE UNSELECTED.
                *********ERROR       #M34.
0428    F108            ASR BEX.
0429    F05F            B.
042A    F0BD            IF NOT IRQ SKIP.
042B    861E            CPCR = TSTSTAT - 1.
                *********STINT       NOT RESET BY ENST.
                *********ERROR       #M6.
042C    0421            AMPCR = RDRDYB - 1.
                INSNTRD.
042D    F10F            A1 = B000.
042E    F097            DR2 BEX.
042F    F0FF            0 EQV B.
0430    F09D            IF ABT SKIP.
0431    861E            CPCR = TSTSTAT - 1.
                *********DATA        READ FAILED.
                *********ERROR       #M7.
0432    F0FD            WHEN URQ STEP.              DEPRESS STOP SWITCH.
                *********STOP        SWITCH DID NOT RESET RDY.
                *********ERROR       #M16.
0433    F080            B = BMAR.                   BEGIN PSADDRSTST.
0434    F07A            B = B1TT.                   SET INST IN BR2.
0435    F16E            BR2 = B.
0436    F16C            BR1 = LIT L.
0437    C88F            LIT = @8F@ SAR = 8.
0438    F057            A3 = LIT L.
                PSADDRTST.
0439    F05D            ASE.
043A    F080            B = BMAR.
043B    F03C            A3 EQV B.
043C    F09D            IF ABT SKIP.
043D    F096            DR1 BEX.
043E    F046            A3 = A3 R.
043F    F04B            A3 = A3 - 1.

0440    F03E            A3 EQV LIT.
0441    E07F            LIT = @7F@.
0442    F0B5            IF NOT ABT SKIP.
0443    4446            MPCR = TST4IRQ - 1.
0444    F045            A3 = A3 L.
0445    F0D2            MAR1 = A3.
0446    4438            MPCR = PSADDRTST - 1.
                TST4IRQ.
0447    F18E            IF IRQ SKIP.
0448    861E            CPCR = TSTSTAT - 1.
                *********PS        ADDRESS ERROR.
                *********ERROR       #M31.
0449    8128            CPCR = SETPORTADDR - 1.
044A    F097            DR2 BEX.
044B    F05F            B.
044C    F1B5            IF URQ SKIP.
044D    861E            CPCR = TSTSTAT - 1.
                *********DR        FAILED TO SELECT.
                *********ERROR       #M30.
044E    F0E6            MIR = B000.
044F    F099            DW1.
0450    F05F            B.
0451    F1AE            IF NOT URQ SKIP.
0452    F000            WAIT.
                *********STINT       SETS WITH ENINT = 0.
                *********ERROR       #M8.
0453    F0EA            MIR = LIT.                  SETUP FOR PRIORITY TEST.
0454    E010            LIT = @10@.
0455    F099            DW1.
0456    F05F            B.
0457    F0FD            WHEN URQ STEP.              DEPRESS START BUTTON.
                *********START       SWITCH DID NOT SET STINT.
                *********ERROR       #M17.
0458    8271            CPCR = SET-CONT-DINT - 1.
0459    8642            CPCR = DESEL - 1.
045A    8155            CPCR = PSADB7 - 1.
045B    F0CF            MAR1 = AMPCR.
045C    014D            AMPCR = CONTPORTADDRESS.
045D    F0F1            MR1.
045E    F0F9            WHEN RDC BEX.
045F    F017            A1 = B.
0460    8128            CPCR = SETPORTADDR - 1.
0461    F108            ASR BEX.
0462    F05F            B.
0463    F003            A1 EQV B.
0464    F09D            IF ABT SKIP.
0465    861E            CPCR = TSTSTAT - 1.
                *********ASR       FAILED TO PRODUCE PROPER ADDRESS.
                *********ERROR       #M9.
0466    827F            CPCR = RESET-CONT-DINT - 1.
0467    8271            CPCR = SET-CONT-DINT - 1.
0468    F108            ASR BEX.
0469    F017            A1 = B.                     CONTAINS RDY STINT.
046A    F07F            B = B R.
046B    D800            SAR = 8.
046C    F086            B = LIT AND B.
046D    E00F            LIT = @0F@.
046E    F052            A3 = B L.
046F    F05D            ASE.
0470    F080            B = BMAR.
0471    F03C            A3 EQV B.
0472    F09D            IF ABT SKIP.
0473    861E            CPCR = TSTSTAT - 1.
                *********ASR       ADDRESS IS WRONG.
                *********ERROR       #M2.
0474    F158            B = BTT1.                                       C
0475    F003            A1 EQV B.                                       C
0476    F09D            IF ABT SKIP.
0477    861E            CPCR = TSTSTAT - 1.
                *********STATUS      WRONG. EXPECTED 01.
                *********ERROR       #M38.
```

```
0478  855C        CPCR  = STOP  - 1.
0479  803E        CPCR  = TESTSELECT  - 1.
                TEST-01.
047A  E000        LIT   = @00@.                    CHECK  STATUS.
047B  863D        CPCR  = STATCHK2  - 1.
047C  861E        CPCR  = TSTSTAT  - 1.
                *********STATUS       FAILURE.
                *********ERROR       #M10.
047D  856D        CPCR  = ENBLINT  - 2.
047E  8574        CPCR  = STRTLP  - 1.
               MTRREAD.
047F  E01A        LIT   = @1A@.
0480  8558        CPCR  = LDCWRD  - 1.
0481  857F        CPCR  = SRQTIM3F  - 1.
0482  861E        CPCR  = TSTSTAT  - 1.
                *********DINT       FAILED  TO  SET  OR  WAS  LATE.
                *********ERROR       #M13.
0483  8642        CPCR  = DESEL  - 1.              DESELECT.
0484  F0F8        WHEN IRQ  STEP.
                *********ERROR       #M36.              DINT  DID  NOT  SET  IRQ.
0485  F1AD        IF  NOT SRQ  SKIP.
0486  F000        WAIT.
                *********SRQ       WHILE  UNSELECTED.
                *********ERROR       #M37.
0487  F05E        ASR.
0488  F000        WAIT.
                *       PORT  SELECT  CARD-ENABLE  STATUS  GATING  TEST.
                *                     TO  VERIFY  ONLY  THE  DEVICE  GENERATING  AN
                *                     INTERRUPT  IS  ADDRESSED  BY  ASR.  METER  THE
                *                     FOLLOWING  SIGNALS.
                *                     ONLY  THE  SIGNAL  CORRESPONDING  TO  THE  POR
                *                     NUMBER  OF  THE  CARD  READER  SHOULD  BE  0%.
                *                     ALL  OTHERS  SHOULD  BE  100%.
                *
                *       PORT          PS1-3
                *
                *        12       2J(PSENST12/)
                *        11       1J(PSENST11/)
                *        10       1K(PSENST10/)
                *         9       2B(PSENST09/)
                *                                    PS1-2
                *
                *         8                    2J(PSENST8/)
                *         7                    1J(PSENST7/)
                *         6                    1K(PSENST6/)
                *         5                    2B(PSENST5/)
                *                                                PS1-1
                *
                *         4                                  2J(PSENST4/)
                *         3                                  1J(PSENST3/)
                *         2                                  1K(PSENST2/)
                *         1                                  2B(PSENST1/)
                *
                *                          AGREE  -  FORCE  STEP
                *
                *                             DISAGREE  -  A5,B5,C5,C7       OF
                *                                          PS1  CARD  BEING
                *                                          METERED.
                *
                *         NOTE  -  SYSTEM  MAY  HAVE  1-2  OR  3  PS1  CARDS.
                *
                *
0489  864A        CPCR  = TESTDATAREQ  - 1.                                    D
048A  85A2        CPCR  = SFTCLR  - 1.
048B  855C        CPCR  = STOP  - 1.
               RDNORM.
048C  E000        LIT   = @00@.
048D  863D        CPCR  = STATCHK2  - 1.
048E  861E        CPCR  = TSTSTAT  - 1.
                *********STATUS       FAILURE.
                *********ERROR       #M10.
```

```
048F  856D        CPCR  = ENBLINT  - 2.
0490  8574        CPCR  = STRTLP  - 1.
0491  E012        LIT   = @12@.
0492  8558        CPCR  = LDCWRD  - 1.
0493  F05E        ASR.
0494  F000        WAIT.                          DID  CARD  FEED  INTO , STACKER.
                *                                IF  YES  FST  IF  NO  GO  TO  M11.
0495  85A2        CPCR  = SFTCLR  - 1.
0496  855C        CPCR  = STOP  - 1.
0497  856D        CPCR  = ENBLINT  - 2.
0498  8574        CPCR  = STRTLP  - 1.
0499  E018        LIT   = @18@.
049A  8558        CPCR  = LDCWRD  - 1.
049B  F000        WAIT.                          DID  CARD  FEED  INTO  STACKER.
                *                                IF  YES  FST  IF  NO  GO  TO  M11.
049C  85A2        CPCR  = SFTCLR  - 1.
049D  855C        CPCR  = STOP  - 1.
049E  803E        CPCR  = TESTSELECT  - 1.
               TEST-02.
               RDDATA.
049F  856D        CPCR  = ENBLINT  - 2.
04A0  8574        CPCR  = STRTLP  - 1.
               CARD2.
04A1  E01A        LIT   = @1A@.
04A2  8558        CPCR  = LDCWRD  - 1.           ENABLE  INT  AND  MTRMODE.
04A3  857F        CPCR  = SRQTIM3F  - 1.
04A4  861E        CPCR  = TSTSTAT  - 1.
                *********DINT       DID  NOT  SET.
                *********OR       WAS  LATE.
                *********ERROR       #M13.
04A5  8587        CPCR  = INITSHFT  - 1.
04A6  F0BB        IF  NOT GC1  SKIP.
04A7  4535        MPCR  = DATACHK  - 1.
04A8  8642        CPCR  = DESEL  - 1.
04A9  F0F8        WHEN IRQ  STEP.
                *********DINT       DID  NOT  CAUSE  IRQ.
                *********ERROR       #M28.
04AA  4536        MPCR  = DATACHK.
               TEST-03.
               SHFTRAM.
04AB  F0EA        MIR  = LIT.
04AC  E010        LIT   = @10@.                  ENBL  INT.
04AD  F099        DW1.
04AE  F05F        B.
04AF  E001        LIT   = @01@.                  RDY  SET.
04B0  863D        CPCR  = STATCHK2  - 1.
04B1  8574        CPCR  = STRTLP  - 1.
04B2  E018        LIT   = @18@.
04B3  8558        CPCR  = LDCWRD  - 1.           RDBINARY.
04B4  E004        LIT   = @04@.
04B5  863D        CPCR  = STATCHK2  - '1.        IS  TROUBLE  SET.
04B6  F0F7        SKIP.
04B7  F000        WAIT.
                *********TROUBLE       BIT  IS  SET.
                *********ERROR       #M14.
               DINTCTR.
04B8  E04E        LIT   = @4E@.
04B9  F0CA        LCTR.                          79  DINTS.
04BA  F05F        B.
               COMPAREM.
04BB  857D        CPCR  = SRQTIM7F  - 1.
04BC  861E        CPCR  = TSTSTAT  - 1.
                *********DINT       FAILED  TO  SET  OR  RDBIN  TROUBLE.
                *********ERROR       #M32.
04BD  F0FC        WHEN SRQ  STEP.
04BE  F097        DR2  BEX.                      SVC  DINT.
04BF  F017        A1  = B.                       STORE  CURRENT  DATA  IN  A1.
04C0  851A        CPCR  = CONSTANTPOINTER  - 1.
04C1  F006        SET  GC1.
04C2  F068        B  = A2.
04C3  F05F        B.
```

```
04C4  F003          A1  EQV  B.
04C5  F09D          IF  ABT  SKIP.
04C6  861E          CPCR = TSTSTAT  - 1.
                  *********ERROR       #M15.
04C7  F0C8          INC,  IF  COV  SKIP.
04C8  44BA          MPCR = COMPAREM -  1.
04C9  8128          CPCR = SETPORTADDR  - 1.
04CA  F00C          RESET  GC1.
04CB  85A2          CPCR = SFTCLR  - 1.
04CC  403E          MPCR = TESTSELECT  - 1.
                  TEST-04.
                  CRCHC0DCHK.
04CD  E010          LIT  = @10@.
04CE  8558          CPCR = LDCWRD - 1.
04CF  F05F          B.
04D0  E001          LIT  = @01@.                  RDY SET.
04D1  863D          CPCR = STATCHK2  - 1.
04D2  8574          CPCR = STRTLP  - 1.
04D3  E012          LIT  = @12@.
04D4  8558          CPCR = LDCWRD - 1.            RDNORMAL.
04D5  E004          LIT  = @04@.
04D6  863D          CPCR = STATCHK2  - 1.         IS  TRBL  SET.
04D7  F0F7          SKIP.
04D8  F000          WAIT.
                  *********TROUBLE       BIT  IS  SET.
                  *********ERROR       #M14.
04D9  F0FC          WHEN SRQ  STEP.
04DA  84E6          CPCR = DINTCTR1  - 1.
                  CONSTPOINT.
04DB  F041          A3  = AMPCR.                  STORE  COMPAREM1.
04DC  F05F          B.
04DD  F002          IF  GC1  STEP  ELSE  SKIP.
04DE  44E0          MPCR = READLIST1  - 1.
04DF  F0CF          MAR1 = AMPCR.
04E0  05FB          AMPCR = CONSTANTLIST1.
                  READLIST1.
04E1  F0F1          MR1.
04E2  F0F9          WHEN RDC  BEX.
04E3  F033          A2  = B.                      NEW DATA  TO  A2.
04E4  F101          AMPCR = A3.                   RESTORE  AMPCR.
04E5  F0D7          MAR1 = BMAR + 1.
04E6  F0C9          JUMP.
                  DINTCTR1.
04E7  C813          SAR  = 8  LIT  = 19.
04E8  F0CA          LCTR.                         21  DINTS
                  COMPAREM1.
04E9  F0FC          WHEN SRQ  STEP.
04EA  F097          DR2  BEX.                     SVC  DINT.
04EB  F017          A1  = B.                      STORE  CURRENT  DATA  IN  A1.
04EC  84DA          CPCR = CONSTPOINT  - 1.
04ED  F006          SET  GC1.
04EE  F068          B  = A2.
04EF  F05F          B.
04F0  F003          A1  EQV  B.
04F1  F09D          IF  ABT  SKIP.
04F2  861E          CPCR = TSTSTAT  - 1.          DISPLAY  ERRORS.
                  *********CRUNCH       PROBLEM.
                  *********ERROR       #M20.
04F3  F0C8          INC,  IF  COV  SKIP.
04F4  44E8          MPCR = COMPAREM1  - 1.
04F5  F0CA          LCTR.
04F6  E039          LIT  = 57.
                  CONTREAD.
04F7  F0FC          WHEN SRQ  STEP.
04F8  F097          DR2  BEX.
04F9  F0C8          INC,  IF  COV  SKIP.
04FA  44F6          MPCR = CONTREAD  - 1.
04FB  8128          CPCR = SETPORTADDR  - 1.
04FC  F00C          RESET  GC1.
04FD  85A2          CPCR = SFTCLR  - 1.
04FE  403E          MPCR = TESTSELECT  - 1.
```

```
                  TEST-05.
                  NORMREAD.
04FF  E010          LIT  = @10@.
0500  8558          CPCR = LDCWRD - 1.
0501  E001          LIT  = @01@.                  RDYSET.
0502  863D          CPCR = STATCHK2  - 1.
0503  8574          CPCR = STRTLP  - 1.
0504  E012          LIT  = @12@.
0505  8558          CPCR = LDCWRD - 1.            RDNORM.
0506  E004          LIT  = @04@.
0507  863D          CPCR = STATCHK2  - 1.         IS  TRBL  SET.
0508  F0F7          SKIP.
0509  F000          WAIT.
                  *********TROUBLE       BIT  IS  SET.
                  *********ERROR       M14.
                  DINTCTR2.
050A  C80A          SAR  = 8  LIT  = 10.
050B  F0CA          LCTR.
050C  F05F          B.
                  COMPAREM2.
050D  F0FC          WHEN SRQ  STEP.
050E  F097          DR2  BEX.
050F  F017          A1  = B.
0510  8526          CPCR = CONSTPOINT2  - 1.
0511  F006          SET  GC1.
0512  F068          B  = A2.
0513  F003          A1  EQV  B.
0514  F09D          IF  ABT  SKIP.
0515  861E          CPCR = TSTSTAT  - 1.
                  *********ERROR       #M21.
0516  F0C8          INC,  IF  COV  SKIP.
0517  450C          MPCR = COMPAREM2  - 1.
0518  F0CA          LCTR.
0519  E03E          LIT  = 62.
051A  84F6          CPCR = CONTREAD  - 1.
                  CONSTANTPOINTER.
051B  F041          A3  = AMPCR.                  STORE  COMPAREM.
051C  F05F          B.
051D  F002          IF  GC1  STEP  ELSE  SKIP.
051E  4520          MPCR = READLIST  - 1.
051F  F0CF          MAR1 = AMPCR.
0520  05AB          AMPCR = CONSTANTLIST.
                  READLIST.
0521  F0F1          MR1.
0522  F0F9          WHEN RDC  BEX.
0523  F033          A2  = B.
0524  F101          AMPCR = A3.
0525  F0D7          MAR1 = BMAR + 1.
0526  F0C9          JUMP.
                  CONSTPOINT2.
0527  F041          A3  = AMPCR.
0528  F05F          B.
0529  F002          IF  GC1  STEP  ELSE  SKIP.
052A  452C          MPCR = READLIST2  - 1.
052B  F0CF          MAR1 = AMPCR.
052C  0610          AMPCR = CONSTANTLIST2.
                  READLIST2.
052D  F0F1          MR1.
052E  F0F9          WHEN RDC  BEX.
052F  F033          A2  = B.
0530  F101          AMPCR = A3.
0531  F0D7          MAR1 = BMAR + 1.
0532  F0C9          JUMP.
                  SHFTREG.
0533  F045          A3  = A3  L.
0534  DF00          SAR  = 15.
0535  F026          A2  = A2  L.
                  DATACHK.
0536  F0FC          WHEN SRQ  STEP.
0537  F066          B  = A1.
0538  F0F4          SAR  = B.
```

```
0539  F097          DR2  BEX.
053A  F07C          B  =  B  L.
053B  F05F          B.
053C  F0C4          IF  NOT  MST  SKIP.
053D  F04C          A3  =  A3  +  1.                STUCK  AT  1  REG.
053E  F066          B  =  A1.
053F  F0F4          SAR  =  B.
0540  F0FC          WHEN SRQ  STEP.
0541  F097          DR2  BEX.
0542  F07C          B  =  B  L.
0543  F05F          B.
0544  F0B3          IF  MST SKIP.
0545  F02A          A2  =  A2  +  1.                STUCK  AT  0  REG.
0546  F00F          A1  =  A1  -  1.
0547  F030          INC.
0548  F02E          IF  COV  SKIP.
0549  4532          MPCR  =  SHFTREG  -  1.
                NOT80YET.
054A  F0CA          LCTR.
054B  C837          SAR  =  8  LIT  =  55.
                NOTYET.
054C  F0FC          WHEN SRQ  STEP.
                *********RAN       OUT  OF  DINTS.
                *********ERROR       #M25.
054D  F097          DR2  BEX.
054E  F030          INC.
054F  F02E          IF  COV  SKIP.
0550  454B          MPCR  =  NOTYET  -  1.
0551  F0BB          IF  NOT  GC1  SKIP.
0552  4590          MPCR  =  CHKRESLTS  -  1.
0553  F0FD          WHEN URQ  STEP.                 DEPRESS  STOP  BUTTON.
                *********STOP        SWITCH  DID  NOT  RESET  RDY.
                *********ERROR       #M16.
0554  F096          DR1  BEX.
0555  F05F          B.
0556  F0FD          WHEN URQ  STEP.                 DEPRESS  START  BUTTON.
                *********START       SWITCH  DID  NOT  SET  STINT.
                *********ERROR       #M17.
0557  F096          DR1  BEX.
0558  4590          MPCR  =  CHKRESLTS  -  1.
                LDCWRD.
0559  F0EA          MIR  =  LIT.
055A  F099          DW1.
055B  F05F          B.
055C  F0C9          JUMP.
                STOP.
055D  E011          LIT  =  @11@.                   TERM.
055E  F0EA          MIR  =  LIT.
055F  F099          DW1.
0560  F05F          B.
0561  F1AD          IF  NOT  SRQ  SKIP.
0562  F000          WAIT.
                *********TERM       DID  NOT  INHIBIT    DINTS.
                *********ERROR       #M22.
0563  F0EA          MIR  =  LIT.
0564  E010          LIT  =  @10@.
0565  F099          DW1.
0566  F05F          B.
0567  F007          A1  =  AMPCR.
0568  F05F          B.
0569  F0FD          WHEN URQ  STEP.                 PRESS  STOP  BUTTON.
                *********ERROR       #M16.
056A  E000          LIT  =  @00@.
056B  863D          CPCR  =  STATCHK2  -  1.
056C  F000          WAIT.
                *********STOP        SWITCH  DID  NOT  RESET  RDY.
                *********OR        STINT  SET.
                *********ERROR       #M16.
056D  F0F7          SKIP.
056E  F019          SET  LC2.
                ENBLINT.
056F  F0EA          MIR  =  LIT.
0570  E010          LIT  =  @10@.
0571  F099          DW1.                            ENABLE  INTERRUPTS.
0572  F0AA          IF  LC2  JUMP.
0573  F05C          AMPCR  =  A1.
0574  458E          MPCR  =  WAITACLK  -  1.
                STRTLP.
0575  F007          A1  =  AMPCR.
0576  F008          IF  GC1  SKIP.
0577  F0DA          MIR  =  AMPCR.
0578  F0FD          WHEN URQ  STEP.                 PRESS  START  BUTTON.
                *********MIR       CONTAINS  CALLING  ADDRESS.
                *********START       SWITCH  DID  NOT  SET  STINT.
                *********ERROR       #M17.
0579  E001          LIT  =  @01@.
057A  863D          CPCR  =  STATCHK2  -  1.
057B  861E          CPCR  =  TSTSTAT  -  1.
                *********CARD       READER  NOT  READY.
                *********ERROR       #M18.
057C  F05C          AMPCR  =  A1.
057D  458E          MPCR  =  WAITACLK  -  1.
                SRQTIM7F.
057E  C87F          SAR  =  8  LIT  =  @7F@.
057F  4580          MPCR  =  SRQTIMOUT  -  1.
                SRQTIM3F.
0580  C83F          SAR  =  8  LIT  =  @3F@.
                SRQTIMOUT.
0581  F039          A2  =  LIT  L.
0582  F121          A2  =  A2  XOR  B111.
0583  F1AD          IF  NOT  SRQ  SKIP.
0584  F1E7          RETN.
0585  F02A          A2  =  A2  +  1.
0586  F183          IF  AOV  JUMP.
0587  4582          MPCR  =  SRQTIMOUT  +  1.
                INITSHFT.
0588  F0CA          LCTR.
0589  E00B          LIT  =  11.
058A  F01D          A1  =  LIT.
058B  E00C          LIT  =  12.
058C  F034          A2  =  B000.
058D  F054          A3  =  B000.
058E  F0C9          JUMP.
                WAITACLK.
058F  F05F          B.
0590  F0C9          JUMP.
                CHKRESLTS.
0591  F0DE          MIR  =  A3.
0592  F03D          A3  EQV  B000.
0593  F09D          IF  ABT  SKIP.
0594  F000          WAIT.
                *********BITS        DISPLAYED  IN  A3  ARE  STUCK  AT  1.
                *********ERROR       #M23.              FST  TO  READ  CARD  2.
0595  F0DD          MIR  =  A2.
0596  F022          A2  EQV  B000.
0597  F09D          IF  ABT  SKIP.
0598  F000          WAIT.
                *********BITS        DISPLAYED  IN  A2  ARE  STUCK  AT  0.
                *********ERROR       #M24.
0599  F002          IF  GC1  STEP  ELSE  SKIP.
059A  459C          MPCR  =  RESTGC1  -  1.
059B  F006          SET  GC1.
059C  44A0          MPCR  =  CARD2  -  1.
                RESTGC1.
059D  F00C          RESET  GC1.
059E  8128          CPCR  =  SETPORTADDR  -  1.
059F  85A2          CPCR  =  SFTCLR  -  1.
05A0  F0FD          WHEN URQ.                PRESS  STOP  BUTTON
                *********STOP        SWITCH  DID  NOT  RESET  RDY.
                *********ERROR       #M16.
05A1  F096          DR1  BEX.                RESET  STATUS  INT
05A2  403E          MPCR  =  TESTSELECT  -  1.
```

```
                    SFTCLR.
05A3  E014          LIT  = @14@.
05A4  F0EA          MIR  = LIT.
05A5  F099          DW1.
05A6  F05F          B.
05A7  F0C9          JUMP.
                    CHECKLOOP.                          FOR DEBUG OF M5.
05A8  F099          DW1.
05A9  F05F          B.
05AA  45A7          MPCR = CHECKLOOP - 1.
                    CONSTANTLIST.
05AB  0123          CNST = @0123@.
05AC  0456          CNST = @0456@.
05AD  0789          CNST = @0789@.
05AE  0ABC          CNST = @0ABC@.
05AF  0DEF          CNST = @0DEF@.
05B0  0123          CNST = @0123@.
05B1  0456          CNST = @0456@.
05B2  0789          CNST = @0789@.
05B3  0ABC          CNST = @0ABC@.
05B4  0DEF          CNST = @0DEF@.
05B5  0123          CNST = @0123@.
05B6  0456          CNST = @0456@.
05B7  0789          CNST = @0789@.
05B8  0ABC          CNST = @0ABC@.
05B9  0DEF          CNST = @0DEF@.
05BA  0123          CNST = @0123@.
05BB  0456          CNST = @0456@.
05BC  0789          CNST = @0789@.
05BD  0ABC          CNST = @0ABC@.
05BE  0DEF          CNST = @0DEF@.
05BF  0123          CNST = @0123@.
05C0  0456          CNST = @0456@.
05C1  0789          CNST = @0789@.
05C2  0ABC          CNST = @0ABC@.
05C3  0DEF          CNST = @0DEF@.
05C4  0123          CNST = @0123@.
05C5  0456          CNST = @0456@.
05C6  0789          CNST = @0789@.
05C7  0ABC          CNST = @0ABC@.
05C8  0DEF          CNST = @0DEF@.
05C9  0123          CNST = @0123@.
05CA  0456          CNST = @0456@.
05CB  0789          CNST = @0789@.
05CC  0ABC          CNST = @0ABC@.
05CD  0DEF          CNST = @0DEF@.
05CE  0123          CNST = @0123@.
05CF  0456          CNST = @0456@.
05D0  0789          CNST = @0789@.
05D1  0ABC          CNST = @0ABC@.
05D2  0DEF          CNST = @0DEF@.
05D3  0123          CNST = @0123@.
05D4  0456          CNST = @0456@.
05D5  0789          CNST = @0789@.
05D6  0ABC          CNST = @0ABC@.
05D7  0DEF          CNST = @0DEF@.
05D8  0123          CNST = @0123@.
05D9  0456          CNST = @0456@.
05DA  0789          CNST = @0789@.
05DB  0ABC          CNST = @0ABC@.
05DC  0DEF          CNST = @0DEF@.
05DD  0123          CNST = @0123@.
05DE  0456          CNST = @0456@.
05DF  0789          CNST = @0789@.
05E0  0ABC          CNST = @0ABC@.
05E1  0DEF          CNST = @0DEF@.
05E2  0123          CNST = @0123@.
05E3  0456          CNST = @0456@.
05E4  0789          CNST = @0789@.
05E5  0ABC          CNST = @0ABC@.
05E6  0DEF          CNST = @0DEF@.
05E7  0123          CNST = @0123@.
05E8  0456          CNST = @0456@.
05E9  0789          CNST = @0789@.
05EA  0ABC          CNST = @0ABC@.
05EB  0DEF          CNST = @0DEF@.
05EC  0123          CNST = @0123@.
05ED  0456          CNST = @0456@.
05EE  0789          CNST = @0789@.
05EF  0ABC          CNST = @0ABC@.
05F0  0DEF          CNST = @0DEF@.
05F1  0123          CNST = @0123@.
05F2  0456          CNST = @0456@.
05F3  0789          CNST = @0789@.
05F4  0ABC          CNST = @0ABC@.
05F5  0DEF          CNST = @0DEF@.
05F6  0123          CNST = @0123@.
05F7  0456          CNST = @0456@.
05F8  0789          CNST = @0789@.
05F9  0ABC          CNST = @0ABC@.
05FA  0DEF          CNST = @0DEF@.
                    CONSTANTLIST1.                      CHECK CRUNCH
05FB  8003          CNST = @8003@.
05FC  8003          CNST = @8003@.
05FD  8003          CNST = @8003@.
05FE  8007          CNST = @8007@.
05FF  8007          CNST = @8007@.
0600  8005          CNST = @8005@.
0601  8006          CNST = @8006@.
0602  8007          CNST = @8007@.
0603  8007          CNST = @8007@.
0604  8007          CNST = @8007@.
0605  8007          CNST = @8007@.
0606  8007          CNST = @8007@.
0607  8006          CNST = @8006@.
0608  8007          CNST = @8007@.
0609  8006          CNST = @8006@.
060A  8007          CNST = @8007@.
060B  8005          CNST = @8005@.
060C  8005          CNST = @8005@.
060D  8007          CNST = @8007@.
060E  8007          CNST = @8007@.
060F  8007          CNST = @8007@.
                    CONSTANTLIST2.
0610  0001          CNST = @0001@.                      RDI1L.
0611  0002          CNST = @0002@.                      RDI2L.
0612  0003          CNST = @0003@.                      RDI3L.
0613  0004          CNST = @0004@.                      RDI4L.
0614  0005          CNST = @0005@.                      RDI5L.
0615  0006          CNST = @0006@.                      RDI6L.
0616  0007          CNST = @0007@.                      RDI7L.
0617  0008          CNST = @0008@.                      RDI8L.
0618  0010          CNST = @0010@.                      RDI9L.
0619  0020          CNST = @0020@.                      RDI0L.
061A  0040          CNST = @0040@.                      RDI11L.
061B  0080          CNST = @0080@.                      RDI12L.
                    STATASR.                            ASR DROP IN
061C  F108          ASR BEX.
061D  461E          MPCR = TSTSTAT - 1.
                    STATSR.                             STATUS RD DROP IN
061E  F096          DR1 BEX.
                    TSTSTAT.
061F  F0BA          IF NOT EXT SKIP.
0620  F0A0          IF EXT SKIP.
0621  F0F7          SKIP.
0622  462E          MPCR = PEXLOOP - 1.
0623  F0DA          MIR = AMPCR.
0624  F000          WAIT.
                *           GO TO INCREMENT ADDRESS DISPLAYED IN MIR.
0625  F0E1          MIR = B.
0626  F000          WAIT.
                *   B REG DISPLAY.
```

```
0627  F0DB          MIR = A1.
0628  F000          WAIT.
                *   A1 REG DISPLAY.
0629  F0DD          MIR = A2.
062A  F000          WAIT.
                *   A2 REG DISPLAY.
062B  F0DE          MIR = A3.
062C  F000          WAIT.
                *   A3 REG DISPLAY.
062D  F00C          RESET GC1.                  RESET LOOP FLAG
062E  462E          MPCR = PEXLOOP - 1.
                *   END OFF TO FLOW OR LOOP.
                PEXLOOP.
062F  F0BA          IF NOT EXT SKIP.
0630  F0A0          IF EXT SKIP.
0631  F0C9          JUMP.
0632  F09A          EXEC.                       FETCH LOOP RETURN
0633  F006          SET GC1.                    SET LOOP FLAG
0634  F0C9          JUMP.
                STATCHKASR.
0635  F108          ASR BEX.
0636  F02F          A2 = A2 OR LIT.
0637  463F          MPCR = STATCHK2 + 1.
                STATGEN8.                       8000 TO STATUS WD ENTRY
0638  F077          B = B001.
0639  4638          MPCR = STATGEN - 2.
                STATGEN.                        A DIGIT ENTRY
063A  F123          A2 = B C.
063B  D200          SAR = 2.
                STATCHK1.                       LIT OR PREVIOUS A2 ENTRY
063C  F02F          A2 = A2 OR LIT.
063D  F0F7          SKIP.
                STATCHK2.                       LIT ONLY ENTRY
063E  F038          A2 = LIT.
063F  F096          DR1 BEX.
0640  F116          A2 EQV B.
0641  F0B4          IF NOT ABT JUMP.            FAILURE EXIT
0642  F1E7          RETN.                       PASS EXIT
                DESEL.
0643  F05D          ASE.
0644  F080          B = BMAR.
0645  F07A          B = BITT.
0646  C80F          SAR = 8 LIT = @0F@.
0647  F16C          BR1 = LIT L.
0648  F099          DW1.                        DESELECT.
0649  F0D5          MAR1 = B.                   RESTORE BR1.
064A  F0C9          JUMP.
                TESTDATAREQ.                                    D
064B  F096          DR1 BEX.                                    D
064C  F05F          B.                                          D
064D  F0B3          IF MST SKIP.                                D
064E  861E          CPCR = TSTSTAT - 1.                         D
                *********NO DATA REQ BIT.                       D
                *********ERROR #M39.                           D
064F  F097          DR2 BEX.                                    D
0650  F05F          B.                                          D
0651  F0C9          JUMP.                                       D
```

MANUAL PROCEDURES

E1	OPERATOR ACTION (EXT BUS ERROR)	MACHINE ACTION	A	D
1.	IN WHICH GROUP ARE THE KNOWN FAILURES.			
1A.	EXT 1 - 4		F20	1B
1B.	EXT 5 - 8		F21	1C
1C.	EXT 9 - 12		F22	1D
1D.	EXT13 - 16		F23	F24

M2.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F2	

M3.	OPERATOR ACTION (STATUS FAILURE)	MACHINE ACTION	A	D
1.	FST 1 TIME AND OBSERVE MIR	MIR = 0001	2	4
2.	METER CRT3 2Y (CRRL/)	100%	3	F3
3.	METER CRT3 1W (EXT1/)	100%	F4	F5
4.	OBSERVE MIR	MIR = 0004	5	F7
5.	METER CRT3 1U (CREL/)	100%	F6	F3

M4.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE	NONE	F8	

M5.	OPERATOR ACTION	MACHINE ACTION	A	D	
1.	FST 1 TIME AND METER THE FOLLOWING POINTS.				
1A.	CRT3 1B (CDSCLK)	3-5%	1B	F9	
1B.	CRT4 1Y (PSWRIT/)	60-70%	1C	F10	
1C.	CRT4 2I (SINT/)	0%	F11	1D	
1D.	CRT4 1S (PSINST)	100%	1E	F12	
1E.	CRT3 2B (CRCLR/)	100%	1G	1F	
1F.	CRT4 2Q (CGCLEAR)	0%	F13	F14	
1G.	CRT3 B4 (WTINST)	60-70%	1H	F15	
1H.	METER CRT3 2Y (CRRL/)	SHOULD BE 0%	1I	F3	B
1I.	METER CRT3 2U (CRCL/) AND DEPRESS THE START SWITCH ON THE CARD READER	0%	F16	F3	B

M6.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	SET EXT/IRQ SWITCH TO EXT AND FST 1 TIME.			
2.	METER PS 2B (PSENST1/)	0%	3	F17
3.	METER CRT3 2D (RDSTAT)	100%	F18	F19

M7.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	FST 1 TIME AND OBSERVE MIR.	MIR = 0080 OR		
		0060 OR		
		0050 OR		
		0040	F24	1A
1A.	OBSERVE MIR	MIR = 0008 OR		
		0004 OR		
		0002 OR		
		0001	F49	F50

M8.	OPERATOR ACTION (STATUS SETS WITH ENINT=0)	MACHINE ACTION	A	D
1.	NONE	NONE	F48	

M9.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE	NONE	F51	

	OPERATOR ACTION	MACHINE ACTION	A	D
M10.	(STATUS ERROR)			
1.	FST 1 TIME AND OBSERVE MIR.	MIR = 0001	3	2
2.		MIR = 0004	M3.4	F52
3.	IS CARD READER RUNNING		F53	M3.2

	OPERATOR ACTION	MACHINE ACTION	A	D
M11.				
1.	NONE		F85	

	OPERATOR ACTION	MACHINE ACTION	A	D
M13.				
1.	METER CRT4 1B (CDSCLK)	3-5%	2	F54
2.	METER CRT4 1G (RDBIN)	100%	3	F55
3.	METER CRT4 2F (RDNORM)	100%	F57	F56

	OPERATOR ACTION	MACHINE ACTION	A	D
M14.	(TROUBLE)			
1.	NONE		M3.4	

M15. (DATA ERROR)
FST 1 TIME AND OBSERVE MIR. MIR CONTAINS THE EXPECTED VALUE. FST 1 TIME AND OBSERVE MIR. VALUE DISPLAYED IS IN ERROR. FROM THE TABLE BELOW SELECT THE VALUE WHICH IS EQUAL TO THAT DISPLAYED IN MIR. X = DON'T CARE.

0127	-	F25	0321	-	F29
0167	-	F25	0301	-	F29
0AFC	-	F25	0FED	-	F29
0163	-	F25	078B	-	F29
0012	-	F25	0FEF	-	F29
0517	-	F25	0303	-	F29
0567	-	F26	0101	-	F29
0F89	-	F27	0323	-	F30
045E	-	F27	0032	-	F31
0CDE	-	F27	0DFE	-	F31
0C56	-	F27	0ABD	-	F31
0701	-	F27	0798	-	F31
0923	-	F27	0799	-	F31
092B	-	F27	0DFF	-	F31
09AB	-	F28	0022	-	F31
0133	-	F32	0786	-	F38
0DE1	-	F33	0224	-	F38
0C00	-	F33	0343	-	F38
0800	-	F33	0813	-	F39
0006	-	F33	0794	-	F39
0120	-	F33	0026	-	F39
0004	-	F33	0F23	-	F40
0000	-	F34	0F0F	-	F41
0FFF	-	F35	0D11	-	F42
8123	-	F36	0123	-	F43
0482	-	F37	0300	-	F44
0002	-	F37	0111	-	F45
0782	-	F37	0C04	-	F46
0802	-	F37	0090	-	F46
000D	-	F38	XXXX	-	F47

	OPERATOR ACTION	MACHINE ACTION	A	D
M16.				
1.	NONE		F58	

	OPERATOR ACTION	MACHINE ACTION	A	D
M17.				
1.	NONE		F59	

	OPERATOR ACTION	MACHINE ACTION	A	D
M18.	(NOT READY)			
1.	NONE		F60	

	OPERATOR ACTION	MACHINE ACTION	A	D
M20.	(CRUNCH PROBLEM)			
1.	FST 1 TIME AND OBSERVE MIR. VALUE DISPLAYED IS THE EXPECTED VALUE. FST 1 TIME AND OBSERVE MIR.	A8 ON	F61	F62

	OPERATOR ACTION	MACHINE ACTION	A	D
M21.				
1.	FST 1 TIME AND OBSERVE MIR. VALUE DISPLAYED IS EXPECTED VALUE. FST 1 TIME AND OBSERVE MIR. VALUE DISPLAYED IS FAILURE.	A1-4 = 0 B1-4 = 0	F63	F64

	OPERATOR ACTION	MACHINE ACTION	A	D
M22.				
1.	NONE		F65	

	OPERATOR ACTION	MACHINE ACTION	A	D
M23.				
1.	OBSERVE MIR. BITS DISPLAYED ARE FAILURES.	B1-4 ØN	F66	2
2.		C1-4 ON	F67	3
3.		D1-4 ON	F68	F52

	OPERATOR ACTION	MACHINE ACTION	A	D
M24.				
1.	OBSERVE MIR. BITS DISPLAYED ARE FAILURES.	B1-4 ON	F66	2
2.		C1-4 ON	F67	3
3.		D1-4 ON	F68	F69

	OPERATOR ACTION	MACHINE ACTION	A	D
M25.				
1.	NONE		F70	

	OPERATOR ACTION	MACHINE ACTION	A	D
M26.				
1.	OBSERVE CARD READER	ALL CARDS WERE READ.	2	3
2.	NORMAL/LOAD SWITCH IN NORMAL POSITION.		F71	F73
3.	NONE		F72	

	OPERATOR ACTION	MACHINE ACTION	A	D
M27.				
1.	NONE		F74	

M28.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F74	
M30.	OPERATOR ACTION (DR FAILED TO SELECT)	MACHINE ACTION	A	D
1.	NONE		F75	
M31.	OPERATOR ACTION (PS ADDR ERROR)	MACHINE ACTION	A	D
1.	NONE		F76	
M32.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F77	
M34.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F78	

M35.	OPERATOR ACTION (IRQ DETECTED)	MACHINE ACTION	A	D	D
1.	OBSERVE MIR	MIR DIGIT B = CARD READER PORT # MINUS 1	1A	F79	D
1A.	METER CRT4-2Q (CGCLEARN)	0%			D
	PRESS CLR PB	100%	2	F14	D
2.	METER CRT4 2I (SINT/)	100%	3	F80	
3.	METER CRT4 2L (DINT/)	100%	F81	F82	

M36.	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F74	
M37.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F83	
M38.	OPERATOR ACTION	MACHINE ACTION	A	D
1.	NONE		F84	

M39.	OPERATOR ACTION	MACHINE ACTION	A	D	D
1.	NONE		F5		D

FAILURE DICTIONARY

F1	CRT2 A5 F7 F5 E7 CRT3 C7 E5 F5	
F2	PS B7	
F3	CARD READER FAULT	
F4	CRT3 D7 A1 C1 E5 A5 B3 F5 A3 PS E7 MU4 E3	B
F5	CRT3 F7 D1 C5 B1	
F6	CRT3 F5 A5 B7	
F7	CRT2 E7	
F8	CRT3 E1 D1 C5 PS F5 D5 D7 C1	B B
F9	CD1 B7 C3	B
F10	PS F7 E7 MU4 E3 D5 EO1 A1 B1	B B
F11	PS F7 B5 E7 A3 E3 A5 C1 D1 B3 D7 E5	
F12	PS D1 A7 MU4 F3	B
F13	CRT3 B1 D1 CRT4 E7	D D
F14	CG1 C1 (IF B721 CG2 C3 CD2 A5)	D
F15	CRT4 A5 C1 F5 B1	
F16	CRT3 F5 E5 D7 C7 D3 E3 C3 C1 D1 B5 A1 A7	
F17	PS B5 C5 D3 A5 B3	
F18	CRT3 B3 B5 E3	
F19	CRT3 A1	
F20	CRT2 E7 CRT3 F7	
F21	CRT2 A5	
F22	CRT2 F7	
F23	CRT2 E7 F5	
F24	CRT2 D3 F7	
F25	CRT1 B3	
F26	CRT1 D3 A3 B1 B3 CRT2 B7	

F27 CRT1 A3

F28 CRT1 A3 D3 B1
CRT2 B7

F29 CRT1 A7

F30 CRT1 A7 B1 D3

F31 CRT1 B7

F32 CRT1 B1 D3 B7

F33 CRT1 C5 D5

F34 CRT1 C5 D5
CRT3 A5 E7 C3

F35 CRT1 E3 D3

F36 CRT2 F3 F5
CRT3 F7

F37 CRT2 B3 B1

F38 CRT2 B7

F39 CRT2 C7

F40 CRT3 E7
CRT4 A3 B3

F41 CRT3 E7 C5 A3

F42 CRT3 E7
CRT4 D5 E5 B3

F43 CRT3 A3

F44 CRT3 C3 E3

F45 CRT3 E7

F46 CRT3 E3

F47 CRT1 B3 D3 A3 B1 A7
B7 C5 D5 E3
CRT2 B7 F3 F5 B3 B1 C7
CRT3 A5 E7 C3 A3 E3
CRT4 A3 B3 E5 D5

F48 CRT3 B3 C1 D1 E3

F49 CRT2 E3 E7 F5

F50 CRT2 D1 C3 C1 D5 D3
D7 C5 F3 E5 E3
CRT3 E1

F51 PS B7 B5 B3 D3
C5 C3 D5 F5

F52 RELOAD TEST DECK
AND START OVER.

F53 DEPRESS STOP BUTTON. B
B

F54 CD1 B7 C3 B

F55 CRT4 A5 B7 D1 D5 A7

F56 CRT4 A5 C7 B1 D1 D5 B
B

F57 CRT3 A5 A1 B1 C5 D1 E1 E7 C3 C1 B
CRT4 B5 C1 C3 D3

F58 CRT3• A1 D3 B5 A3 C3
B3 D5 D1 B7 E1

F59 CRT3 B7
CRT4 F5 E3

F60 CRT3 A1 E1 A3 B3 A5

F61 CRT1 F1 F3 F5 F7

F62 CRT2 E7 D7 E5 F3 C5
D5 C3 C1 D1

F63 CRT2 F3 E5
CRT4 B7 A5

F64 RUN TEST 02 - 04 AGAIN.

F65 CRT2 B7 C7
CRT3 E1 E7
CRT4 E1 A7 B7 C7

F66 CRT1 B1 E1 E3 C7 E7
CRT2 A5

F67 CRT1 D7 E5 E7
CRT2 D3 F7

```
F68     CRT1  D3  E5  E7  C3  E1  E3  D5
        CRT2  E3  F5  E7

F69     CRT3  B1  C5  A5  A3
        CRT4  C7  D3

F70     CRT3  C3  E5  E7
        CRT4  E3

F71     CRT3  A1  E7
        CRT4  A3

F72     REFER  TO  TECH  MANUAL
        FOR  CARD  READER  INTERNAL
        ADJUSTMENTS.

F73     PRESS  LOAD/NORMAL  SWITCH
        TO  NORMAL  POSITION.

F74     PS  D5  C3  D3  F5

F75     PS  E7  E5  A3  A5  C1

F76     PS  E7  F7

F77     CRT4  E1  E3  B3  A5
              F5  D1  D7  D3

F78     PS  B3  E3

F79     GO  TO  SPO  OR  CONSOLE  MTR.

F80     CRT3  C1  E3

F81     PS  D5  F5  D7  C1  E3
            B3

F82     CRT3  E1

F83     PS  D7  B3  C1  F5  E3

F84     CRT3  D3  A3  D5
        CRT4  C1

F85     CRT4  D5  D1  E3
```

ILLUSTRATIONS

```
*                    DESCRIPTION   OF  TEST  DECK.
*                          2601-7608      REV  A


*
*CARD  1.
*   COL12,15,20,29,33,34,35-PUNCH                ROW  12
*   COL11,21,24,26,36-PUNCH              ROW  11.
*  COL3,8,13,25,28,30,31-PUNCH                ROW  0.
*   COL4,15,23-PUNCH          ROW  1.
*   COL1,30,36-PUNCH          ROW  2.
*   COL20,25,28,31,35-PUNCH              ROW  3.
*   COL24,33-PUNCH       ROW  4.
*   COL12,13,29,34-PUNCH             ROW  5.
*   COL2,7-PUNCH      ROW  6.   COL6-PUNCH    ROW  7.
*   COL9-PUNCH    ROW  8.   COL11,21,22,26-PUNCH            ROW  9.
*


*CARD2  AND  CARD  3  BLANK
*


*CARD4
*    COL2,80-PUNCH       ROW  12.COL4,80-PUNCH         ROW  11.
*    COL1,6,80-PUNCH        ROW  0.COL24,80-PUNCH        ROW  1.
*    COL22,80-PUNCH        ROW  2.COL20,80-PUNCH         ROW  3.
*    COL18,80-PUNCH        ROW  4.COL16,80-PUNCH         ROW  5.
*    COL14,80-PUNCH        ROW  6.COL12,80-PUNCH         ROW  7.
*    COL8,80-PUNCH       ROW  9.COL10,80-PUNCH         ROW  8.                    B
*  CARD  5  SAME  AS  CARD  4  EXCEPT   LEAVE   COL  80   BLANK.
*


*CARD  6.
*  MULTIPUNCH   ROWS  1,2,6,9       IN  COLS  BELOW.
*  COL1,6,11,16,21,26,31,36,41,46,51,566,61,66,71,76.
*  MULTIPUNCH   ROWS  11,2,3,5,7          IN  COLS  BELOW.
*  COL2,7,12,17,22,27,32,37,42,47,52,577,62,67,72,77.
*  MULTIPUNCH   ROWS  11,0,1,4,8,9          IN  COLS  BELOW.
*  COL3,8,13,18,23,28,33,38,43,48,53,588,63,68,73,78.
*  MULTIPUNCH   ROWS  12,0,3,4,5,6,8             IN  COLS  BELOW.
*  COL4,9,14,19,24,29,34,39,44,49,54,599,64,69,74,79.
*  MULTIPUNCH   ROWS  12,11,1,2,3,4,6,7,8,9                IN  COLS  BELOW.
*  COL5,10,15,20,25,30,35,40,45,50,55,660,65,70,75,80.
*    COL10,80-PUNCH        ROW  8.COL8,80-PUNCH        ROW  9.
*


*CARD  7.
*    COL1-MULTIPUNCH     ROWS2,3;COL2-MULTIPUNCH        ROWS1,2;
*    COL3-MULTIPUNCH     ROWS1,3;COL4-MULTIPUNCH        ROWS5,6;
*    COL5-MULTIPUNCH     ROWS5,7;COL6-MULTIPUNCH        ROWS4,5;
*    COL7-MULTIPUNCH     ROWS4,6;COL8-MULTIPUNCH        ROWS4,7;                   B
*    COL9-MULTIPUNCH     ROWS3,4;COL10-MULTIPUNCH        ROWS3,5;
*    COL11-MULTIPUNCH      ROWS3,6;COL12-MULTIPUNCH        ROWS3,7;
*    COL13-MULTIPUNCH      ROWS2,4;COL14-MULTIPUNCH        ROWS2,5;
*    COL15-MULTIPUNCH      ROWS2,6;COL16-MULTIPUNCH        ROWS2,7;
*    COL17-MULTIPUNCH      ROWS1,4;COL18-MULTIPUNCH        ROWS1,5;
*    COL19-MULTIPUNCH      ROWS1,6;COL20-MULTIPUNCH        ROWS1,7;
*    COL21-MULTIPUNCH      ROW6,7;
*


*CARD  8
*    COL1-PUNCH    1.COL2-PUNCH     2.COL3-PUNCH     3.COL4-PUNCH     4.
*    COL5-PUNCH    5.COL6-PUNCH     6.COL7-PUNCH     7.COL8-PUNCH     8.
*    COL9-PUNCH    9.COL10-PUNCH     0.COL11-PUNCH      11.COL12-PUNCH      12
```

RP96MTR RECORDER-PUNCH (80/96 COL.) 9119-1, 9419-2/6, AND 9418-2 CARD PERIPHERALS B 311 I/O CONTROL

```
 PROGRAM-ID   RP96MTR.
 START.
*   THIS  MTR APPLIES   TO THE B 0311   READER-PUNCH   CONTROL
*   (FOR  DDC 80/96-COL.      CARD EQUIPMENT).
*   THE FOLLOWING  CARD PERIPHERALS   ARE TESTED.
*     STYLE        FUNCTION                                  # COLS.
*     9119-1       READ                                      96
*     9419-2       KEYPUNCH/READ/PUNCH/PRINT                 96
*     9419-6       KEYPUNCH/READ/PUNCH/PRINT/SORT            96
*     9418-2       KEYPUNCH/READ/PUNCH/PRINT                 80
*
*
*****READER-PUNCH      MTR SET  UP  INSTRUCTIONS
*
*  THIS  MTR ASSUMES  THAT ALL  OFF  LINE  TESTS  FOR  THE
*  READER-PUNCH   HAVE PASSED.
*
*
****LOAD    PRIMARY  HOPPER  WITH  READ DECK  #  1448    7961
****LOAD    SECONDARY  HOPPER  WITH  10  BLANK  CARDS
****REMOVE     ALL  CARDS  FROM  OUTPUT  STACKERS
****PLACE     READER  PUNCH  ON  LINE  SWITCH  TO  OFF  AND
****PRESS     RESET  BUTTON  AND  START  BUTTON.   PLACE
****ON    LINE  SWITCH  TO  ON  LINE  AND  PRESS   START   BUTTON.
*********NOTE-        FOR  READER  ONLY  (9119-1)        PLACE  READ  TEST
*********DECK        IN  INPUT  HOPPER  AND  PRESS   START   BUTTON
*********INSTEAD        OF  THE  ABOVE  SET  UP  STEPS
****PLACE     MTR/MEM  SWITCH   IN  MTR  POSITION
****PLACE     IRQ/EXT   SWITCH   IN  CENTER   POSITION
****PUT    LOAD  SWITCH  IN  LOAD  POSITION
****PRESS     SYSTEM  CLEAR
****LOAD    MTR  PROGRAM  1448    7003
****PUT    LOAD  SWITCH  IN  NORMAL  POSITION
****PRESS     SYSTEM  CLEAR
*********ERRORS        NOTED  ON  INITIAL    SET-UP
*********ERROR       #  E  70
****NOTE**************************************************
*IN  A  FEW  ERROR  CONDITIONS   THE  PROGRAM  WILL  BE          *
*LOOPING   AND  THE  INCREMENTER   INDICATORS   WILL  APPEAR     *
*AS  A  FALSE  ERROR  ADDRESS.     TO  PREVENT   THIS  PROBLEM,  *
*WHENEVER  THE  INCREMENTER   APPEARS   TO  HAVE  STOPPED   ON   *
*AN  ERROR,   THE  OPERATOR   SHOULD  PUT  THE  SGL/NOR   SWITCH*
*TO  SGL  AND  PRESS   AND  RELEASE   SGL  PUSHBUTTON   UNTIL    *
*EITHER   IT  IS  DETERMINED   THAT  THE  INCREMENTER   VALUE    *
*IS   NOT  CHANGING,   OR  THE  HIGHEST   INCREMENTER   VALUE  IS*
*OBTAINED   FROM  THE  LOOP.     RETURN  SGL/NOR   SWITCH  TO    *
*NOR.                                                           *
*****************************************************
*   PROG      MACHINE
*   STEP      INDICATION          OPERATOR  ACTION
*
*       1     INCR  =  0016       VERIFY  THAT  THE  CORRECT  SYSTEM
*                                 CONFIGURATION   IS  DISPLAYED
*                                 IN  MIR
*                                 CON  -  PRESS  READY
*                                 SPO  -  PRESS  INPUT  REQUEST
*
*       2     INCR  =  0008       VERIFY  THAT  THE  CORRECT
*                                 CONTROLLER  ADDRESS  IS
*                                 DISPLAYED   IN  MIR  BITS  5,6,7,8
*             CON  -  PK'S  ON
*             SPO  -  RDY  ON
*                                 CON  -  PRESS  PK  FOR  PORT  NUMBER
*                                 SPO  -  PRESS  2  NUMERIC  KEYS  FOR
*                                 PORT  NUMBER
*       3     INCR  =  0009
*             CON  -  NUM.  ON
*             SPO  -  RDY  ON
*                                 PRESS  2  NUMERIC  KEYS  TO  SELECT
*                                 A  TEST  (SEE  REQUIRED  TEST
*                                 TABLE  BELOW)
********NOTE       (SEE  INCR  VALUES  FOR  MORE  INFORMATION  ABOU
*                  ABOVE  PROGRAM  STEPS)
***REQUIRED     TESTS  TABLE
*  DEVICE         REQUIRED  TESTS
*
*  9119-1          6,   13
*  9419-2          4,   11,   12
*  9419-6          5,   11,   12
*  9418-2          7,   11,   12
*  NOTE-RUN   TEST  4,5,6,OR      7  FIRST
*  NOTE-SEE   INCR  07CD(END    OF  KEYBOARD  TEST)   FOR
*  TESTS  11,   12,   AND  13   INFORMATION
*  NOTE-EACH   TEST      4,   5,   AND  7  INCLUDE   A  READER  TEST,
*     A  PUNCH-PRINT    TEST,    AND  A  KEYBOARD  TEST.     THE  FE
*     CAN  RUN  EACH  TEST  SEPARATELY   BY  RUNNING  TEST
*     08(READER),       09(PUNCH-PRINT,       OR  10(KEYBOARD).        RUN
*     TEST  08,   09,    AND  10   WHEN  WORKING  ON  SPECIFIC
*     PROBLEMS.      RUN  TEST  4,   5,   OR  7  FOR  DIAGNOSIS.
*     SEE  INCR  0009+    FOR  INFORMATION   ABOUT  EACH  TEST
*  CONTROLLER
 STARTCONTROLLER.            START  FROM  SYSTEM  CLEAR
```

PROGRAM LISTING

```
0000   814E          CPCR  =  BUSSTEST   -  1.      TEST  EXTERNAL  BUSS
                  *********ERROR       #  E1    IF  BUSS  TEST  FAILS  HERE
                  *********PRESS        FORCE  STEP  TO  DISPLAY   ERROR  BITS   IN  MIR
                  *
                        TESTNUMBERLIMIT     VALUE  IS  13.
                  *
0001   F18E          IF  IRQ  SKIP.           TEST  FOR  ERROR  IRQ
0002   400D          MPCR  =  IRQOFF   -  1.
0003   F108          ASR  BEX.
0004   F0E1          MIR  =  B.
0005   F000          WAIT.       UNEXPECTED   IRQ,   ADDRESS   IN  MIR
                  *
                  ********ERROR       #  E2
0006   4480          MPCR  =  IRQ-E4-E5-E6       -  1.
                  *  ABOVE  MPCR  IS  USED  ONLY  TO  CHECK  IF  THIS  MTR  STOPS
                  *  AT  ERROR  #  E4,E5,OR     E6  AFTER  UNEXPECTED  IRQ  ABOVE
                  *
                   SELECTPORT.
                  *
                  *
0007   F0DE          MIR  =  A3.       CONTROLLER  ADDRESS  (ASR  AFTER  IRQ)
0008   F0FC          WHEN  SRQ  STEP.        ENTER  PORT  NUMBER
                  *    CONTROLLER  ADDRESS  IS  DISPLAYED   IN  MIR
                  *    IF  CONTROLLER  ADDRESS  IS  NOT  CORRECT,   RUN  SPO  OR
                  *                                          CONSOLE  MTR
                  *    IF  CONTROLLER  ADDRESS  IS  CORRECT,   ENTER  PORT  NUMBER
                  *              THAT  IS  BEING  USED  BY  THE  READER  PUNCH
                  *        FOR  CONSOLE  SYSTEMS
                  *           PRESS  PK  UNDER  LIGHTED   A  AND  B  INDICATORS
                  *           (LEFT    TO  RIGHT)   FOR  PORTS   1  THROUGH  12
                  *        FOR  SPO  SYSTEMS
                  *           PRESS  2  NUMERIC  KEYS  FOR  PORTS  01   THROUGH  12
                  *           'PORT'    IS  PRINTED   ON  SPO
                  *
                  *    NOTE-IF    AN  INVALID   PORT  NUMBER  IS  ENTERED,    THE  MTR
                  *          SOUNDS  THE  ALARM  AND  RETURNS   FOR  ANOTHER  PORT
                  *          NUMBER
```

```
                SELECTTEST.
0009    F0FC        WHEN SRQ STEP.
                *   PRESS 2 NUMERIC KEYS TO SELECT TEST
                *     FOR CONSOLE SYSTEMS
                *       PRESS KEYS ON NUMERIC KEYBOARD
                *     FOR SPO SYSTEMS
                *       'TEST' IS PRINTED
                *       PRESS NUMERIC KEYS
                *
                *   TEST INCLUDED IN THIS MTR ARE:
                *   TEST
                *   NUMBER
                *    01  - SET 80-COLUMN FLAG AND RETURN TO SELECTTEST
                *    02  - SET 96-COLUMN FLAG AND RETURN TO SELECTTEST
                *    03  - NOT USED
                *    04  - TEST 9419-2  6-BIT READER PUNCH
                *    05  - TEST 9419-6  6-BIT READER PUNCH
                *    06  - TEST 9119-1  6-BIT READER
                *    07  - TEST 9418-2  READER PUNCH
                *    08  - READER TEST  TEST READER AND RETURN TO
                *          SELECTTEST.  ENTER TEST 01 OR 02 FIRST TO
                *          SET THE 80 OR 96 COLUMN FLAG.
                *          LOAD PRIMARY HOPPER WITH READER TEST DECK
                *          LOAD SECONDARY HOPPER WITH SOME BLANK CARDS
                *               (PREVENTS A NOT READY STATUS)
                *    09  - PUNCH-PRINT TEST  TEST PUNCH AND RETURN
                *          TO SELECTTEST.  ENTER TEST 01 OR 02 FIRST TO
                *          SET THE 80 OR 96 COLUMN FLAG.
                *          LOAD SECONDARY HOPPER WITH 10 BLANK CARDS.
                *          TEST 09 WILL LEAVE LAST CARD AT WAIT STATION.
                *    10  - KEYBOARD TEST  TEST KEYBOARD AND RETURN TO
                *          SELECTTEST.  ENTER TEST 01 OR 02 FIRST TO SET
                *          THE 80 OR 96 COLUMN FLAG.
                *          LOAD HOPPER WITH SOME CARDS SO THAT READER-
                *          PUNCH CAN BE MADE READY
                *    11  - OVERFLOW AND READ-CHECK TEST FOR 9419-2,
                *          9419-6,  9418-2.  ENTER TEST 01 OR 02 FIRST
                *          TO SET THE 80 OR 96 COLUMN FLAG
                *    12  - PUNCH-CHECK TEST AND PUNCH EXERCISER.  ENTER
                *          TEST 01 OR 02 FIRST TO SET THE 80 OR 96
                *          COLUMN FLAG
                *    13  - SAME AS TEST 11 EXECPT FOR 9119-1
                *          (NOTE-GOOD STATUS IS DIFFERENT FOR READER
                *           ONLY DEVICE)
                *   NOTE - SEE INCR 07CD+(END OF KEYBOARD TEST) FOR
                *   EXPLANATION OF TESTS 11, 12, AND 13.
                *   NOTE - MAKE READER PUNCH READY FOR ALL TESTS
                *          REMOVE CARDS FROM OUTPUT STACKERS
                *          LOAD HOPPERS WITH CARDS
                *          ON LINE SWITCH TO OFF
                *          PRESS RESET BUTTON
                *          PRESS START BUTTON
                *          ON LINE SWITCH TO ON
                *          PRESS START BUTTON
                *
000A    F097        DR2 BEX.
000B    F086        B = LIT AND B.  STRIP UPPER DIGIT
000C    E00F        LIT = @0F@.
000D    F0C9        JUMP.
                *
                *
                IRQOFF.
000E    F17D        DLD.  READ CONFIGURATION CARD
000F    F0F9        WHEN RDC BEX.
0010    F0E1        MIR = B.  SYSTEM CONFIGURATION IN MIR
0011    F017        A1 = B.
0012    F0F9        WHEN RDC BEX.
0013    F0FF        0 EQV B.
0014    F09D        IF ABT SKIP.
0015    F000        WAIT.  CONFIG FF NOT RESET BY BEX-
                ********** FAILURE IS CON1 CHIP D7

0016    F0F8        WHEN IRQ STEP.
                *   VERIFY CORRECT SYSTEM CONFIGURATION DISPLAYED IN MIR
                *   IF YES,  PUSH READY BUTTON ON CONSOLE OR
                *            INPUT REQUEST ON SPO.  IF PROGRAM HANGS HERE
                *            (NO RESPONSE TO INPUT REQUEST OR READY
                *            BUTTON) RUN SPO OR CONSOLE MTR
                *   IF NO,  PRESS FST
                *
                *   METER CON1 PIN 2K
                *    IF 0% REPLACE CHIPS D5,D3,C7,D7  ON CON1 CARD
                *    IF NOT 0% REPLACE CHIPS D5,A5,A7,F5,F7  ON CON1 CARD
                *
0017    F18E        IF IRQ SKIP.
0018    407A        MPCR = CON1LOOP - 1.
                *
0019    814E        CPCR = BUSSTEST - 1.  FIRST BUSS TEST WITH IRQ ON
                *   IF BUSS TEST FAILS HERE,  FAILURE IS CONTROLLER PORT
                *   SELECT CARD B7
                *
001A    F108        ASR BEX.
001B    F051        A3 = B.  SAVE CONTROLLER ADDRESS
001C    F07A        B = BITT.  SET STATUS WORD DATA REQUEST BIT
001D    C820        SAR = 8 LIT = @20@.
001E    F07F        B = B R.
001F    F036        A2 = B L.  CLEAR BITS 9-16
0020    F066        B = A1.  SYSTEM CONFIGURATION FOR SPO-CONSOLE CHECK
0021    F0C3        IF NOT LST SKIP.  SPO-CONSOLE CHECK
0022    E000        LIT = 0.  SPO ON SYSTEM
0023    F1CC        MIR = A2 OR LIT.
                *   FOR SPO CONTPORTADDRESS  = 1000XXXX00000000
                *   FOR CONSOLE CONTPORTADDRESS  = 1000XXXX00100000
0024    F0CF        MAR1 = AMPCR.
0025    014E        AMPCR = CONTPORTADDRESS.
0026    F0F3        MW1.  STORE CONTROLLER PORT ADDRESS
0027    8101        CPCR = CLEARFLAGS - 1.  CLEAR ALL FLAGS
0028    8118        CPCR = SETCONTADDRS - 1.
0029    8197        CPCR = INITMAINSTACK - 1.  SET MAIN STACK ADDRESS
002A    819F        CPCR = INITFLOSTACK - 1.  SET FLOW STACK ADDRESS
002B    0031        AMPCR = CONSPORTSELECT - 1.
                **

002C    F0DE        MIR = A3.
002D    F066        B = A1.  SYSTEM CONFIGURATION FOR SPO-CONSOLE CHECK
                *   REMOVE WHEN SYS CONF.  CARD INSTALLED
                **
002E    F0C2        IF NOT LST JUMP.
002F    C001        SAR = 0 LIT = 1.
                *   SET FLAG 0 IN FLAG WORD 1 TO 1 FOR SPO,  0 FOR CONSOLE
0030    81C9        CPCR = SETFLAGW1 - 1.
0031    407F        MPCR = SPOPORTSELECTP - 1.
                *
                CONSPORTSELECT.
                *   CONSOLE ON SYSTEM
                *   PORT SELECT.  OPERATOR ENTERS PK 1-12 TO INDICATE-
                *   THE PORT NUMBER OF THE DEVICE TO BE TESTED
                *
0032    8118        CPCR = SETCONTADDRS - 1.
0033    F1D5        MIR = B001 + 1.  ENABLE KEYBOARD.
0034    F099        DW1.
0035    8126        CPCR = LITEINDA - 1.
0036    E0FF        LIT = @FF@.  LIGHT PK 1-8
0037    812C        CPCR = LITEINDB - 1.
0038    E00F        LIT = @0F@.  LIGHT PK 9-12
                *   GET PORT NUMBER (PK KEY 1-12)
0039    8006        CPCR = SELECTPORT - 1.
003A    F017        A1 = B.  SAVE PORT ADDRESS
003B    8126        CPCR = LITEINDA - 1.
003C    E000        LIT = 0.  TURN OFF PK 1-8
003D    812C        CPCR = LITEINDB - 1.
003E    E000        LIT = 0.  TURN OFF PK 9-11
003F    F066        B = A1.  PORT ADDRESS TO B FOR SAVEPORT
```

```
                STOREPORT.              FROM SPO  PORT  SELECT
0040  813A          CPCR  = CSAVEPORT  - 1.     SAVE  PORT  ADDRESS
0041  CF01          SAR  = 15  LIT  = 1.        SET  FLAG  15  TO  INDICATE-
0042  81C9          CPCR  = SETFLAGW1  - 1.     PORT  HAS  BEEN  SELECTED
                * PRINT  TEST  SELECT  MESSAGE  FOR  FIRST  ENTRY  TO  SPO-
                * TEST  SELECT
0043  C001          SAR  = 0  LIT  = 1.
0044  81EC          CPCR  = TESTFLAGW1  - 1.  TEST  SPO-CONSOLE  FLAG
0045  409A          MPCR  = SPOTESTSELECTP  - 1.  TRUE  RETURN  SPO
                *
                 TESTSELECTCLEAR.           PROGRAM  JUMPS  HERE  TO  CLEAR-
                * MEMORY  FLAG  WORDS  2,3,AND  4  BEFORE  ALLOWING  THE-
                * OPERATOR  TO  SELECT  A  TEST.  MEMORY  FLAG  WORD  1  AND-
                * THE  PORT  ADDRESS  ARE  NOT  CHANGED.
0046  810A          CPCR  = CLEARFW2-3-4  - 1.
                 TESTSELECT.                PROGRAM  JUMPS  HERE  TO  ALLOW  THE-
                *                  OPERATOR  TO  SELECT  A  TEST.  THE  MEMORY-
                *                  FLAG  WORDS  2,3,4  ARE  NOT  CHANGED
                * CLEAR  ERROR  FLAG,  IF  ON  IT  REFERS  TO  LAST  TEST
0047  C100          SAR  = 1  LIT  = 0.
0048  81C9          CPCR  = SETFLAGW1  - 1.
0049  8118          CPCR  = SETCONTADDRS  - 1.
004A  F096          DR1  BEX.          RESET  STATUS  INTERRUPT
004B  807D          CPCR  = TESTSPO-CONSOLE  - 1.
004C  409C          MPCR  = SPOTESTSELECT  - 1.  SPO  ON  SYSTEM
                *
                * CONSOLE  ON  SYSTEM
                *
004D  812C          CPCR  = LITEINDB  - 1.
004E  E000          LIT  = 0.                  CLEAR  B  INDICATORS
004F  F1D5          MIR  = B001  + 1.      ENABLE  KEYBOARD
0050  F099          DW1.
                *
0051  812E          CPCR  = LITEINDS  - 1.
0052  E008          LIT  = 8.                  LIGHT  NUMERIC  INDICATOR
                *
                *
                * GET  FIRST  DIGIT  OF  TEST  NUMBER  (10  S  DIGIT)
0053  8008          CPCR  = SELECTTEST  - 1.
0054  F051          A3  = B.          SAVE  (10  S  DIGIT)
                *
                * GET  SECOND  DIGIT  OF  TEST  NUMBER  (1  S  DIGIT)
0055  8008          CPCR  = SELECTTEST  - 1.
                *
0056  812E          CPCR  = LITEINDS  - 1.
0057  E000          LIT  = 0.                  TURN  OFF  NUMERIC  INDICATOR
                * IF  STATUS  INT.  GO  TO  MEMORY-MODIFY  FOR  ANY  TEST  #
0058  F1AE          IF  NOT  URQ  SKIP.          CONSOLE  URQ  TEST
0059  4286          MPCR  = MEMORY-MODIFY  - 1.
                *
                 TENSLOOPCHECK.
                * TEST  TENS  DIGIT  FOR  0  THRU  9
005A  E00A          LIT  = 10.
005B  F032          A2  = A3.
005C  F11B          A2  - LIT.
005D  F0B7          IF  NOT  AOV  SKIP.
005E  40AF          MPCR  = INVALIDTEST  - 1.
                * TEST  ONES  DIGIT  FOR  0  THRU  9
005F  F033          A2  = B.
0060  F11B          A2  - LIT.
0061  F0B7          IF  NOT  AOV  SKIP.
0062  40AF          MPCR  = INVALIDTEST  - 1.
                *
                 TENSLOOP.
0063  F04B          A3  = A3  - 1.
0064  E00A          LIT  = 10.
0065  F09E          IF  AOV  SKIP.
0066  4068          MPCR  = ENDTENSLOOP  - 1.
0067  F083          B  = LIT  + B.
0068  4062          MPCR  = TENSLOOP  - 1.
                *
                 ENDTENSLOOP.
0069  F017          A1  = B.                  SAVE  TEST  NUMBER
                * INSURE  THAT  TEST  NUMBER  IS  NOT  GREATER  THAN  THE  UPPER
                * LIMIT  FOR  THIS  MTR  (SEE  DEFINE  TESTNUMBERLIMIT)
006A  E00D          LIT  = TESTNUMBERLIMIT.
006B  F109          A1  - LIT  - 1.
006C  F0B7          IF  NOT  AOV  SKIP.
006D  40AF          MPCR  = INVALIDTEST  - 1.          ILLEGAL  TEST  NUMBER
                *
                * DISPLAY  TEST  NUMBER  IN  A  INDICATORS
006E  F082          B  = LIT  L.
006F  C890          SAR  = 8  LIT  = @90@.
0070  F0DC          MIR  = A1  + B.
0071  F098          DW2.
                * DISABLE  SYSTEM  CONTROLLER  (SPO  OR  CONSOLE)
0072  F0E6          MIR  = 0.
0073  F099          DW1.
                * INSURE  THAT  BOTH  STATUS  AND  DATA  INTERRUPTS  FROM  SPO-
                * OR  CONSOLE  ARE  CLEARED  BEFORE  JUMPING  TO  MTR
0074  F096          DR1  BEX.          RESET  STATUS  INTERRUPT
0075  F097          DR2  BEX.          RESET  DATA  INTERRUPT
                *
0076  8130          CPCR  = SETPORTADDR  - 1.  BR1  = INST.  BR2  = DATA
0077  040A          AMPCR  = TESTTABLE  - 1.
0078  F100          AMPCR  = A1  + AMPCR.
0079  F05F          B.
007A  F0C9          JUMP.
                / SUBROUTINES
                * LOOP  USED  TO  METER  PIN  2K  (TP  92)  ON  CON1  CARD
                 CON1LOOP.
007B  F17D          DLD.
007C  F0F9          WHEN  RDC  BEX.
007D  407A          MPCR  = CON1LOOP  - 1.
                *
                 TESTSPO-CONSOLE.
007E  C001          SAR  = 0  LIT  = 1.  SPO-CONSOLE  FLAG  (1  = SPO)
007F  41EC          MPCR  = TESTFLAGW1  - 1.
                *
                *
                 SPOPORTSELECTP.
                * ENTER  HERE  TO  PRINT  SELECT  PORT  MESSAGE
0080  80DB          CPCR  = SPOPRINT  - 1.
0081  01C2          AMPCR  = PORTPRINT.
                 SPOPORTSELECT.
                * ENTER  HERE  TO  AVOID  PRINTING
0082  8118          CPCR  = SETCONTADDRS  - 1.
0083  F0E7          MIR  = B001.
0084  F099          DW1.          ENABLE  SPO  INPUT
                * SELECT  PORT  #  PER  NUMERIC  KEYS  (01  THRU  12)
0085  8006          CPCR  = SELECTPORT  - 1.          FOR  TENS  DIGIT
0086  F017          A1  = B.                          SAVE  TENS  DIGIT
0087  8006          CPCR  = SELECTPORT  - 1.          FOR  ONES  DIGIT
                *          ONES  DIGIT  IS  IN  B
                * OPERATOR  ENTERS  PORT  NUMBER  (1  THROUGH  12)
0088  F0E6          MIR  = 0.
0089  F099          DW1.          DISABLE  SPO  INPUT
                * TEST  TENS  DIGIT  FOR  0  OR  1
008A  E001          LIT  = 1.
008B  F109          A1  - LIT  - 1.
008C  F0B7          IF  NOT  AOV  SKIP.
008D  4148          MPCR  = INVALIDPORT  - 1.          TENS  DIGIT  > 1
                * TEST  ONES  DIGIT  FOR  0  THRU  9
008E  E00A          LIT  = 10.
008F  F033          A2  = B.                          ONES  DIGIT  IN  A2
0090  F11B          A2  - LIT.
0091  F0B7          IF  NOT  AOV  SKIP.
0092  4148          MPCR  = INVALIDPORT  - 1.          ONES  DIGIT  > 9
                *
0093  E00A          LIT  = 10.
0094  F066          B  = A1.
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0095  F0C3          IF  NOT  LST  SKIP.
0096  F029          A2  = A2  + LIT.
0097  F068          B  = A2.                    PORT  ADDRESS  IN  B
                  * SUBSTRACT  1  FROM  PORT  NUMBER  TO  GET  PORT  ADDRESS
0098  F162          B  = 0  -  B.
0099  F163          B  = 0  -  B  -  1.
009A  803F          CPCR  =  STOREPORT  -  1.
                  *
                    SPOTESTSELECTP.
009B  80DB          CPCR  =  SPOPRINT  -  1.      PRINT  SELECT  TEST  MESSAGE
009C  01C6          AMPCR  =  TESTPRINT.          ADDRESS  OF  MESSAGE
                  *
                    SPOTESTSELECT.
                  *  ENTRY  POINT  FOR  NO  PRINTING
009D  8118          CPCR  =  SETCONTADDRS  -  1.
009E  F0E7          MIR  =  B001.
009F  F099          DW1.              ENABLE  SPO  INPUT
                  *  SELECT  TEST  #  PER  NUMERIC  KEYS  (00  THRU  99)
00A0  8008          CPCR  =  SELECTTEST  -  1.          FOR  TENS  DIGIT
00A1  F051          A3  =  B.                           SAVE  TENS  DIGIT
00A2  8008          CPCR  =  SELECTTEST  -  1.          FOR  ONES  DIGIT
                  *        ONES  DIGIT  IN  B
00A3  F0E6          MIR  =  0.
00A4  F099          DW1.              DISABLE  SPO  INPUT
00A5  F033          A2  =  B.         SAVE  ONES  DIGIT
                  *  IF  STINT  GO  TO  SPO  MEMORY  MODIFY
00A6  F1B5          IF  URQ  SKIP.
00A7  40A9          MPCR  =  CSPACEP  -  1.
                  *
00A8  F096          DR1  BEX.         RESET  STINT
00A9  4387          MPCR  =  SPO-MEM-MOD  -  1.
                  *
                    CSPACEP.
00AA  80DB          CPCR  =  SPOPRINT  -  1.      SPACE  AFTER  TESTNUMBER
00AB  00AF          AMPCR  =  SPACEPRINT.         ADDRESS  OF  PRINT  MESSAGE
00AC  8118          CPCR  =  SETCONTADDRS  -  1.
00AD  F068          B  =  A2.         ONES  DIGIT  TO  B.
00AE  4059          MPCR  =  TENSLOOPCHECK  -  1.
                  *
                    SPACEPRINT.
00AF  2080          CNST  =  @2080@.          -  STOP
                  *
                    INVALIDTEST.
00B0  80B8          CPCR  =  ALARM,  -  1.          SOUND  BELL
00B1  4046          MPCR  =  TESTSELECT  -  1.
                  *
                  /
                    INDICATE-ERROR.
                  *  SPO  SYSTEMS-  SOUND  ALARM
                  *  CONSOLE  SYSTEMS-  SOUND  ALARM  AND  TURN  ERROR  LIGHT  ON
                  *
00B2  F0DA          MIR  =  AMPCR.
00B3  F05F          B.
00B4  8156          CPCR  =  STACK  -  1.  SAVE  AMPCR,  A1,  A2,  A3
                  *  SET  FLAG  1  IN  FLAG  WORD  1  TO  1  TO  INDICATE  ERROR
00B5  C101          SAR  =  1  LIT  =  1.
00B6  81C9          CPCR  =  SETFLAGW1  -  1.
00B7  80B8          CPCR  =  ALARM  -  1.         SOUND  ALARM
00B8  4175          MPCR  =  UNSTACKRESTOREA  -  1.  RETURN  TO  MTR
                  *
                    ALARM.
                  *
00B9  F0DA          MIR  =  AMPCR.
00BA  F05F          B.
00BB  8156          CPCR  =  STACK  -  1.
00BC  8118          CPCR  =  SETCONTADDRS  -  1.
00BD  807D          CPCR  =  TESTSPO-CONSOLE  -  1.
00BE  40CF          MPCR  =  SPOALARM  -  1.      SPO  ON  SYSTEM
                  *  CONSOLE  ON  SYSTEM
00BF  E008          LIT  =  @08@.
00C0  F0EA          MIR  =  LIT.
00C1  F099          DW1.
00C2  C207          SAR  =  2  LIT  =  7.
00C3  F089          B  =  LIT.
00C4  F0E2          MIR  =  B  C.     ALARM  DATA  WORD  FOR  CONSOLE
00C5  F0FC          WHEN  SRQ  STEP.
00C6  F098          DW2.
00C7  F05F          B.
00C8  F0FC          WHEN  SRQ  STEP.
                  *  TURN  ERROR  LIGHT  ON,  IF  ERROR  FLAG  IS  ON
00C9  C100          SAR  =  1  LIT  =  0.
00CA  81EC          CPCR  =  TESTFLAGW1  -  1.
00CB  40D7          MPCR  =  CALARM  -  1.        ERROR  FLAG  IS  OFF
                  *  ERROR  FLAG  IS  ON
00CC  812E          CPCR  =  LITEINDS  -  1.
00CD  E004          LIT  =  @04@.             ERROR  LIGHT
00CE  40D7          MPCR  =  CALARM  -  1.
                  *
00CF  40D7          MPCR  =  CALARM  -  1.
                  *
                    SPOALARM.     SPO  ON  SYSTEM
00D0  F1D5          MIR  =  B001  +  1.       ENABLE  OUTPUT
00D1  F099          DW1.
00D2  F0EA          MIR  =  LIT.
00D3  E007          LIT  =  @07@.     RING  BELL
00D4  F0FC          WHEN  SRQ  STEP.
00D5  F098          DW2.
00D6  F05F          B.
00D7  F0FC          WHEN  SRQ  STEP.
                  *
                    CALARM.
00D8  F0E6          MIR  =  0.        DISABLE  SPO  OR  CONSOLE
00D9  F099          DW1.
00DA  8130          CPCR  =  SETPORTADDR  -  1.  BR1  =  INST.  BR2  =  DATA
00DB  4175          MPCR  =  UNSTACKRESTOREA  -  1.  RETURN
                  *
                  *
                  *
                    SPOPRINT.
                  *  SPO  PRINT  FROM  MEMORY
                  *
00DC  F0DA          MIR  =  AMPCR.
00DD  F05F          B.
00DE  8156          CPCR  =  STACK  -  1.         STACK  AMPCR  AND  A  REGISTERS
00DF  8118          CPCR  =  SETCONTADDRS  -  1.      SELECT  SPO
00E0  81B7          CPCR  =  RDSTACKAMPCRTOB  -  1.
00E1  F05B          AMPCR  =  B.      RETURN  AMPCR  FOR  EXEC
00E2  F05F          B.
00E3  F09A          EXEC.     ADDRESS  OF  MESSAGE  TO  AMPCR
00E4  F0EA          MIR  =  LIT.
00E5  C802          SAR  =  8  LIT  =  @02@.
00E6  F099          DW1.                      ENABLE  SPO  PRINTER
                    SPOREADY.
00E7  F096          DR1  BEX.             READ  SPO  STATUS
00E8  F05F          B.
00E9  F0C3          IF  NOT  LST  SKIP.   CHECK  FOR  READY
00EA  40E6          MPCR  =  SPOREADY  -  1.
                  *
00EB  F0CF          MAR1  =  AMPCR.       BR1  =  ADDRESS  OF  MESSAGE
                    SPOFETCH.
00EC  F0F1          MR1.
00ED  F0FA          WHEN  RDC  BEX  MAR1  =  BMAR  +  1.
00EE  F07D          B  =  B  C.
00EF  F0C4          IF  NOT  MST  SKIP.           MST  =  STOP  CODE
00F0  40FA          MPCR  =  SPOSTOP  -  1.       END  PRINT
00F1  F0FC          WHEN  SRQ  STEP.      WAIT  FOR  PRINTER  INTERRUPT
00F2  F0E1          MIR  =  B.
00F3  F098          DW2.                  WRITE  FIRST  CHARACTER
00F4  F07D          B  =  B  C.
00F5  F0C4          IF  NOT  MST  SKIP.           MST  =  STOP  CODE
00F6  40FA          MPCR  =  SPOSTOP  -  1.       END  PRINT
00F7  F0E1          MIR  =  B.
00F8  F0FC          WHEN  SRQ  STEP.      WAIT  FOR  PRINTER  INTERRUPT
00F9  F098          DW2.                  WRITE  SECOND  CHARACTER
00FA  40EB          MPCR  =  SPOFETCH  -  1.
```

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                *
                SPOSTOP.
00FB  F0FC          WHEN SRQ STEP.          WAIT FOR LAST CHARACTER TO PRINT
00FC  81D6          CPCR = RSTBR1 - 1.      RESTORE BR1
00FD  F096          DR1 BEX.                RESET STINT
00FE  F0E6          MIR = B000.
00FF  F099          DW1.                    DISABLE SPO OUTPUT
0100  8130          CPCR = SETPORTADDR - 1. RESTORE DEVICE PORT ADDRS
0101  4175          MPCR = UNSTACKRESTOREA - 1. RETURN
                *
                CLEARFLAGS.
0102  F023          A2 = AMPCR.             SAVE RETURN
0103  F0E6          MIR = 0.
0104  F0CF          MAR1 = AMPCR.
0105  014D          AMPCR = PORTADDRESS.
0106  F0F3          MW1.                    CLEAR PORT ADDRESS
0107  F0CF          MAR1 = AMPCR.
0108  0208          AMPCR = MEMFLAGW1.
0109  F0F3          MW1.                    CLEAR MEMORY FLAG WORD 1
010A  F102          AMPCR = A2.             RESTORE RETURN
                CLEARFW2-3-4.
010B  F023          A2 = AMPCR.             SAVE RETURN
010C  F0E6          MIR = 0.
010D  F0CF          MAR1 = AMPCR.
010E  0209          AMPCR = MEMFLAGW2.
010F  F0F3          MW1.                    CLEAR MEMORY FLAG WORD 2
0110  F0CF          MAR1 = AMPCR.
0111  020A          AMPCR = MEMFLAGW3.
0112  F0F3          MW1.                    CLEAR MEMORY FLAG WORD 3
0113  F0CF          MAR1 = AMPCR.
0114  020B          AMPCR = MEMFLAGW4.
0115  F0F3          MW1.                    CLEAR MEMORY FLAG WORD 4
0116  F102          AMPCR = A2.             RESTORE RETURN
0117  F05F          B.
0118  F0C9          JUMP.
                *
                SETCONTADDRS.
0119  F060          B = AMPCR.          SAVE RETURN
011A  F0CF          MAR1 = AMPCR.
011B  014E          AMPCR = CONTPORTADDRESS.
011C  F05B          AMPCR = B.          RESTORE RETURN
011D  D800          SAR = 8.
011E  F0F1          MR1.
011F  F0F9          WHEN RDC BEX.       CONTROLLER ADDRESS TO B
0120  F07F          B = B R.
0121  F07C          B = B L.        CLEAR ALL BITS EXCEPT 5,6,7,8
0122  F078          B = B0TT.
0123  F16E          BR2 = B.            BR2 = 0000XXXX DATA
0124  F07A          B = B1TT.
0125  F0D5          MAR1 = B.           BR1 = 1000XXXX INSTRUCTION
0126  F0C9          JUMP.
                *
                LITEINDA.               LIGHT A INDICATORS
0127  E06F          LIT = @6F@.
0128  F0CA          LCTR.
0129  F09A          EXEC.               LOAD VARIABLE LIT
012A  F0EF          MIR = Z.
012B  F098          DW2.
012C  F0C9          JUMP.
                LITEINDB.               LIGHT B INDICATORS
012D  E077          LIT = @77@.
012E  4127          MPCR = LITEINDA.
                *
                LITEINDS.                   LIGHT S INDICATORS
012F  E07E          LIT = @7E@.
0130  4127          MPCR = LITEINDA.
                *
                SETPORTADDR.
0131  F060          B = AMPCR.          SAVE RETURN
0132  F0CF          MAR1 = AMPCR.
0133  014D          AMPCR = PORTADDRESS.
0134  F05B          AMPCR = B.          RESTORE RETURN
0135  F0F1          MR1.
0136  F0F9          WHEN RDC BEX.       PORT ADDRESS TO B
0137  F16E          BR2 = B.        BR2 FOR DATA
0138  F07A          B = B1TT.
0139  F0D5          MAR1 = B.       BR1 FOR INSTRUCTION
013A  F0C9          JUMP.
                *
                *
                *
                CSAVEPORT.              SAVE PORT ADDRESS (DATA IN B)
                * TEST PORT ADDRESS FOR PORT 12 OR LESS
013B  E00B          LIT = 11.
013C  F017          A1 = B.
013D  F109          A1 - LIT - 1.
013E  F0B7          IF NOT AOV SKIP.
013F  4148          MPCR = INVALIDPORT - 1.     PORT ADDRESS > 12
                * CLEAR ALL BITS EXCEPT 5,6,7,8
0140  F07C          B = B L.
0141  D400          SAR = 4.
0142  F0E5          MIR = B R.
0143  F060          B = AMPCR.      SAVE RETURN
0144  F0CF          MAR1 = AMPCR.
0145  014D          AMPCR = PORTADDRESS.
0146  F05B          AMPCR = B.      RESTORE RETURN
0147  F0F3          MW1.
0148  F0C9          JUMP.
                *
                INVALIDPORT.
                *
0149  80B8          CPCR = ALARM - 1.       SOUND BELL
                *
014A  807D          CPCR = TESTSPO-CONSOLE  - 1.
014B  4081          MPCR = SPOPORTSELECT    - 1.
014C  4031          MPCR = CONSPORTSELECT   - 1.
                PORTADDRESS.
014D  0000          CNST = @0000@.
                CONTPORTADDRESS.
014E  0000          CNST = @0000@.
                *
                BUSSTEST.               EXTERNAL BUSS TEST
014F  F0F9          WHEN RDC BEX.
0150  F0FF          0 EQV B.
0151  F09C          IF ABT JUMP.
0152  F0DA          MIR = AMPCR.
0153  F000          WAIT.
                *********OBSERVE MIR
                *********GO TO INCREMENTER ADDRESS DISPLAYED IN MIR
0154  F0E1          MIR = B.
0155  F000          WAIT.
0156  7FFF          MPCR = STARTCONTROLLER - 1.
                /
                STACK.
                *UNCONDITIONAL SAVE A1, A2, A3, AMPCR IN MEMORY STACK
                *DISTROYS - B, SAR, LIT, MIR
                *ASSUMES BR1, BR2 DIFFER BY INST BIT ONLY
0157  F082          B = LIT L.                                          C
0158  C401          SAR = 4 LIT = 1.                                    C
0159  F0D5          MAR1 = B.               STACK POINTER 4096          C
                STACKW3.
015A  F0F1          MR1.
015B  F0F9          WHEN RDC BEX.           FETCH POINTER
015C  F083          B = LIT + B.            INCRAMENT POINTER
015D  E004          LIT = 4.
015E  F08C          BMI MIR = B.
015F  F0F3          MW1.                    RESTORE NEW POINTER
0160  F08C          BMI MIR = B.
0161  F0D5          MAR1 = B.               NEW STACK ADDRESS
0162  F0F3          MW1.                    STORE AMPCR TOP OF STACK
0163  F0DB          MIR = A1.
```

```
0164  F089        B = LIT.
0165  E003        LIT = 3.
0166  F01C        A1 = BMAR.
0167  F064        B = A1 - B.
0168  F0D5        MAR1 = B.       OLD TOP OF STACK ADDRESS + 1.
0169  F0F3        MW1.                    SAVE A1
016A  F0D7        MAR1 = BMAR + 1.
016B  F0DD        MIR = A2.
016C  F0F3        MW1.                    SAVE A2
016D  F0D7        MAR1 = BMAR + 1.
016E  F0DE        MIR = A3.
016F  F0F3        MW1.                    SAVE A3
0170  F05F        B.
0171  41D6        MPCR = RSTBR1 - 1.      RESTORE BR1 EXIT
              UNSTACK.
             *RESTORE AMPCR FROM TOP OF MEMORY STACK
             *A REGISTERS REMAIN UNCHANGED
0172  8185        CPCR = STACKR - 1.
0173  F05B        AMPCR = B.              RESTORE AMPCR
0174  F05F        B.
0175  41D6        MPCR = RSTBR1 - 1.      RESTORE BR1 EXIT
              UNSTACKRESTOREA.
             *RESTORE AMPCR AND A REGISTERS FROM TOP OF STACK
0176  8185        CPCR = STACKR - 1.
0177  F05B        AMPCR = B.              RESTORE AMPCR
0178  F08D        BMI. (ADDRESS - 1) OF STORED A1
0179  F0D6        MAR1 = B + 1.
017A  F0F1        MR1.                    FETCH A1
017B  F0F9        WHEN RDC BEX.
017C  F0D7        MAR1 = BMAR + 1.
017D  F017        A1 = B.                 RESTORE A1
017E  F0F1        MR1.
017F  F0F9        WHEN RDC BEX.
0180  F051        A3 = B.                 RESTORE A3
0181  F033        A2 = B.                 RESTORE A2
0182  F0F1        MR1.                    FETCH A3
0183  F0F9        WHEN RDC BEX.
0184  F051        A3 = B.                 RESTORE A3
0185  41D6        MPCR = RSTBR1 - 1.      RESTORE BR1 AND EXIT
              STACKR.
0186  F082        B = LIT L.                                          C
0187  C401        SAR = 4 LIT = 1.                                    C
0188  F0D5        MAR1 = B.               STACK POINTER 4096          C
              STACKR1.
0189  F0F1        MR1.
018A  F0F9        WHEN RDC BEX.           FETCH POINTER
018B  F0DD        MIR = A2.       SAVE A2
018C  F033        A2 = B.
018D  E004        LIT = 4.
018E  F146        B = A2 - LIT.           DECRAMENT STACK POINTER
018F  F08C        BMI, MIR = B.           EXCHANGE MIR & B
0190  F033        A2 = B.                 RESTORE A2
0191  F08D        BMI.      POINTER ADDRESS TO B
0192  F0F3        MW1.                    RESTORE POINTER
0193  F083        B = LIT + B. ADDRESS OF SAVED AMPCR TO B
              STACKR2.
0194  F0D5        MAR1 = B.
0195  F0F1        MR1.                    FETCH AMPCR FROM STACK
0196  F0F9        WHEN RDC BEX.
0197  F0C9        JUMP.
              INITMAINSTACK.              INITIALIZE    STACK POINTER
0198  F079        B = B100.
0199  D300        SAR = 3.
019A  F07F        B = B R.
019B  F0D5        MAR1 = B.
019C  F0E1        MIR = B.
019D  F0F3        MW1.                    POINTER = 4096
019E  F05F        B.
019F  41D6        MPCR = RSTBR1 - 1.      RESTORE BR1 EXIT

              INITFLOSTACK.               INITIALIZE    FLO POINTER
01A0  F082        B = LIT L.
01A1  C70C        SAR = 7 LIT = @0C@.
01A2  F0D5        MAR1 = B.
01A3  F0E1        MIR = B.
01A4  F0F3        MW1.            POINTER = 6144
01A5  41D6        MPCR = RSTBR1 - 1.      RESTORE BR1 EXIT
              MARKFLOSTACK.
             *SAVE AMPCR FROM MAIN PROGRAM FLOW-FOR GLOBAL RETURN
             *ASSUMES B, MIR, SAR, LIT CAN BE DISTROYED AND THAT
             *BR1, BR2 DIFFER BY INST BIT ONLY
01A6  F0DA        MIR = AMPCR.
01A7  F082        B = LIT L.
01A8  C70C        SAR = 7 LIT = @0C@.
01A9  F0D5        MAR1 = B.               FLO POINTER = 6144
01AA  4159        MPCR = STACKW3 - 1.     WRITE AMPCR TO STACK
              FLOSTACKRDDEC.
             *RESTORE AMPCR FROM TOP OF FLOW STACK AND DECRAMENT
             *STACK POINTER
01AB  F082        B = LIT L.
01AC  C70C        SAR = 7 LIT = @0C@.
01AD  F0D5        MAR1 = B.               FLOW STACK POINTER = 6144
01AE  8188        CPCR = STACKR1 - 1.     READ POINTER AND AMPCR
01AF  4172        MPCR = UNSTACK.         OPTIONAL NO A WD RESTORE
              FLOSTACKRD.
             *RESTORE AMPCR FROM TOP OF FLOW STACK WITHOUT
             *DECRAMENTING FLOW STACK POINTER.
01B0  F082        B = LIT L.
01B1  C70C        SAR = 7 LIT = @0C@.
01B2  F0D5        MAR1 = B.               FLO STACK POINTER = 6144
01B3  F0F1        MR1.
01B4  F0F9        WHEN RDC BEX.           FETCH POINTER
01B5  F05F        B.
01B6  8193        CPCR = STACKR2 - 1.     READ TOP OF STACK
01B7  4172        MPCR = UNSTACK.         OPTIONAL NO A WD RESTORE
              RDSTACKAMPCRTOB.
             *READ TOP AMPCR IN STACK TO B REG - USE FOR
             *NESTED EXEC.

01B8  F082        B = LIT L.                                          C
01B9  C810        LIT = @10@ SAR = 8.                                 C
01BA  F0D5        MAR1 = B.
01BB  F0F1        MR1.            FETCH POINTER
01BC  F0F9        WHEN RDC BEX.
01BD  F0D5        MAR1 = B.       TOP OF STACK ADDRESS
01BE  F0F1        MR1.
01BF  F0F9        WHEN RDC BEX.           B = AMPCR FROM STACK
01C0  F05F        B.
01C1  41D6        MPCR = RSTBR1 - 1.      RESTORE BR1 EXIT
             /
              PORTPRINT.
01C2  0D0A        CNST = @0D0A@.          CR LF
01C3  504F        CNST = @504F@.  PO
01C4  5254        CNST = @5254@.  RT
01C5  2080        CNST = @2080@.  - STOP
              TESTPRINT.
01C6  0D0A        CNST = @0D0A@.          CRLF
01C7  5445        CNST = @5445@.  TE
01C8  5354        CNST = @5354@.  ST
01C9  2080        CNST = @2080@.  - STOP
             /
             * TEST FLAG AND SET FLAG ROUTINES
             *
              SETFLAGW1.      FLAG NO. IN SAR, STATE IN LIT
01CA  F060        B = AMPCR.      SAVE RETURN
01CB  F0CF        MAR1 = AMPCR.       ADDRESS OF FLAG WORD 1 TO MAR1
01CC  0208        AMPCR = MEMFLAGW1.
             *
```

```
                SETFLAGS.               COMMON POINT  TO SETFLAGW1-2-3-4
01CD  F0F1          MR1.
01CE  F05B          AMPCR = B.          RESTORE  RETURN
01CF  F0F9          WHEN RDC BEX.               FLAG  WORD TO B
01D0  F092          CSAR.               CHANGE VALUE  TO SHIFT  FLAG  TO LSB
01D1  F172          CSAR  B = B C.              MOVE FLAG  IN  B TO LSB
01D2  F075          B = BTT0.
01D3  F087          B = LIT  OR B.              SET  FLAG  PER  LIT
01D4  F07D          B = B C.            SHIFT  FLAGS  BACK  TO  POSITION
01D5  F0E1          MIR = B.            MODIFIED  FLAG  WORD  TO  MIR
01D6  F0F3          MW1.                FLAG  WORD  TO  MEMORY
                *
                RESTORE-BR1.
                RSTBR1.                 COMMON POINT  FROM  ABOVE  AND -
                *                       AND TESTFLAGW1-2-3-4
01D7  F0E1          MIR = B.                    SAVE  B
01D8  F05D          ASE.                SELECT  BR2
01D9  F080          B = BMAR.
                * GENERATE  NEW BR1   (MSB  INST-DATA   SET  OPPOSITE   BR2)
01DA  F159          B = BFTF.
01DB  D800          SAR = 8.
01DC  F07F          B = B R.
01DD  F07C          B = B L.            CLEAR  MAR (DO  NOT  USE  LIT  HERE)
01DE  F0D5          MAR1 = B.
01DF  F08D          BMI.                        RESTORE  B
01E0  F0C9          JUMP.               RETURN
                *
                SETFLAGW2.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01E1  F060          B = AMPCR.          SAVE  RETURN
01E2  F0CF          MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD 2  TO  MAR1
01E3  0209          AMPCR = MEMFLAGW2.
01E4  41CC          MPCR = SETFLAGS  -  1.
                *


                SETFLAGW3.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01E5  F060          B = AMPCR.          SAVE  RETURN
01E6  F0CF          MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD 3  TO  MAR1
01E7  020A          AMPCR = MEMFLAGW3.
01E8  41CC          MPCR = SETFLAGS  -  1.
                *
                SETFLAGW4.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01E9  F060          B = AMPCR.          SAVE  RETURN
01EA  F0CF          MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD 4  TO  MAR1
01EB  020B          AMPCR = MEMFLAGW4.
01EC  41CC          MPCR = SETFLAGS  -  1.
                *
                TESTFLAGW1.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
01ED  F060          B = AMPCR.          SAVE  RETURN
01EE  F0CF          MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD 1  TO  MAR1
01EF  0208          AMPCR = MEMFLAGW1.
                *
                TESTFLAGS.              COMMON POINT  TO TESTFLAGW1-2-3-4
01F0  F0F1          MR1.
01F1  F05B          AMPCR = B.          RESTORE  RETURN
01F2  F0F9          WHEN RDC BEX.               FLAG  WORD TO B
01F3  F092          CSAR.
01F4  F07F          B = B R.            SHIFT  FLAG  TO  LSB
01F5  F157          B = BT0T.
01F6  F078          B = B0TT.
01F7  F05F          B.
01F8  F0CB          LIT  EQV  B.
01F9  F09D          IF  ABT  SKIP.
01FA  F105          AMPCR = AMPCR + 1.          SET  AMPCR FOR FALSE  RETURN
01FB  41D6          MPCR = RSTBR1  -  1.
                *
                TESTFLAGW2.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
01FC  F060          B = AMPCR.          SAVE  RETURN
01FD  F0CF          MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD 2  TO  MAR1
01FE  0209          AMPCR = MEMFLAGW2.
01FF  41EF          MPCR = TESTFLAGS  -  1.
                *
```

```
                TESTFLAGW3.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
0200  F060          B = AMPCR.          SAVE  RETURN
0201  F0CF          MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD 3  TO  MAR1
0202  020A          AMPCR = MEMFLAGW3.
0203  41EF          MPCR = TESTFLAGS  -  1.
                *
                TESTFLAGW4.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
0204  F060          B = AMPCR.          SAVE  RETURN
0205  F0CF          MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD 4  TO  MAR11
0206  020B          AMPCR = MEMFLAGW4.
0207  41EF          MPCR = TESTFLAGS  -  1.
                *
                * MEMORY WORDS FOR PROGRAM FLAGS
                MEMFLAGW1.
0208  0000          CNST = @0000@.              FLAGS  1  THRU  16  OF  WORD 1
                MEMFLAGW2.
0209  0000          CNST = @0000@.              FLAGS  1  THRU  16  OF  WORD 2
                MEMFLAGW3.
020A  0000          CNST = @0000@.              FLAGS  1  THRU  16  OF  WORD 3
                MEMFLAGW4.
020B  0000          CNST = @0000@.              FLAGS  1  THRU  16  OF  WORD 4
                * END OF FLAG ROUTINES
                *
                READDATAKEYTOA1.
                * SUB-ROUTINE   TO READ  1 DATA CHARACTER  FROM SPO  OR -
                *  CONSOLE  AND RETURN WITH  CHARACTER  IN  A1
                *  A2  AND A3  ARE SAVED
                *  ALL  OTHER  REGISTERS   ARE DESTROYED
                *
020C  F0DA          MIR = AMPCR.
020D  F05F          B.
020E  8156          CPCR = STACK - 1.  SAVE  AMPCR FOR RETURN
020F  8118          CPCR = SETCONTADDRS  - 1.
0210  807D          CPCR = TESTSPO-CONSOLE     - 1.
0211  4221          MPCR = SPOKEY  - 1.         SPO  ON SYSTEM
                *
                * CONSOLE  ON SYSTEM
0212  F1D5          MIR = B001  + 1.      ENABLE  KEYBOARD
0213  F099          DW1.
0214  812E          CPCR = LITEINDS  - 1.
0215  E008          LIT = 8.          LIGHT  NUMERIC  INDICATOR
0216  F0FC          WHEN SRQ  STEP.
0217  F097          DR2  BEX.
0218  F017          A1 = B.           SAVE  DATA  CHARACTER  IN  A1.
0219  F009          A1 = A1  AND LIT.     USE  ONLY  LOWER  DIGIT
021A  E00F          LIT = @0F@.
                * DISPLAY   LOWER  DIGIT   IN  B INDICATORS
021B  F082          B = LIT  L .
021C  C888          SAR = 8  LIT  = @88@.
021D  F0DC          MIR = A1 + B.
021E  F098          DW2.
021F  812E          CPCR = LITEINDS  - 1.
0220  E000          LIT = 0.          TURN  NUMERIC  INDICATOR   OFF
0221  4228          MPCR = EXITDKEY  - 1.
                *
                SPOKEY.         SPO  ON SYSTEM
0222  F0E7          MIR = B001.
0223  F099          DW1.        ENABLE  SPO  INPUT
0224  F0FC          WHEN SRQ  STEP.
0225  F097          DR2  BEX.
0226  F017          A1 = B.           SAVE  DATA  CHARACTER  IN  A1
0227  F009          A1 = A1  AND LIT.     USE  ONLY  LOWER  DIG
0228  E00F          LIT = @0F@.
                *
                EXITDKEY.
0229  F0E6          MIR = 0.
022A  F099          DW1.        DISABLE   SPO  OR CONSOLE
022B  8130          CPCR = SETPORTADDR  - 1.        RESTORE  BR1  AND BR2
022C  8171          CPCR = UNSTACK  - 1.        RETURN   (CHARACTER  IN  A1)
                *
                / SIMULATED  REGISTERS     SIMREG1,    SIMREG2,    SIMREG3
```

```
                ZROSREG1.
022D    F0E6            MIR = B000.
                WRSREG1.
022E    F060            B = AMPCR.
022F    F0CF            MAR1 = AMPCR.
0230    026C            AMPCR = SIMREG1.
                ZROSREG1A.
0231    F05B            AMPCR = B.
0232    F0F3            MW1.
0233    F05F            B.
0234    4257            MPCR = INCSREG1A - 1.
                ZROSREG2.
0235    F0E6            MIR = B000.
                WRSREG2.
0236    F060            B = AMPCR.
0237    F0CF            MAR1 = AMPCR.
0238    026D            AMPCR = SIMREG2.
0239    4230            MPCR = ZROSREG1A - 1.
                ZROSREG3.
023A    F0E6            MIR = B000.
                WRSREG3.
023B    F060            B = AMPCR.
023C    F0CF            MAR1 = AMPCR.
023D    026E            AMPCR = SIMREG3.
023E    4230            MPCR = ZROSREG1A - 1.
                RDSREG1.
023F    F060            B = AMPCR.
0240    F0CF            MAR1 = AMPCR.
0241    026C            AMPCR = SIMREG1.
                RDSREG1A.
0242    F05B            AMPCR = B.
0243    F0F1            MR1.
0244    F0F9            WHEN RDC BEX.
0245    F0E1            MIR = B.
0246    4257            MPCR = INCSREG1A - 1.
                RDSREG2.
0247    F060            B = AMPCR.
0248    F0CF            MAR1 = AMPCR.
0249    026D            AMPCR = SIMREG2.
024A    4241            MPCR = RDSREG1A - 1.
                RDSREG3.
024B    F060            B = AMPCR.
024C    F0CF            MAR1 = AMPCR.
024D    026E            AMPCR = SIMREG3.
024E    4241            MPCR = RDSREG1A - 1.
                INCSREG1.
024F    F060            B = AMPCR.
0250    F0CF            MAR1 = AMPCR.
0251    026C            AMPCR = SIMREG1.
                INCSREG1B.
0252    F05B            AMPCR = B.
0253    F0F1            MR1.
0254    F0F9            WHEN RDC BEX.
0255    F07E            B = B + 1.
0256    F0E1            MIR = B.
0257    F0F3            MW1.
                INCSREG1A.
0258    41D6            MPCR = RESTORE-BR1 - 1.
                INCSREG2.
0259    F060            B = AMPCR.
025A    F0CF            MAR1 = AMPCR.
025B    026D            AMPCR = SIMREG2.
025C    4251            MPCR = INCSREG1B - 1.
                INCSREG3.
025D    F060            B = AMPCR.
025E    F0CF            MAR1 = AMPCR.
025F    026E            AMPCR = SIMREG3.
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0260    4251            MPCR = INCSREG1B - 1.
                DECSREG2.
0261    F060            B = AMPCR.
0262    F0CF            MAR1 = AMPCR.
0263    026D            AMPCR = SIMREG2.
0264    F05B            AMPCR = B.
0265    F0F1            MR1.
0266    F0F9            WHEN RDC BEX.
0267    F162            B = 0 - B.
0268    F163            B = 0 - B - 1.
0269    F0E1            MIR = B.
026A    F0F3            MW1.
026B    4257            MPCR = INCSREG1A - 1.
                SIMREG1.
026C    0000            CNST = @0000@.
                SIMREG2.
026D    0000            CNST = @0000@.
                SIMREG3.
026E    0000            CNST = @0000@.
                SET-CONT-DINT.
                *  SET CONTROLLER DATA INTERRUPT,  RESTORE PORT ADDRESS
                *  IN BR1 AND BR2 THEN JUMP
026F    F0DA            MIR = AMPCR.
0270    F05F            B.
0271    8156            CPCR = STACK - 1. SAVE AMPCR, A1,A2,A3    IN STACK
0272    8118            CPCR = SETCONTADDRS - 1.
0273    807D            CPCR = TESTSPO-CONSOLE - 1.
0274    4276            MPCR = SCDINT - 1.        SPO ON SYSTEM
                *
                *  CONSOLE ON SYSTEM
0275    E004            LIT = @04@.    ENABLE CONSOLE PRINTER DINT
0276    F0F7            SKIP.
                SCDINT.
0277    E002            LIT = @02@.    ENABLE SPO OUTPUT
0278    F0EA            MIR = LIT.
0279    F099            DW1.
027A    F0FC            WHEN SRQ STEP.
                ********        STOP HERE IF CONTROLLER ENABLE DOES NOT CAUSE
                *                SRQ (NOTE- SPO SRQ HAS BEEN USED PRIOR TO
                *                      THIS STOP
                *               RUN SPO OR CONSOLE MTR
                *
                RSCDINT.
027B    8130            CPCR = SETPORTADDR - 1.       RESTORE BR1 AND BR2
027C    4175            MPCR = UNSTACKRESTOREA - 1. RETURN
                *
                *
                RESET-CONT-DINT.
                *  DISABLE CONTROLLER, RESTORE PORT ADDRESS IN BR1 AND
                *  BR2, THEN JUMP
027D    F0DA            MIR = AMPCR.
027E    F05F            B.
027F    8156            CPCR = STACK - 1. SAVE AMPCR,A1,A2,A3    IN STACK
0280    8118            CPCR = SETCONTADDRS - 1.
0281    F0E6            MIR = 0.
0282    F099            DW1.
0283    F05F            B.
0284    427A            MPCR = RSCDINT - 1.
                *
                /
                MEM-MOD-SETLC3.    SET WRITE-BEFORE-READ    FLAG
                *  JUMP TO ABOVE LABEL FROM UPPER CASE RESET KEY CODE
                *  ALLOWS WRITE-BEFORE-READ    OF FIRST ADDRESS
0285    F01A            SET LC3.
0286    F0F7            SKIP.
                MEMORY-MODIFY.
0287    F0AD            IF LC3 STEP.
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0288  F01F        RESET   GC2.
0289  F0A9        IF  LC2   STEP.
028A  8118        CPCR  = SETCONTADDRS  -  1.
                * RETURNS  WITH  BR1  =  INSTRUCTION,    BR2  =  DATA
028B  F0EA        MIR   =   LIT.
028C  C881        SAR   = 8  LIT   = @81@.
028D  F082        B  =  LIT   L.
028E  F0EC        MIR  =  LIT   OR  B.
028F  E009        LIT   =  9.
0290  F098        DW2.
0291  E010        LIT   =   @10@.
0292  F099        DW1.
0293  F082          B  =   LIT   L.
0294  C803        SAR   =  8,    LIT    =  @03@.
0295  F0E1        MIR   =   B.
0296  F0FC        WHEN  SRQ  STEP.
0297  F098        DW2.                                          READY   THE      R
0298  F0EA          MIR   =   LIT.
0299  E008          LIT   =   @08@.
029A  F0FC        WHEN  SRQ  STEP.
029B  F099        DW1.
029C  F082        B   =   LIT    L.
029D  E0C0        LIT   =   @C0@.
029E  F0ED        MIR   =   LIT   +   B.
029F  E004        LIT   =  @04@.
02A0  F0FC        WHEN  SRQ  STEP.
02A1  F098        DW2.
02A2  0340        AMPCR   =   MM-POSITION   -   1.
02A3  F01D        A1    =     LIT.
02A4  E00A        LIT   =   @0A@.
02A5  F091        CALL.                                         POSITION   RIG
              MM-LIST-NEXT.
02A6  032F        AMPCR   =     MM-ADVANCE   -   1.
02A7  F091        CALL.                                         ADVANCE   I  L    E
02A8  F018          SET   LC1.
02A9  F019        SET   LC2.
02AA  F0CA        LCTR.
02AB  E003        LIT   =   @03@.
02AC  02DE        AMPCR   =     MM-KYBD   -   1.
02AD  F091        CALL.                                         ACCEPT   AND  P    N
02AE  F0D1        MAR1   =   A2.
02AF  F0E7        MIR  =  B001.
02B0  F0AF        IF  LC3  SET  LC3  ELSE  SKIP.
02B1  F0F3        MW1.      WRITE  BEFORE  TO  PREVENT   PE.
                *   WILL  NOT  WRITE  BEFORE  READ  ON  711   (B.REQUIRED     HERE)
02B2  F0F1        MR1.
02B3  F0F9        WHEN  RDC   BEX.                              GET  THE  CONT    T
02B4  F033        A2   =   B.
02B5  E003        LIT   =   @03@.
02B6  02BE        AMPCR   =   MM-CONTENTS   -   1.
02B7  F041          A3   =   AMPCR.
02B8  F0CA        LCTR.
02B9  0340        AMPCR   =  MM-POSITION     -   1.
02BA  F01D        A1   =  LIT.
02BB  E003        LIT   =  @03@.
02BC  F091        CALL.
02BD  0352        AMPCR  =  MM-PRINT   -   1.
02BE  F0C9        JUMP.                                         PRINT  THE  CO    E
              MM-CONTENTS.
02BF  F0CA        LCTR.
02C0  E000        LIT   =   @00@.
02C1  F00C        RESET   GC1.
02C2  F0AD        IF  LC3  STEP.          RESET  WRITE-BEFORE-READ     FLAG
02C3  02C8        AMPCR  =  RESET-GC1LC3     -  1.  FOR  RETURN  FROM  MM-KYBD
02C4  42DE        MPCR  =  MM-KYBD  -  1.
                *
                * MM-KYBD  JUMPS  HERE  FOR  OCK  I,II,III       KEYS
              SET-LC3GC1.
02C5  F01A        SET   LC3.
              SET-GC1.
02C6  F006        SET   GC1.
02C7  F0F7        SKIP.
              SET-LC3.
02C8  F01A        SET   LC3.
              RESET-GC1LC3.
02C9  F0CA        LCTR.
02CA  E003        LIT   =   @03@.
02CB  0340        AMPCR   =  MM-POSITION     -   1.
02CC  F01D          A1   =  LIT.
02CD  F091        CALL.
02CE  F018        SET   LC1.
02CF  02DE        AMPCR   =     MM-KYBD   -   1.
02D0  F091        CALL.                                                 ACCEPT   AND  P    N
02D1  F0DD        MIR   =   A2.
02D2  F0F3        MW1.
02D3  0287        AMPCR  =  MEMORY-MODIFY.
02D4  F19C        IF  NOT  GC1   JUMP.
02D5  F019        SET   LC2.                                    POS  TO  LEFT.
02D6  F01D        A1   =  LIT.
02D7  E012        LIT   =   @12@.
02D8  0340        AMPCR   =   MM-POSITION     -   1.
02D9  F0D7        MAR1   =  BMAR   +  1.
02DA  F035        A2   =  BMAR.
02DB  F091        CALL.
02DC  02A5        AMPCR   =   MM-LIST-NEXT     -   1.
02DD  F0F6        SET   GC2.
02DE  F0C9        JUMP.
              MM-KYBD.
02DF  F041        A3   =   AMPCR.                                       SAVE  RETURN     D
02E0  F081        B   =   NOT  CTR   R.
02E1  D800        SAR   =   8.
02E2  0352        AMPCR   =  MM-PRINT   -   1.
02E3  F0A2        IF  GC2  SKIP.
02E4  42E6        MPCR   =     MM-NANO-SAVE   -  1.
02E5  F01F        RESET   GC2.
02E6  F0C9        JUMP.
              MM-NANO-SAVE.
02E7  F017        A1   =   B.
02E8  F05D        ASE.       SELECT   BR2
02E9  F080        B  =  BMAR.
02EA  F16F        BR2  =  B1TT.          BR2  =  CONTROL  PORT
02EB  F1DB        MIR   =   0   +   Z.
02EC  E002        LIT   =     @02@.
02ED  F098        DW2.                                                  ENABLE  KBD  D    A
02EE  F034        A2   =  B000.
02EF  F05D        ASE.       SELECT   BR2
02F0  F080        B  =  BMAR.
02F1  F078        B  =  B0TT.
02F2  F16E        BR2  =  B.             BR2  =  DATA  PORT
              MM-KYBD-LOOP.
02F3  F0C5        IF  SRQ  DR2  BEX  SKIP.
02F4  42F2        MPCR  =  MM-KYBD-LOOP   -  1.
02F5  0287        AMPCR  =  MEMORY-MODIFY.
02F6  F0CB        LIT   EQV   B.
02F7  E01F        LIT   =  @1F@.     RESET  KEY  LOWER  SHIFT   MECHANICAL
02F8  F09B        IF  ABT  LUOP  JUMP.   RESET  KEY   START   OVER
02F9  E0AB        LIT   =  @AB@.     RESET  KEY  LOWER  SHIFT   ELECTRONIC
02FA  F09B        IF  ABT  LUOP  JUMP.   RESET  KEY   START   OVER
02FB  0284        AMPCR  =  MEM-MOD-SETLC3     -  1.
02FC  E09F        LIT   =  @9F@.     RESET  KEY  UPPER  SHIFT   MECHANICAL
02FD  F09B        IF  ABT  LUOP  JUMP.
02FE  E08B        LIT   =  @8B@.     RESET  KEY  UPPER  SHIFT   ELECTRONIC
02FF  F09B        IF  ABT  LUOP  JUMP.
0300  0381        AMPCR  =  MICRO-TOOL   -  1.
0301  E04C        LIT   =  @4C@.          OCK  IIII    KEY  MECHANICAL
0302  F09B        IF  ABT  LUOP  JUMP.   OCK  IIII    KEY   GO  TO  END
0303  E0A0        LIT   =  @A0@.          OCK  IIII    KEY  ELECTRONIC
0304  F09B        IF  ABT  LUOP  JUMP.   OCK  IIII    KEY   GO  TO  END
0305  02C4        AMPCR  =  SET-LC3GC1     -  1.
0306  E0CE        LIT   =  @CE@.          OCK  II   UPPER  SHIFT   MECHANICAL
0307  F09B        IF  ABT  LUOP  JUMP.
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0308  E083     LIT  =  @83@.          OCK  II   UPPER  SHIFT   ELECTRONIC
0309  F09B     IF  ABT  LUOP  JUMP.
030A  02C5     AMPCR  =  SET-GC1   -  1.
030B  E04E     LIT  =  @4E@.          OCK  II   LOWER  SHIFT   MECHANICAL
030C  F09B     IF  ABT  LUOP  JUMP.
030D  E0A3     LIT  =  @A3@.          OCK  II   LOWER  SHIFT   ELECTRONIC
030E  F09B     IF  ABT  LUOP  JUMP.
030F  02C7     AMPCR  =  SET-LC3   -  1.
0310  E0CD     LIT  =  @CD@.          OCK  I    UPPER  SHIFT   MECHANICAL
0311  F09B     IF  ABT  LUOP  JUMP.
0312  E081     LIT  =  @81@.          OCK  I    UPPER  SHIFT   ELECTRONIC
0313  F09B     IF  ABT  LUOP  JUMP.
0314  F0E1     MIR  =  B.
0315  F07F     B  =  B  R.
0316  C400     SAR  =  4  LIT  =  0.
0317  031E     AMPCR  =  ABCDEF-KEY   -  1.
0318  E004     LIT  =  @04@.    UPPER  DIGIT   FOR  ALPHA  ELECTRONIC
0319  F0CB     LIT  EQV  B.
031A  F09B     IF  ABT  LUOP  JUMP.
031B  E005     LIT  =  @05@.    UPPER  DIGIT   FOR  ALPHA  MECHANICAL
031C  F09B     IF  ABT  LUOP  JUMP.
031D  E000     LIT  =  0.
031E  F0F7     SKIP.                  NUMERIC  KEY  ENTERED
            ABCDEF-KEY.               ALPHA  KEY  ENTERED
031F  E009     LIT  =  @09@.
0320  F08D     BMI.         RESTORE  B (CHARACTER   ENTERED)
0321  F083     B  =  LIT  +  B.  ADD  9  IF  ALPHA  KEY
0322  F086     B   =  LIT    AND   B.
0323  CC0F     SAR   =  12,    LIT   =  @0F@.
0324  F025     A2     =    A2    C.
0325  F031     A2     =    A2    +    B.                      CONCATENATE
0326  02F2     AMPCR    =    MM-KYBD-LOOP     -    1.
0327  F030     INC.
0328  F0B9      IF  NOT  COV     JUMP.                        TEST   FOR   A
0329  F066     B   =    A1.
032A  F095     CTR      =     B.                              RESTORE  COUN      R
032B  0352     AMPCR    =     MM-PRINT     -     1.
032C  F0A6     IF    LC1      JUMP.                           PRINT   FLAG.
032D  F101     AMPCR    =    A3.
032E  F05F     B.
032F  F0C9     JUMP.
             MM-ADVANCE.
0330  F05D     ASE.        SELECT   BR2
0331  F080     B  =  BMAR.
0332  F16F     BR2   =  BITT.          BR2   =  CONTROL  PORT
0333  F0EA     MIR    =     LIT.
0334  E008     LIT     =     @08@.
0335  F098     DW2.                                           ENABLE     FORM     I
0336  F082     B  =  LIT    L.
0337  E0C0     LIT     =     @C0@.
0338  F0ED       MIR     =     LIT    +  B.
0339  E050     LIT     =     @50@.
033A  F05D     ASE.        SELECT    BR2
033B  F080     B  =  BMAR.
033C  F078     B  =  BOTT.
033D  F16E     BR2   =  B.             BR2   =  DATA  PORT
033E  F0FC     WHEN  SRQ  STEP.
033F  F098     DW2.
0340  F0C9     JUMP.
              MM-POSITION.
0341  F05D     ASE.        SELECT    BR2
0342  F080     B  =  BMAR.
0343  F16F     BR2   =  BITT.          BR2   =  CONTROL  PORT
0344  F0EA       MIR     =    LIT.
0345  C810     SAR  =  8,   LIT    =  @10@.
0346  F098     DW2.                                           ENABLE  CARRI
0347  E001     LIT    =  @01@.                                LEFT   POSITIO       P
0348  F015     IF  LC2   SKIP.
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0349  E000     LIT   =  @00@.                                   RIGHT   POSITI
034A  F082     B  =  LIT   L.
034B  F0DC     MIR    =    A1    +  B.
034C  F05D     ASE.       SELECT    BR2
034D  F080     B  =  BMAR.
034E  F078     B  =  BOTT.
034F  F16E     BR2   =  B.              BR2   =  DATA   PORT
0350  F0FC       WHEN  SRQ  STEP.
0351  F098     DW2.
0352  F0C9       JUMP.
            MM-PRINT.
0353  F0A5       IF   LC1     STEP.
0354  F1DB     MIR     =     0     +     Z.
0355  E004     LIT     =     @04@.
0356  F05D     ASE.       SELECT    BR2
0357  F080     B  =  BMAR.
0358  F16F     BR2   =  BITT.           BR2   =  CONTROL   PORT
0359  F098     DW2.                                             ENABLE   PRINT
035A  C84B     SAR   =  8,    LIT    =  @4B@.
035B  F015     IF   LC2   SKIP.                                 LC2   MEANS  RE      R
035C  C849     SAR   =  8,    LIT    =  @49@.
035D  F089     B     =     LIT.
035E  F01B     A1   =  B  L.
035F  F081      B     =    NOT    CTR     R.
0360  F07C     B     =  B     L.
0361  DE00     SAR     =  14.
0362  F05F     B.
0363  F0F4     SAR     =  B.
0364  F025     A2   =   A2   C.
0365  F05D     ASE.       SELECT    BR2
0366  F080     B  =  BMAR.
0367  F078     B  =  BOTT.
0368  F16E     BR2   =  B.              BR2   =  DATA   PORT
            MM-PRINT-LOOP.
0369  F147     B     =     A2     C.
036A  D400     SAR     =     4.
036B  F07F     B     =     B     R.
036C  DC00     SAR   =  12.                                     ISOLATE    NEXT     I
036D  F0CC      LIT     -     B.
036E  E009      LIT     =     @09@.
036F  F09E     IF   AOV  SKIP.
0370  F018     SET     LC1.                                     UNDIGIT
0371  E037     LIT     =     @37@.
0372  F014     IF     LC1       SKIP.
0373  E030     LIT     =     @30@.
0374  F083     B  =  LIT    +  B.                               PUT   ZONE   ON.
0375  F0DC     MIR   =  A1   +  B.
0376  F0FC     WHEN  SRQ  STEP.
0377  F098      DW2.
0378  F030      INC.
0379  F0C5     IF   SRQ   DR2   BEX   SKIP.
037A  F101      AMPCR     =     A3.
            MM-NANO-DUMB.
037B  F0C5     IF   SRQ   DR2   BEX   SKIP.
037C  437A     MPCR  =  MM-NANO-DUMB  -  1.
037D  F09F     IF     COV  JUMP.                                END  OF  PRINT
037E  F025     A2      =     A2       C.
037F  DC00     SAR   =  12.                                     LINE   UP  NEXT     I
0380  0368     AMPCR    =    MM-PRINT-LOOP      -     1.
0381  F0C9     JUMP.
          ********************************************************           *
           MICRO-TOOL.                          PRESS   OCK   IIII
          *  MEMORY-MODIFY   USES   LC1,LC2,LC3,GC1,GC2
0382  F0AD     IF   LC3   STEP.
0383  F0A5     IF   LC1   STEP.
0384  F0A9     IF   LC2   STEP.
0385  F00C     RESET   GC1.
0386  F01F     RESET   GC2.
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0387  4046          MPCR = TESTSELECT  - 1.
                /
              SPO-MEM-MOD.
0388  F0A9          IF LC2 STEP.  RESET WRITE-BEFORE-READ  FLAG
0389  8118          CPCR = SETCONTADDRS  - 1.
                *  RETURN WITH BR1 = INST,  BR2 = DATA
038A  F0A5          IF LC1.
              SMM-NEW-ADDRESS.
038B  83B5          CPCR = SMM-ENABLE-OUT  - 1.
038C  E00D          LIT = @0D@.
038D  83F2          CPCR = SMM-DEV-WT-LIT  - 1.
038E  E00A          LIT = @0A@.
038F  83F2          CPCR = SMM-DEV-WT-LIT  - 1.
0390  83BD          CPCR = SMM-SPACE-4  - 1.
0391  83B2          CPCR = SMM-ENABLE-IN  - 1.
0392  F0A8          IF LC1 SET LC1 SKIP.
0393  83C6          CPCR = SMM-ACCEPT-4  - 1.
0394  83B5          CPCR = SMM-ENABLE-OUT  - 1.
0395  F0BF          IF NOT LC1 SKIP.
0396  83D7          CPCR = SMM-PRINT-4  - 1.
0397  83BD          CPCR = SMM-SPACE-4  - 1.
0398  F0D1          MAR1 = A2.
0399  F0E7          MIR = B001.
039A  F0AB          IF LC2 SET LC2 ELSE SKIP.
039B  F0F3          MW1.  WRITE BEFORE READ PREVENT PE
                *  WILL NOT WRITE BEFORE READ ON 711 (B.REQUIRED HERE)
039C  F0F1          MR1.
039D  F0F9          WHEN RDC BEX.
039E  F033          A2 = B.
039F  83D7          CPCR = SMM-PRINT-4  - 1.
03A0  83B2          CPCR = SMM-ENABLE-IN  - 1.
              SMM-WHAT-TO-DO.
03A1  83EB          CPCR = SMM-DEV-RD  - 1.
03A2  F0CB          LIT EQV B.
03A3  E020          LIT = @20@.
03A4  03A9          AMPCR = SMM-NEW-CONTENT  - 1.
03A5  F09B          IF ABT LUOP JUMP.
03A6  E01B          LIT = @1B@.
03A7  F09D          IF ABT SKIP.
03A8  43A0          MPCR = SMM-WHAT-TO-DO  - 1.
03A9  F018          SET LC1.
              SMM-NEW-CONTENT.
03AA  83B5          CPCR = SMM-ENABLE-OUT  - 1.
03AB  83BD          CPCR = SMM-SPACE-4  - 1.
03AC  83B2          CPCR = SMM-ENABLE-IN  - 1.
03AD  83C6          CPCR = SMM-ACCEPT-4  - 1.
03AE  F0DD          MIR = A2.
03AF  F0F3          MW1.
03B0  F0FB          WHEN RMI MAR1 = BMAR + 1.
03B1  F035          A2 = BMAR.
03B2  438A          MPCR = SMM-NEW-ADDRESS  - 1.
              SMM-ENABLE-IN.
03B3  F0FC          WHEN SRQ STEP.
03B4  F0E7          MIR = B001.
03B5  43B6          MPCR = SMM-SEND-CW  - 1.
              SMM-ENABLE-OUT.
03B6  F1D5          MIR = B001  + 1.
              SMM-SEND-CW.
03B7  F05D          ASE.
03B8  F080          B = BMAR.
03B9  F16F          BR2 = BITT.
03BA  F098          DW2.
03BB  F05F          B.
03BC  F16E          BR2 = B.
03BD  F0C9          JUMP.
              SMM-SPACE-4.
03BE  F007          A1 = AMPCR.
03BF  F05F          B.
03C0  F05F          B.
03C1  E020          LIT = @20@.
03C2  83F2          CPCR = SMM-DEV-WT-LIT  - 1.
03C3  83F3          CPCR = SMM-DEV-WT  - 1.
03C4  83F3          CPCR = SMM-DEV-WT  - 1.
03C5  83F3          CPCR = SMM-DEV-WT  - 1.
03C6  43E8          MPCR = SMM-JUMP-A1  - 1.
              SMM-ACCEPT-4.
03C7  F007          A1 = AMPCR.
03C8  F0CA          LCTR.
03C9  CC02          SAR = 12,  LIT = 2.
03CA  F034          A2 = B000.
              SMM-ACCEPT-LOOP.
03CB  F026          A2 = A2 L.
03CC  83EB          CPCR = SMM-DEV-RD  - 1.
03CD  F0CC          LIT - B.
03CE  E040          LIT = @40@.
03CF  F09E          IF AOV SKIP.
03D0  F083          B = LIT + B.
03D1  E009          LIT = 9.
03D2  F086          B = LIT AND B.
03D3  E00F          LIT = @0F@.
03D4  F031          A2 = A2 + B.
03D5  F0C8          INC IF COV SKIP.
03D6  43CA          MPCR = SMM-ACCEPT-LOOP  - 1.
03D7  43E8          MPCR = SMM-JUMP-A1  - 1.
              SMM-PRINT-4.
03D8  F007          A1 = AMPCR.
03D9  F0CA          LCTR.
03DA  CC02          SAR = 12,  LIT = 2.
              SMM-PRINT-LOOP.
03DB  F025          A2 = A2 C.
03DC  F06D          B = A2 AND LIT.
03DD  E00F          LIT = @0F@.
03DE  F0CC          LIT - B.
03DF  E009          LIT = 9.
03E0  F09E          IF AOV SKIP.
03E1  F083          B = LIT + B.
03E2  E007          LIT = @07@.
03E3  F0ED          MIR = LIT + B.
03E4  E030          LIT = @30@.
03E5  83F3          CPCR = SMM-DEV-WT  - 1.
03E6  F0C8          INC IF COV SKIP.
03E7  43DA          MPCR = SMM-PRINT-LOOP  - 1.
03E8  43E8          MPCR = SMM-JUMP-A1  - 1.
              SMM-JUMP-A1.
03E9  F05C          AMPCR = A1.
03EA  F05F          B.
03EB  F0C9          JUMP.
              SMM-DEV-RD.
03EC  F1AE          IF NOT URQ SKIP.
03ED  43F8          MPCR = SMM-STINTS  - 1.
03EE  F0C5          IF SRQ DR2 BEX SKIP.
03EF  43EB          MPCR = SMM-DEV-RD  - 1.
03F0  F086          B = LIT AND B.
03F1  E07F          LIT = @7F@.
03F2  F0C9          JUMP.
              SMM-DEV-WT-LIT.
03F3  F0EA          MIR = LIT.
              SMM-DEV-WT.
03F4  F1AE          IF NOT URQ SKIP.
03F5  43F8          MPCR = SMM-STINTS  - 1.
03F6  F0C6          IF SRQ DW2 SKIP.
03F7  43F3          MPCR = SMM-DEV-WT  - 1.
03F8  F0C9          JUMP.
              SMM-STINTS.
03F9  F05D          ASE.
03FA  F035          A2 = BMAR.
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03FB  F08E        BR2  = A2  OR  B100.
03FC  F097        DR2  BEX.
03FD  F07D        B  = B  C.
03FE  D300        SAR  = 3.          ERROR  STATUS  TO  LSB,   E-O-M   TO  MSB
03FF  F090        BR2  = A2.
0400  F05F        B.
                *
                *  PUSH  INPUT-REQUEST    TO  RESET  LC2  (NORMAL  OPERATION
                *                         BEFORE  ERROR  WAS  PUSHED)
                *  PUSH  ERROR  TO  SET  LC2  (WRITE   BEFORE  READ  FLAG)
                *  PUSH  END-OF-MESSAGE     TO  EXIT  SPO-MEMORY-MODIFY
0401  F0C4        IF  NOT  MST  SKIP.
0402  4407        MPCR  = SMM-EXIT  - 1.      E-O-M   STATUS
0403  F019        SET  LC2.          WRITE-BEFORE-READ      FLAG
0404  F05F        B.
0405  F0B2        IF  LST  SKIP.
0406  4387        MPCR  = SPO-MEM-MOD  - 1.          INPUT-REQUEST     STATUS
0407  4388        MPCR  = SPO-MEM-MOD.    ERROR  STATUS  (LEAVE   LC2  SET)
              SMM-EXIT.
                *  SPO-MEM-MOD   USES  LC1  AND  LC2
0408  F0A5        IF  LC1  STEP.
0409  F0A9        IF  LC2  STEP.
040A  4046        MPCR  = TESTSELECT   - 1.
                /
              TESTTABLE.
040B  4418        MPCR  = TEST-0     - 1.
040C  4419        MPCR  = TEST-1     - 1.
040D  4421        MPCR  = TEST-2     - 1.
040E  4426        MPCR  = TEST-3     - 1.
040F  442C        MPCR  = TEST-4     - 1.
0410  4435        MPCR  = TEST-5     - 1.
0411  443F        MPCR  = TEST-6     - 1.
0412  4448        MPCR  = TEST-7     - 1.
0413  4450        MPCR  = TEST-8     - 1.
0414  4452        MPCR  = TEST-9     - 1.
0415  4454        MPCR  = TEST-10    - 1.
0416  4456        MPCR  = TEST-11    - 1.
0417  4459        MPCR  = TEST-12    - 1.
0418  445B        MPCR  = TEST-13    - 1.
                *  ADD  TESTS   AS  NEEDED
                *  PROGRAM  JUMPS  TO  LABELS   TEST-0,TEST-1,        ETC  PER
                *  TEST-NUMBERS   ENTERED  IN  THE  CONTROLLER
                *  PROGRAM  JUMPS  TO  MEMORY-MODIFY   FOR  ANY  TEST-NUMBER,
                *  IF  STINT   IS   ON
                /
                   TEST-0.            NOT  USED
0419  40AF        MPCR  = INVALIDTEST   - 1.
                *
              TEST-1.                                  80   COLUMN
041A  D800        SAR  = 8.
041B  F007        A1  = AMPCR.                        SAVE  RETURN
041C  0046        AMPCR  = TESTSELECT   - 1.
041D  F082        B  = LIT  L.     80  COLUMN  FLAG
041E  E001        LIT  = 1.
041F  F05F        B.
0420  E000        LIT  = 0.          COLUMN  COUNT  FLAG
0421  4474        MPCR  = CPTSEL   - 1.
                *
              TEST-2.                                  96   COLUMN  6-BIT
0422  D700        SAR  = 7.
0423  0046        AMPCR  = TESTSELECT   - 1.
0424  F082        B  = LIT  L.     96  COLUMN  6-BIT     FLAG
0425  E001        LIT  = 1.
0426  4474        MPCR  = CPTSEL   - 1.
                *
              TEST-3.                                  96   COLUMN  8-BIT
0427  D600        SAR  = 6.
0428  0046        AMPCR  = TESTSELECT   - 1.
0429  F082        B  = LIT  L.
042A  E001        LIT  = 1.
042B  40AF        MPCR  = INVALIDTEST   - 1.
042C  4474        MPCR  = CPTSEL   - 1.
                *
              TEST-4.                                  9419-2      6-BIT
042D  D600        SAR  = 6.
042E  047C        AMPCR  = READTEST   - 1.
042F  F082        B  = LIT  L.
0430  E01F        LIT  = @1F@.
0431  F087        B  = LIT  OR  B.
0432  E040        LIT  = @40@.
0433  F05F        B.
0434  E001        LIT  = 1.
0435  4474        MPCR  = CPTSEL   - 1.
                *
              TEST-5.                                  9419-6      6-BIT
0436  D600        SAR  = 6.
0437  F007        A1  = AMPCR.                        SAVE  RETURN
0438  047C        AMPCR  = READTEST   - 1.
0439  F082        B  = LIT  L.
043A  E01F        LIT  = @1F@.
043B  F087        B  = LIT  OR  B.
043C  E020        LIT  = @20@.
043D  F05F        B.
043E  E001        LIT  = 1.
043F  4474        MPCR  = CPTSEL   - 1.
                *
              TEST-6.                                  9119-1      6-BIT
0440  D200        SAR  = 2.
0441  047C        AMPCR  = READTEST   - 1.
0442  F082        B  = LIT  L.
0443  E001        LIT  = 1.
0444  F087        B  = LIT  OR  B.
0445  E010        LIT  = @10@.
0446  F05F        B.
0447  E001        LIT  = 1.
0448  4474        MPCR  = CPTSEL   - 1.
                *
              TEST-7.                                  9418-2
0449  C879        SAR  = 8  LIT  = @79@.
044A  F082        B  = LIT  L.
044B  047C        AMPCR  = READTEST   - 1.
044C  F087        B  = LIT  OR  B.
044D  E008        LIT  = @08@.
044E  F05F        B.
044F  E000        LIT  = 0.
0450  4474        MPCR  = CPTSEL   - 1.
                *
              TEST-8.                                  READ  TEST
0451  047C        AMPCR  = READTEST   - 1.
0452  445E        MPCR  = CPSEL2   - 1.
                *
              TEST-9.                                  PUNCH-PRINT     TEST
0453  062D        AMPCR  = PUNCH-PRINTTEST     - 1.
0454  445E        MPCR  = CPSEL2   - 1.
                *
              TEST-10.                                 KEYBOARD  TEST
0455  0742        AMPCR  = KEYBOARDTEST   - 1.
0456  445E        MPCR  = CPSEL2   - 1.
                *
              TEST-11.          OVERFLOW  AND  READ-CHECK   TEST
0457  F0AD        IF  LC3  STEP.   RESET  9119-1      FLAG
0458  07D1        AMPCR  = OVERFLOWTEST   - 1.
0459  445E        MPCR  = CPSEL2   - 1.
                *
              TEST-12.          PUNCH-CHECK   TEST  AND  PUNCH  EXERCISER
045A  07F0        AMPCR  = PUNCH-CHECKTEST     - 1.
045B  445E        MPCR  = CPSEL2   - 1.
                *
              TEST-13.          OVERFLOW  AND  READ-CHECK   TEST   FOR  9119-1
045C  F01A        SET  LC3.          9119-1     STATUS   FLAG
045D  07D1        AMPCR  = OVERFLOWTEST   - 1.
```

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045E  445E        MPCR = CPSEL2 - 1.
                  *
                    CPSEL2.        TEST SELECTS 8-13 JUMP HERE WITH RETURN-
                  *                IN AMPCR
                  *
                  * INSURE THAT EITHER 96 OR 80 COL FLAG IS SET
045F  F007        A1 = AMPCR.          SAVE ADDRESS OF SELECTED TEST
0460  F05F        B.
0461  C601        SAR = 6 LIT = 1.
0462  81FB        CPCR = TESTFLAGW2 - 1. TEST 96-COL 6-BIT FLAG
0463  446D        MPCR = COL96 - 1.      96-COL DEVICE BEING TESTED
0464  C701        SAR = 7 LIT = 1.
0465  81FB        CPCR = TESTFLAGW2 - 1. TEST 96-COL 8-BIT FLAG
0466  446D        MPCR = COL96 - 1.      96-COL DEVICE BEING TESTED
0467  C801        SAR = 8 LIT = 1.
0468  81FB        CPCR = TESTFLAGW2 - 1. TEST 80-COL FLAG
0469  446B        MPCR = COL80 - 1.      80-COL DEVICE BEING TESTED
046A  F000        WAIT.
                  **********ERROR      NO COLUMN FLAG IS SET
                  * PRESS FS TO RETURN TO SELECTTEST, THEN ENTER TEST
                  *       NUMBER 01(80-COL)    OR 02(96-COL)    TO SET COLUMN
                  *       FLAG
046B  4046        MPCR = TESTSELECT - 1.
                  *
                    COL80.
046C  E000        LIT = 0.             80 COLUMN FLAG
046D  F0F7        SKIP.
                    COL96.
046E  E001        LIT = 1.             96 COLUMN FLAG
046F  D000        SAR = 0.
0470  81E0        CPCR = SETFLAGW2 - 1.  SET COLUMN COUNT FLAG
0471  C101        SAR = 1 LIT = 1.
0472  81E0        CPCR = SETFLAGW2 - 1.  SET SINGLE TEST FLAG
0473  F05C        AMPCR = A1.            ADDRESS OF SELECTED TEST
                  * THE CONTROLLER SETS PORT ADDRESS BR1 = INST,BR2=  DATA
                  * THIS MTR USES BR2 = INST , BR1 = DATA
0474  48A6        MPCR = COMP-BREG-IB - 1.
                  *
                    CPTSEL.        TEST SELECTS 1-7 JUMP HERE WITH FLAGS-
                  *                IN B AND LIT AND RETURN IN AMPCR
0475  F007        A1 = AMPCR.  SAVE ADDRESS OF SELECTED TEST
0476  F087        B = LIT OR B.  ADD COL-CNT FLAG FOR THIS TEST
0477  F0E1        MIR = B.
0478  F0CF        MAR1 = AMPCR.
0479  0209        AMPCR = MEMFLAGW2.
047A  F0F3        MW1.
047B  F05C        AMPCR = A1.            ADDRESS OF SELECTED TEST
                  * THE CONTROLLER SETS PORT ADDRESS BR1 = INST,BR2=  DATA
                  * THIS MTR USES BR2 = INST , BR1 = DATA
047C  48A6        MPCR = COMP-BREG-IB - 1.
                  *
                  *  END OF TEST SELECT
                  /
                      STATUS.
                      READTEST.
                  * SET LC3 IF 9119-1 IS BEING TESTED
                  *  (ALL STATUS CHECKS ARE DIFFERENT FOR READER ONLY)
047D  F0AD        IF LC3 STEP.
047E  CC01        SAR = 12 LIT = 1.      9119-1 FLAG
047F  81FB        CPCR = TESTFLAGW2 - 1.
0480  F01A        SET LC3.       9119-1  BEING TESTED
                  *
                    IRQ-E4-E5-E6.
0481  F096        DR1 BEX.
0482  F05F        B.
0483  F1B5        IF URQ SKIP.           TEST FOR ERROR INTERRUPT
0484  448C        MPCR = STATUS02 - 1.
0485  F097        DR2 BEX.               ATTEMPT RESETTING ERROR
0486  F05F        B.
0487  F05F        B.
0488  F1B5        IF URQ SKIP.           TEST INTERRUPT RESET

0489  448A        MPCR = STATUS01 - 1.
048A  F000        WAIT.
                  *********ERROR      URQ IS SET AND WILL NOT RESET
                  *********ERROR      # E 4
                    STATUS01.
048B  F0E1        MIR = B.
048C  F000        WAIT.                  STATUS DISPLAYED IN MIR
                  *********DETECTED       ERROR URQ SET BUT RESET WITH READ
                  *********ERROR      # E 5
                    STATUS02.
048D  F1AD        IF NOT SRQ SKIP.       TEST FOR ERROR INTERRUPT
048E  8863        CPCR = STAT4 - 1.      UNWANTED SRQ (DINT ) PRESEN
                  *********ERROR      # E 6
                    STATUS03.
048F  F097        DR2 BEX.
0490  F05F        B.
0491  E042        LIT = @42@.
0492  F0AF        IF LC3 SET LC3 ELSE SKIP.
0493  E002        LIT = @02@.    9119-1  STATUS
0494  F0CB        LIT EQV B.
0495  F09D        IF ABT SKIP.
0496  883A        CPCR = STAT2A - 1.     FIRST STATUS CHECK FAILURE
                  ********ERROR      # E 3
0497  048E        AMPCR = STATUS03 - 1.  LOOPING AVAILABLE
0498  F0E6        MIR = B000.
0499  F098        DW2.                   SET ENABLE
049A  F05F        B.
049B  E042        LIT = @42@.
049C  F0AF        IF LC3 SET LC3 ELSE SKIP.
049D  E002        LIT = @02@.    9119-1  STATUS
049E  F097        DR2 BEX.
049F  F0CB        LIT EQV B.
04A0  F09D        IF ABT SKIP.
04A1  883A        CPCR = STAT2A - 1.     STATUS FAILURE
                  *********ERROR      # E 56
                  *
                    RC00A.
04A2  E003        LIT = 3.
04A3  F058        A3 = LIT.
04A4  F0DE        MIR = A3.
04A5  F098        DW2.                   CW = 0003
04A6  F05F        B.
04A7  E040        LIT = @40@.
04A8  F0AF        IF LC3 SET LC3 ELSE SKIP.
04A9  E000        LIT = @00@.    9119-1  STATUS
04AA  F097        DR2 BEX.
04AB  F0CB        LIT EQV B.             DID BIT 15 RESET
04AC  F09D        IF ABT SKIP.           STATUS SHOULD BE HEX 0040
                  *                STATUS SHOULD BE HEX 0000 FOR 9119-1
04AD  8853        CPCR = STAT3 - 1.      STATUS FAILURE
                  *********ERROR      # E 7
04AE  04A1        AMPCR = RC00A - 1.     LOOPING AVAILABLE
04AF  887A        CPCR = DELAY1 - 1.
04B0  887A        CPCR = DELAY1 - 1.
04B1  F016        A1 = A3.
04B2  C181        LIT = @81@ SAR = 1.
04B3  F0AF        IF LC3 SET LC3 ELSE SKIP.
04B4  E001        LIT = @01@.    9119-1  STATUS
04B5  F089        B = LIT.
04B6  F07D        B = B C.
04B7  F051        A3 = B.                SW = 8040
                  *                STATUS WORD = 8000 FOR 9119-1
04B8  F1AE        IF NOT URQ SKIP.       TEST FOR ERROR STINT
04B9  8852        CPCR = STAT3A - 1.
                  *********DETECTED       URQ SET
                  *********ERROR      # E 8
04BA  8891        CPCR = BUSS - 1.       TEST EXT BUSS
                  *********EXT       BUSS FAILURE
                  *********ERROR      # E 9
04BB  F097        DR2 BEX.
04BC  F03C        A3 EQV B.              IS STAT GOOD
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04BD  F09D        IF  ABT  SKIP.
04BE  8853        CPCR  =  STAT3  -  1.
                  *********STATUS       AFTER  FIRST   CARD  MOTION  ATTEMPT  FAILED
                  *********ERROR      #  E  10
04BF  04A1        AMPCR  =  RC00A  -  1.          LOOPING  AVAILABLE
04C0  F1AD        IF  NOT  SRQ  SKIP.
04C1  F0F7        SKIP.
04C2  F000        WAIT.                           SRQ  NOT  SET
                  *********ERROR      #  E  11
04C3  F096        DR1  BEX.                       READ  CHARACTER
04C4  F05F        B.
04C5  F1AD        IF  NOT  SRQ  SKIP.
04C6  F000        WAIT.                           DINT  (SRQ)   DID  NOT  RESET
                  *********ERROR      #  E  12
04C7  8888        CPCR  =  DELAY2  -  1.
04C8  F1AD        IF  NOT  SRQ  SKIP.
04C9  F0F7        SKIP.
04CA  F000        WAIT.                           DINT  FAILED  TO  SET  FOR
                  *                               SECOND  TRANSFER
                  *********ERROR      #  E  13
                   RC00B.
04CB  D400        SAR  =  4.
04CC  F077        B  =  B001.
04CD  F0E2        MIR  =  B  C.
04CE  F098        DW2.                            TERMINATE
04CF  F05F        B.
04D0  F05F        B.
04D1  F05F        B.
04D2  F1AD        IF  NOT  SRQ  SKIP.             TEST  SRQS  DISABLED
04D3  8863        CPCR  =  STAT4  -  1.           TERMINATE  TEST  FAILED
                  *********TERMINATE      ATTEMPT  FAILED
                  *********ERROR      #  E  14
04D4  04CA        AMPCR  =  RC00B  -  1.          LOOPING  AVAILABLE  FOR  TERMI  T
                   RC001.
04D5  887A        CPCR  =  DELAY1  -  1.    EXTRA  DELAY  FOR  80-COL.    DEVICE
04D6  F1AE        IF  NOT  URQ  SKIP.             STINT  FAILED  TO  SET
04D7  44E2        MPCR  =  RC00C  -  1.
04D8  D100        SAR  =  1.
04D9  F097        DR2  BEX.
04DA  F07D        B  =  B  C.
04DB  F05F        B.
04DC  F0B2        IF  LST  SKIP.
04DD  F000        WAIT.
                  *********URQ      FAILED  TO  SET  DUE  TO  CCC  NOT  SET
                  *********ERROR      #  E  15
04DE  F000        WAIT.
                  *********CCC      FAILED  TO  SET  URQ.   OPERATOR  ATTEMPT  TO
                  *********SET      URQ  BY  ALTERNATE  METHOD.
                  *********KEY      PROG  1  ON  READER  PUNCH  KEYBOARD
                  *********PRESS      FORCE  STEP  -  FST
04DF  F05F        B.
04E0  F1B5        IF  URQ  SKIP.
04E1  F000        WAIT.                           ALTERNATE  FAILED
                  *********ERROR      #  E  16
                  *
04E2  F000        WAIT.                           ALTERNATE  ATTEMPT  GOOD
                  *********ERROR      #  E  17
                   RC00C.
04E3  E042        LIT  =  @42@.
04E4  F0AF        IF  LC3  SET  LC3  ELSE  SKIP.
04E5  E002        LIT  =  @02@.    9119-1    STATUS
04E6  F097        DR2  BEX.
04E7  F0CB        LIT  EQV  B.
04E8  F09D        IF  ABT  SKIP.
04E9  883A        CPCR  =  STAT2A  -  1.
                  *********STATUS       FAILURE  END  OF  FIRST  CARD
                  *********ERROR      #  E  18
04EA  F1AE        IF  NOT  URQ  SKIP.
04EB  F000        WAIT.                           STINT  FAILED  TO  RESET
                  *********ERROR      #  E  19
04EC  F0A5        IF  LC1  STEP.
                   READ.
04ED  C703        SAR  =  7  LIT  =  3.
04EE  F077        B  =  B001.
04EF  F051        A3  =  B.
04F0  F07D        B  =  B  C.
04F1  F087        B  =  LIT  OR  B.
04F2  F017        A1  =  B.
                   RC002.
04F3  8899        CPCR  =  COLCNT  -  1.  RET  WITH  LIT  =  95  OR  LIT  =  79
04F4  F0CA        LCTR.
04F5  F0DB        MIR  =  A1.
04F6  F098        DW2.                            CW  =  0203
04F7  F05F        B.
                   LOOP1.
04F8  E040        LIT  =  @40@.
04F9  F0AF        IF  LC3  SET  LC3  ELSE  SKIP.
04FA  E000        LIT  =  @00@.    9119-1    STATUS
04FB  F1AE        IF  NOT  URQ  SKIP.             TEST  FOR  ERROR  URQ
04FC  8839        CPCR  =  STAT2  -  1.
                  *********ERROR      #  E  20
                  ***  PROGRAM  WILL  INDICATE  E  20  IF  A  96-COLUMN  DEVICE
                  *    TEST  NUMBER  IS  ENTERED  WITH  THE  DDP  CONNECTED  TO
                  *    AN  80-COLUMN  DEVICE
04FD  04F2        AMPCR  =  RC002  -  1.
04FE  04F7        AMPCR  =  LOOP1  -  1.
04FF  F1AD        IF  NOT  SRQ  SKIP.
0500  F0F7        SKIP.
0501  F0C9        JUMP.
0502  F096        DR1  BEX.
0503  F0E1        MIR  =  B.
0504  F030        INC.
0505  F03C        A3  EQV  B.
0506  F09D        IF  ABT  SKIP.
0507  8830        CPCR  =  CHAERR  -  1.
                  *********DATA      CHARACTER  ERROR
                  *********ERROR      #  E  21
0508  F0B9        IF  NOT  COV  JUMP.
0509  E042        LIT  =  @42@.
050A  F0AF        IF  LC3  SET  LC3  ELSE  SKIP.
050B  E002        LIT  =  @02@.    9119-1    STATUS
050C  F0FD        WHEN  URQ  STEP.
                  *  PROGRAM  WILL  HANG  HERE  IF  AN  80-COLUMN  DEVICE  TEST
                  *   NUMBER  IS  ENTERED  WITH  THE  DDP  CONNECTED  TO  A
                  *   96-COLUMN  DEVICE
050D  F097        DR2  BEX.
050E  F0CB        LIT  EQV  B.
050F  F09D        IF  ABT  SKIP.
0510  883A        CPCR  =  STAT2A  -  1.          STATUS  FAILURE
                  *********ERROR      #  E  22
0511  04F2        AMPCR  =  RC002  -  1.
0512  F1A5        IF  NOT  LC1  SET  LC1  JUMP.    CHECK  FOR  SECOND  CARD
                  *                                 IS  IT  SECOND  CARD
                  *
                  *  IF  FIRST  CARD  OF  2-CARD  PAIR,  JUMP  TO  RC002
                  *  IF  SECOND  CARD  OF  2-CARD  PAIR,  CHECK  FOR  LAST  CARD
                  *
                  *  LAST  CARD  CHECK  (96-COL    ALL  PUNCHES)  (80-C    12  PUNCH)
0513  C801        SAR  =  8  LIT  =  1.
0514  81FB        CPCR  =  TESTFLAGW2  -  1.
0515  451C        MPCR  =  LASTC80C  -  1.
                  *
                  *  96  COLUMN  6-BIT  LAST  CARD  CHECK
0516  E03F        LIT  =  @3F@.
0517  F05F        B.
0518  0527        AMPCR  =  RC003  -  1.
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0519  F03E          A3  EQV  LIT.
051A  F09C          IF  ABT  JUMP.                    IS  IT  LAST  CARD
051B  F04C          A3  = A3  + 1.                    NO  INC  CHAR
051C  44F2          MPCR = RC002  - 1.                READ  NEW  CARD
                  *
                   LASTC80C.
                  *  80  COLUMN  LAST  CARD  CHECK
051D  C501          SAR  = 5  LIT  = 1.
051E  F089          B  = LIT.
051F  F05F          B.
0520  F07D          B  = B  C.
0521  0527          AMPCR = RC003  - 1.
0522  F03C          A3  EQV  B.
0523  F09C          IF  ABT  JUMP.
                  *
0524  DF00          SAR  = 15.
0525  F05F          B.
0526  F044          A3  = A3  C.      NEXT  COLUMN  PUNCHED  ON  TEST  DECK
0527  44F2          MPCR = RC002  - 1.                READ  NEXT  CARD
                  *
                   RC003.
0528  E005          LIT  = 5.
0529  F058          A3  = LIT.
052A  F076          B  = B111.
052B  F049          A3  = A3  XOR  B.  COMPLEMENT  TO  GET  AOV  ON  6TH  ADD  1
052C  F032          A2  = A3.                         CARD  COUNT  6
052D  E03F          LIT  = @3F@.
052E  F058          A3  = LIT.
052F  F05F          B.
                  *
                  *  A3  = @3F@  FOR  96  COLUMN  6-BIT
                  *SET  A3  = @FFF@  FOR  80  COLUMN
0530  C800          SAR  = 8  LIT  = 0.                    80-COL  FLAG
0531  81FB          CPCR  = TESTFLAGW2  - 1.
0532  4535          MPCR = RC004  - 1.                96-COL  DEVICE  BEING  TESTED
                  *
0533  CA3F          SAR  = 10  LIT  = @3F@.       80-COL  DEVICE  BEING  TESTED
0534  F082          B  = LIT  L.
0535  F048          A3  = A3  OR  B.          SET  MOST-SIG  6  BITS
                  *
                   RC004.
0536  8899          CPCR  = COLCNT - 1.  RET  WITH  LIT  = 95  OR  LIT  = 79
0537  F0CA          LCTR.
0538  F0DB          MIR  = A1.
0539  F098          DW2.                              CW  = 0203
053A  F05F          B.
053B  F0BB          IF  NOT  GC1  SKIP.
053C  4540          MPCR = LOOP2  - 1.
053D  F006          SET  GC1.
053E  F0FC          WHEN SRQ  STEP.
053F  8891          CPCR  = BUSS  - 1.                TEST  EXT  BUSS
                  *********ERROR       # E 9
0540  454A          MPCR = LOOP2A  - 1.
                   LOOP2.
0541  E040          LIT  = @40@.
0542  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0543  E000          LIT  = @00@.     9119-1     STATUS
0544  F1AE          IF  NOT  URQ  SKIP.               TEST  FOR  ERROR  URQ
0545  8839          CPCR  = STAT2  - 1.
                  *********ERROR       # E 20
0546  0540          AMPCR = LOOP2  - 1.
0547  F1AD          IF  NOT  SRQ  SKIP.
0548  454A          MPCR = LOOP2A  - 1.
0549  F1AC          IF  NOT  IRQ  JUMP.    ASR  DE-SELECTS    IF  IRQ  HERE
054A  F000          WAIT.
                  *********ERROR       # E 80
                  *
                   LOOP2A.
054B  F096          DR1  BEX.
054C  F0E1          MIR  = B.
054D  F030          INC.
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054E  F03C          A3  EQV  B.
054F  F09D          IF  ABT  SKIP.
0550  8830          CPCR  = CHAERR  - 1.
                  *********DATA       CHARACTER  ERROR
                  *********ERROR       # E 24
0551  055E          AMPCR = RC005  - 1.
0552  F09F          IF  COV  JUMP.
                  *  SET  B = @3F@  FOR  96  COLUMN  6-BIT
                  *  SET  B = @FFF@  FOR  80  COLUMN
0553  C800          SAR  = 8  LIT  = 0.                    80-COL  FLAG
0554  81FB          CPCR  = TESTFLAGW2  - 1.
0555  455A          MPCR = COM96COL  - 1.     96-COL  DEVICE  BEING  TESTED
                  *
0556  F05F          B.
0557  CA3F          LIT  = @3F@  SAR  = 10.       80-COL  DEVICE  BEING  TESTED
0558  F082          B  = LIT  L.
0559  F087          B  = LIT  OR  B.
055A  455C          MPCR = COMPCHAR  - 1.
                  *
                   COM96COL.
055B  E03F          LIT  = @3F@.
055C  F089          B  = LIT.
                  *
                   COMPCHAR.
055D  F049          A3  = A3  XOR  B.              COMPLEMENT  CHARACTER
055E  4540          MPCR = LOOP2  - 1.
                   RC005.
055F  056B          AMPCR = RC006  - 1.
0560  E042          LIT  = @42@.
0561  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0562  E002          LIT  = @02@.     9119-1     STATUS
0563  F0FD          WHEN URQ  STEP.
0564  F097          DR2  BEX.
0565  F02A          A2  = A2  + B001.              INC  CARD  COUNT
0566  F0B6          IF  NOT  AOV  JUMP.            CARD  6  TEST
0567  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
0568  E002          LIT  = @02@.     9119-1     STATUS
0569  F0AF          IF  LC3  SET  LC3  ELSE  SKIP.
056A  E002          LIT  = @02@.     9119-1     STATUS
056B  F019          SET  LC2.
                   RC006.
056C  F0CB          LIT  EQV  B.
056D  F09D          IF  ABT  SKIP.
056E  883A          CPCR  = STAT2A  - 1.          STATUS  FAILURE
                  *********ERROR       # E 22
056F  F015          IF  LC2  SKIP.
0570  4535          MPCR = RC004  - 1.
                  /
                  *  PORT  SELECT  TESTS
                  *  VERIFY  THAT  AN  ASR  DOES  NOT  DESELECT
                   NOIRQLOOP.
0571  F18E          IF  IRQ  SKIP.
0572  4576          MPCR = NOIRQ  - 1.
                  *
0573  F108          ASR  BEX.          RESET  UNEXPECTED  IRQ
0574  F0E1          MIR  = B.
                  *  UNEXPECTED  IRQ  WAS  ON  ASR  RESULT  IN  MIR
                  *  PRESS  FS  TO  CHECK  IRQ  AGAIN
0575  F000          WAIT.
0576  4570          MPCR = NOIRQLOOP  - 1.
                  *
                   NOIRQ.
                  *  READ  CARD  TO  SET  READER-PUNCH  URQ
0577  F0DB          MIR  = A1.     CW  = 0203
0578  F098          DW2.
0579  F0FC          WHEN SRQ  STEP.
057A  F0EE          MIR  = LIT  L.
057B  C810          LIT  = @10@  SAR  = 8.
057C  F098          DW2.       CW  = 0100          (TERM-  SET  URQ)
057D  F0FD          WHEN URQ  STEP.
057E  F108          ASR  BEX.
```

```
057F  F05F        B.
0580  F1B5        IF  URQ SKIP.
0581  85F2        CPCR = PSERROR - 1.          ASR DE-SELECTS
                *********ERROR      # E 80
0582  F0FF        0 EQV B.              CHECK FOR NO ASR RESPONSE
0583  F09D        IF ABT SKIP.
0584  85F2        CPCR = PSERROR - 1.  ASR NOT 0 WITH NO IRQ
                *********ERROR      # E 81
0585  88AA        CPCR = DESELECT - 1.     RP URQ SHOULD CHANGE TO IRQ
0586  F18E        IF IRQ SKIP.
0587  85F2        CPCR = PSERROR - 1.                NO STINT IRQ
                *********ERROR      # E 82
                *
0588  814E        CPCR = BUSSTEST - 1.
                *********ERROR      # E 183
                * FIRST BUSS TEST WITH READER PUNCH IRQ ON
                *
0589  F108        ASR BEX.
058A  F033        A2 = B.          SAVE RP STATUS
058B  F07F        B = B R.
058C  D800        SAR = 8.
058D  F052        A3 = B L.        CLEAR STATUS BITS
058E  F080        B = BMAR.        GET DEVICE ADDRESS
058F  F078        B = BOTT.
0590  F03C        A3 EQV B.
0591  F09D        IF ABT SKIP.
0592  85F2        CPCR = PSERROR - 1.       ASR ADDRESS WRONG
                *********ERROR      # E 83
                * PRESS FORCE STEP TO DISPLAY RECEIVED ADDRESS IN MIR
                * PRESS FORCE STEP TO DISPLAY CORRECT ADDRESS IN MIR
                *
0593  E042        LIT = @42@.      RP STATUS
0594  F0AF        IF LC3 SET LC3 ELSE SKIP.
0595  E002        LIT = @02@.      9119-1     STATUS
0596  F06A        B = A2 L.
0597  F07F        B = B R.         CLEAR ADDRESS BITS
0598  F0CB        LIT EQV B.
0599  F09D        IF ABT SKIP.
059A  85F2        CPCR = PSERROR - 1.       RP ASR STATUS ERROR
                *********ERROR      # E 91
                *
059B  F0BD        IF NOT IRQ SKIP.
059C  85F2        CPCR = PSERROR - 1.       STINT NOT RESET
                *********ERROR      # E 84
059D  F0DB        MIR = A1.
059E  F098        DW2. CONTROL
059F  88AA        CPCR = DESELECT - 1.
05A0  F097        DR2 BEX.
05A1  F05F        B.
05A2  F0FC        WHEN SRQ STEP.        HANG HERE IF NO READ SELECT
                *********ERROR      # E 89
                *
                * VERIFY MEM READ DOES NOT GENERATE A DEVICE READ
05A3  F080        B = BMAR.
05A4  F078        B = BOTT.
05A5  F0D5        MAR1 = B.
05A6  F0F1        MR1.
05A7  F058        A3 = LIT.
05A8  C80F        LIT = 15 SAR = 8.
05A9  F1AD        IF NOT SRQ SKIP.
05AA  F0F7        SKIP.
05AB  85F2        CPCR = PSERROR - 1.       MR1 RESET SRQ
                *********ERROR      # E 85
                *
                * TEST DINT IRQ
05AC  88AA        CPCR = DESELECT - 1.  RP SRQ SHOULD CHANGE TO IRQ
05AD  F18E        IF IRQ SKIP.
05AE  F000        WAIT.                 NO DINT IRQ
                *********ERROR      # E90
                *
05AF  F097        DR2 BEX.
```

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05B0  F0FC        WHEN SRQ STEP.
                * DO DATA READ ON ALL PORTS EXCEPT READER-PUNCH AND
                * VERIFY READER-PUNCH HAS NOT BEEN ACCESSED
                ACCESSLOOP.
05B1  F05D        ASE.
05B2  F16D        BR2 = A3 L.
05B3  F056        A3 = BMAR.
05B4  F03C        A3 EQV B.
05B5  F09D        IF ABT SKIP.
05B6  F097        DR2 BEX.
05B7  F05E        ASR.              SELECT BR1.
05B8  F0F8        WHEN IRQ STEP.        HANG HERE IF ADDRESS ERROR
                *********ERROR      # E 86
                * READER-PUNCH PORT ACCESSED BY ANOTHER PORT ADDRESS
                *
05B9  F080        B = BMAR.
05BA  F046        A3 = A3 R.
05BB  F04B        A3 = A3 - 1.
05BC  F0B7        IF NOT AOV SKIP.
05BD  45B0        MPCR = ACCESSLOOP - 1.
                *
05BE  F16F        BR2 = BITT.           RESTORE BR2
                *
                * CHECK ASR PRIORITY
05BF  F096        DR1 BEX.
05C0  F097        DR2 BEX.
                * READ CARD TO SET READER-PUNCH URQ
05C1  F0DB        MIR = A1.    CW = 0203
05C2  F098        DW2.
05C3  F0FC        WHEN SRQ STEP.
05C4  C810        SAR = 8 LIT = @10@.
05C5  F0EE        MIR = LIT L.
05C6  F098        DW2.      CW = 1000      (TERM TO CAUSE URQ)
05C7  F0FD        WHEN URQ STEP.
05C8  826E        CPCR = SET-CONT-DINT    - 1.
05C9  88AA        CPCR = DESELECT - 1.
05CA  F0CF        MAR1 = AMPCR.
05CB  014E        AMPCR = CONTPORTADDRESS.
05CC  F0F1        MR1.
05CD  F0F9        WHEN RDC BEX.
05CE  F033        A2 = B.          STORRED CONT STATUS
                *                  SPO = 8X00,   CONSOLE = 8X20
05CF  F108        ASR BEX.
05D0  F116        A2 EQV B.        CHECK CONTROLLER ASR RESPONSE
05D1  F09D        IF ABT SKIP.
05D2  85F2        CPCR = PSERROR - 1.
                *********ERROR      # E 87
05D3  827C        CPCR = RESET-CONT-DINT    - 1.
05D4  826E        CPCR = SET-CONT-DINT    - 1.
05D5  F108        ASR BEX.
05D6  F033        A2 = B.          SAVE READER-PUNCH STATUS
05D7  F0CF        MAR1 = AMPCR.
05D8  014D        AMPCR = PORTADDRESS.
05D9  F0F1        MR1.
05DA  F0F9        WHEN RDC BEX.
05DB  E042        LIT = @42@.
05DC  F0AF        IF LC3 SET LC3 ELSE SKIP.
05DD  E002        LIT = @02@.      9119-1     STATUS
05DE  F087        B = LIT OR B.
05DF  F116        A2 EQV B.
05E0  F09D        IF ABT SKIP.
05E1  85F2        CPCR = PSERROR - 1.       CONT ENST WENT TO RP
                *********ERROR      # E 88
05E2  827C        CPCR = RESET-CONT-DINT    - 1.
05E3  88A6        CPCR = COMP-BREG-IB    - 1.
05E4  F0DB        MIR = A1.
05E5  F098        DW2.              CW = 0203
05E6  F0FC        WHEN SRQ STEP.
05E7  C810        LIT = @10@  SAR = 8.
05E8  F0EE        MIR = LIT L.
05E9  88AA        CPCR = DESELECT - 1.
```

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05EA  80B8          CPCR = ALARM - 1.  ALERT OPERATOR
05EB  88A6          CPCR = COMP-BREG-IB   - 1.
05EC  F05E          ASR.
05ED  F000          WAIT.
                *                PORT SELECT CARD-ENABLE STATUS GATING TEST
                *                  TO VERIFY ONLY THE DEVICE GENERATING AN
                *                  INTERRUPT IS ADDRESSED BY ASR, METER THE
                *                  FOLLOWING SIGNALS
                *                  ONLY THE SIGNALS CORRESPONDING TO THE
                *                  PORT NUMBER OF THE READER-PUNCH SHOULD
                *                  BE 0%
                *                  ALL OTHERS SHOULD BE 100%
                *
                *                  IF YES  FORCE STEP
                *                  IF NO   REPLACE CHIPS A5 B5 C5 C7
                *                          OF PS1 CARD BEING METERED
                **  PORT        PS1-3
                **
                **  12          2J(PSENST12/)
                **  11          1J(PSENST11/)
                **  10          1K(PSENST10/)
                **   9          2B(PSENST09/)
                **                          PS1-2
                **
                **   8                    2J(PSENST8/)
                **   7                    1J(PSENST7/)
                **   6                    1K(PSENST6/)
                **   5                    2B(PSENST5/)
                **                                    PS1-1
                **
                **   4                                2J(PSENST4/)
                **   3                                1J(PSENST3/)
                **   2                                1K(PSENST2/)
                **   1                                2B(PSENST1/)
                **
                **  NOTE - SYSTEM MAY USE 1, 2, OR 3 PS1 CARDS
                *
                *
05EE  C810          LIT = @10@  SAR = 8.
05EF  F0EE          MIR = LIT L.
05F0  F098          DW2.  CW = 0100      TERM TO COMPLETE CC
05F1  F0FD          WHEN URQ STEP.
05F2  45FD          MPCR = SKIP-PST   - 1.
                *
                 PSERROR.
05F3  F0DA          MIR = AMPCR.
05F4  F000          WAIT.
                ********* OBSERVE      MIR
                ********* GO      TO INCREMENTER ADDRESS DISPLAYED IN MIR
05F5  F0DE          MIR = A3.
05F6  F000          WAIT.
05F7  F0E1          MIR = B.
05F8  F000          WAIT.
05F9  F0EA          MIR = LIT.
05FA  F000          WAIT.
05FB  F0DD          MIR = A2.
05FC  F000          WAIT.
05FD  4046          MPCR = TESTSELECT   - 1.
                *
                 SKIP-PST.
                *
05FE  F01E          IF LC3 SKIP.
05FF  4601          MPCR = NOT9119-1    - 1.
                *
0600  F000          WAIT.
                *   END OF 9119-1    READER TEST
                *   RUN TEST 13 TO TEST READ CHECK FUNCTIONS
                *   SEE INCR 07CF+ FOR TEST 13 EXPLANATION
                *   PRESS FS TO GO TO SELECTTEST (PROG STEP 3)
0601  4046          MPCR = TESTSELECT   - 1.
                *
                 NOT9119-1.
0602  F00C          RESET GC1.
0603  F0DB          MIR = A1.
0604  F098          DW2.                          WITH HOPPER EMPTY
                *                                 PREVENT SHOULD INHIBIT SCCL
0605  F05F          B.
0606  F05F          B.
0607  F05F          B.
0608  E052          LIT = @52@.
0609  F1AE          IF NOT URQ SKIP.
060A  460B          MPCR = RC006A   - 1.
060B  8839          CPCR = STAT2   - 1.
                ********* EMPTY      HOPPER          PREVENT FAILED TO SET STINT
                ********* ERROR      # E 26
                 RC006A.
060C  F097          DR2 BEX.
060D  F0CB          LIT EQV B.
060E  F09D          IF ABT SKIP.
060F  883A          CPCR = STAT2A   - 1.        STATUS FAILURE
                ********* ERROR      # E 27
0610  E082          LIT = @82@.
0611  F042          A3 = A1.
0612  F089          B = LIT.
0613  F049          A3 = A3 XOR B.              SET INH INPUT FEED
                *                                 RESET UNLOAD
0614  F0DE          MIR = A3.                   CW = 0281
0615  E042          LIT = @42@.
0616  F098          DW2.
0617  F0FD          WHEN URQ STEP.
0618  F097          DR2 BEX.
0619  F0CB          LIT EQV B.
061A  F09D          IF ABT SKIP.
061B  883A          CPCR = STAT2A   - 1.        STATUS FAILURE
                ********* ERROR      # E 29
                *
                 MC003.
061C  C343          SAR = 3 LIT = @43@.
061D  F077          B = B001.
061E  F0E2          MIR = B C.
061F  F098          DW2.                        CLEAR
0620  F05F          B.
0621  F05F          B.
0622  F05F          B.
0623  F097          DR2 BEX.
0624  F0CB          LIT EQV B.
0625  F09D          IF ABT SKIP.
0626  883A          CPCR = STAT2A   - 1.        STATUS FAILURE
                ********* ERROR      # E 63
                *
                *  END OF READER TEST
0627  C101          SAR = 1 LIT = 1.            WAS READER TEST ENTERED-
0628  81FB          CPCR = TESTFLAGW2   - 1.    FROM CONTROLLER
0629  4046          MPCR = TESTSELECT   - 1.    YES,JUMP TO CONTROLLER
                *  NO,  DOES THE DEVICE BEING TESTED HAVE A PUNCH
062A  C300          SAR = 3 LIT = 0.
062B  81FB          CPCR = TESTFLAGW2   - 1.
062C  4046          MPCR = TESTSELECT   - 1.    NO, JUMP TO CONTROLLER
                *  YES,  CONTINUE WITH PUNCHPRTTEST
                *
062D  F000          WAIT.
                ********* READER      PUNCH CLEARED TO NOT-READY.    OPERATOR
                ********* PUT      PUNCH BACK TO READY STATE (PRESS   START
                ********* BUTTON      ON PUNCH).    IF PUNCH WILL NOT GO TO
                ********* READY      STATE        ERROR # E 64
                *
                ********* READER      TEST COMPLETE.
                ********* REMOVE      TEST CARDS FROM STACKER 1.
                ********* ERROR      IF ANY CARDS IN STACKER 2.
                ********* ERROR      # E 30
                ********* FORCE      STEP (FST)   FOR PUNCH TEST.
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                PUNCH-PRINTTEST.
                *
062E  F0A5          IF  LC1  STEP.
062F  F0A9          IF  LC2  STEP.
0630  F00C          RESET  GC1.
0631  F01F          RESET  GC2.
                PUNCH.
0632  C413          LIT  = @13@  SAR  = 4.
0633  F089          B  = LIT.
0634  F0E1          MIR  = B.                    CW = 0013
0635  F098          DW2.                         FEED  CARD  TO  WAIT  STATION
                PC001.
0636  F05F          B.
0637  E040          LIT  = @40@.
0638  F1AE          IF  NOT  URQ  SKIP.          TEST  FOR  ERROR  URQ.
0639  8839          CPCR  = STAT2  - 1.
                *********ERROR      # E 31
063A  0631          AMPCR = PUNCH - 1.
063B  0635          AMPCR = PC001  - 1.
063C  F1AD          IF  NOT  SRQ  SKIP.
063D  F0F7          SKIP.
063E  F0C9          JUMP.
063F  F077          B  =. B001.
0640  F0E2          MIR  = B  C.
0641  E042          LIT  = @42@.
0642  F098          DW2.                         TERMINATE
0643  F0FD          WHEN URQ  STEP.
0644  F097          DR2  BEX.
0645  F0CB          LIT  EQV  B.
0646  F09D          IF  ABT  SKIP.
0647  883A          CPCR  = STAT2A  - 1.         STATUS  FAILURE.
                *********ERROR      # E 22
0648  C735          LIT  = @35@  SAR  = 7.
0649  F077          B  = B001.
064A  F07D          B  = B  C.
064B  F087          B  = LIT  OR  B.
064C  F017          A1  = B.
064D  F054          A3  = B000.                  A1  = CW  = 0235
064E  F0DB          MIR  = A1.
064F  F098          DW2.
0650  F05F          B.
0651  8888          CPCR  = DELAY2  - 1.
0652  F1AD          IF  NOT  SRQ  SKIP.
0653  F0F7          SKIP.
0654  F000          WAIT.                        DINT  DID  NOT  SET.
                *********ERROR      # E 33
0655  F0DE          MIR  = A3.
0656  F099          DW1.
0657  F05F          B.
0658  F1AD          IF  NOT  SRQ  SKIP.
0659  F000          WAIT.                        DINT  NOT  RESET  AFTER  WRITE
                *********ERROR      # E 34
065A  8888          CPCR  = DELAY2  - 1.
065B  F1AD          IF  NOT  SRQ  SKIP.
065C  F0F7          SKIP.
065D  F000          WAIT.
                *********XFRCP/       FAILED  DINT  NOT  SET  SECOND  TIME
                *********ERROR      # E 35
065E  F0E6          MIR  = 0.
065F  F098          DW2.                         RESET  LOB.
0660  F076          B  = B111.
0661  F049          A3  = A3  XOR  B.
0662  F0DE          MIR  = A3.
0663  F099          DW1.
0664  F05F          B.
0665  8888          CPCR  = DELAY2  - 1.
0666  F1AD          IF  NOT  SRQ  SKIP.
0667  F000          WAIT.                        LOB  NOT  RESETTING
                *********ERROR      # E 36
0668  F066          B  = A1.
0669  F075          B  = BTT0.
066A  F0E1          MIR  = B.
066B  F098          DW2.                              SET  LOB
066C  8899          CPCR  = COLCNT  - 1.  RET  WITH  LIT  = 95  OR  LIT  = 79
066D  F0CA          LCTR.
066E  F05F          B.
066F  F030          INC.       FIRST  COLUMN  PUNCHED  BEFORE  FIRST  LOOP
0670  F05F          B.
0671  467F          MPCR  = LOOP3A  - 1.
                PC002.
0672  8899          CPCR  = COLCNT  - 1.  RET  WITH  LIT  = 95  OR  LIT  = 79
0673  F0CA          LCTR.
0674  F0DB          MIR  = A1.
0675  F098          DW2.
0676  F05F          B.
                LOOP3.
0677  E040          LIT  = @40@.
0678  F1AE          IF  NOT  URQ  SKIP.               TEST  FOR  ERROR  URQ
0679  8839          CPCR  = STAT2  - 1.
                *********ERROR      # E 37
067A  0676          AMPCR = LOOP3  - 1.
067B  F1AD          IF  NOT  SRQ  SKIP.
067C  F0F7          SKIP.
067D  F0C9          JUMP.
067E  F0DE          MIR  = A3.
067F  F099          DW1.
                LOOP3A.
0680  F030          INC.
0681  0686          AMPCR = PC003  - 1.
0682  F09F          IF  COV  JUMP.
0683  F076          B  = B111.
0684  F049          A3  = A3  XOR  B.
0685  4676          MPCR  = LOOP3  - 1.
0686  F05F          B.
                PC003.
0687  E042          LIT  = @42@.
0688  F0FD          WHEN URQ  STEP.
                *********HANG       UP  IF  UNLOAD  BIT  NOT  CLEARING  READ
                *********BUFF       FULL.
                *********ERROR      # E 38
0689  F097          DR2  BEX.
068A  F0CB          LIT  EQV  B.
068B  F09D          IF  ABT  SKIP.
068C  883A          CPCR  = STAT2A  - 1.         STATUS  FAILURE
                *********ERROR      # E 22
068D  0671          AMPCR = PC002  - 1.
068E  F1A5          IF  NOT  LC1  SET  LC1  JUMP.
                *                                 IS  IT  SECOND  CARD
068F  0695          AMPCR = PC004  - 1.
0690  F0AA          IF  LC2  JUMP.               WERE  LAST  2  CARDS
                *                                 PUNCHED  AND  PRINTED
0691  F019          SET  LC2.                    NO
0692  E040          LIT  = @40@.
0693  F011          A1  = A1  + LIT.             CW = 0275
0694  0671          AMPCR = PC002  - 1.
0695  F0C9          JUMP.                        GO  BACK  TO  LOOP
                *                                 DO  PUNCH  AND  PRINT
                PC004.
0696  F07B          B  = B000.                   PUNCH  SEPARATE  PRINT
0697  F033          A2  = B.
0698  D800          SAR  = 8.
0699  F077          B  = B001.
069A  F07D          B  = B  C.
069B  F010          A1  = A1  + B.
                PC005.
069C  8899          CPCR  = COLCNT  - 1.  RET  WITH  LIT  = 95  OR  LIT  = 79
069D  F0CA          LCTR.
069E  F0DB          MIR  = A1.
069F  F098          DW2.                         CW = 0375
06A0  8914          CPCR  = CLEAR80CHRINDEX  - 1.  CLEAR  80  CHAR,  INDEX
                LOOP4.
06A1  E040          LIT  = @40@.
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06A2  F1AE        IF  NOT  URQ  SKIP.              TEST  FOR  ERROR  URQ.
06A3  8839        CPCR  =  STAT2  -  1.
          *********ERROR      # E 40
06A4  06A0        AMPCR  =  LOOP4  -  1.
06A5  F1AD        IF  NOT  SRQ  SKIP.
06A6  F0F7        SKIP.
06A7  F0C9        JUMP.
06A8  F0DE        MIR  =  A3.
06A9  F0BB        IF  NOT  GC1  SKIP.              IS  IT  A  PRINT  CHARACTER
06AA  F0DD        MIR  =  A2.
06AB  F099        DW1.                             WRITE  CHARACTER
06AC  F030        INC.
06AD  06BE        AMPCR  =  PC007  -  1.
06AE  F09F        IF  COV  JUMP.
06AF  06B9        AMPCR  =  PC006  -  1.
06B0  F0A1        IF  GC1  JUMP.
                  *
                  * IF  GC1  JUMP  TO  PC006  TO INCREMENT  PRINT  CHARACTER
                  * IF  NOT  GC1  COMPLEMENT  PUNCH CHARACTER
06B1  C801        SAR  =  8  LIT  =  1.            80-COL  FLAG
06B2  81FB        CPCR  =  TESTFLAGW2  -  1.
                  * ALL  PUNCHES  IS  NOT A  LEGAL  PRINT  CHAR.  FOR 80-COL.
06B3  46B6        MPCR  =  PP80  -  1.   80-COL  DEVICE  BEING  TESTED
                  *
                  * 96-COL  DEVICE  BEING  TESTED
06B4  F076        B  =  B111.
06B5  F049        A3  =  A3  XOR  B.      COMPLEMENT  CHARACTER
06B6  46A0        MPCR  =  LOOP4  -  1.
                  *
                  PP80.
06B7  F077        B  =  B001.
06B8  F049        A3  =  A3  XOR  B.      COMPLEMENT  CHARACTER
06B9  46A0        MPCR  =  LOOP4  -  1.
                  *
                  PC006.
                  *
06BA  F02A        A2  =  A2  +  B001.    INCREMENT  PRINT  CHAR  FOR  96-COL
06BB  C801        SAR  =  8  LIT  =  1.            80-COL  FLAG
06BC  81FB        CPCR  =  TESTFLAGW2  -  1.
06BD  88B1        CPCR  =  INCR80COLCHAR  -  1.    CHANGE  A2  FOR  80-COL
06BE  46A0        MPCR  =  LOOP4  -  1.
                  *
                  PC007.
06BF  06C5        AMPCR  =  PC008  -  1.
06C0  F0A1        IF  GC1  JUMP.                   WAS  COV  FOR  PRINT
06C1  F006        SET  GC1.                        NO
06C2  8899        CPCR  =  COLCNT  -  1.  RET  WITH  LIT  =  95  OR  LIT  =  79
06C3  F0CA        LCTR.
06C4  F034        A2  =  B000.
06C5  46A0        MPCR  =  LOOP4  -  1.
                  PC008.
06C6  F00C        RESET  GC1.                      YES
06C7  E042        LIT  =  @42@.
06C8  F0FD        WHEN  URQ  STEP.
06C9  F097        DR2  BEX.
06CA  F0CB        LIT  EQV  B.
06CB  F09D        IF  ABT  SKIP.
06CC  883A        CPCR  =  STAT2A  -  1.           STATUS  FAILURE.
          *********ERROR      # E 22
06CD  069B        AMPCR  =  PC005  -  1.
06CE  F1A5        IF  NOT  LC1  SET  LC1  JUMP.
                  *                                IS  IT  SECOND  CARD
06CF  D800        SAR  =  8.                       PRINT  AND  PUNCH  ALL  CHARS
06D0  F077        B  =  B001.
06D1  F042        A3  =  A1.
06D2  F07D        B  =  B  C.
06D3  F049        A3  =  A3  XOR  B.               RESET  SEPARATE  PRINT
06D4  F016        A1  =  A3.
                  PC009.
06D5  F054        A3  =  B000.
06D6  F034        A2  =  0.
```

```
06D7  8899        CPCR  =  COLCNT  -  1.  RET  WITH  LIT  =  95  OR  LIT  =  79
06D8  F0CA        LCTR.
06D9  8914        CPCR  =  CLEAR80CHRINDEX  -  1.  CLEAR  80  CHAR  INDEX
06DA  F0DB        MIR  =  A1.      CW  =  0275   1ST  CARD  PUNCH  AND  PRINT
06DB  F098        DW2.      CW  =  0275   1ST  OR  0265   2ND  CARD
06DC  F042        A3  =  A1.
06DD  DA00        SAR  =  10.
06DE  F077        B  =  B001.
06DF  F07D        B  =  B  C.
06E0  F049        A3  =  A3  XOR  B.       RESET  PRINT
06E1  F016        A1  =  A3.       CW  =  0265   2ND  CARD
06E2  F054        A3  =  0.
06E3  F05F        B.
                  LOOP5.
06E4  E040        LIT  =  @40@.
06E5  F1AE        IF  NOT  URQ  SKIP.              TEST  FOR  ERROR  URQ.
06E6  8839        CPCR  =  STAT2  -  1.
          *********ERROR      # E 20
06E7  06E3        AMPCR  =  LOOP5  -  1.
06E8  F1AD        IF  NOT  SRQ  SKIP.
06E9  F0F7        SKIP.
06EA  F0C9        JUMP.
06EB  F0DD        MIR  =  A2.
06EC  F099        DW1.
06ED  F02A        A2  =  A2  +  1.          INCREMENT  A2  FOR  96-COL
06EE  C801        SAR  =  8  LIT  =  1.            80-COL  FLAG
06EF  81FB        CPCR  =  TESTFLAGW2  -  1.
06F0  88B1        CPCR  =  INCR80COLCHAR  -  1.    CHANGE  A2  FOR  80-COL
06F1  06E3        AMPCR  =  LOOP5  -  1.
06F2  F030        INC.
06F3  F05F        B.
06F4  F0B9        IF  NOT  COV  JUMP.
06F5  E042        LIT  =  @42@.
06F6  F0FD        WHEN  URQ  STEP.
06F7  F097        DR2  BEX.
06F8  F0CB        LIT  EQV  B.
06F9  F09D        IF  ABT  SKIP.
06FA  883A        CPCR  =  STAT2A  -  1.           STATUS  FAILURE
          *********ERROR      # E 22
06FB  06D4        AMPCR  =  PC009  -  1.
06FC  F1A5        IF  NOT  LC1  SET  LC1  JUMP.
06FD  C603        SAR  =  6  LIT  =  3.
06FE  F089        B  =  LIT.
06FF  F07D        B  =  B  C.
0700  F13C        A3  =  LIT  +  B.
0701  E077        LIT  =  @77@.
0702  F016        A1  =  A3.                       SET  UP  LOAD,  UNLOAD  AND  STA     E
0703  F058        A3  =  LIT.
0704  E015        LIT  =  @15@.
0705  F05F        B.
0706  C800        SAR  =  8  LIT  =  0.                 80-COL  FLAG
0707  81FB        CPCR  =  TESTFLAGW2  -  1.
0708  470B        MPCR  =  PC010  -  1.  96-COL  DEVICE  BEIGN  TESTED
                  *
0709  CA15        SAR  =  10  LIT  =  @15@.     80-COL  DEVICE  BEING  TESTED
070A  F082        B  =  LIT  L.
070B  F048        A3  =  A3  OR  B.        FOR  80-COL  A3  =  @0555@
                  *
                  PC010.
070C  8899        CPCR  =  COLCNT  -  1.  RET  WITH  LIT  =  95  OR  LIT  =  79
070D  F0CA        LCTR.
070E  F0DB        MIR  =  A1.
070F  F098        DW2.                             CW  =  0C77
0710  F05F        B.
                  LOOP7.
0711  E040        LIT  =  @40@.
0712  F1AE        IF  NOT  URQ  SKIP.              TEST  FOR  ERROR  URQ.
0713  8839        CPCR  =  STAT2  -  1.
          *********ERROR      # E 20
0714  0710        AMPCR  =  LOOP7  -  1.
```

```
0715  F1AD          IF  NOT SRQ  SKIP.
0716  F0F7          SKIP.
0717  F0C9          JUMP.
0718  F0DE          MIR  =  A3.
0719  F099          DW1.
071A  F030          INC.
071B  F076          B  =  B111.
071C  F049          A3  =  A3  XOR  B.
071D  F0B9          IF  NOT COV  JUMP.
071E  887A          CPCR  =  DELAY1  -  1.
071F  887A          CPCR  =  DELAY1  -  1.    EXTRA  DELAY  FOR  80-COL.    DEVICE
0720  F1AD          IF  NOT SRQ  SKIP.
0721  F0F7          SKIP.
0722  F000          WAIT.
                  *********SRQ      FOR  UNLOAD  NOT  PRESENT.   UIB/   FAILED   TO
                  *********INHIBIT       CLRRDBF/   FROM  TERMINATING   UNLOAD  SEQ.
                  *********ERROR      #  E  45
0723  D400          SAR  =  4.
0724  F077          B  =  B001.
0725  F0E2          MIR  =  B  C.
0726  E042          LIT  =  @42@.
0727  F098          DW2.                          TERMINATE
0728  F0FD          WHEN URQ STEP.
0729  F097          DR2  BEX.
072A  F0CB          LIT  EQV  B.
072B  F09D          IF  ABT  SKIP.
072C  883A          CPCR  =  STAT2A  -  1.        STATUS   FAILURE.
                  *********ERROR      #  E  22
072D  E002          LIT  =  2.
072E  F042          A3  =  A1.
072F  F089          B  =  LIT.
0730  F049          A3  =  A3  XOR  B.            RESET   UNLOAD
0731  F016          A1  =  A3.
0732  F0DB          MIR  =  A1.                   CW  =  0C75
0733  F098          DW2.                          SEC  HOPP  EMPTY  INHIBIT    SCCL
0734  F05F          B.
0735  F05F          B.
0736  F05F          B.
0737  E052          LIT  =  @52@.
0738  F097          DR2  BEX.
0739  F0CB          LIT  EQV  B.
073A  F09D          IF  ABT  SKIP.
073B  883A          CPCR  =  STAT2A  -  1.        STATUS   FAILURE.
                  *********ERROR      #  E  47
                  *
                  *  END  OF  PUNCHPRTTEST
073C  C101          SAR  =  1  LIT  =  1.         WAS PUNCH-PRINT    TEST
073D  81FB          CPCR  =  TESTFLAGW2   -  1.   ENTERED  FROM  CONTROLLER
073E  4046          MPCR  =  TESTSELECT   -  1.   YES,   JUMP  TO  CONTROLLER
                  *  NO,  DOES  THE  DEVICE   BEING   TESTED   HAVE  A  KEYBOARD
073F  C500          SAR  =  5  LIT  =  0.
0740  F05F          B.
0741  81FB          CPCR  =  TESTFLAGW2   -  1.
0742  4046          MPCR  =  TESTSELECT   -  1.   NO,   JUMP  TO  CONTROLLER
                  *
                  *  YES,   CONTINUE   WITH   KEYBOARD   TEST
                  *
                    KEYBOARDTEST.
                  *
                    MC001.
0743  C103          LIT  =  3  SAR  =  1.
0744  F077          B  =  B001.
0745  F07D          B  =  B  C.
0746  F087          B  =  LIT  OR  B.
0747  F017          A1  =  B.                     CW  =  8003
0748  F077          B  =  B001.
0749  F07D          B  =  B  C.
074A  C242          LIT  =  @42@  SAR  =  2.
074B  F13C          A3  =  LIT  +  B.             SW  =  4052
074C  F033          A2  =  B.
074D  E008          LIT  =  8.
074E  F0CA          LCTR.
074F  F0E6          MIR  =  B000.                 OPEN  ENABLE  WINDOW
0750  F098          DW2.
0751  F0FD          WHEN URQ STEP.                WHEN OPERATOR  REQUEST
                  *********OPERATOR       PRESS   PROG1  KEY  ON  READER  PUNCH  KYBD
                  *********WHEN       READY  LIGHT   FLASHES,    ENTER   NUM  1   THRU  9.
                  *********PRESS       RELEASE   KEY.
                  *********IF       NO  RESPONSES   TO   PROG1   KEY,   SIGNAL   OPREQ1/
                  *********FAILED       TO  SET   STINT.
                  *********ERROR      #  E  48
0752  8891          CPCR  =  BUSS  -  1.          TEST   EXT  BUSS
                  *********EXT       BUSS   FAILURE
                  *********ERROR      #  E  9
0753  F097          DR2  BEX.
0754  F03C          A3  EQV  B.
0755  F09D          IF  ABT  SKIP.
0756  8853          CPCR  =  STAT3  -  1.         STATUS   ERROR.
                  *********ERROR      #  E  49
0757  F0DB          MIR  =  A1.                   CW  =  8003    OPERATOR   ALERT
0758  F077          B  =  B001.
0759  F051          A3  =  B.
075A  F098          DW2.
075B  F05F          B.
                    LOOP9.
075C  F1AE          IF  NOT URQ SKIP.             TEST   FOR  ERROR  URQ.
075D  8852          CPCR  =  STAT3A  -  1.
                  *********ERROR      #  E  50
075E  075B          AMPCR  =  LOOP9  -  1.
075F  F1AD          IF  NOT SRQ  SKIP.
0760  F0F7          SKIP.
0761  F0C9          JUMP.                         LOOP  UNTIL  OPERATOR
                  *                               KEYS  RELEASE
                  *********ERROR      #  E  51
0762  F096          DR1  BEX.
0763  F030          INC.
0764  F03C          A3  EQV  B.
0765  F09D          IF  ABT  SKIP.
0766  8830          CPCR  =  CHAERR  -  1.
                  *********KEYBOARD       CHARACTER   ERROR
                  *********ERROR      #  E  52
                  *
0767  C800          SAR  =  8  LIT  =  0.         80  COL  FLAG
0768  81FB          CPCR  =  TESTFLAGW2   -  1.
0769  476C          MPCR  =  KEYINC  -  1.        96  COL  DEVICE   BEING   TESTED
                  *
                  *  80  COL  DEVICE   BEING   TESTED
076A  DF00          SAR  =  15.
076B  F045          A3  =  A3  L.      INCRE  80-COL    SHIFT   1  BIT   LEFT
076C  476D          MPCR  =  KEYINC.         SKIP  96-COL    INCREMENT
                    KEYINC.
076D  F04C          A3  =  A3  +  1.   INCRE  96-COL    ADD  1
                  *
076E  075B          AMPCR  =  LOOP9  -  1.
076F  F0B9          IF  NOT COV  JUMP.
0770  C442          LIT  =  @42@  SAR  =  4.
0771  F077          B  =  B001.
0772  F0E2          MIR  =  B  C.
0773  F098          DW2.                          TERMINATE
0774  F0FD          WHEN URQ STEP.
0775  F097          DR2  BEX.
0776  F0CB          LIT  EQV  B.
0777  F09D          IF  ABT  SKIP.
0778  883A          CPCR  =  STAT2A  -  1.        STATUS   FAILURE.
                  *********ERROR      #  E  58
                    MC002.
0779  F0E6          MIR  =  B000.                 OPEN  ENABLE  WINDOW
077A  F098          DW2.
077B  F05E          ASR.
077C  F035          A2  =  BMAR.                  STORE  BR1
077D  F043          A3  =  A2.
077E  C88F          SAR  =  8  LIT  =  @8F@.
```

```
077F  F16C          BR1  = LIT  L.
0780  F099          DW1.                          UNSELECT  READER  PUNCH.
0781  F089          B  = LIT.
0782  E040          LIT  = @40@.
0783  F07D          B  = B C.
0784  F04D          A3 = A3 + B.
0785  E042          LIT  = @42@.
0786  F04E          A3 = A3 + LIT.                A3 = SW = 4P42
0787  F0F8          WHEN IRQ  STEP.
                  *********OPERATOR      PRESS  PROG1  KEY  ON  READER  PUNCH  KYBD
                  *********IF       NO  RESPONSE.
                  *********ERROR       #  E  59
0788  F108          ASR  BEX.
0789  F03C          A3  EQV  B.
078A  F09D          IF  ABT  SKIP.
078B  8853          CPCR = STAT3  -  1.           STATUS  FAILURE
                  *********STATUS       SHOULD  HAVE  BEEN  4P42
                  *********ERROR       #  E  60
078C  F0DB          MIR  = A1.                    CW = 8003
078D  F098          DW2.                          WRITE  OPERATOR  ALERT
078E  F05F          B.
078F  F099          DW1.                          UNSELECT  READER  PUNCH.
0790  F089          B  = LIT.
0791  C20B          SAR  = 2  LIT  = @0B@.
0792  F07D          B  = B C.
0793  F049          A3 = A3 XOR B.
0794  F0F8          WHEN IRQ  STEP.
                  *********OPERATOR      PRESS  RELEASE  KEY
                  *********IF       NO  RESPONSE
                  *********ERROR       #  E  61
0795  F108          ASR  BEX.
0796  F077          B  = B001.
0797  D400          SAR  = 4.
0798  F0E2          MIR  = B C.
0799  F098          DW2.                          TERMINATE
079A  F0D1          MAR1 = A2.
079B  F0FD          WHEN URQ  STEP.
079C  F097          DR2  BEX.
079D  F000          WAIT.
                  *********FOR       PROTOTYPE  SYSTEM  PRESS  FORCE  STEP  -  FST.
                  *********FOR       PRODUCTION  SYSTEM  PRESS  PROG1  KEY  ON
                  *********READER       PUNCH  KEYBOARD  AND  FORCE  STEP  -  FST
079E  F1AE          IF  NOT  URQ  SKIP.
079F  F000          WAIT.
                  *********ENABLE       FAILURE
                  *********ERROR       #  E  71
07A0  C846          LIT  = @46@  SAR  = 8.
07A1  F089          B  = LIT.
07A2  F07D          B  = B C.
07A3  E081          LIT  = @81@.
07A4  F13C          A3 = LIT  + B.
07A5  F016          A1 = A3.
07A6  F0DB          MIR  = A1.
07A7  F098          DW2.                          CW = 4681
07A8  F05F          B.
07A9  887A          CPCR = DELAY1  -  1.
07AA  F1AE          IF  NOT  URQ  SKIP.
07AB  F000          WAIT.                         STATUS  DISABLE  FAILURE
                  *********ERROR       #  E  53
07AC  F0CA          LCTR.
07AD  E0BF          LIT  = @BF@.
07AE  F05F          B.
07AF  C101          SAR  = 1  LIT  = 1.           WAS KEY BOARD TEST  ENTERED
07B0  81FB          CPCR = TESTFLAGW2  -  1.  FROM CONTROLLER
07B1  47B3          MPCR = SKYBDT  -  1.          YES  STATUS  = @42@
07B2  E043          LIT  = @43@.                  NO   STATUS  = @43@
07B3  F0F7          SKIP.
```

```
                    SKYBDT.
07B4  E042          LIT  = @42@.
07B5  F097          DR2  BEX.
07B6  F0FE          Z  EQV  B.
                  *   SW = 4043(AFTER      PUNCH TEST  -  BOTH  HOPPERS  EMPTY)
                  *   SW = 4042(KEYBOARD      TEST  ENTERED  FROM  CONTROLLER)
07B7  F09D          IF  ABT  SKIP.
07B8  883A          CPCR = STAT2A  -  1.          STATUS  FAILURE
                  *********ERROR       #  E  54
07B9  F07B          B  = B000.
07BA  F0E1          MIR  = B.
07BB  F098          DW2.                          DUMMY WRITE  TO  ENABLE  STAT
07BC  F05F          B.
07BD  F05F          B.
07BE  F1AE          IF  NOT  URQ  SKIP.
07BF  F000          WAIT.                         STATUS  DISABLE  PARTIAL  FAIL  E
                  *********ERROR       #  E  55
07C0  E084          LIT  = @84@.
07C1  F089          B  = LIT.
07C2  F0E1          MIR  = B.
07C3  F098          DW2.                          CW = 0084
07C4  F05F          B.
07C5  F05F          B.
07C6  F1AE          IF  NOT  URQ  SKIP.           DID  IR9/  PREVENT  STINT
07C7  F000          WAIT.
                  *********ERROR       #  E  57
07C8  D300          SAR  = 3.
07C9  F077          B  = B001.
07CA  F0E2          MIR  = B C.
07CB  F098          DW2.
                  *   WAS KEYBOARD  TEST  ENTERED  FROM  CONTROLLER
07CC  C101          SAR  = 1  LIT  = 1.
07CD  81FB          CPCR = TESTFLAGW2  -  1.
07CE  4046          MPCR = TESTSELECT  -  1.      YES,  JUMP  TO  CONTROLLER
                  *   NO,  CONTINUE
07CF  F000          WAIT.
                  *********KEYBOARD       TEST  COMPLETE
                  *********PUNCH       TEST  COMPLETE.
                  *********FOR       THE  9419-6      READER-PUNCH
                  *********PUNCH       SHOULD  HAVE  8  CARDS  IN  STACKER  1,
                  *********CARD       #  9  IN  STACKER  6,  AND  CARD  #  10  IN
                  *********STACKER       3.    (THIS  RESULT  IS  PREDICTED,  BASED
                  *********       ON  INTERFACE  SPEC.  NO.  2100  7778)
                  *
                  *********FOR       THE  OTHER  READER-PUNCH  DEVICES
                  *********PUNCH       SHOULD  HAVE  8  CARDS  IN  STACKER  1  AND
                  *********2       CARDS  IN  STACKER  2.
                  *********IF       DISAGREE  ERROR  #  E  65
                  *********SEE       FIGURE  1  FOR  PUNCH  AND  PRINT  INFORMATION
                  *********IF       DISAGREE  ERROR  #  E  66
                  *********INSURE       THAT  ALL  OFF  LINE  TESTS  HAVE  PASSED
                  *********BEFORE       FOLLOWING  INSTRUCTIONS  IN  E  #  66
                  *
                  *********THREE       READER-PUNCH  FUNCTIONS  REMAIN  TO  BE
                  *********TESTED.
                  *********1.       OVERFLOW  MODE.
                  *********2.       READCHECK.
                  *********3.       PUNCHCHECK.
                  *********THESE       FUNCTIONS  ARE  TESTED  BY  SELECTING  TESTS
                  *********11       AND  12  FROM  SELECTTEST,  AND  DOING
                  *********MANUAL       INTERVENTION  TO  FORCE  THE  CONDITION.
                  **********NOTE-       TEST  13  IS  THE  SAME  AS  TEST  11  EXCEPT
                  **********THAT       IT  IS  FOR  THE  9119-1  (STATUS  CHECKS
                  **********ARE       DIFFERENT  FOR  THE  READER-ONLY)
                  *
                  *
                  **********READ       EXPLANATION  OF  TESTS  11  AND  12  BELOW,
07D0  F097          DR2  BEX.
```

```
07D1  4046          MPCR = TESTSELECT   - 1.
                  ***TEST   11  EXPLANATION****       (TEST   13  FOR 9119-1)
                  **TEST   11  READS ANY DATA CARDS FROM PRIMARY HOPPER IN
                  **OVERFLOW   MODE UNTIL A STATUS  CHANGE OCCURRS.   IT  CAN
                  **BE   USED FOR DEBUG OR TO TEST,   1.  OVERFLOW MODE OR
                  **2.   READ CHECK.
                  ****OVERFLOW    TEST
                  ****1.      PLACE  ANY CARDS IN  PRIMARY  HOPPER  AND PARTIALLY
                  ****        FILL   OUTPUT  STACKER  1.  TOTAL  CARDS  IN  PRIMARY
                  ****        HOPPER  AND STACKER  1 SHOULD BE ENOUGH TO CAUSE
                  ****        STACKER  1  TO FILL   AND OVERFLOW  TO  STACKER  2.
                  ****2.      CLEAR  AND READY  READERPUNCH.
                  ****3.      PRESS   FORCE  STEP.(WHEN    INCR   VALUE   =  WAIT  AT  END
                  ****        OF  TEST  4,  5,  6,  OR 7)
                  ****4.      SELECT   TEST  11  (13   FOR  9119-1)      FROM PROG STEP  3
                  ****5.      VERIFY   THAT  CARDS  MOVE  FROM  PRIMARY  HOPPER  TO
                  ****        STACKER  1  UNTIL  STACKER  1  FILLS,    AND  THAT
                  ****        CARDS  CONTINUE  TO  MOVE  FROM  PRIMARY  HOPPER  BUT
                  ****        GO  TO  STACKER  2  INSTEAD.    CARDS  SHOULD  CONTINUE
                  ****        TO  READ  UNTIL   PRIMARY  HOPPER  IS  EMPTY.
                  *********IF       DISAGREE   WITH  OVERFLOW  TEST,   STEP  5
                  *********ERROR      # E 68
                  ****6.      REMOVE  ALL  CARDS  FROM  OUTPUT  STACKERS
                  ****READCHECK    TEST
                  ****1.      PLACE  A PUNCHED  CARD  WITH  APPROXIMATELY
                  ****        1/8   INCH  CUT  OFF  LEADING   EDGE,   IN  PRIMARY
                  ****        HOPPER.
                  ****2.      CLEAR  AND READY  READER  PUNCH.
                  ****3.      PRESS   FORCE  STEP.(WHEN    INCR   VALUE   =  WAIT  AT  END
                  ****        OF  TEST  4,  5,  6,  OR 7)
                  ****3.5     SELECT   TEST  11  (13   FOR  9119-1)      FROM PROG STEP  3
                  ****4.      AFTER  CARD  IS  READ  PRESS   FORCE  STEP  AND  OBSERVE
                  ****        MIR.   VERIFY   MIR  BIT   D4  IS  SET.   OTHER  BITS   ARE
                  ****        DON'T   CARE.    OBSERVE   READER  PUNCH  AND  VERIFY
                  ****        THAT  THE  READCHECK  ERROR  INDICATOR   IS  ON.
                  *********IF       DISAGREE   WITH  READCHECK  TEST,   STEP  4
                  *********ERROR      # E 67
                  ****5.      PUT  READER  PUNCH  ON  LINE/OFF    SWITCH   TO  OFF
                  ****        AND  THEN  BACK  TO  ON  LINE   AND  REMOVE  CARD
                  ****        FROM  STACKER
                  *
                  *****TEST      12  EXPLANATION****
                  ***TEST    12  PUNCHES  CARDS  FROM  SECONDARY  HOPPER  UNTIL  A
                  **STATUS    CHANGE  OCCURES.   THE  PUNCHING  ALTERNATES
                  **BETWEEN    TWO  WORST  CASE  PATTERNS,    TEN  CARDS  EACH.
                  **THIS    TEST  CAN  BE  USED  FOR  DEBUG  OR  TO  TEST  PUNCHCHECK
                  ****PUNCHCHECK    TEST
                  ****1.      LIFT   FRONT  COVER  ON  PUNCH  AND  PULL  OUT
                  ****        INTERLOCK.
                  ****2.      PLACE  APPROXIMATELY   15  BLANK  CARDS  IN  SECONDARY
                  ****        HOPPER  AND  REMOVE  ANY  CARDS  FROM  OUTPUT  STACKERS
                  ****3.      CLEAR  AND READY  READER  PUNCH.
                  ****4.      PRESS   FORCE  STEP.(WHEN    INCR   VALUE   =  WAIT  AT  END
                  ****        OF  TEST  4,  5,  6,  OR 7)
                  ****4.5     SELECT   TEST  12  FROM  PROG  STEP  3
                  ****5.      WHILE  CARDS  ARE  PUNCHING,    BLOCK  OUT  POST  PUNCH
                  ****        READ  LAMP.
                  ****6.      WHEN  PUNCHING  STOPS   PRESS   FORCE  STEP  AND
                  ****        OBSERVE  MIR.    VERIFY   MIR  BIT   D8  IS  SET.   ALL
                  ****        OTHER  BITS   ARE  DON'T   CARE.    OBSERVE   READER
                  ****        PUNCH  AND  VERIFY   PUNCHCHECK   ERROR  INDICATOR
                  ****        IS  ON.
                  *********IF       DISAGREE   WITH  PUNCHCHECK  TEST,   STEP  6
                  *********ERROR      # E 69
                  ****READER    PUNCH  TEST  COMPLETE
                  *
                   OVERFLOWTEST.
                   READ-CHECKTEST.
                  *
                   MC004.          OVERFLOW  AND  READ-CHECK   TEST
07D2  C707           SAR  = 7  LIT  = 7.
07D3  F089           B = LIT.
07D4  F07D           B = B C.
07D5  F087           B = LIT  OR B.
07D6  F017           A1 = B.
                   MC005.
07D7  8899           CPCR = COLCNT - 1.  RET WITH LIT = 95  OR LIT = 79
07D8  F0CA           LCTR.
07D9  F0DB           MIR = A1.
07DA  F098           DW2.                          CW = 0E03
07DB  F05F           B.
                   LOOP10.
07DC  E040           LIT = @40@.
07DD  F0AF           IF LC3 SET LC3 ELSE SKIP.
07DE  E000           LIT = @00@.    9119-1    STATUS
07DF  F1AE           IF NOT URQ SKIP.          TEST FOR INTERUPT
07E0  882A           CPCR = STATUS-CHANGERD  - 1.
                  *********REFER      TO NOTE BELOW ON CHANGES IN STATUS
07E1  07DB           AMPCR = LOOP10  - 1.
07E2  F1AD           IF NOT SRQ SKIP.
07E3  F0F7           SKIP.
07E4  F0C9           JUMP.
07E5  F096           DR1 BEX.
07E6  F030           INC.
07E7  F0B9           IF NOT COV JUMP.
07E8  E042           LIT = @42@.
07E9  F0AF           IF LC3 SET LC3 ELSE SKIP.
07EA  E002           LIT = @02@.    9119-1    STATUS
07EB  F0FD           WHEN URQ STEP.
07EC  F097           DR2 BEX.
07ED  F0CB           LIT EQV B.
07EE  F09D           IF ABT SKIP.
07EF  882B           CPCR = STATUS-CHANGE  - 1.
                  *********FORCE      STEP TO DISPLAY STATUS IN MIR
                  *********IF      READCHECK BEING FORCED BUT FAILED TO
                  *********OCCUR      OR READ CHECK BIT D4 NOT SET IN
                  *********STATUS
                  *********ERROR      # E 67
                  *********IF      OVERFLOW FAILED TO OCCUR
                  *********ERROR      # E 68
07F0  47D6           MPCR = MC005  - 1.
                  *
                   PUNCH-CHECKTEST.
                   MC006.          PUNCH CHECK AND PUNCH EXERCISER
07F1  E013           LIT = @13@.
07F2  F089           B = LIT.
07F3  F0E1           MIR = B.
07F4  F098           DW2.                          MOVE CARD TO WAIT STATION
07F5  F0FC           WHEN SRQ STEP.
07F6  D400           SAR = 4.
07F7  F077           B = B001.
07F8  F0E2           MIR = B C.
07F9  F098           DW2.                          TERMINATE
07FA  F0FD           WHEN URQ STEP.
07FB  F097           DR2 BEX.
07FC  C775           LIT = @75@  SAR = 7.
07FD  F077           B = B001.
07FE  F07D           B = B C.
07FF  F087           B = LIT  OR B.
0800  F017           A1 = B.                       A1 = CW = 0275
0801  F034           A2 = B000.
                   MC007.
0802  F058           A3 = LIT                      CARD COUNTER    10
0803  E009           LIT = 9.
0804  F076           B = B111.
0805  F049           A3 = A3 XOR B.
                   MC009.
0806  8899           CPCR = COLCNT - 1.  RET WITH LIT = 95  OR LIT = 79
0807  F0CA           LCTR.
0808  F0DB           MIR = A1.
0809  F098           DW2.
080A  F05F           B.
```

```
                LOOP11.
080B  E040          LIT  = @40@.
080C  F1AE          IF  NOT  URQ  SKIP.            TEST  FOR  INTERUPT
080D  882A          CPCR  = STATUS-CHANGERD  - 1.
                ********REFER       TO NOTE BELOW ON CHANGES IN STATUS
080E  080A          AMPCR  = LOOP11  - 1.
080F  F1AD          IF  NOT  SRQ  SKIP.
0810  F0F7          SKIP.
0811  F0C9          JUMP.
0812  F0DD          MIR  = A2.
0813  F099          DW1.
0814  F030          INC.
0815  F121          A2  = A2  XOR  B111.   COMPLEMENT  CHARACTER
0816  080A          AMPCR  = LOOP11  - 1.
0817  F0B9          IF  NOT  COV  JUMP.
0818  F121          A2  = A2  XOR  B111.   COMPLEMENT  CHARACTER
0819  F0FD          WHEN URQ STEP.
081A  E042          LIT  = @42@.
081B  F097          DR2  BEX.
081C  F0CB          LIT  EQV  B.
081D  F09D          IF  ABT  SKIP.
081E  882B          CPCR  = STATUS-CHANGE  - 1.
                *********FORCE       STEP  TO DISPLAY  STATUS  IN  MIR
                *********IF        PUNCH CHECK BEING  FORCED  BUT  FAILED  TO
                *********OCCUR       OR PUNCH CHECK  BIT  D8  NOT  SET  IN  STATUS
                *********ERROR       # E 69
081F  F04C          A3  = A3  + B001.
0820  F09E          IF  AOV  SKIP.
0821  4805          MPCR  = MC009  - 1.
0822  F014          IF  LC1  SKIP.
0823  4825          MPCR  = MC010  - 1.
0824  F034          A2  = B000.                    CHANGE  PUNCH  PATTERN
0825  4801          MPCR  = MC007  - 1.
                MC010.
0826  F018          SET  LC1.
0827  CA15          SAR  = 10  LIT  = @15@.
0828  F082          B  = LIT  L.
0829  F03A          A2  = LIT  + B.  CHANGE  PUNCH  PATTER  (A2  = @555@)
082A  4801          MPCR  = MC007  - 1.
                *
                *
                STATUS-CHANGERD.
082B  F097          DR2  BEX.
                STATUS-CHANGE.
082C  F0DA          MIR  = AMPCR.
082D  F000          WAIT.
                **********OBSERVE       MIR
                **********GO       TO INCR  ADDRESS  DISPLAYED  IN  MIR
                *
082E  F0E1          MIR  = B.
082F  F000          WAIT.
                *  STATUS  WORD DISPLAYED  IN  MIR
0830  4046          MPCR  = TESTSELECT  - 1.
                *
                CHAERR.
0831  F0DA          MIR  = AMPCR.
0832  F000          WAIT.
                *********OBSERVE       MIR
                *********GO       TO  INCREMENTER  ADDRESS  DISPLAYED  IN  MIR
0833  F0E1          MIR  = B.
0834  F000          WAIT.                          ERROR  CHARACTER
0835  F0DE          MIR  = A3.
0836  F000          WAIT.                          GOOD  CHARACTER
0837  F0DB          MIR  = A1.
0838  F000          WAIT.                          CONTROL  WORD
                *                                  FORCE  STEP  BACK  IN  PROGRAM
                *                                  OR CLEAR  TO  START  OVER
0839  F0C9          JUMP.
                STAT2.
083A  F097          DR2  BEX.
                STAT2A.
083B  F0BA          IF  NOT  EXT  SKIP.            TEST  FOR  LOOPING
083C  F0A0          IF  EXT  SKIP.
083D  483F          MPCR  = STAT2B  - 1.
083E  F09A          EXEC.
083F  F0C9          JUMP.
                STAT2B.
0840  F1AD          IF  NOT  SRQ  SKIP.
0841  F000          WAIT.
                *********SRQ       SET,  NOTE  AND  FORCE  STEP.
0842  F0DA          MIR  = AMPCR.
0843  F000          WAIT.
                *********OBSERVE       MIR
                *********GO       TO  INCREMENTER  ADDRESS  DISPLAYED  IN  MIR
0844  F0E1          MIR  =  B.
0845  F000          WAIT.                          STATUS  FROM  READER  PUNCH
0846  F089          B  =  LIT.
0847  F0E1          MIR  = B.
0848  F000          WAIT.                          STATUS  SHOULD  BE
0849  C860          SAR  = 8  LIT  = @60@.
084A  F15A          B  = CTR.
084B  F07F          B  = B  R.
084C  F083          B  = LIT  + B.
084D  F07C          B  = B  L.
084E  F0E2          MIR  = B  C.
084F  F000          WAIT.                          COUNTER  VALUE
0850  F0DB          MIR  = A1.
0851  F000          WAIT.                          CONTROL  WORD
                *                                  FORCE  STEP  BACK  IN  PROGRAM
                *                                  OR CLEAR  TO  START  OVER
0852  F0C9          JUMP.
                STAT3A.
0853  F097          DR2  BEX.
                STAT3.
0854  F0BA          IF  NOT  EXT  SKIP.            TEST  FOR  LOOPING
0855  F0A0          IF  EXT  SKIP.
0856  4858          MPCR  = STAT3B  - 1.
0857  F09A          EXEC.
0858  F0C9          JUMP.
                STAT3B.
0859  F0DA          MIR  = AMPCR.
085A  F000          WAIT.
                *********OBSERVE       MIR
                *********GO       TO  INCREMENTER  ADDRESS  DISPLAYED  IN  MIR
085B  F0E1          MIR  = B.
085C  F000          WAIT.                          STATUS  WORD FROM
                *                                  READER  PUNCH
085D  F0DE          MIR  = A3.
085E  F000          WAIT.
085F  F0DD          MIR  = A2.
0860  F000          WAIT.
0861  F0DB          MIR  = A1.
0862  F000          WAIT.
                *                                  FORCE  STEP  BACK  IN  PROGRAM
                *                                  OR CLEAR  TO  START  OVER
0863  F0C9          JUMP.
                STAT4.
0864  F0BA          IF  NOT  EXT  SKIP.            TEST  FOR  LOOPING
0865  F0A0          IF  EXT  SKIP.
0866  4868          MPCR  = STAT4A  - 1.
0867  F09A          EXEC.
0868  F0C9          JUMP.
                STAT4A.
0869  F096          DR1  BEX.
086A  F05F          B.
086B  F1AD          IF  NOT  SRQ  SKIP.
086C  F000          WAIT.
                *********SRQ       WILL  NOT  RESET
                *********NOTE       AND  FORCE  STEP  - FST
086D  F0DA          MIR  = AMPCR.
086E  F000          WAIT.
```

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                *********OBSERVE       MIR
                *********GO      TO  INCREMENTER  ADDRESS  DISPLAYED   IN  MIR
086F    F097            DR2  BEX.
0870    F0E1            MIR  =  B.
0871    F05F            B.
0872    F0B3            IF  MST  SKIP.
0873    F000            WAIT.
                *********NOTE      1
0874    D100            SAR  =  1.
0875    F07D            B  =  B  C.
0876    F05F            B.
0877    F0B2            IF  LST  SKIP.
0878    F000            WAIT.
                *********NOTE      2
0879    F000            WAIT.
                *********NOTE      3
                *                                FORCE  STEP  BACK  IN  PROGRAM
                *                                OR  CLEAR  TO  START  OVER
087A    F0C9            JUMP.
                DELAY1.                          1  SEC
087B    F060            B  =  AMPCR.
087C    F0E1            MIR  =  B.
087D    F07B            B  =  B000.
087E    E007            LIT  =  7.
087F    F0CA            LCTR.
0880    F0F5            SAVE.
0881    F07E            B  =  B  +  1.
0882    F0B6            IF  NOT  AOV  JUMP.
0883    F030            INC.
0884    F0B9            IF  NOT  COV  JUMP.
0885    F08D            BMI.
0886    F05B            AMPCR  =  B.
0887    F05F            B.
0888    F0C9            JUMP.
                DELAY2.                          35  U  SEC        NO  CTR  SAVE
0889    F060            B  =  AMPCR.
088A    F0CA            LCTR.
088B    E00E            LIT  =  @0E@.
088C    F0F5            SAVE.
088D    F030            INC.
088E    F0B9            IF  NOT  COV  JUMP.
088F    F05B            AMPCR  =  B.
0890    F05F            B.
0891    F0C9            JUMP.
                BUSS.
0892    F0F9            WHEN  RDC  BEX.
0893    F0FF            0  EQV  B.
0894    F09C            IF  ABT  JUMP.
0895    F0DA            MIR  =  AMPCR.
0896    F000            WAIT.
                *********OBSERVE       MIR
                *********REFER       TO  MICRO  ADDRESS  IN  MIR
                **FS    TO  DISPLAY   ERROR  BITS   IN  MIR
0897    F0E1            MIR  =  B.
0898    F000            WAIT.                    ERROR  BITS
0899    F0C9            JUMP.
                *
                 COLCNT.
                * RETURN  WITH  LIT  =  79  OR  95  FOR  NUMBER  OF  COLUMNS
089A    F0DA            MIR  =  AMPCR.           SAVE  RETURN
089B    E04F            LIT  =  @4F@.            80-COLUMN
089C    F0CF            MAR1  =  AMPCR.
089D    0209            AMPCR  =  MEMFLAGW2.
089E    F0F1            MR1.
089F    F0F9            WHEN  RDC  BEX.
08A0    F05F            B.
08A1    F0C3            IF  NOT  LST  SKIP.      TRUE  IF  96-COL    DEVICE
08A2    E05F            LIT  =  @5F@.            96-COLUMN
08A3    F08D            BMI.
08A4    F05B            AMPCR  =  B.             RESTORE  RETURN
08A5    F05F            B.
08A6    41D7            MPCR  =  RSTBR1.
                *
                *
                 COMP-BREG-IB.
                * THE  CONTROLLER  SETS  PORT  ADDRESS  BR1  =  INST,BR2  =  DAT
                * THIS  MTR  WAS  WRITTEN  TO  USE  BR2  =  INST,   BR1  =  DATA
                * THIS  ROUTINE  SWITCHES  THE  MTR  BR1  &  BR2  INST  BITS
08A7    F05D            ASE.        SELECT  BR2
08A8    F080            B  =  BMAR.
08A9    F16F            BR2  =  BITT.     SET  INSTRUCTION   BIT  IN  BR2
08AA    41D6            MPCR  =  RSTBR1  -  1.    SET  BR1  =  DATA,  JUMP
                *
                 DESELECT.                       WRITE  TO  PORT  16
08AB    F05D            ASE.
08AC    F080            B  =  BMAR.
08AD    F08F            BR2  =  LIT  L.
08AE    C80F            LIT  =  15  SAR  =  8.
08AF    F098            DW2.
08B0    F16E            BR2  =  B.
08B1    F0C9            JUMP.
                *
                 INCR80COLCHAR.
                * SUB-ROUTINE     INCREMENTS  THROUGH  THE  LEGAL  PRINT-
                * CHARACTERS  FOR  80-COL    DEVICES
                * RETURNS  TO  CALLER  WITH  CHARACTER  IN  A2
08B2    F023            A2  =  AMPCR.            SAVE  RETURN
08B3    F0CF            MAR1  =  AMPCR.
08B4    08C1            AMPCR  =  CHAR80COL.
08B5    F0F1            MR1.
08B6    F0F9            WHEN  RDC  BEX.          NEXT  CHARACTER  INDEX
08B7    E001            LIT  =  1.
08B8    F083            B  =  LIT  +  B.         INCREMENT  INDEX
08B9    F0E1            MIR  =  B.
08BA    F0F3            MW1.                     SAVE  INCREMENTED  INDEX
08BB    F0D5            MAR1  =  B.              ADDRESS  OF  NEXT  CHARACTER
08BC    F0F1            MR1.
08BD    F0F9            WHEN  RDC  BEX.
08BE    F102            AMPCR  =  A2.            RESTORE  RETURN
08BF    F033            A2  =  B.                CHARACTER  TO  A2
08C0    41D6            MPCR  =  RSTBR1  -  1.RESTORE.   BR1  AND  RETURN
                *
                 CHAR80COL.
08C1    0000            CNST  =  @0000@.         NEXT  CHARACTER  INDEX,   CLEARED-
                * BEFORE  EACH  LOOP  THAT  INCREMENTS  THRU  80  CHARACTERS
                * FIRST  COLUMN  CNST  =  0  PUNCHED  BEFORE  THIS  LOOP
08C2    0001            CNST  =  @0001@.         1              1
08C3    0002            CNST  =  @0002@.         2              2
08C4    0004            CNST  =  @0004@.         3              3
08C5    0008            CNST  =  @0008@.         4              4
08C6    0010            CNST  =  @0010@.         5              5
08C7    0020            CNST  =  @0020@.         6              6
08C8    0040            CNST  =  @0040@.         7              7
08C9    0080            CNST  =  @0080@.         8              8
08CA    0100            CNST  =  @0100@.         9              9
08CB    0082            CNST  =  @0082@.         :              8-2
08CC    0084            CNST  =  @0084@.         #              8-3
08CD    0088            CNST  =  @0088@.         @              8-4
08CE    0090            CNST  =  @0090@.         '              8-5
08CF    00A0            CNST  =  @00A0@.         =              8-6
08D0    00C0            CNST  =  @00C0@.         "              8-7
08D1    0800            CNST  =  @0800@.         &              12
08D2    0801            CNST  =  @0801@.         A              12-1
08D3    0802            CNST  =  @0802@.         B              12-2
08D4    0804            CNST  =  @0804@.         C              12-3
08D5    0808            CNST  =  @0808@.         D              12-4
08D6    0810            CNST  =  @0810@.         E              12-5
08D7    0820            CNST  =  @0820@.         F              12-6
08D8    0840            CNST  =  @0840@.         G              12-7
08D9    0880            CNST  =  @0880@.         H              12-8
08DA    0900            CNST  =  @0900@.         I              12-9
08DB    0882            CNST  =  @0882@.                        12-8-2
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08DC  0884          CNST  =  @0884@.      .          12-8-3
08DD  0888          CNST  =  @0888@.      <          12-8-4
08DE  0890          CNST  =  @0890@.      (          12-8-5
08DF  08A0          CNST  =  @08A0@.      +          12-8-6
08E0  08C0          CNST  =  @08C0@.      |          12-8-7
08E1  0400          CNST  =  @0400@.      -          11
08E2  0401          CNST  =  @0401@.      J          11-1
08E3  0402          CNST  =  @0402@.      K          11-2
08E4  0404          CNST  =  @0404@.      L          11-3
08E5  0408          CNST  =  @0408@.      M          11-4
08E6  0410          CNST  =  @0410@.      N          11-5
08E7  0420          CNST  =  @0420@.      O          11-6
08E8  0440          CNST  =  @0440@.      P          11-7
08E9  0480          CNST  =  @0480@.      Q          11-8
08EA  0500          CNST  =  @0500@.      R          11-9
08EB  0482          CNST  =  @0482@.      !          11-8-2
08EC  0484          CNST  =  @0484@.      $          11-8-3
08ED  0488          CNST  =  @0488@.      *          11-8-4
08EE  0490          CNST  =  @0490@.      )          11-8-5
08EF  04A0          CNST  =  @04A0@.      ;          11-8-6
08F0  04C0          CNST  =  @04C0@.      ¬          11-8-7
08F1  0200          CNST  =  @0200@.      0          0
08F2  0201          CNST  =  @0201@.      /          0-1
08F3  0202          CNST  =  @0202@.      S          0-2
08F4  0204          CNST  =  @0204@.      T          0-3
08F5  0208          CNST  =  @0208@.      U          0-4
08F6  0210          CNST  =  @0210@.      V          0-5
08F7  0220          CNST  =  @0220@.      W          0-6
08F8  0240          CNST  =  @0240@.      X          0-7
08F9  0280          CNST  =  @0280@.      Y          0-8
08FA  0300          CNST  =  @0300@.      Z          0-9
08FB  0282          CNST  =  @0282@.                 0-8-2
08FC  0284          CNST  =  @0284@.      ,          0-8-3
08FD  0288          CNST  =  @0288@.      %          0-8-4
08FE  0290          CNST  =  @0290@.      _          0-8-5
08FF  02A0          CNST  =  @02A0@.      >          0-8-6
0900  02C0          CNST  =  @02C0@.      ?          0-8-7
0901  0000          CNST  =  @0000@.      BLANK      NO PUNCHES
0902  0001          CNST  =  @0001@.      1          1
0903  0002          CNST  =  @0002@.      2          2
0904  0004          CNST  =  @0004@.      3          3
0905  0008          CNST  =  @0008@.      4          4
0906  0010          CNST  =  @0010@.      5          5
0907  0020          CNST  =  @0020@.      6          6
0908  0040          CNST  =  @0040@.      7          7
0909  0080          CNST  =  @0080@.      8          8
090A  0100          CNST  =  @0100@.      9          9
090B  0082          CNST  =  @0082@.      :          8-2
090C  0084          CNST  =  @0084@.      #          8-3
090D  0088          CNST  =  @0088@.      @          8-4
090E  0090          CNST  =  @0090@.      '          8-5
090F  00A0          CNST  =  @00A0@.      =          8-6
0910  00C0          CNST  =  @00C0@.      `          8-7
0911  0800          CNST  =  @0800@.      &          12
0912  0801          CNST  =  @0801@.      A          12-1
0913  0802          CNST  =  @0802@.      B          12-2
0914  0804          CNST  =  @0804@.      C          12-3
                CLEAR80CHRINDEX.          ENTERED TO CLEAR THE CHARACTER-
                *  INDEX WORD BEFORE EACH LOOP THAT CYCLES THROUGH ALL-
                *  OF THE LEGAL PRINT CHARACTERS FOR 80-COL DEVICES
0915  F060          B = AMPCR.             SAVE RETURN
0916  F0CF          MAR1 = AMPCR.
0917  08C1          AMPCR = CHAR80COL.
0918  F0DA          MIR = AMPCR.
0919  F0F3          MW1.
091A  F05B          AMPCR = B.             RETORE RETURN
091B  41D6          MPCR = RSTBR1 - 1.          RESTORE BR1 AND RETURN
091C  4000          CNST  =  @4000@.
                FINISH.
```

MANUAL PROCEDURES

E1	OPERATOR ACTION	MACHINE ACTION	A	D	
1	DIRECTED HERE FROM FE MEMORY TEST		4	2	
2	OBSERVE CONSOLE INDICATORS	ERROR LIGHT IS ON	F90	3	
3		FE MEMORY TEST INDICATED THE 9610 PORT FAILING BUSS TEST	4	F 1	
4	USE FOLLOWING TABLE TO ISOLATE ERROR				
	BITS ON FROM FE MEMORY TEST		FAILURE		
	10 AND 15 (ONLY BITS ON FOR READER-PUNCH)		F 2		
	15 (ONLY BIT ON FOR READER ONLY-9119-1)		F 83		
	13, 14, 15, OR 16		F 3		
	9, 10, 11, OR 12		F 4		
	5, 6, 7, OR 8		F 5		
	1, 2, 3, OR 4		F 6		

E2	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR DIGIT B FOR PORT ADDRESS OF READER PUNCH.(PORT ADDRESS IS PORT NO MINUS ONE)		2	7	
2	METER CU1-2N #FP5N!(PSURQ/)	100%	3	E4	
3	METER CU1-2P #FP5P!(PSSRQ/)	100%	6	4	
4	METER RC1-2L (DINT/)	100%	F213	5	
5	HOLDING CLEAR PUSHBUTTON METER RC1-1H #CG(CD)CLEAR(N)!	100%	F36	F214	
6	HOLDING CLEAR PUSHBUTTON METER RC1-1H #CG(CD)CLEAR(N)!	100%	F173	F214	
7	GO TO MTR FOR DEVICE IN PORT ADDRESS DISPLAYED				

E3	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0000	2	5	B
2	PRESS SYSTEM CLEAR. PUT EXT/IRQ SWITCH TO EXT. RESELECT PORT AND TEST.	PROGRAM LOOPING AT ERROR 3	3	2	B B B B
3	METER RC1-2T (READ/)	METER READING 87-94%	4	F 8	
4	METER RC1-1U (INST)	METER READING 100%	F 9	F10	
5	OBSERVE MIR	MIR BIT A8 SET	F14	6	
6	OBSERVE MIR	MIR BIT A4 SET	7	8	
7	METER RC3-2Y (OPREQ/)	METER READING 100%	F15	F16	
8	OBSERVE MIR	ANY MIR B BIT SET	F17	9	
9	OBSERVE MIR	MIR BIT C8 SET	F18	10	
10	OBSERVE MIR	MIR BIT C4 NOT SET	F18	11	
11	OBSERVE MIR	MIR BIT C2 SET	F19	12	
12	OBSERVE MIR	MIR BIT C1 SET	F20	13	
13	OBSERVE MIR	MIR BIT D8 SET	14	15	
14	PUT METER ON RC2-1K (PUNCHCHK/)	METER READING 100%	F21	F22	
15	OBSERVE MIR	MIR BIT D4 SET	16	17	
16	PUT METER ON RC2-2K (READCHK/)	METER READING 100%	F21	F23	B B B
17	OBSERVE MIR	MIR BIT D2 NOT SET	18	24	
18	PUT METER ON RC2-FPB3 (CCC/)	METER READING 0%	F24	19	B B B
19	PUT METER ON RC2-1I (SCCL/)	METER READING 100%	20	F25	
20	PUT METER ON RC2-1L (CCL1/)	METER READING 100%	F26	21	
21	PUT METER ON RC4-1E (CCL/)	METER READING 100%	F27	22	
22	OBSERVE READER PUNCH	READY LIGHT IS FLASHING	23	F28	
23	PUT METER ON RC4-1J (OPALERT/)	METER READING 100%	F29	F30	
24	OBSERVE MIR	MIR BIT D1 SET	25	1	
25	OBSERVE READER PUNCH	READY LIGHT IS ON	26	27	
26	PUT METER ON RC1-1K (READY)	METER READING 0%	F 31	F 32	
27	PUT METER ON RC4-1V (CLEAR/)	METER READING 100%	F33	F34	

E4	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON RC1-2Y (STINT/)	METER READING 0%	F35	F213	B B B B

E5	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F173		B B

E6	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	NONE	NONE	F36		B B

E7	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	PRESS FORCE STEP (FST) OBSERVE MIR	MIR BIT C1 SET	2	3	
2	PUT METER ON RC1-1C (PRIEMORY/)	METER READING 100%	F 37	F 38	
3	OBSERVE MIR	MIR = 0042 (RP) MIR = 0002 (9119-1)	4	9	B B B B
4	OBSERVE READER PUNCH	CARD FED TO WAIT STATION FOR RP. CARD FED FOR 9119-1.	F39	5	B B B B B
5	PRESS SYSTEM CLEAR. PUT EXT/IRQ SWITCH TO EXT. CLEAR READER PUNCH AND RESTART MTR	PROGRAM LOOPING AT ERROR # E7	6	5	B B B B
6	PUT METER ON RC4-2N (INWRB4)	METER READING 5-10%	8	7	
7	PUT METER ON RC4-1Y (WRITE/)	METER READING 92-97%	F 40	F 8	
8	PUT METER ON RC1-2M (CLR/)	METER READING 100%	F 41	10	D D D
9	OBSERVE MIR	MIR BIT D4 SET	F 42	F 43	
10	METER RC1-1H #CG(CD)CLEAR(N)!	0%	F11	F214	D D D B B

E8	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	PRESS FORCE STEP, OBSERVE MIR	MIR = 0042 (RP) MIR = 0002 (9119-1)	2	4	B B B B

2	OBSERVE READER PUNCH	CARD DID NOT FEED TO WAIT STATION (RP). CARD DID NOT FEED (9119-1)	F44	3	B B B
3	PUT METER ON RC4-2G (CLRRDBF/)	METER READING 100%	F 45	F 46	B B B B B
4	OBSERVE MIR	MIR = 8043 (RP) MIR = 8003 (9119-1)	F47		B B B B B
E9	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	PRESS FORCE STEP, OBSERVE MIR	MIR = 003F	F 48	2	
2	OBSERVE MIR	ANY D BIT SET	F 49	3	
3	OBSERVE MIR	ANY C BIT SET	F 50	4	
4	OBSERVE MIR	ANY A BIT SET	F 51		
E10	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP, OBSERVE MIR	MIR = 0040 (RP) MIR = 0000 (9119-1)	2	F43	B B B B B B
2	OBSERVE READER PUNCH	CARD FED TO WAIT STATION (RP) CARD FED (9119-1)	3	7	B B
3	PUT METER ON RC4-2L (DINT/)	METER READING 0%	F 52	4	
4	PUT METER ON RC3-FP4D (UIB)	METER READING 100%	5	F 53	
5	PUT METER ON RC3-FP4L (LBIT4/)	METER READING 100%	6	F 54	B B
6	PUT METER ON RC4-1U (RDINAVL/)	METER READING 0 %	10	F 56	B B B B
7	OBSERVE READER PUNCH	READY LIGHT FLASHING (RP) STEP 8 (9119-1)	F57	8	B B
8	PUT METER ON RC4-2T (PPINL/)	METER READING 100%	9	F 44	
9	PUT METER ON RC2-1I (SCCL/)	METER READING 100%	11	F 59	
10	PUT METER ON RC4-1G (RDBFRFL/)	METER READING 0 %	12	F170	B B
11	PUT METER ON RC2-1B (SCLK)	METER READING 3-5%	F 58	F171	B B
12	NONE	SYSTEM UNDER TEST IS A PROTOTYPE SYSTEM	F 55	13	
13	PUT METER ON RC1-2C (ENABLE)	METER READING 100%	F 55	F172	
E11	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON RC4-2L (DINT/)	METER READING 0%	2	F 60	B B
2	PUT METER ON PS-2Q (PSSRQ/)	METER READING 0%	F61	3	B B B
3	PUT METER ON PS-1R (PSIRQ/)	METER READING 0%	F62	F182	B B B
E12	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F 63		
E13	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F 64		
E14	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON RC3-FP4L (LBIT4/)	METER READING 0%	F 65	F 66	B B
E15	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	OBSERVE READER PUNCH	SECOND CARD FED TO WAIT STATION (RP). SECOND CARD FED (9119-1).	F 67	2	B B
2	PUT METER ON RC4-1E (CCL/)	METER READING 100%	F 68	3	
3	PUT METER ON RC4-2T (PPINL/)	METER READING 100%	F 69	F 70	
E16	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON RC1-2Y (STINT/)	METER READING 0%	2	3	
2	PUT METER ON PS1-1Q (PSURQ/)	METER READING 0%	F 61	F 71	
3	PUT METER ON RC3-1F (STATUS)	METER READING 0%	F 72	F 47	
E17	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F 73		
E18	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0040 (RP) MIR = 0000 (9119-1)	F74	F43	B B
E19	OPERATOR ACTION	MACHINE ACTION			
1	NONE	NONE	F 75		B B
E20	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	PRESS FORCE STEP	NONE	2		
2	OBSERVE MIR	MIR BIT A4 SET	F158	3	

3	OBSERVE MIR	MIR BIT C1 SET	F157	4	
4	OBSERVE MIR	MIR BIT D8 SET	F155	5	
5	OBSERVE MIR	MIR BIT D4 SET	F156	F 43	

E21 OPERATOR ACTION — A D

1 NOTE ERROR CHARACTER IN MIR FOR LATER REFERENCE

2 TEN CARDS ARE LEFT IN SECONDARY HOPPER (SKIP STEP 2 FOR ANY 1 HOPPER DEVICE) — 3 F78

3 PRESS FORCE STEP AND OBSERVE EXPECTED CHARACTER IN MIR

4 DOES CHARACTER ON CARD (SAME ALL COLUMNS) AT WAIT STATION EQUAL EXPECTED CHARACTER IN STEP 3. (SEE CHART BELOW FOR CARD COLUMN AND MIR BIT MATCHING) — 5 F79

5 THE ABOVE STEPS HAVE VERIFIED THAT THE ERROR CARD WAS NOT READ FROM THE SECONDARY HOPPER AND THAT THE READ TEST DECK THROUGH CARD IN WAIT STATION IS GOOD

6 CARD AT WAIT STATION IS PUNCHED COLUMN 1 ONLY (FIRST DATA READ) — 7 10

7 MIR = 8001 — F76 8

8 MIR = 0040 FOR READER-PUNCH DEVICE
MIR = 0000 FOR READER-ONLY DEVICE — 9 10

9 METER RC4-U3 = 0% (ST+INRD) — F77 10

10 STEPS 6, 7, 8, AND 9 VERIFY THAT DATA IS BEING READ. (F76 AND F77 CAUSE STATUS INSTEAD OF DATA TO BE READ).

11 USE THE FOLLOWING TABLE TO FURTHER ISOLATE THE ERROR. NOTE FROM COLUMN 5 IN TABLE THAT MIR BITS FOR CHARACTERS ARE LISTED 16(TOP BIT) THROUGH 5 (BOTTOM BIT). REPLACE EACH X IN COLUMN 1 (NOTE 1) WITH EACH BIT OF THE ERROR CHARACTER. REPLACE EACH X IN COLUMN 2 (NOTE 2) WITH EACH BIT OF THE EXPECTED CHARACTER. FOLLOW THE INSTRUCTIONS IN NOTE 3 FOR EACH BIT IN COLUMN 1 THAT IS DIFFERENT FROM ITS CORRESPONDING BIT IN COLUMN 2.

ERROR CHAR. NOTE 1	EXPEC. CHAR. NOTE 2	CARD PUNCH 80-96		MIR BIT	SIGNAL NAME*	MRTER POINT NOTE 3	FAILURE NOTE 4	NUMBER NOTE 5	NOTE 6
X	X	1	1	16	RDI1L/	RC1-1S	F80	F202	F81
X	X	2	2	15	RDI2L/	RC1-2Q	F80	F201	F82
X	X	3	4	14	RDI4L/	RC1-1P	F80	F201	F84
X	X	4	8	13	RDI8L/	RC1-1L	F80	F202	F84
X	X	5	A	12	RDIAL/	RC1-2U	F80	F203	F87
X	X	6	B	11	RDIBL/	RC1-2V	F80	F203	F87
X	X	7		10	RDICL/	RC3-2J	F80	F204	F210
X	X	8		9	RDIDL/	RC3-1U	F80	F204	F210
X	X	9		8	RDI9L/	RC3-1J	F80	F205	F211
X	X	0		7	RDI10L/	RC3-2K	F80	F206	F211
X	X	11		6	RDI11L/	RC3-1L	F80	F206	F211
X	X	12		5	RDI12L/	RC3-1Y	F80	F207	F212

NOTE 1- ERROR CHARACTER IS 1 OR 0 FOR EACH BIT FROM STEP 1

NOTE 2- EXPECTED CHARACTER IS DISPLAYED IN MIR

NOTE 3- METER READINGS SHOULD BE 0% (LOW) FOR ALL BITS THAT SHOULD BE 1(ON) PER EXPECTED CHARACTER IN MIR AND CHARACTER PUNCHED IN CARD AT WAIT STATION.
METER READINGS SHOULD BE 100% (HIGH) FOR ALL BITS THAT SHOULD BE 0(OFF) PER EXPECTED CHARACTER IN MIR AND CHARACTER PUNCHED IN CARD AT WAIT STATION.

NOTE 4- METER READS HIGH, SIGNAL SHOULD BE LOW

NOTE 5- METER READS LOW, SIGNAL SHOULD BE HIGH

NOTE 6- METER READING EQUALS EXPECTED SIGNAL STATE

* SIGNAL NAMES IN TABLE ARE FOR 96 COL READER CABLE
THE FOLLOWING SIGNAL NAMES ARE DIFFERENT FOR 80 COL. CABLE
RDI4L/ = RDI3L/
RDI8L/ = RDI4L/
RDIAL/ = RDI5L/
RDIBL/ = RDI6L/
RDICL/ = RDI7L/
RDIDL/ = RDI8L/

E22 OPERATOR ACTION — MACHINE ACTION — A D

1	PRESS FORCE STEP	NONE		2	
2	OBSERVE MIR	MIR BIT A8 SET	F159	3	
3	OBSERVE MIR	MIR BIT A4 SET	F158	4	
4	OBSERVE MIR	MIR BIT D8 SET	F155	5	
5	OBSERVE MIR	MIR BIT D4 SET	F156	F 43	

E24	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	NONE	NONE	F 98		
E26	OPERATOR ACTION	MACHINE ACTION			
1	PRESS FORCE STEP AND OBSERVE MIR	MIR BIT D2 NOT SET	2	F101	
2	PUT METER ON RC1-1C (PRIEMORY/)	METER READING 0%	3	4	
3	OBSERVE READER PUNCH	WAIT STATION IS EMPTY	F 99	F 79	
4	OBSERVE READER PUNCH	PRIMARY HOPPER IS EMPTY	F100	F 79	
E27	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0042	F102	F103	
E29	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0043	2	3	
2	OBSERVE READER PUNCH	TEST CARDS ARE IN OUTPUT STACKER 2	F104	F105	
3	OBSERVE MIR	MIR = 0050	F174	E 22 STEP2	
E30	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F106		B B
E31	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0043	2	3	B
2	CLEAR AND READY READER PUNCH WITH SOME BLANK CARDS IN BOTH HOPPERS. PRESS SYSTEM CLEAR. SELECT PORT. SELECT TEST 01(80-COL) OR TEST 02(96-COL). SELECT TEST 12 (PUNCH TEST).	CARD FED FROM PRIMARY HOPPER	F107	F108	B B B B B B B B B B B
3	OBSERVE MIR	MIR = 0052	4	E 20 STEP2	
4	PUT METER ON RC1-2E (SECEMHOP/)	METER READING 100%	F121	F122	
E33	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE READER PUNCH	2 CARDS FED FROM SECONDARY HOPPER	F109	2	
2	PUT METER ON RC4-2T (PPINL/)	METER READING 0%	F110	F111	

E34	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F112		
E35	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F113		B B
E36	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	NONE	NONE	F114		
E37	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 8050	F115	E 20 STEP2	
E38	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 8040	F116	2	
2	OBSERVE MIR	MIR = 0040	F117	E 22 STEP2	
E40	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0042	2	E 20 STEP2	
2	OBSERVE READER PUNCH	CARDS IN OUTPUT STACKER 2	F118	F119	
E45	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F120		B B
E47	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0040	2	E 22 STEP2	
2	PUT METER ON RC1-2E (SECEMHOP/)	METER READING 0%	F121	3	
3	OBSERVE READER PUNCH	SECONDARY HOPPER IS EMPTY	F122	F176	
E48	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON RC3-2Y (OPREQ/)	METER READING 0%	2	F123	
2	PUT METER ON RC1-2W (OPREQ1/)	METER READING 0%	F124	F125	
E49	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0042	F126	E 22 STEP2	

E50	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0050	F127	2	
2	OBSERVE MIR	MIR = 4043	3	4	
3	PUT METER ON RC4-1J (OPALERT/)	METER READING 0%	F128	F129	
4	OBSERVE MIR	MIR = 0040	F175	E 20 STEP2	B B
E51	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	NONE	NONE	F130		
E52	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND RECORD MIR BAD CHARACTER VALUE, PRESS FORCE STEP AND RECORD MIR GOOD CHARACTER VALUE.	OPERATOR RERAN TEST AND GOT SAME DATA FAILURE	F131	F132	
E53	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F144		
E54	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 4042	F145	E 22 STEP2	
E55	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F115		
E56	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0040 (RP) MIR = 0000 (9119-1)	F146	E 22 STEP2	B B B B
E57	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	NONE	NONE	F115		
E58	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0040	F133	E 22 STEP2	
E59	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PUT METER ON PS1-1R (PSIRQ/)	METER READING 0%	F 61	F134	
E60	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0000	F135	2	
2	OBSERVE MIR	MIR B BITS = READER PUNCH PORT # MINUS ONE	3	F136	
3	OBSERVE MIR	MIR = 0X00	F137	4	
4	OBSERVE MIR	MIR = 4X00	F 77	5	
5	OBSERVE MIR	MIR = 0X42	F138	2	
E61	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F139		B B
E63	OPERATOR ACTION	MACHINE ACTION	A	D	B
1	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0053	F115	2	
2	OBSERVE READER PUNCH	READY LIGHT IS OFF	3	F140	
3	PUT METER ON RC1-1K (READY)	METER READING 100%	F141	F142	
E64	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F143		
E65	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F147		
E66	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	ROW 1 PUNCHED ALL COLUMNS ALL CARDS	F148	2	
2	NONE	ROW 2 PUNCHED ALL COLUMMS ALL CARDS	F149	3	B B
3	NONE	ROW 4 (96-COL) OR ROW 3 (80-COL) PUNCHED ALL COLUMNS ALL CARDS	F150	4	B B B B B B
4	NONE	ROW 8 (96-COL) OR ROW 4 (80-COL) PUNCHED ALL COLUMNS ALL CARDS	F151	5	B B B B B B
5	NONE	ROWS A OR B (96-COL) OR ROWS 5 OR 6 (80-COL) PUNCHED ALL COLUMNS ALL CARDS	F152	6	B B B B B B
6	NONE	ROWS A AND B ARE ONLY ROWS PUNCHED ON 96-COL. PUNCH ROWS 5,6,7,8,9,0,11, AND 12 ARE ONLY ROWS PUNCHED ON 80-COL PUNCH	F153	7	B B B B B B
7	NONE	ROW 1 PUNCH MISSING	F148	8	B
8	NONE	ROW 2 PUNCH MISSING	F149	9	

9	NONE	ROW 4 (96-COL) OR ROW 3 (80-COL) PUNCH MISSING	F150	10
10	NONE	ROW 8 (96-COL) OR ROW 4 (80-COL) PUNCH MISSING	F151	11
11	NONE	ROW A OR B (96-COL) OR ROW 5 OR 6 (80-COL) PUNCH MISSING	F152	12
12	NONE	NO PRINTING ON CARDS	F154	13
13	80-COL PUNCH BEING TESTED		14	1
14	NONE	ROW 12 PUNCH MISSING	F180	15
15	NONE	ROW 9,0,11,12,7, OR 8 NOT PUNCHED AS SHOWN IN FIGURE 2	F181	1

E67	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NO CARD MOTION	F160	2
2	OBSERVE MIR	MIR BIT D4 IS ON	4	3
3	PUT METER ON RC2-2K (READCHK/)	METER READING 0%	F 92	F163
4	OBSERVE READER PUNCH	READCHECK INDICATOR DID NOT COME ON	F164	1

E68	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NO CARD MOTION	1A	2
1A	PRESS FORCE STEP AND OBSERVE MIR	MIR = 0052	F121	F160
2	NONE	ALL CARDS WENT TO STACKER 2	F161	3
3	NONE	STACKER 1 FILLED BUT FAILED TO OVERFLOW TO STACKER 2	F162	1

E69	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NO CARD MOTION	F160	2
2	OBSERVE MIR	MIR BIT D8 IS ON	4	3
3	PUT METER ON RC2-1K (PUNCHCHK/)	METER READING 0%	F 92	F165
4	OBSERVE READER PUNCH	PUNCHCHECK INDICATOR DID NOT COME ON	F166	1

E70	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	CAN NOT PUT PUNCH IN READY STATE	2	4
2	PUT METER ON RC1-1K (READY)	METER READING 100%	3	F167
3	PUT METER ON RC4-1V (CLEAR/)	METER READING 100%	F 33	F 34
4	NONE	READY LIGHT FLASHES WHEN PUNCH PUT IN READY STATE	F168	5
5	NONE	CARD FEEDS AS SOON AS PUNCH PUT IN READY STATE	F169	6
6	CONTINUE MTR			

E71	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F172	

E80	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F186	

E81	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F187	

E82	OPERATOR ACTION	MACHINE ACTION	A	D
1	PUT METER ON RC1-2Y (STINT/)	METER READING 0%	F188	F185

E83	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F184	

E84	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F190	

E85	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F192		
E86	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F194		
E87	OPERATOR ACTION	MACHINE ACTION	A	D	
1	READER-PUNCH ON SAME CARD AS CONTROLLER		F195	F196	
E88	OPERATOR ACTION	MACHINE ACTION	A	D	
1	READER-PUNCH ON SAME CARD AS CONTROLLER		F195	F196	
E89	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F191		
E90	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F193		
E91	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F189		

FAILURE DICTIONARY

FAILURE	SUSPECT CHIPS OR PROCEDURE
F1	PERFORM FE MEMORY TEST
F2	RC1 C5
F3	RC2 F5
F4	RC2 F7
F6	RC3 E7
F7	PERFORM CONSOLE MTR
F8	PS E7, F7
F9	RC1 C5, F7, C7, B7
F10	RC1 C5, B5 RC4 C7
F11	RC1 C7
F12	CG C1
F13	USE NEW ERROR NUMBER THE PROGRAM STOPPED AT
F14	RC4 C7 RC3 E7
F15	RC3 F5, E7, E5
F16	READER PUNCH FAILURE SIGNAL OPREQ/ FAILING OR PUNCH NOT PROPERLY CLEARED
F17	RC3 D5, C7, A5, E3
F18	RC2 D3, E1, F7
F19	RC2 D3, F7
F20	RC1 B5 RC2 D3, F7
F21	RC2 E3, E1, F5
F22	READER PUNCH FAILURE, SIGNAL PUNCHCHK/ FAILING OR PUNCH NOT PROPERLY CLEARED
F23	READER PUNCH FAILURE, SIGNAL READCHK/ FAILING OR PUNCH NOT PROPERLY CLEARED
F24	RC2 E3, E1, F5
F25	RC2 A1, A3, C3, D5
F26	RC2 B1, A7, B7, D5
F27	RC4 B3
F28	SIGNAL CCL/ FROM READER PUNCH FAILING

F29 SIGNAL OPALERT/ IN READER PUNCH FAILING

F30 RC4 E7
RC3 C5

F31 RC2 E3, C5, F5

F32 SIGNAL READY FROM READER PUNCH FAILING

F33 READER PUNCH FAILURE - WILL NOT GO TO READY STATE
RC1 D7

F34 RC4 E3, E1

F35 RC1 F7, B5, E5, D5, B7

F36 RC4 A7, C7, C5

F37 RC1 B7, D7, C3, E5

F38 SIGNAL PRIEMORY/ FROM READER PUNCH FAILING

F39 RC2 B1, E3, E1, F5

F40 RC4 D7, D5, B3
RC3 D3

F41 RC2 B7, A7, C1, B1

F42 READ CHECK IN READER PUNCH FAILING

F43 READER PUNCH FAILING, CHECK FOR MISFEED OR JAM, CLEAR PUNCH AND RESTART MTR

F44 RC2 C7, C5, D7

F45 RC4 E7, B7

F46 RC4 D3, C1

F47 RC3 A3, D3

F48 RC1 C7, B7
RC4 C1

F49 RC2 F5

F50 RC2 F7

F51 RC3 E7
PS F7, E7 B

F52 RC4 C7, D5, D1
RC3 E7

F53 RC3 A3, B7, A7
RC2 C1

F54 RC3 C5

F55 RC4 C1, A7, C5, D5, C7, C3, B3, D3

F56 SIGNAL RDINAVL/ FROM READER PUNCH FAILING

F57 RC3 D3

F58 RC2 D5, C3, A3, B1, C1, A1, A7

F59 READER PUNCH FAILING TO RESPOND TO SIGNAL SCCL/

F60 RC4 C7, A7

F61 CU1 BC3
B
B

F62 PS C1, A3, E5, E7, A5 B

F63 RC4 C7, D3, B3, C1

F64 RC4 B5, D5, C7, A3, D7, B7
RC3 B7

F65 RC4 A7, C5, D3

F66 RC3 C5, B7, D3

F67 RC4 B3

F68 RC2 C1, B5, D5

F69 RC4 B7, E7
OR READER PUNCH FAILING TO RESPOND TO SIGNAL CLRRDBF/

F70 RC3 C3, D7, B5
OR READER PUNCH SIGNAL SPRINL/ FAILING
B
B

F71 PS E3, C1, D7, E5, A3 B

F72 RC1 F7, B5, E5, D5, D7, C3, B7, C5, A7

F73 RC1 E5, D5, D7

F74 RC2 D5, B1, C1, C3

F75 RC1 C3, F7, B5, D5

F76 RC4 B3, D1

F77 RC1 C5

F78 RC2 C5, C7, D7

F79 READ TEST DECK IS NOT CORRECT
B
B

F80 SIGNAL (SEE E 21 FOR NAME) FROM READER PUNCH FAILING B
B
B

F81 RC2 E3, C5, F5 B
RC1 C7
OR POSSIBLE READER PUNCH INTERMITTANT DROPPING OF BITS

F82 RC2 E3
OR POSSIBLE READER PUNCH INTERMITTANT DROPPING OF BITS
B
B

F83 RC1 C5 B
RC2 F5 B

F84 RC2 E3, E1, F5
OR POSSIBLE READER PUNCH INTERMITTANT DROPPING OF BITS

F85 SIGNAL RDI4L/ FROM READER PUNCH FAILING

F87 RC2 D3, F7
RC1 F7
OR POSSIBLE READER PUNCH INTERMITTANT DROPPING OF BITS

F90 PARITY ERROR, PERFORM FE MEMORY TEST

F91 READER PUNCH INTERMITTANT FAILURE TO LOAD CORRECT DATA TO READ BUFFER

F92 RC2 E3

F93 RC1 F7
RC2 D3

F94 RC2 D3
RC3 A5

F95 RC3 D5, F5, E3

F96 RC3 D5, C7, E3

F97 RC3 D5, C7, A5

F98 READER PUNCH FAILING WORST CASE READ DATA OR READER TEST DECK NOT CORRECT

F99 RC1 C3, A7, D7, E5, B7

F100 SIGNAL PRIEMORY/ FROM READER PUNCH FAILING

F101 RC1 B7, B5, E5

F102 RC2 D3

F103 RC2 A7

F104 RC2 C1, B1
RC1 B5

F105 RC2 C7, C5, D7, B7, A7
OR READER PUNCH FAILING TO RESPOND TO SIGNAL INHINF0/

F106 RC3 B7, C3, D7, B5, C7, D3, A5
OR READER PUNCH FAILING TO DECODE STACKER SELECT LINES

F107 RC2 C5, C7, D7
OR SIGNAL SECFDSEL/ FAILING IN READER PUNCH

F108 SECONDARY HOPPER FEED FAILING

F109 RC2 C7, C5, D7
OR PUNCH FAILING TO RESPOND TO SIGNAL PUNCH/

F110 RC2 E1
RC3 A3
RC4 C1, C3, D5

F111 SIGNAL PPINL/ FROM PUNCH FAILING

F112 RC4 C1, D3

F113 RC4 D5, D7
OR PUNCH FAILING TO RESPOND TO SIGNAL XFRCP/

F114 RC3 A3
RC2 E1
RC4 C1

F115 RC1 C3, E5

F116 RC2 C1
RC3 A3

F117 RC4 B7, C3

F118 RC3 B7

F119 RC3 C3, D7, B5
OR PUNCH FAILING TO RESPOND TO SIGNAL SPRINL/

F120 RC4 C3

F121 RC1 C3, D7, B7

F122 SIGNAL SECEMHOP/ FROM READER PUNCH FAILING

F123 SIGNAL OPREQ/ FROM READER PUNCH FAILING

F124 RC1 B7, D5, A5, E5

F125 RC3 E5, F5

F126 RC3 E7

F127 RC1 C3, A7, E5

F128 RC4 E7, B3
RC3 D3, C5, A7

F129 SIGNAL OPALERT/ FAILING AT READER PUNCH

F130 READER PUNCH FAILING TO GIVE SIGNALS RDBFRFL/ OR RDINAVL/ WHEN RELEASE KEY PRESSED

F131 READER PUNCH FAILING TO LOAD CORRECT KEYBOARD DATA TO INPUT BUFFER

F132 OPERATOR ERROR, RESTART MTR

F133 RC3 A7, C5
RC4 B3

F134 PS E3, D3, C3, D5

F135 PS B5, B3, D3, C5

F136 PS C5, B5, B7

F137 PS C7, B5

F138 RC4 D1

F139 PS D5

F140 RC4 E1, E3, E5
RC3 A3, D3
OR READER PUNCH FAILING TO RESPOND SIGNAL CLEAR/

F141 RC1 A7, D7
RC2 E3

F142 SIGNAL READY FROM READER PUNCH FAILING

F143 RC4 E1
RC3 A3

F144 RC3 A3, D3
RC1 B7, C5

F145 READER PUNCH FAILING TO GO NOT READY WITH NO CARDS IN WAIT STATION AND BOTH HOPPER

F146 RC2 A7, C1

F147 RC3 C3, D7, B5
OR SIGNALS SS1L/, SS2L/, SS4L/, FAILING AT READER PUNCH

F148 RC2 B3, E7
OR PUNCH FAILING TO RESPOND TO SIGNAL PPI1L/

F149 RC2 B3, E7
OR PUNCH FAILING TO RESPOND TO SIGNAL PPI2L/

F150 RC2 B3, E7
OR PUNCH FAILING TO RESPOND TO SIGNAL PPI4L/
(96-COL) OR SIGNAL PPI3L/ (80-COL)

F151 RC2 B3, E7, C5
OR PUNCH FAILING TO RESPOND TO SIGNAL PPI8L/
(96-COL) OR SIGNAL PPI4L/ (80-COL)

F152 PUNCH FAILING TO RESPOND TO SIGNALS PPIAL/ OR PPIBL/
(96-COL) . OR SIGNALS PPI5L/ OR PPI6L/ (80-COL)

F153 RC2 B3

F154 RC2 C7, C5, D7
OR PUNCH FAILING TO RESPOND TO SIGNAL PRINT/

F155 IF PERFORMING READER TEST SIGNAL PUNCHCHK/ FROM PUNCH FAILING
IF PERFORMING PUNCH TEST, CHECK PUNCHED CARDS FOR BAD REGISTRATION OR INCORRECT PUNCHING. IF CARDS CORRECT SIGNAL PUNCHCHK/ FROM PUNCH FAILING

F156 SIGNAL READCHK/ FROM READER PUNCH FAILING OR BAD REGISTRATION ON READ DECK

F157 SIGNAL PRIEMORY/ OR SECEMHOP/ FROM READER PUNCH HOPPERS FAILING, OR READ OR PUNCH DECK CARD AMOUNT NOT CORRECT

F158 SIGNAL OPREQ/ FROM READER PUNCH FAILING OR PROG1 KEY WAS PRESSED BY MISTAKE

F159 INTERMITTANT SIGNAL DINT/ FAILURE, RESTART MTR

F160 CLEAR AND READY PUNCH, PRESS SYSTEM CLEAR, RESELECT PORT AND RESELECT TEST FROM READER PUNCH KEYBOARD

F161 RC3 C3, D7, B5
OR SIGNAL SS4L/ FAILING AT PUNCH

F162 OVERFLOW MODE FAILING AT PUNCH

F163 READER PUNCH INTERNAL READCHECK FUNCTION FAILURE

F164 INTERNAL READER PUNCH FAILURE, PROBABLE READCHECK LAMP BAD

F165 READER PUNCH INTERNAL PUNCHCHECK FUNCTION FAILURE

F166 INTERNAL READER PUNCH FAILURE, PROBABLE PUNCHCHECK LAMP BAD

F167 READY LINE FROM PUNCH GOOD, PROBABLE READY LAMP BAD

F168 RC4 E7
RC3 C5
OR SIGNAL OPALERT FAILING AT READER PUNCH

F169 RC2 D5, C3, A3, A1
OR SIGNAL SCCL/ FAILING AT READER PUNCH

F170 SIGNAL RDBFRFL/ FROM READER PUNCH FAILING

F171 NO S CLOCKS TO THIS DDP #CDSCLKPCN)! ON CD

F172 RC3 A7
RC1 E3 OR B1, F3 OR B3, A7

F173 RC1 B5 C5 C7

F174 RC1 B5

F175 RC1 D5

F176 PUNCH TEST DECK HAS WRONG AMOUNT OF CARDS

F180 RC3 D7 C3 B5
OR SIGNAL PPI12L/ FAILING IN READER PUNCH

F181 SIGNAL PER FOLLOWING TABLE FAILING IN READER PUNCH

CARD ROW	SIGNAL NAME
7	PPI7L
8	PPI8L
9	PPI9L
0	PPI0L
11	PPI11L
12	PPI12L

F182 PS C1, D1, B3, D7, E3

F183 PS B5

F184 PS C5, B7

F185 PS F7, B3, B5
MU4 D5

F186 PS A5, B5, A7, C1, C3

F187 PS B3 AND D3 OF ALL PS CARDS

F188 PS A3, C1, C3, D3, D5, E3, E5

F189 PS C7, B5, C5, A5

F190 PS A5, C7
RC1 C5

F191 PS A5, B5, C1

F192 PS F7

F193 PS D5

F194 PS E7, F7
MU4 D5

F195 PS A5, B5, C5, C7

F196 PS B3 (ON PS USED BY READER-PUNCH)
PS B5 (ON ALL OTHER PS CARDS)

F201 SIGNAL (SEE E 21 FOR NAME) FROM READER PUNCH FAILING
RC1 A5
RC2 E3

F202 SIGNAL (SEE E 21 FOR NAME) FROM READER PUNCH FAILING
RC1 E7
RC2 E3

F203 SIGNAL (SEE E 21 FOR NAME) FROM READER PUNCH FAILING
RC1 E7, F7

F204 SIGNAL (SEE E 21 FOR NAME) FROM READER PUNCH FAILING
RC3 A5
RC2 D3

F205 SIGNAL (SEE E 21 FOR NAME) FROM READER PUNCH FAILING
RC3 A5, C7

F206 SIGNAL (SEE E 21 FOR NAME) FROM READER PUNCH FAILING
RC3 E3, C7

F207 SIGNAL (SEE E 21 FOR NAME) FROM READER PUNCH FAILING
RC3 E3, F5

F210 RC2 D3, E1,F7
OR POSSIBLE READER PUNCH INTERMITTANT DROPPING OF BITS

F211 RC3 C7, D5
OR POSSIBLE READER PUNCH INTERMITTANT DROPPING OF BITS

F212 RC3 F5, D5
OR POSSIBLE READER PUNCH INTERMITTANT DROPPING OF BITS

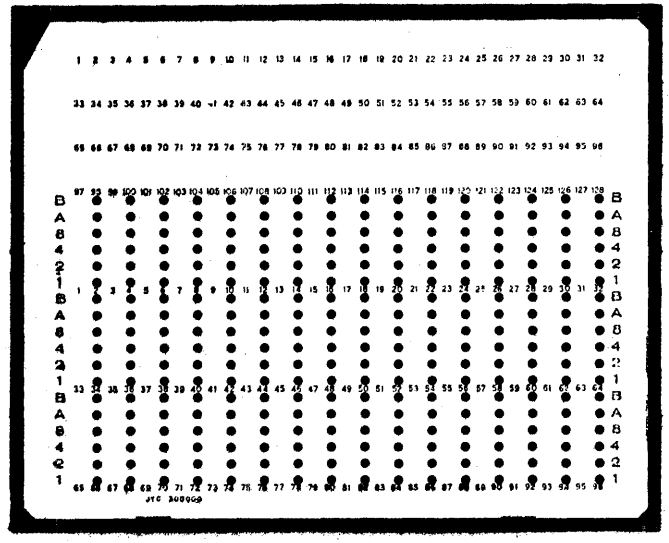
F213 PS E3, D7, D1, C1, B3

F214 CG1 C1 (FOR B721 CG2 C3 & CD2 A5)

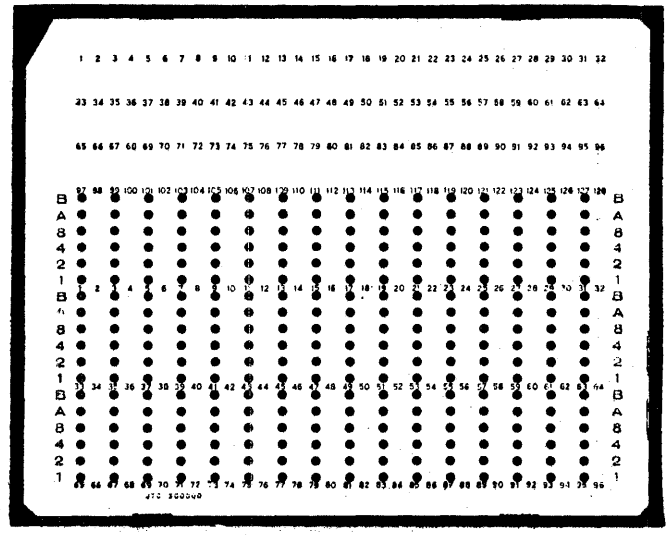
ILLUSTRATIONS

FIGURE 1 EXPECTED PUNCHED DECK FOR 96-COLUMN PUNCH TEST

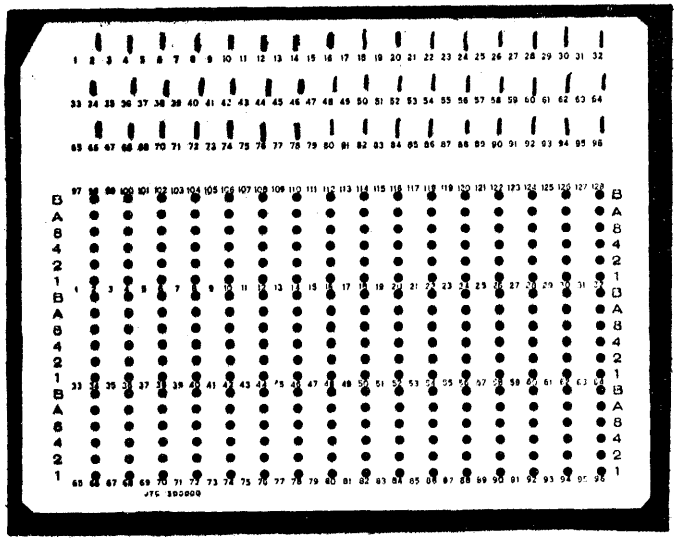
CARD # 1



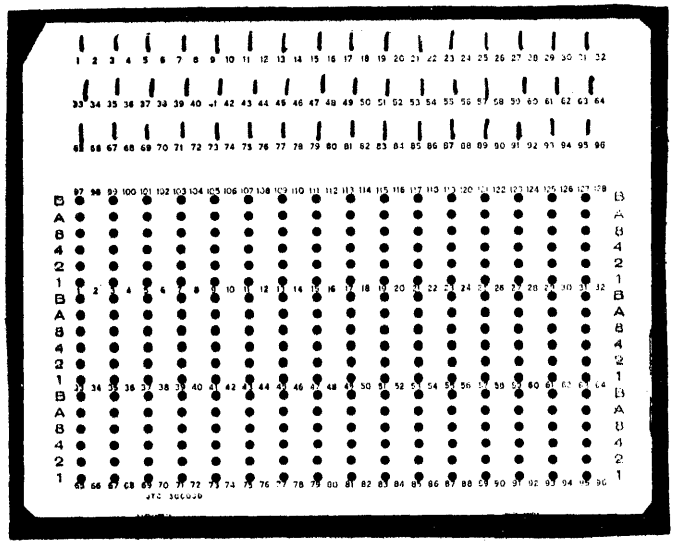
CARD # 2



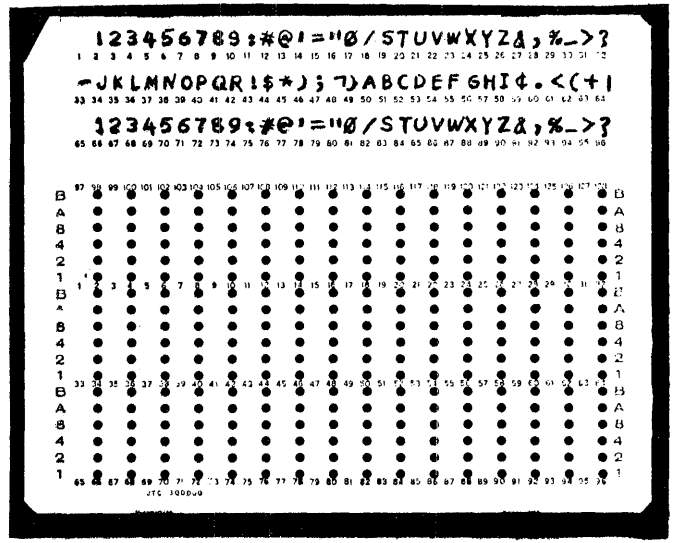
CARD # 3



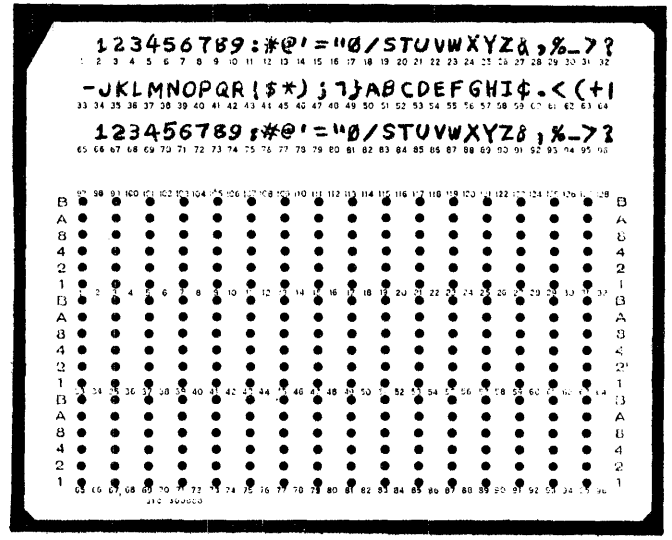
CARD # 4



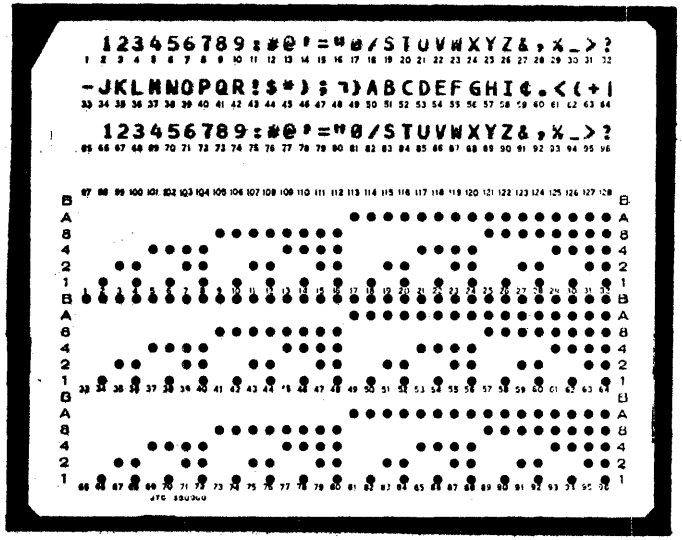
CARD # 5



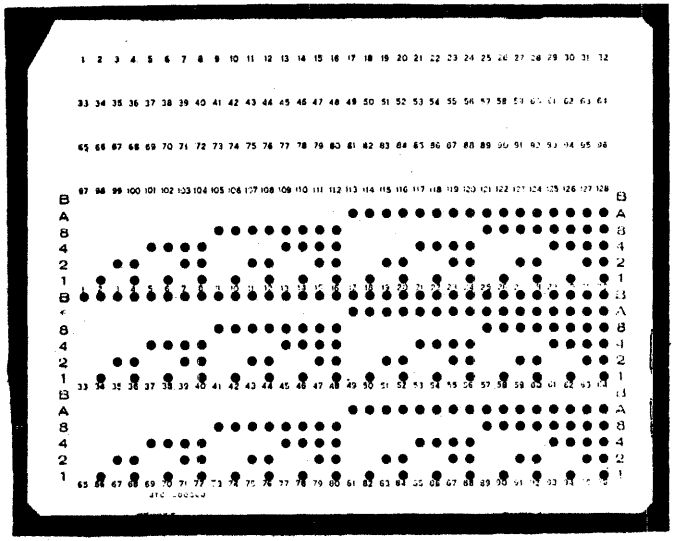
CARD # 6



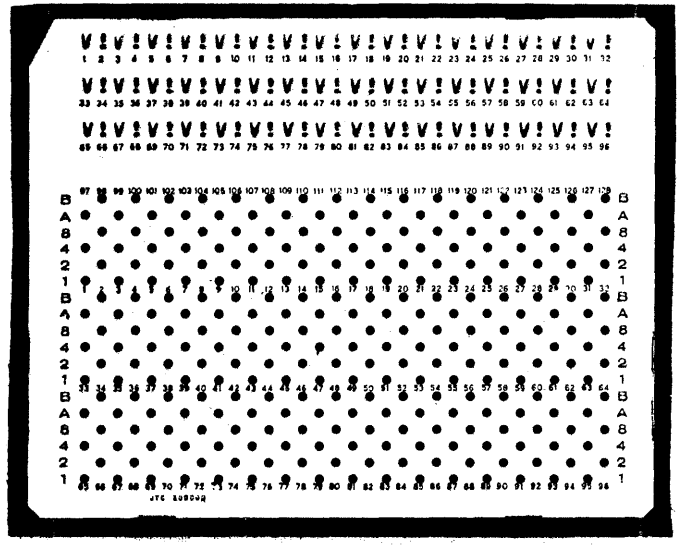
CARD # 7



CARD # 8



CARD # 9



CARD # 10

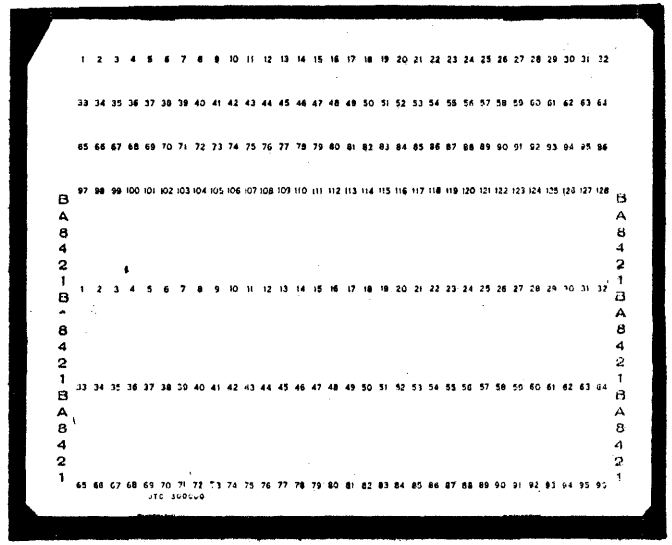
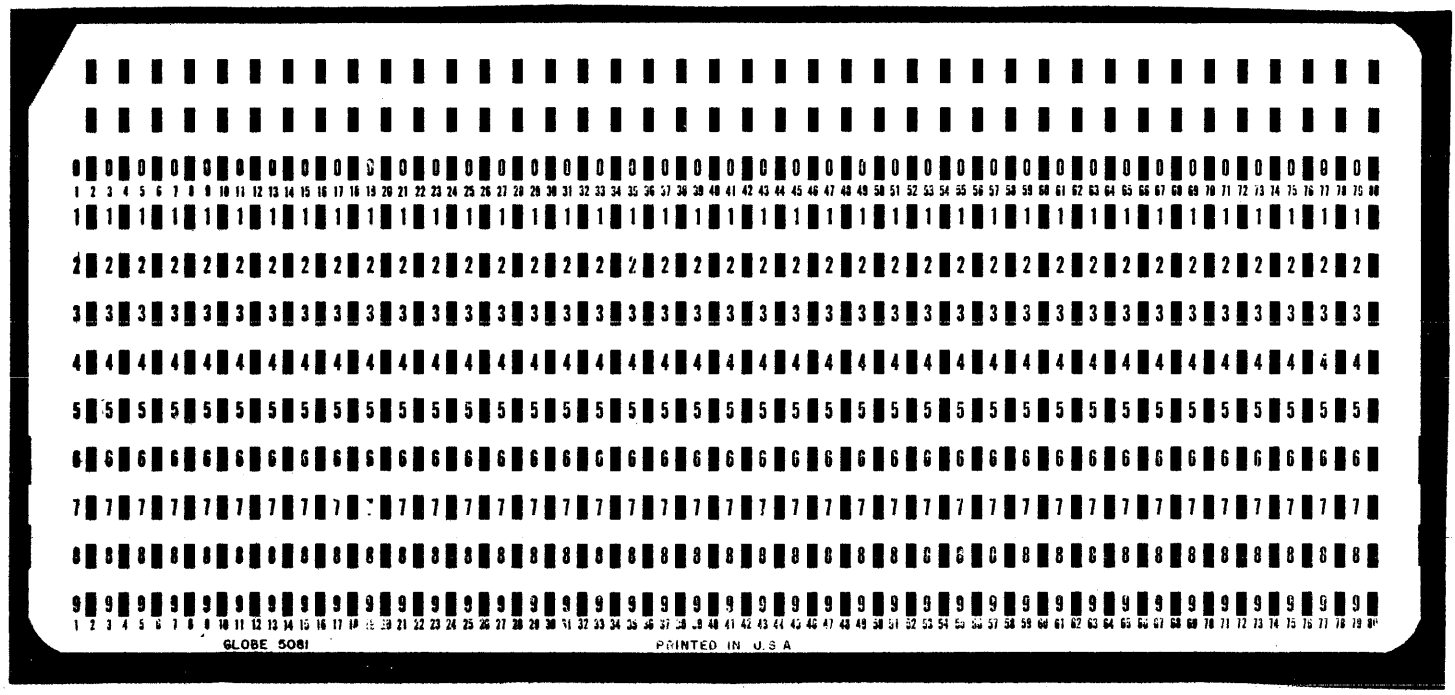


FIGURE 2 EXPECTED PUNCHED DECK FOR 80-COLUMN PUNCH TEST

CARD # 1



CARD # 2

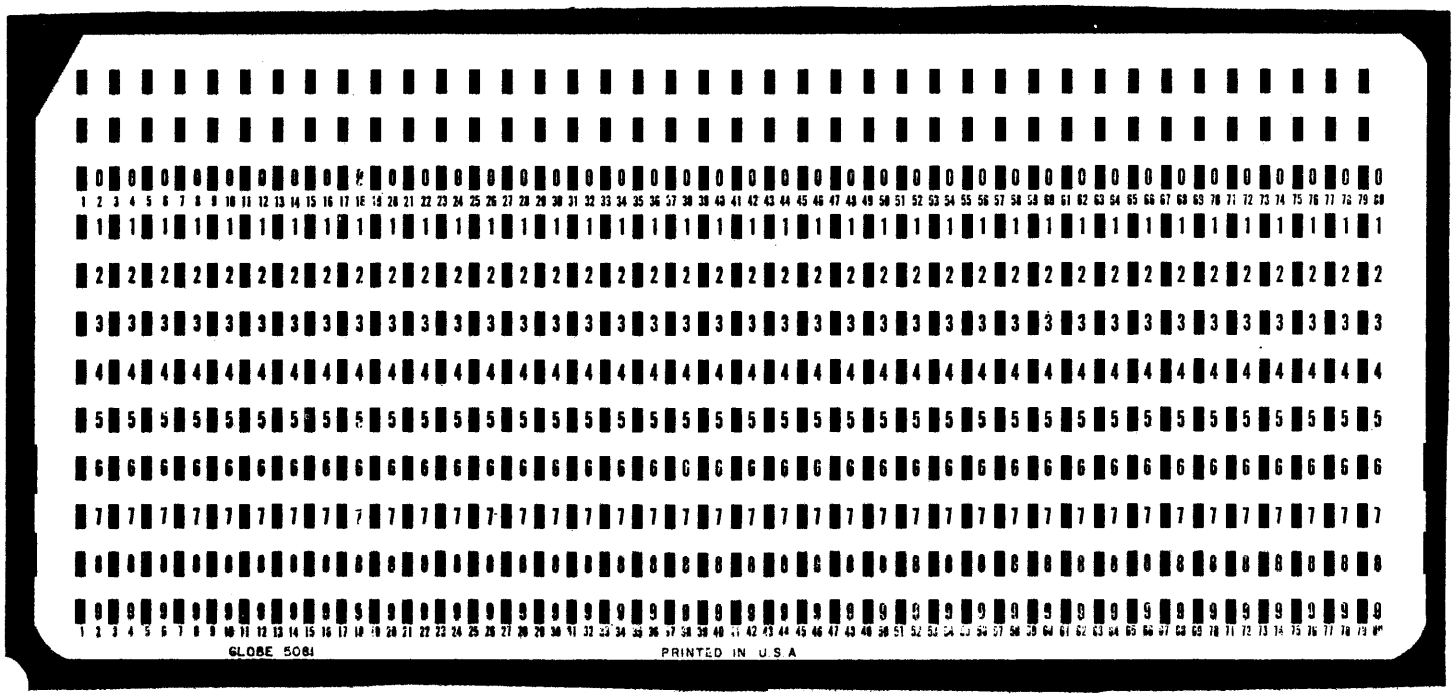
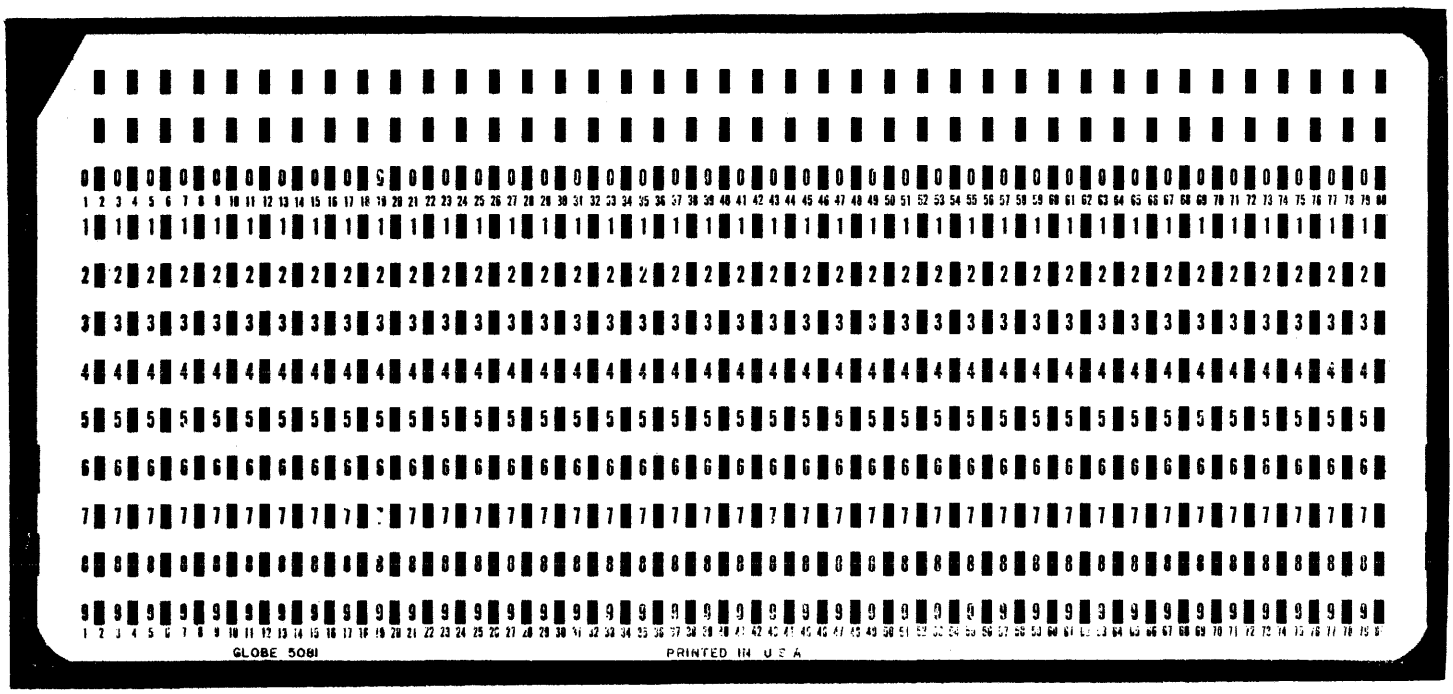


FIGURE 2 EXPECTED PUNCHED DECK FOR 80-COLUMN PUNCH TEST

CARD # 3



CARD # 4

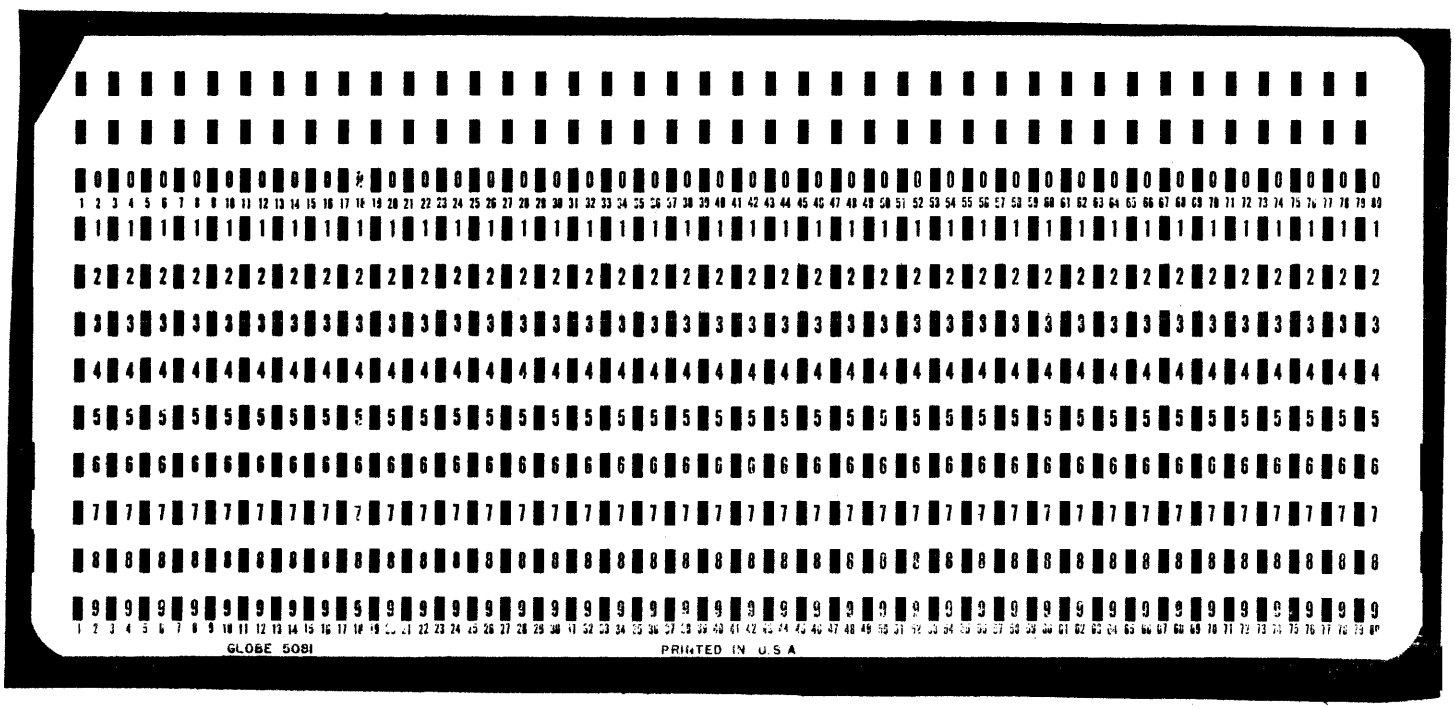
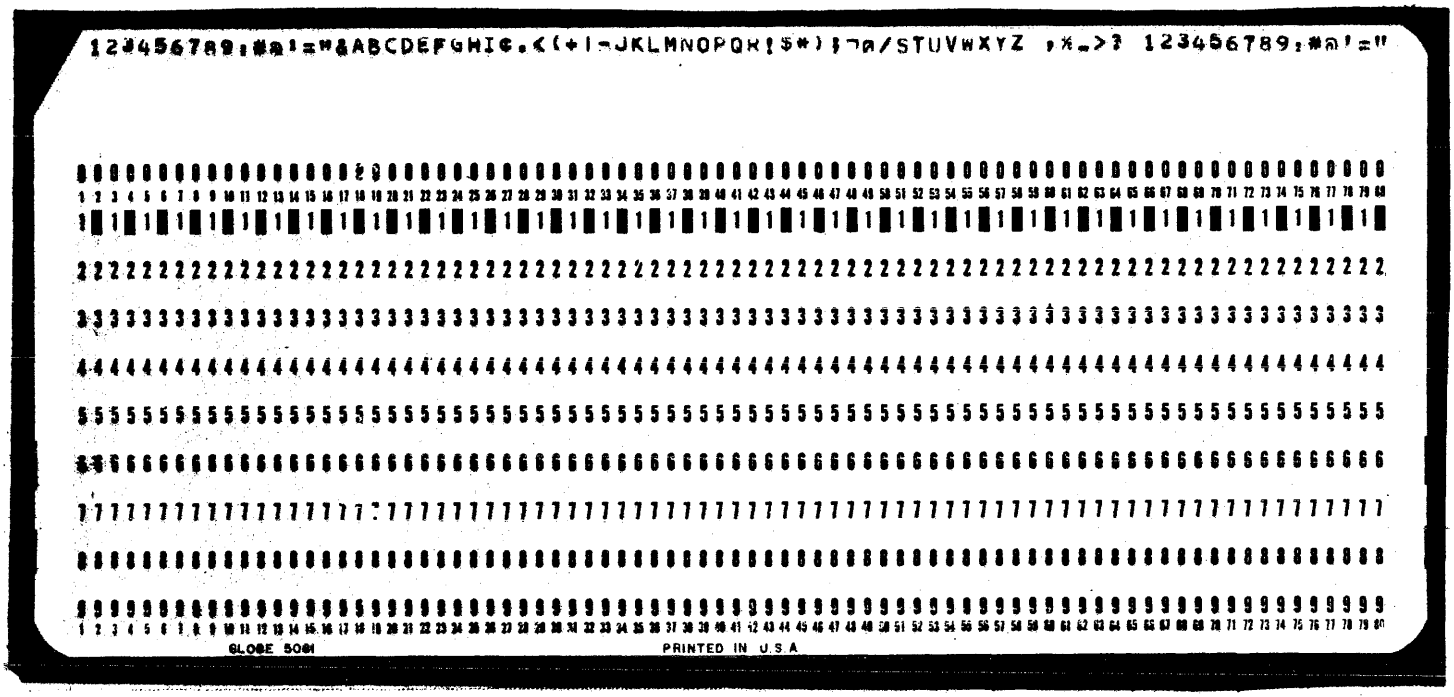


FIGURE 2 EXPECTED PUNCHED DECK FOR 80-COLUMN PUNCH TEST

CARD # 5



CARD # 6

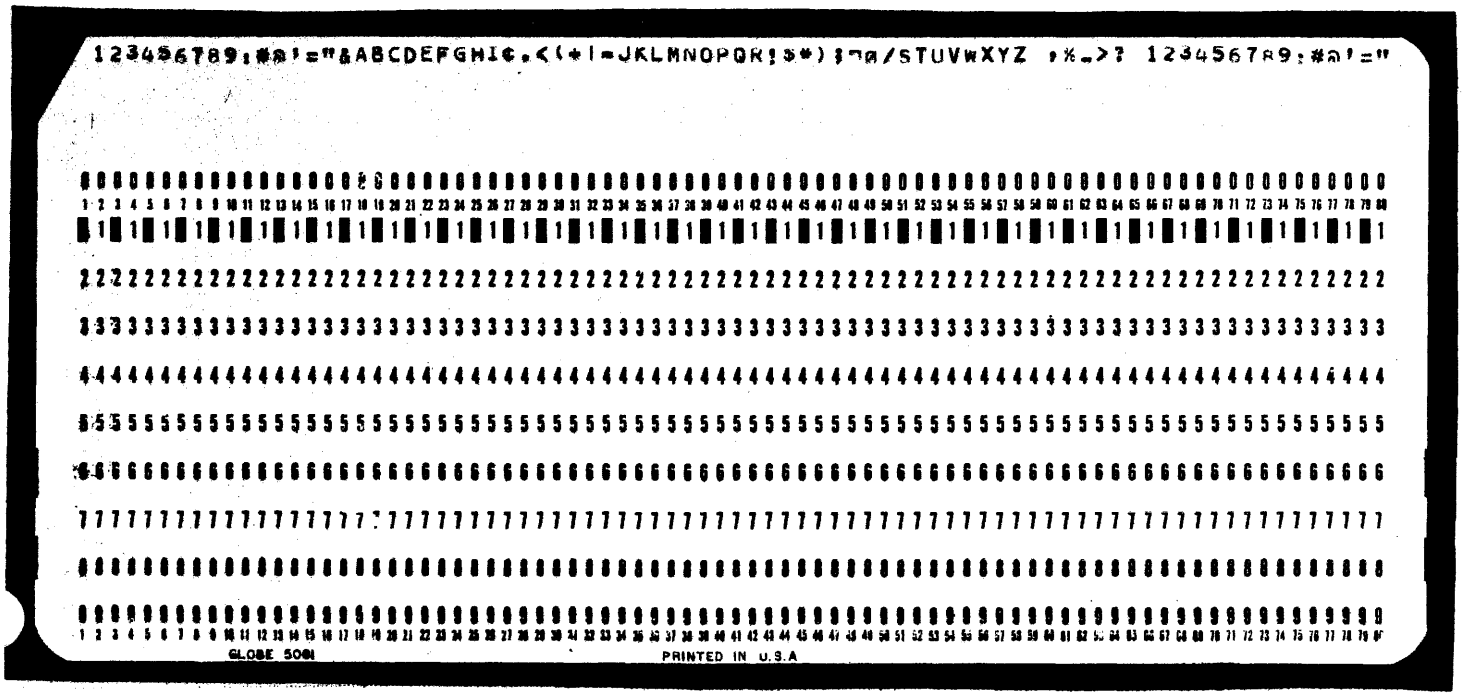
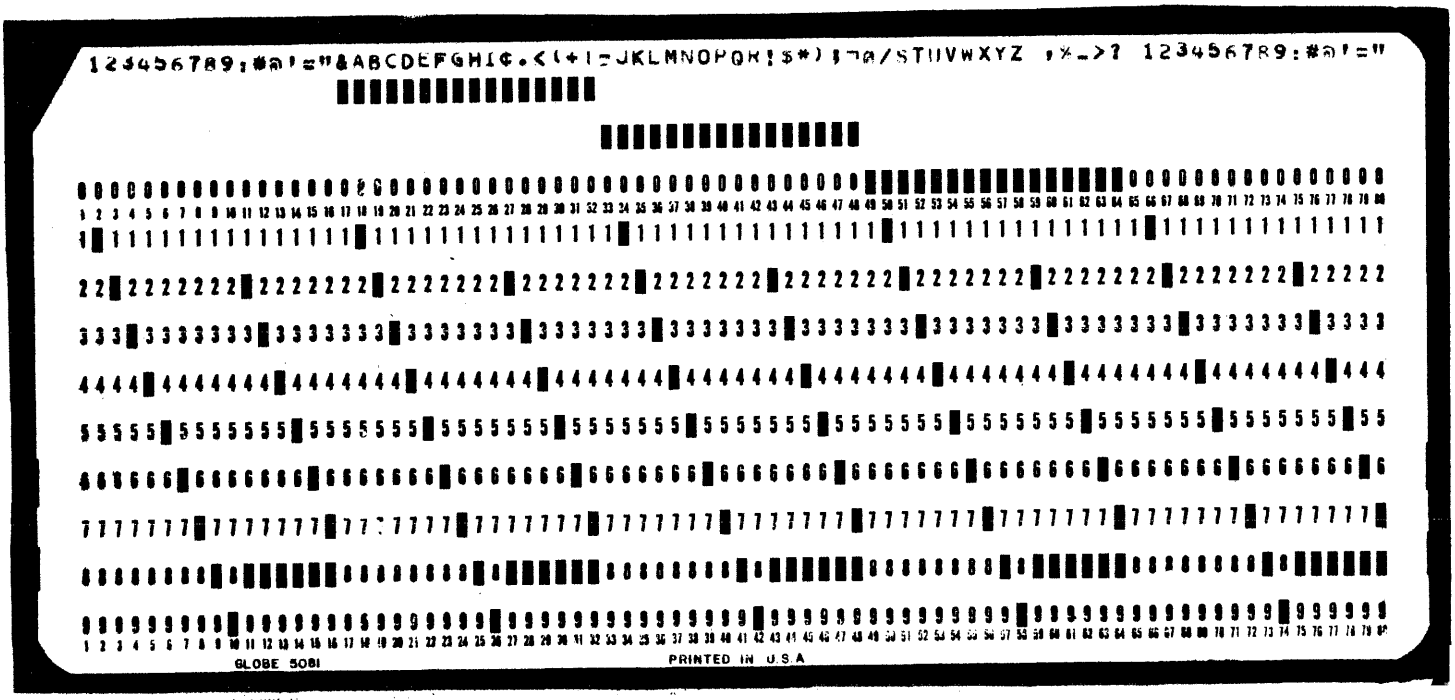


FIGURE 2 EXPECTED PUNCHED DECK FOR 80-COLUMN PUNCH TEST

CARD # 7



CARD # 8

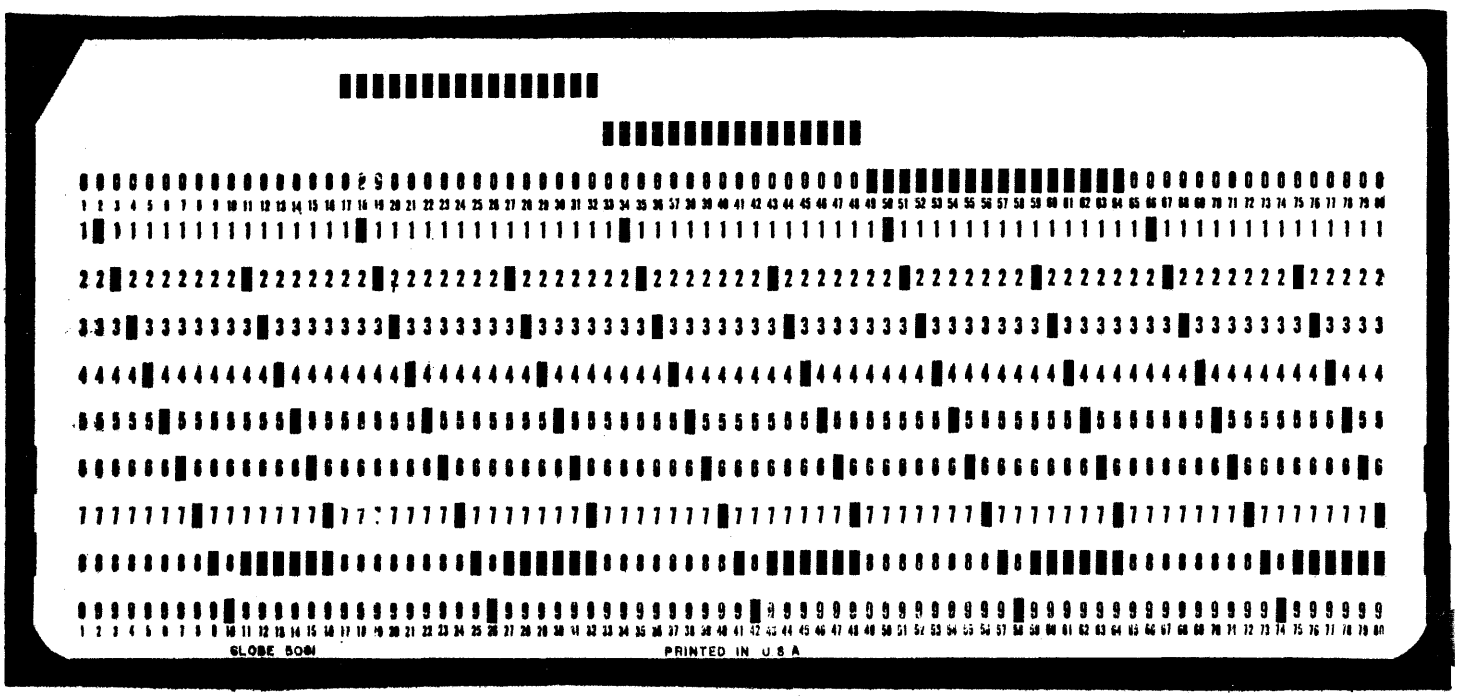
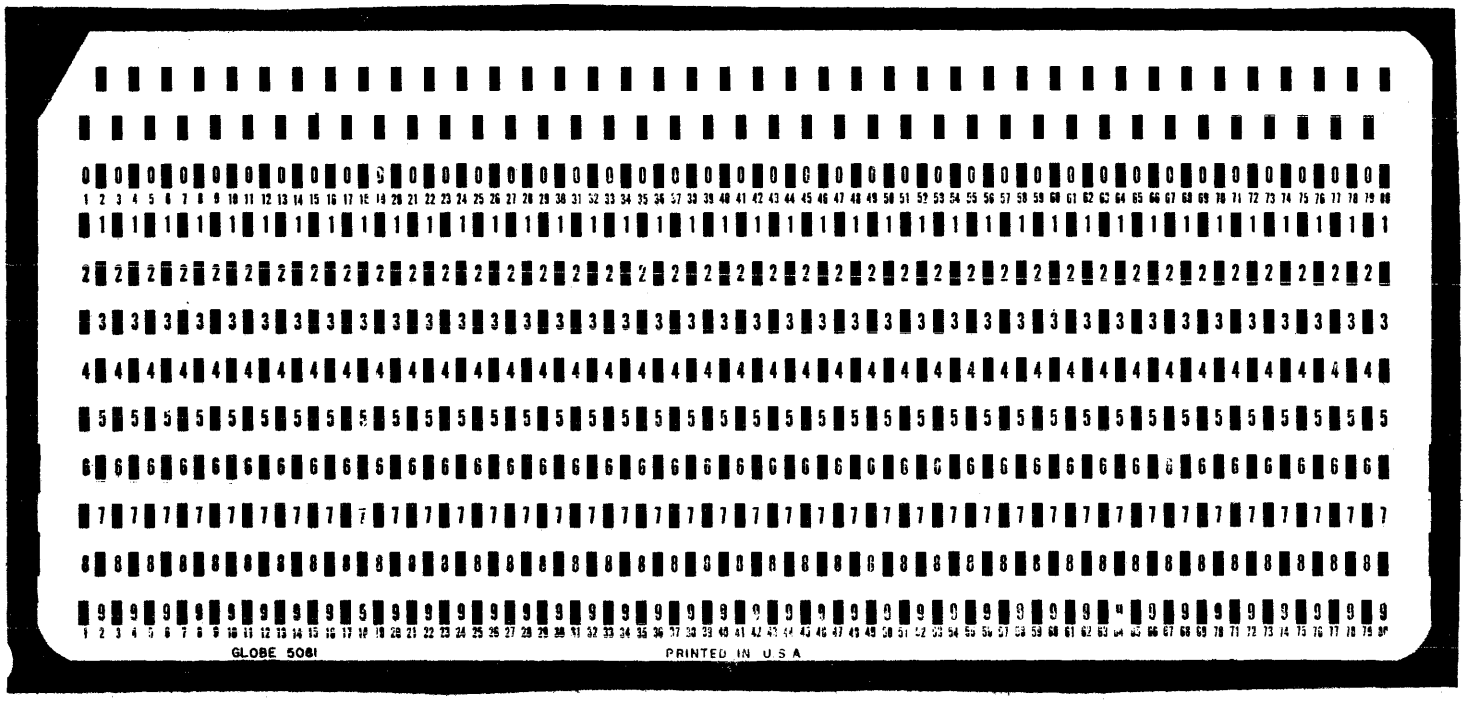


FIGURE 2 EXPECTED PUNCHED DECK FOR 80-COLUMN PUNCH TEST

CARD # 9



CARD # 10

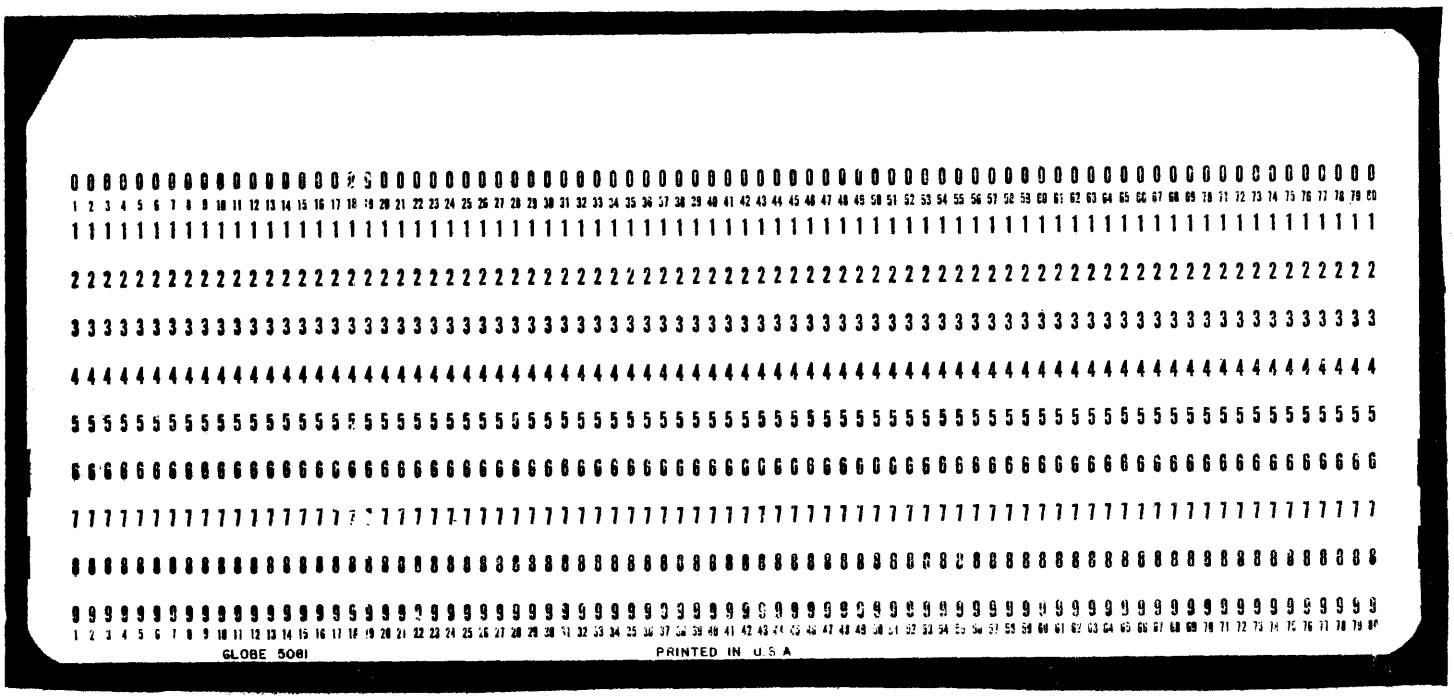


FIGURE 3
DESCRIPTION OF RP96MTR 96-COLUMN READ TEST DECK

CARD NUMBER	ROWS PUNCHED ON ALL COLUMNS OF CARD
1	BLANK
2 & 3	1
4 & 5	2
6 & 7	1,2
8 & 9	4
10 & 11	4,1
12 & 13	4,2
14 & 15	4,2,1
16 & 17	8
18 & 19	8,1
20 & 21	8,2
22 & 23	8,2,1
24 & 25	8,4
26 & 27	8,4,1
28 & 29	8,4,2
30 & 31	8,4,2,1
32 & 33	A
34 & 35	A,1
36 & 37	A,2
38 & 39	A,2,1
40 & 41	A,4
42 & 43	A,4,1
44 & 45	A,4,2
46 & 47	A,4,2,1
48 & 49	A,8
50 & 51	A,8,1
52 & 53	A,8,2
54 & 55	A,8,2,1
56 & 57	A,8,4
58 & 59	A,8,4,1
60 & 61	A,8,4,2
62 & 63	A,8,4,2,1
64 & 65	B
66 & 67	B,1
68 & 69	B,2
70 & 71	B,2,1
72 & 73	B,4
74 & 75	B,4,1
76 & 77	B,4,2
78 & 79	B,4,2,1
80 & 81	B,8
82 & 83	B,8,1
84 & 85	B,8,2
86 & 87	B,8,2,1
88 & 89	B,8,4
90 & 91	B,8,4,1
92 & 93	B,8,4,2
94 & 95	B,8,4,2,1

FIGURE 4
DESCRIPTION OF RP96MTR 80-COLUMN READ TEST DECK

CARD NUMBER	ROWS PUNCHED ON ALL COLUMNS OF CARD
96 & 97	B,A
98 & 99	B,A,1
100 & 101	B,A,2
102 & 103	B,A,2,1
104 & 105	B,A,4
106 & 107	B,A,4,1
108 & 109	B,A,4,2
110 & 111	B,A,4,2,1
112 & 113	B,A,8
114 & 115	B,A,8,1
116 & 117	B,A,8,2
118 & 119	B,A,8,2,1
120 & 121	B,A,8,4
122 & 123	B,A,8,4,1
124 & 125	B,A,8,4,2
126 & 127	B,A,8,4,2,1
128	ALL ROWS PUNCHED IN ALL EVEN NUMBERED COLUMNS
129	ALL ROWS PUNCHED IN ALL ODD NUMBERED COLUMNS
130	ALL ROWS PUNCHED IN ALL EVEN NUMBERED COLUMNS
131	ALL ROWS PUNCHED IN ALL ODD NUMBERED COLUMNS
132	ALL ROWS PUNCHED IN ALL EVEN NUMBERED COLUMNS
133	ALL ROWS PUNCHED IN ALL ODD NUMBERED COLUMNS
134	BLANK
135	BLANK
136	BLANK
1	BLANK
2 & 3	1
4 & 5	2
6 & 7	3
8 & 9	4
10 & 11	5
12 & 13	6
14 & 15	7
16 & 17	8
18 & 19	9
20 & 21	0
22 & 23	11
23 & 24	12
25	ALL ROWS PUNCHED IN ALL ODD NUMBERED COLUMNS
26	ALL ROWS PUNCHED IN ALL EVEN NUMBERED COLUMNS
27	ALL ROWS PUNCHED IN ALL ODD NUMBERED COLUMNS
28	ALL ROWS PUNCHED IN ALL EVEN NUMBERED COLUMNS
29	ALL ROWS PUNCHED IN ALL ODD NUMBERED COLUMNS
30	ALL ROWS PUNCHED IN ALL EVEN NUMBERED COLUMNS
31	BLANK
32	BLANK
33	BLANK

PMTR PRINTER
988, 9247, AND 9249 LINE PRINTERS
B 243, B 244, AND B 245 IOC'S

```
 PROGRAM-ID   PMTR.
* CONTROLLER
*
* THIS   MTR APPLIES   TO THE FOLLOWING:
*
* 1  9247    LINE   PRINTERS     (TIREMAN)
*        MODELS  A9247-2,        A9247-12,        B9247-3
* 2  9247    PRINTER   DDP  #B244
* 3  A9249    LINE   PRINTERS
* 4  A9249    PRINTER   DDP  #B243
* 5  A988    LINE   PRINTER
* 6  A988    PRINTER   DDP  B245

*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*  *                                                            *
*  *     PLACE  MTR/MEM SWITCH  IN  MTR POSITION                *
*  *     PLACE  IRQ/EXT   SWITCH  IN  CENTER  POSITION          *
*  *     LOAD  PMTR PROGRAM  2602    9678                       *
*  *     PLACE  LOAD  SWITCH  IN  NORMAL -  PRESS  CLEAR        *
*  *                              NOTE                          *
*  *                                                            *
*  *     ANY  DISAGREEMENT   WITH  INSTRUCTIONS   -  SEE        *
*  *     INCREMENTER  ADDRESS  FOR  FURTHER  ACTIONS            *
*  *                                                            *
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*
* NOTE:   EACH  PRINTER  HAS  SEPARATE  SET-UP  INSTRUCTIONS        C
*  9247   PRINTER  SET-UP  INSTRUCTIONS  START  ON  PAGE  1        C
*  9249   PRINTER  SET-UP  INSTRUCTIONS  START  ON  PAGE  5        C
*  988    PRINTER  SET-UP  INSTRUCTIONS  START  ON  PAGE  9        C
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*                                                               *
*     9249   (TIREMAN)   PRINTER  SET-UP  INSTRUCTIONS          *
*                                                               *
*     IF  PRINTER  HAS  FORMAT SELECTOR  SWITCH,  SET           *
*     THIS  SWITCH  TO  THE  APPROPRIATE  POSITION              *
*                                                               *
*     INSURE  THAT  CHARACTER  SET  SWITCH  IS  IN  PROPER      *
*     POSITION                                                  *
*                                                               *
*         1          64  CHARACTER  SET                         *
*         2,5,6      48  CHARACTER  SET                         *
*         3          16  CHARACTER  SET                         *
*         4          96  CHARACTER  SET                         *
*                                                               *
*     IF  PRINTER  HAS  FORMAT  TAPE  -  SHOULD  BE  PUNCHED    *
*     AS  FOLLOWS                                               *
*                                                               *
*           LINE                  CHANNEL                     *
*                                                               *
*             1                     1                         *
*             7                     2                         *
*            13                     3                         *
*            19                     4                         *
*            25                     5                         *
*            31                     6                         *
*            37                     7                         *
*            43                     8                         *
*            49                     9                         *
*            55                    10                         *
*            61                    11                         *
*            63   (END  OF  PAGE)  12                         *
*                                                               *
```

```
*  *     PRESS  'START'   TO  TURN  ON  CHAIN  AND  WAIT  FOR  IT  *
*  *     TO  STOP  BEFORE  BEGINNING  MTR                         *
*  *     CHAIN  DOES  NOT  STOP  -  APP  3  MINUTE  -  ERR  #E26  *
*  *                                                              *
*  *     IF  PRINTER  STARTS  PRINTING  AND  THERE  IS  PAPER     *
*  *     MOTION  AS  SOON  AS  CHAIN  IS  TURNED  ON,  ERROR  IN  *
*  *     SCNRDY  SIGNAL  -  ERROR  #E8                            *
*  *                                                              *
*  *     IF  THERE  IS  PAPER  MOTION  BUT  NO  PRINTING  AS      *
*  *     SOON  AS  CHAIN  IS  TURNED  ON,  ERROR  IN  DC2L        *
*  *     SIGNAL  -  ERROR  #  E9                                  *
*  *                                                              *
*  *     IF  THERE  IS  PRINTING  BUT  NO  PAPER  MOTION  AS      *
*  *     SOON  AS  CHAIN  IS  TURNED  ON,  ERROR  IN  DC1L        *
*  *     SIGNAL  -  ERROR  #E10                                   *
*  *                                                              *
*  *     IF  'OVERIDE'   LAMP  ON  PRINTER  DOES  NOT  GO  OFF    *
*  *     IN  APPROXIMATELY  30  SECONDS,  ERROR  IN  PCTP         *
*  *     SIGNAL  -  ERROR  #E11                                   *
*  *                                                              *
*  *     ADVANCE  TO  TOP  OF  FORM                               *
*  *                                                              *
*  *     IF  THE  PRINTING  IS  INCORRECT  AT  PROG  STEP  4,     *  C
*  *     AND  THE  MTR  SOMETIMES  STOPS  AT  A  'WHEN  URQ       *  C
*  *     STEP'  PRIOR  TO  PROG  STEP  4,  FOLLOW  INSTRUCTIONS*  C
*  *     IN  ERROR  #E6  AND  E5.                                 *  C
*  *                                                              *
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*
*
*                    OPERATOR  INSTRUCTIONS
*
*
*  PROG      MACHINE
*  STEP      INDICATION          OPERATOR  ACTION
*
*     1      INCR  =  0015       VERIFY  THAT  CORRECT  SYSTEM
*                                CONFIGURATION  IS  DISPLAYED
*                                IN  MIR
*                                CON  -  PRESS  READY
*                                SPO  -  PRESS  INPUT  REQUEST
*
*     2      INCR  =  0007       VERIFY  THAT  CORRECT
*                                CONTROLLER  ADDRESS  IS
*                                DISPLAYED  IN  MIR  BITS  5,6,7,8
*            CON  -  PK'S  ON
*            SPO  -  RDY  ON
*                                CON  -  PRESS  PK  FOR  PORT  NUMBER
*                                SPO  -  PRESS  2  NUMERIC  KEYS  FOR
*                                PORT  NUMBER
*
*     3      INCR  =  0008                                          C
*            CON  -  NUM.  ON
*            SPO  -  RDY  ON
*                                A  TEST  (SEE  TEST  SELECT  TABLE)
*                                ENTER  TESTS  WITH  PRINTER  READY
*                                FOR  FAILURE  DIAGNOSIS,  TEST  01
*                                (OR  07)  MUST  BE  USED.
*
*     4      INCR  =  0894       COMPARE  PRINTOUT  WITH  FORMAT     C
*                              CHART  BELOW.
*                              IF  AGREE  -  FORCE  STEP
*                              IF  DISAGREE  WITH  PRINOUT  -  #E21
*
*     5      INCR  =  077F       SEE  ROTATE  PATTERN  DESCRIPTION   C
*                              IF  CORRECT  -  FST  TO  CONTINUE  MTR
*                              IF  INCORRECT  -  #E23
*
*     6      INCR  =  078A       TEST  OF  PORT  SELECT
*
```

7 INCR = 07AA SET PRINTER TO NOT READY C
FORCE STEP

SEE INCR VALUES FOR MORE INFORMATION ABOUT PROGRAM STEPS

TEST SELECT TABLE

NUMBER	DESCRIPTION
01	NORMAL TEST ROUTINE
07	NORMAL TEST ROUTINE - 96 CHAR CHAIN IF PAPER SLEWS AND PRINTER GOES NOT READY AFTER PRESSING 01 (07) ERROR IN SIGNAL DTIL - ERROR #E12
02	ROTATE ALPHA TEST
03	LOOP ON SINGLE SPACES NOTE: BEFORE PERFORMING THIS TEST FEED HOLES FOR PRINTER PAPER MUST BE TORN OUT TO AVOID EXCESSIVE PAPER TRANSFER.
04	ALTERNATE 'FF' - '00' DATA INPUT
05	ALTERNATE '30' - '20' DATA INPUT (ROMTEST)

REFER TO A9249 TEST TABLE (TEST 14 ON) FOR FUNCTIONAL TESTS (MOST OF THESE TESTS CAN BE EXECUTED ON THE TIREMAN PRINTER

FORMAT CHART

A'S -	AT TOP OF FORM IF LINE CONTAINS '1'S' ERROR #E4
B'S -	SINGLE SPACED
C'S -	DOUBLE SPACED
D'S -	1ST FIELD MARK FROM TOP OF FORM OR CHANNEL 2 FOR 12 CHANNEL
E'S -	2ND FIELD MARK FROM TOP OF FORM OR CHANNEL 3 FOR 12 CHANNEL
F'S -	3RD FIELD MARK FROM TOP OF FORM OR CHANNEL 4 FOR 12 CHANNEL
G'S -	4TH FIELD MARK FROM TOP OF FORM OR CHANNEL 5 FOR 12 CHANNEL
H'S -	5TH FIELD MARK FROM TOP OF FORM OR CHANNEL 6 FOR 12 CHANNEL
I'S -	6TH FIELD MARK FROM TOP OF FORM OR CHANNEL 7 FOR 12 CHANNEL
J'S -	7TH FIELD MARK FROM TOP OF FORM OR CHANNEL 8 FOR 12 CHANNEL
K'S -	8TH FIELD MARK FROM TOP OF FORM OR CHANNEL 9 FOR 12 CHANNEL
L'S -	9TH FIELD MARK FROM TOP OF FORM OR CHANNEL 10 FOR 12 CHANNEL
M'S -	10TH FIELD MARK FROM TOP OF FORM OR CHANNEL 11 FOR 12 CHANNEL
N'S -	11TH FIELD MARK FROM TOP OF FORM OR CHANNEL 12 FOR 12 CHANNEL

/

A9249 PRINTER SET UP INSTRUCTIONS

INSTALL ANY VERTICAL FORMAT TAPE THAT HAS A HOLE PUNCHED IN EACH OF THE USED CHANNELS (CHANNELS 1 AND 2 FOR 2-CHANNEL PRINTERS OR CHANNELS 1, 2, 4, 6, AND 12 FOR 12-CHANNEL PRINTERS) FOR 12-CHANNEL PRINTERS START THE MTR WITH THE PAPER POSITIONED AT LEAST 12 LINES BEFORE THE CHANNEL 12 PUNCH. INSURE THAT FORMAT TAPE AND FORMS ARE CORRECTLY REGISTERED.

PLACE POWER ON/OFF SWITCH IN ON POSITION
PLACE RESET/MOTOR-ALWAYS-ON/AUTO SWITCH IN AUTO POSITION (PUSH TO RESET THEN AUTO IF CHAIN MOTOR IS RUNNING)
THE MOTOR OFF INDICATOR SHOULD BE ON NOW INDICATING THAT THE CHAIN MOTOR IS OFF
PRESS STOP SWITCH TO MAKE THE PRINTER NOT READY
THE READY INDICATOR SHOULD BE OFF, INDICATING THAT THE PRINTER IS NOT READY

PRESS SYSTEM CLEAR---IF CHAIN MOTOR STARTS,
********* ERROR # E 262
NOTE: THIS FAILURE IS IN THE CHL/ SIGNAL. SEE E262 STEP 2, IF THE PRINTER DOES NOT START PRINTING ON THE FIRST RUN AFTER PRINTER POWER HAS BEEN TURNED OFF TO ON (TO RESET CHL/ FF), BUT DOES START PRINTING ON ALL LATER RUNS TRY CHANGING PO1 B3 AND C3 FIRST.

NOTE: SEE PO1-C1 PIN 5. SOME FAILURES THAT AFFECT CLEARING OF SIGNAL DACK BETWEEN CHARACTERS CAN CAUSE DIFFERENT STOPS ON EACH EXECUTION OF THE MTR. IF THE MTR HANGS AT A DIFFERENT 'WHEN SRQ' OR 'WHEN URQ' ON SEVERAL STARTS OF TEST 10, CHANGE PO1 C3 AND D3 BEFORE FOLLOWING THE ERROR STOP INSTRUCTIONS

NOTE: IF CHAIN MOTOR TIMES OUT WHILE PRINTER IS PRINTING,
********* ERROR # E 263
CHANGE PO1 A7 FIRST

NOTE: IF PRINTER GOES NOT READY WHILE PRINTING FOR NO C
APPARENT REASON, CHECK TERMINATOR (R1,R6,C17) O C
P02 PIN 1P C

OPERATOR INSTRUCTIONS

PROG STEP	MACHINE INDICATION	OPERATOR ACTION
1	INCR = 0015	VERIFY THAT THE CORRECT SYSTEM CONFIGURATION IS DISPLAYED IN MIR CON - PRESS READY SPO - PRESS INPUT REQUEST
2	INCR = 0007	VERIFY THAT THE CORRECT CONTROLLER ADDRESS IS DISPLAYED IN MIR BITS 5,6,7,8
	CON - PK'S ON SPO - RDY ON	CON - PRESS PK FOR PORT NUMBER SPO - PRESS 2 NUMERIC KEYS FOR PORT NUMBER

```
*
*       3     INCR  = 0008
*             CON -  NUM. ON
*             SPO -  RDY ON
*                              PRESS  2  NUMERIC  KEYS  TO  SELECT
*                              A TEST  (SEE  TEST  TABLE  BELOW)
*
* SEE  INCR  VALUES  FOR  INFORMATION  ABOUT  PROGRAM  WAITS.
* (SEE  TEST  12  DESCRIPTION  BELOW)  THE  ALARM  SOUNDS  AT
* THE  NORMAL  WAITS  AT  WHICH  PRINTER  OPERATIONS  ARE
* CHECKED.
*
***  TEST  TABLE
*
*                TEST  10  AND  22  BELOW  ARE  REQUIRED  TESTS.
*                ALSO,  IF  A  KATAKANA  CODE  PRINTER  IS  BEING
*                TESTED  ENTER  TEST  11  BEFORE  ENTERING  TEST
*                10  TO  SET  A  FLAG.
*                ALL  OTHER  TESTS  ARE  INCLUDED  TO  MAKE  THE
*                MTR  MORE  FLEXIBLE  AND  TO  PROVIDE  LOOPS  FOR
*                METERING,  SCOPING,  ETC.
*                SOME  METERING  RESULTS  ARE  AS  FOLLOWS:
*                THERE  WERE  NO  FAILURES  AND  THE  TESTS  WERE
*                LOOPING.  IN  MOST  CASES  THE  PRINTER  MUST
*                BE  OPERATING  TO  GET  THE  EXPECTED  RESULTS.
*                (ERROR  RESULTS  WERE  OBTAINED  WITH  THE
*                 PRINTER  TURNED  OFF  OR  WITH  THE  PRINTER
*                 CABLE  UNCONNECTED)
*                THE  DATA  LINES  B1  THROUGH  B7  METERED  ABOUT
*                100%  OR  0%  AS  EXPECTED  FROM  THE  BITS  OF
*                THE  DATA  OR  CONTROL  CHARACTER
*                TEST  17
*                      ACK/  METERS  ABOUT  60%
*                      DSTB/  METERS  ABOUT  85%
*                TEST  18
*                      NO  METER  MOVEMENT  FOR  ACK/  OR  DSTB/
*                TEST  19  AND  TEST  23
*                      ACK/  AND  DSTB/  CAUSE  ONLY  A  VERY
*                      SMALL  OSCILLATION  (ABOUT  1/2%)  OF  THE
*                      METER  INDICATOR
*
*
* NUMBER       DESCRIPTION
*  10   -  NORMAL  DIAGNOSTIC  TEST
*          ENTER  WITH  PRINTER  NOT  READY  AND  CHAIN  MOTOR
*          OFF  (NOTE-THIS  TEST  WILL  RUN  WITH  THE  MOTOR
*          ALWAYS  ON,  BUT  THE  MOTOR  MUST  BE  OFF  TO  TEST
*          THE  MOTOR  TURN  ON  FUNCTION)
*           THE  ALARM  SOUNDS  AT  SEVERAL  'WAITS',  AT  WHICH
*           PRINTER  OUTPUT  IS  CHECKED.  PUSH  THE  'STOP'
*           BUTTON  TO  MAKE  THE  PRINTER  NOT  READY,  AND
*           SPACE  4  OR  MORE  LINES  TO  OBSERVE  THE
*           PRINTOUTS  AT  THESE  WAITS.  IF  THE  'STOP'  AND
*           'PRINT'  BUTTONS  ARE  DISABLED,  LIFT  THE  YOKE
*           LATCH  BAR  TO  MAKE  THE  PRINTER  NOT  READY.
*           THE  'STOP'  AND  'PRINT'  BUTTONS  ARE  DISABLED
*           BY  SEVERAL  FAILURES.  THIS  INDICATION  IS
*           USED  FOR  DIAGNOSIS  IN  E220,  ONLY  WHEN  IT  IS
*           THE  ONLY  FAILURE  INDICATION.
*
*  11   -  SET  KATAKANA  CODE  FLAG,  SOUND  THE  ALARM,  AND
*          RETURN  TO  TESTSELECT.  ENTER  THIS  TEST  WHEN
*          TESTING  A  KATAKANA  PRINTER  BEFORE  ENTERING
*          TESTS  10  OR  16.  START  FROM  SYSTEM  CLEAR  TO
*          RESET  THIS  FLAG.
*
*  12   -  SET  SKIP-PRINTOUT-CHECKS  FLAG,  SOUND  THE
*          ALARM,  AND  RETURN  TO  TESTSELECT.  SEVERAL
*          WAITS  AT  WHICH  THE  OPERATOR  CHECKS  PRINTER
*          OPERATIONS  ARE  IN  THIS  MTR.  THESE  WAITS  ARE
*          SKIPPED  IF  TEST  12  IS  ENTERED  BEFORE  TEST  10.
*          START  FROM  SYSTEM  CLEAR  TO  RESET  THIS  SKIP
*          FLAG,  AND  FOLLOW  THE  INSTRUCTIONS  AT  WAITS
*          FOR  DIAGNOSIS.
*
*  13   -  SET  2-CHANNEL-PRINTER  FLAG,  SOUND  THE  ALARM,
*          AND  RETURN  TO  TESTSELECT.  ENTER  TEST  13
*          BEFORE  TEST  10  TO  SKIP  THE  END-OF-PAGE  STATUS
*          TEST.  EOP  STATUS  IS  SET  ONLY  ON  12-CHANNEL
*          PRINTERS.  RUN  TEST  14,  15,  OR  16  TO  RESET
*          THIS  FLAG.
*      **NOTE-  ENTER  THE  FOLLOWING  TESTS  WITH  THE
*          PRINTER  IN  READY  STATE.  TEST  10  IS  THE
*          DIAGNOSTIC  TEST.  THESE  FOLLOWING  TESTS
*          PROVIDE  WAYS  TO  EXERCISE  THE  PRINTER.
*
*  14   -  END-OF-PAGE  STATUS  TEST.  LOOP  PRINTING
*          'EOPC12'  UNTIL  EOP  STATUS  IS  DETECTED
*
*
*  15   -  SKIP-TO-CHANNEL  TEST.  SKIP  TO  CHANNEL  1,  4,
*          6,  AND  2  WITH  A  PRINTOUT  FOR  EACH  CHANNEL
*
*  16   -  ROTATE  PATTERN  TEST.  PRINT  FULL  LINES  AND
*          SINGLE  SPACE  WITH  ROTATING  CHARACTER  CODES
*          20  THROUGH  5F  (20  THROUGH  60  IF  TEST  12  IS
*          ENTERED  FIRST  TO  SET  KATAKANA  FLAG).  WITH
*          IRQ/EXT  SWITCH  IN  EXT  POSITION,  THIS  TEST
*          WILL  LOOP  CONTINUOUSLY.  WITH  EXT  OFF  THIS
*          TEST  WILL  STOP  AT  THE  END  OF  A  NORMAL
*          ROTATE  PATTERN.
*
*  17   -  LOAD  PRINT  DATA  TEST.  SEND  LOAD  PRINT  DATA
*          CONTROL  WORD  TO  PRINTER.  LOOP  IF  IRQ/EXT
*          SWITCH  IS  IN  EXT  POSITION.
*
*  18   -  SINGLE  SPACE  TEST.  SINGLE  SPACE  PRINTER.
*          LOOP  IF  IRQ/EXT  SWITCH  IS  IN  EXT  POSITION.
*
*  19   -  VARIABLE  PRINT  TEST.  PRINT  1  LINE  OF  ANY
*          CHARACTER  AND  SINGLE  SPACE.  FOLLOW
*          INSTRUCTIONS  AT  WAITS  IN  THIS  TEST  TO
*          SELECT  PRINT  CHARACTER.  LOOP  IF  IRQ/EXT
*          SWITCH  IS  IN  EXT  POSITION.
*
*  20   -  VARIABLE  CONTROL  TEST.  SEND  ANY  CONTROL
*          CHARACTER  TO  PRINTER.  FOLLOW  INSTRUCTIONS
*          AT  WAITS  IN  THIS  TEST  TO  SELECT  CONTROL  WORD.
*
*  21   -  PORT  SELECT  TEST
*
*  22   -  MOTOR  ON-OFF-ON  AND  12-CHANNEL  DDP  TO
*          2-CHANNEL  PRINTER  TEST.
*          THIS  TEST  SHOULD  BE  EXECUTED  AFTER  THE
*          DIAGNOSTIC  TEST  (10)  HAS  PASSED
*
*  23   -  SEND  DATA  CHARACTER  TO  PRINTER  IN  CONTINUOUS
*          LOOP  BASED  ON  TIME.  (SRQ  NOT  CHECKED)
*          FOLLOW  INSTRUCTIONS  AT  WAITS  IN  THIS  TEST  TO
*          SELECT  DATA  CHARACTER.
*         CAUTION:  DO  NOT  LET  THE  PRINTER  OVERPRINT  LONG
*         ENOUGH  TO  RUIN  THE  RIBBON  IN  THIS  TEST.
*
*  24   -  SEND  CONTROL  CHARACTER  TO  PRINTER  IN
*          CONTINUOUS  LOOP  BASED  ON  TIME.  (URQ  NOT
*          CHECKED)  FOLLOW  INSTRUCTIONS  AT  WAITS  IN  THIS
*          TEST  TO  SELECT  CONTROL  CHARACTER.
*
*
* A988   LINE  PRINTER  SET  UP  INSTRUCTIONS
*
```

A988 PRINTER SET UP INSTRUCTIONS

INSERT FORMS CONTROL PAPER TAPE WITH FORMAT -

CHANNEL #1 - HOLES PUNCHED COLUMNS 6 & 11
CHANNEL #2 - BOTTOM OF FORM
CHANNEL #3 - TOP OF FORM
CHANNEL #4 - ALL COLUMNS PUNCHED

A988 PRINTER TURN ON PROCEDURE

PROCESSOR POWER - ON
PRINTER CICUIT BREAKER (REAR) - ON
PRINTER GATES - CLOSED
POWER SWITCH (FRONT PANEL) - ON

OBSERVE

PRINT LITE	POWER LITE	RIBBON LITE	PAPER LITE	STOP LITE	START LITE
ON	ON	OFF	OFF	ON	OFF

PRESS TOP OF FORM BUTTON FOR CORRECT ACTION

PRESS LINE ADVANCE BUTTON FOR CORRECT ACTION

PRESS START BUTTON AND OBSERVE PRINT STOP LITE IS NOT LIT AND PRINT START LITE IS ON

OPERATOR INSTRUCTIONS

PROG STEP	MACHINE INDICATION	OPERATOR ACTION
1	INCR = 0015	VERIFY THAT CORRECT SYSTEM CONFIGURATION IS DISPLAYED IN MIR CON - PRESS READY SPO - PRESS INPUT REQUEST
2	INCR = 0007 CON - PK'S ON SPO - RDY ON	VERIFY THAT THE CORRECT CONTROLLER ADDRESS IS DISPLAYED IN MIR BITS 5,6,7,8 CON - PRESS PK FOR PORT NUMBER SPO - PRESS 2 NUMERIC KEYS FOR PORT NUMBER
3	INCR = 0008 CON - NUM. ON SPO - RDY ON	PRESS 2 NUMERIC KEYS TO SELECT A TEST (SEE TEST SELECT TABLE BELOW) ANY TEST MAY BE SELECTED BUT FOR DIAGNOSIS - RUN MTR IN NORMAL SEQUENCE (32 THRU 40) CHECK LISTING FOR OPERATOR ACTION IF PAPER ACTION REQUIRES THAT THE OPERATION IS TERMINATED - ERROR # P38
4	INCR = 0903	CHECK PRINTOUT WITH ROTATE PATTERN DESCRIPTION SEE LISTING TO CHECK PORT SELECT SIGNALS. IF OK MTR COMPLETE.

********NOTE (SEE INCR VALUES FOR MORE INFORMATION ABOU ABOVE PROGRAM STEPS)

REFER TO THE A9249 TEST TABLE (TESTS 18, 19, 20, 23, AND 24) FOR TESTS THAT MAY BE USEFUL FOR SCOPING, METERING, ETC.

USE FOLLOWING AS SPECIFIED IN MANUAL PROCEDURE

TEST SELECT TABLE

NUMBER	DESCRIPTION
30	REPEAT SELECTED TEST
31	EXECUTE SELECTED TEST AND THEN SEQUENCE THRU REMAINING TESTS
32	CHECK STATUS WITHOUT SENSING URQ
33	PRINT PROGRAM TITLE ON POTTER
34	CHECK STATUS CONTROLS
35	CHECK FORMS COMMANDS
36	ROTATE ALPHA-NUMERIC EXERCISE AND CHECK STATUS BIT 1
37	ROTATE CHARACTER
38	PRINT COLUMN 1
39	PORT SELECT TEST
40	TOP OF FORM SUBROUTINE
41	INHIBIT ERROR

NOTE

TO LOOP GIVEN TEST FOR SIGNAL TRACING
SELECT TEST 30 TO SET REPEAT FLAG
SELECT TEST 41 TO INHIBIT ERROR
SELECT DESIRED TEST

PRESS CLEAR TO EXIT LOOP TEST

/

PROGRAM LISTING

```
                STARTCONTROLLER.          START  FROM SYSTEM  CLEAR
0000  814D            CPCR  = BUSSTEST1   - 1.    TEST  EXTERNAL  BUSS
                *********ERROR       # E1
                *********PRESS       FORCE  STEP  TO  DISPLAY  ERROR BITS  IN  MIR
                      TESTNUMBERLIMIT   VALUE  IS  41.
                *
0001  F18E            IF  IRQ  SKIP.          TEST  FOR  ERROR  IRQ
0002  400C            MPCR  = IRQOFF  - 1.
0003  F108            ASR  BEX.
0004  F0E1            MIR  = B.
0005  F000            WAIT.      UNEXPECTED  IRQ,  ADDRESS  IN  MIR
                *
                *  IF  DDP  ADDRESS  IN  MIR  EQUALS  PRINTER  DDP  ADDRESS
                *
                *  FOR  9247   PRINTER
                *********       ERROR  #  E 0
                *
                *  FOR  A9249   PRINTER
                *********       ERROR  #  E 260
                *
                *  FOR  A988   PRINTER
                *********       ERROR  #  P 2
                *
                 SELECTPORT.
                *
                *
0006  F0DE            MIR  = A3.       CONTROLLER  ADDRESS  (ASR  AFTER  IRQ)
0007  F0FC            WHEN SRQ  STEP.
                *  CONTROLLER  ADDRESS  IS  DISPLAYED  IN  MIR
                *  IF  CONTROLLER  ADDRESS  IS  NOT CORRECT,   RUN SPO  OR
                *                                              CONSOLE  MTR
                *  IF  CONTROLLER  ADDRESS  IS  CORRECT,   ENTER  PORT  NUMBER
                *        OF  DEVICE  THAT  IS  BEING  TESTED
                *   FOR  CONSOLE  SYSTEMS
                *        PRESS  PK  UNDER  LIGHTED  A  AND  B  INDICATORS
                *        (LEFT  TO  RIGHT)  FOR  PORTS  1  THROUGH  12
                *   FOR  SPO  SYSTEMS
                *        PRESS  2  NUMERIC  KEYS  FOR  PORTS  01  THROUGH  12
                *        'PORT'  IS  PRINTED
                *
                *  NOTE-IF  AN  INVALID  PORT  NUMBER  IS  ENTERED,  THE  MTR
                *       SOUNDS  THE  ALARM  AND  RETURNS  FOR  ANOTHER  PORT
                *       NUMBER.  (ONLY  THE  LOWER  4  BITS  OF  EACH
                *       CHARACTER  ARE  USED  IN  THIS  CHECK-PRESS  CORRECT
                *       KEYS)
                *
                *
                 SELECTTEST.
0008  F0FC            WHEN SRQ  STEP.
                *  PRESS  2  NUMERIC  KEYS  TO  SELECT  TEST
                *    FOR  CONSOLE  SYSTEMS
                *        PRESS  KEYS  ON  NUMERIC  KEYBOARD
                *    FOR  SPO  SYSTEMS
                *        'TEST'  IS  PRINTED
                *        PRESS  NUMERIC  KEYS
                *
                *
                *  NOTE-IF  AN  INVALID  TEST  NUMBER  IS  ENTERED,  THE  MTR
                *       SOUNDS  THE  ALARM  AND  RETURNS  FOR  ANOTHER  TEST
                *        NUMBER.  (ONLY  THE  LOWER  4  BITS  OF  EACH
                *        CHARACTER  ARE  USED  IN  THIS  CHECK-PRESS  CORRECT
                *        KEYS)
                *
                *
0009  F097            DR2  BEX.
000A  F086            B  =  LIT  AND  B.       STRIP  UPPER  DIGIT
000B  E00F            LIT  =  @0F@.
000C  F0C9            JUMP.
                *
                *
                 IRQOFF.
000D  F17D            DLD.                  READ  CONFIGURATION  CARD
000E  F0F9            WHEN RDC  BEX.
000F  F0E1            MIR  =  B.        SYSTEM  CONFIGURATION  IN  MIR
0010  F017            A1  =  B.
0011  F0F9            WHEN RDC  BEX.
0012  F0FF            0  EQV  B.
0013  F09D            IF  ABT  SKIP.
0014  F000            WAIT.  .          CONFIG  FF  NOT  RESET  BY  BEX-
                **********                FAILURE  IS  CON1  CHIP  D7
                *
0015  F0F8            WHEN IRQ  STEP.
                *  VERIFY  CORRECT  SYSTEM  CONFIGURATION  DISPLAYED  IN  MIR
                *  IF  YES,  PUSH  READY  BUTTON  ON  CONSOLE  OR
                *            INPUT  REQUEST  ON  SPO.    IF  PROGRAM  HANGS  HERE
                *            (NO  RESPONSE  TO  INPUT  REQUEST  OR  READY
                *            BUTTON)  RUN  SPO  OR  CONSOLE  MTR
                *  IF  NO,  PRESS  FST
                *
                *  METER  CON1  PIN  2K
                *   IF  0%  REPLACE  CHIPS  D5,D3,C7,D7       ON  CON1  CARD
                *   IF  NOT  0%  REPLACE  CHIPS  D5,A5,A7,F5,F7        ON  CON1  CARD
                *
0016  F18E            IF  IRQ  SKIP.
0017  4079            MPCR  =  CON1LOOP  - 1.
                *
0018  8155            CPCR  =  BUSSTEST  - 1.     FIRST  BUSS  TEST  WITH  IRQ  ON
                *  IF  BUSS  TEST  FAILS  HERE,  FAILURE  IS  CONTROLLER  PORT
                *      SELECT  CARD  B7
                *
0019  F108            ASR  BEX.
001A  F051            A3  =  B.          SAVE  CONTROLLER  ADDRESS
001B  F07A            B  =  BITT.        SET  STATUS  WORD  DATA  REQUEST  BIT
001C  C820            SAR  =  8  LIT  =  @20@.
001D  F07F            B  =  B  R.
001E  F036            A2  =  B  L.       CLEAR  BITS  9-16
001F  F066            B  =  A1.  SYSTEM  CONFIGURATION  FOR  SPO-CONSOLE  CHECK
0020  F0C3            IF  NOT  LST  SKIP.     SPO-CONSOLE  CHECK
0021  E000            LIT  =  0.              SPO  ON  SYSTEM
0022  F1CC            MIR  =  A2  OR  LIT.
                *  FOR  SPO  CONTPORTADDRESS          =  1000XXXX00000000
                *  FOR  CONSOLE  CONTPORTADDRESS      =  1000XXXX00100000
0023  F0CF            MAR1  =  AMPCR.
0024  014D            AMPCR  =  CONTPORTADDRESS.
0025  F0F3            MW1.          STORE  CONTROLLER  PORT  ADDRESS
0026  8100            CPCR  =  CLEARFLAGS  - 1.     CLEAR  ALL  FLAGS
0027  8117            CPCR  =  SETCONTADDRS  - 1.
0028  81A2            CPCR  =  INITMAINSTACK  - 1.     SET  MAIN  STACK  ADDRESS
0029  81AA            CPCR  =  INITFLOSTACK  - 1.    SET  FLOW  STACK  ADDRESS
002A  0030            AMPCR  =  CONSPORTSELECT  - 1.
                **
002B  F0DE            MIR  =  A3.
002C  F066            B  =  A1.  SYSTEM  CONFIGURATION  FOR  SPO-CONSOLE  CHECK
                **
002D  F0C2            IF  NOT  LST  JUMP.
002E  C001            SAR  =  0  LIT  =  1.
                *  SET  FLAG  0  IN  FLAG  WORD  1  TO  1  FOR  SPO,  0  FOR  CONSOLE
002F  81D5            CPCR  =  SETFLAGW1  - 1.
0030  407E            MPCR  =  SPOPORTSELECTP  - 1.
                *
                 CONSPORTSELECT.
                *  CONSOLE  ON  SYSTEM
                *  PORT  SELECT,  OPERATOR  ENTERS  PK  1-12  TO  INDICATE-
                *  THE  PORT  NUMBER  OF  THE  DEVICE  TO  BE  TESTED
                *
```

```
0031  8117          CPCR = SETCONTADDRS - 1.
0032  F1D5          MIR = B001 + 1.      ENABLE KEYBOARD.
0033  F099          DW1.
0034  8125          CPCR = LITEINDA - 1.
0035  E0FF          LIT = @FF@.                LIGHT PK 1-8
0036  812B          CPCR = LITEINDB - 1.
0037  E00F          LIT = @0F@.          LIGHT PK 9-12
                * GET PORT NUMBER (PK KEY 1-12)
0038  8005          CPCR = SELECTPORT - 1.
0039  F017          A1 = B.          SAVE PORT ADDRESS
003A  8125          CPCR = LITEINDA - 1.
003B  E000          LIT = 0.                   TURN OFF PK 1-8
003C  812B          CPCR = LITEINDB - 1.
003D  E000          LIT = 0.                   TURN OFF PK 9-11
003E  F066          B = A1.          PORT ADDRESS TO B FOR SAVEPORT
                STOREPORT.           FROM SPO PORT SELECT
003F  8139          CPCR = CSAVEPORT - 1.  SAVE PORT ADDRESS
0040  CF01          SAR = 15 LIT = 1.      SET FLAG 15 TO INDICATE-
0041  81D5          CPCR = SETFLAGW1 - 1.  PORT HAS BEEN SELECTED
                * PRINT TEST SELECT MESSAGE FOR FIRST ENTRY TO SPO-
                * TEST SELECT
0042  C001          SAR = 0 LIT = 1.
0043  81F8          CPCR = TESTFLAGW1 - 1. TEST SPO-CONSOLE FLAG
0044  4099          MPCR = SPOTESTSELECTP - 1.  TRUE RETURN SPO
                *
                TESTSELECTCLEAR.           PROGRAM JUMPS HERE TO CLEAR-
                * MEMORY FLAG WORDS 2,3,AND 4 BEFORE ALLOWING THE-
                * OPERATOR TO SELECT A TEST.  MEMORY FLAG WORD 1 AND-
                * THE PORT ADDRESS ARE NOT CHANGED.
0045  8109          CPCR = CLEARFW2-3-4 - 1.
                GETTESTSEL.
                TSELRTN.
                TESTSELECT.                PROGRAM JUMPS HERE TO ALLOW THE-
                *                OPERATOR TO SELECT A TEST.  THE MEMORY-
                *                FLAG WORDS 2,3,4 ARE NOT CHANGED
                * CLEAR ERROR FLAG, IF ON IT REFERS TO LAST TEST
0046  C100          SAR = 1 LIT = 0.
0047  81D5          CPCR = SETFLAGW1 - 1.
0048  8117          CPCR = SETCONTADDRS - 1.
0049  F096          DR1 BEX.          RESET STATUS INTERRUPT
004A  807C          CPCR = TESTSPO-CONSOLE - 1.
004B  409B          MPCR = SPOTESTSELECT - 1.  SPO ON SYSTEM
                *
                * CONSOLE ON SYSTEM
                *
004C  812B          CPCR = LITEINDB - 1.
004D  E000          LIT = 0.                   CLEAR B INDICATORS
004E  F1D5          MIR = B001 + 1.      ENABLE KEYBOARD
004F  F099          DW1.
                *
0050  812D          CPCR = LITEINDS - 1.
0051  E008          LIT = 8.                   LIGHT NUMERIC INDICATOR
                *
                *
                * GET FIRST DIGIT OF TEST NUMBER (10 S DIGIT)
0052  8007          CPCR = SELECTTEST - 1.
0053  F051          A3 = B.          SAVE (10 S DIGIT)
                *
                * GET SECOND DIGIT OF TEST NUMBER (1 S DIGIT)
0054  8007          CPCR = SELECTTEST - 1.
                *
0055  812D          CPCR = LITEINDS - 1.
0056  E000          LIT = 0.                   TURN OFF NUMERIC INDICATOR
                * IF STATUS INT. GO TO MEMORY-MODIFY FOR ANY TEST #
0057  F1AE          IF NOT URQ SKIP.           CONSOLE URQ TEST
0058  4292          MPCR = MEMORY-MODIFY - 1.
                *
                TENSLOOPCHECK.
                * TEST TENS DIGIT FOR 0 THRU 9
0059  E00A          LIT = 10.
005A  F032          A2 = A3.
005B  F11B          A2 - LIT.
005C  F0B7          IF NOT AOV SKIP.
005D  40AE          MPCR = INVALIDTEST - 1.
                * TEST ONES DIGIT FOR 0 THRU 9
005E  F033          A2 = B.
005F  F11B          A2 - LIT.
0060  F0B7          IF NOT AOV SKIP.
0061  40AE          MPCR = INVALIDTEST - 1.
                *
                TENSLOOP.
0062  F04B          A3 = A3 - 1.
0063  E00A          LIT = 10.
0064  F09E          IF AOV SKIP.
0065  4067          MPCR = ENDTENSLOOP - 1.
0066  F083          B = LIT + B.
0067  4061          MPCR = TENSLOOP - 1.
                *
                ENDTENSLOOP.
0068  F017          A1 = B.                    SAVE TEST NUMBER
                * INSURE THAT TEST NUMBER IS NOT GREATER THAN THE UPPER
                * LIMIT FOR THIS MTR (SEE DEFINE TESTNUMBERLIMIT)
0069  E029          LIT = TESTNUMBERLIMIT.
006A  F109          A1 - LIT - 1.
006B  F0B7          IF NOT AOV SKIP.
006C  40AE          MPCR = INVALIDTEST - 1.    ILLEGAL TEST NUMBER
                *
                * DISPLAY TEST NUMBER IN A INDICATORS
006D  F082          B = LIT L.
006E  C890          SAR = 8 LIT = @90@.
006F  F0DC          MIR = A1 + B.
0070  F098          DW2.
                * DISABLE SYSTEM CONTROLLER (SPO OR CONSOLE)
0071  F0E6          MIR = 0.
0072  F099          DW1.
                * INSURE THAT BOTH STATUS AND DATA INTERRUPTS FROM SPO-
                * OR CONSOLE ARE CLEARED BEFORE JUMPING TO MTR
0073  F096          DR1 BEX.          RESET STATUS INTERRUPT
0074  F097          DR2 BEX.          RESET DATA INTERRUPT
                *
0075  812F          CPCR = SETPORTADDR - 1.  BR1 = INST.  BR2 = DATA
0076  0417          AMPCR = TESTTABLE - 1.
0077  F100          AMPCR = A1 + AMPCR.
0078  F078          B = B0TT.          SET B = BR2(DATA)  FOR POTTER
0079  F0C9          JUMP.
                / SUBROUTINES
                * LOOP USED TO METER PIN 2K (TP 92) ON CON1 CARD
                CON1LOOP.
007A  F17D          DLD.
007B  F0F9          WHEN RDC BEX.
007C  4079          MPCR = CON1LOOP - 1.
                *
                TESTSPO-CONSOLE.
007D  C001          SAR = 0 LIT = 1.  SPO-CONSOLE FLAG (1 = SPO)
007E  41F8          MPCR = TESTFLAGW1 - 1.
                *
                *
                SPOPORTSELECTP.
                * ENTER HERE TO PRINT SELECT PORT MESSAGE
007F  80DA          CPCR = SPOPRINT - 1.
0080  01CE          AMPCR = PORTPRINT.
                SPOPORTSELECT.
                * ENTER HERE TO AVOID PRINTING
0081  8117          CPCR = SETCONTADDRS - 1.
0082  F0E7          MIR = B001.
0083  F099          DW1.          ENABLE SPO INPUT
                * SELECT PORT # PER NUMERIC KEYS (01 THRU 12)
0084  8005          CPCR = SELECTPORT - 1.     FOR TENS DIGIT
0085  F017          A1 = B.                    SAVE TENS DIGIT
0086  8005          CPCR = SELECTPORT - 1.     FOR ONES DIGIT
                *       ONES DIGIT IS IN B
```

```
                * OPERATOR ENTERS PORT NUMBER (1 THROUGH 12)
0087  F0E6          MIR = 0.
0088  F099          DW1.            DISABLE SPO INPUT
                * TEST TENS DIGIT FOR 0 OR 1
0089  E001          LIT = 1.
008A  F109          A1 - LIT - 1.
008B  F0B7          IF NOT AOV SKIP.
008C  4147          MPCR = INVALIDPORT - 1.     TENS DIGIT > 1
                * TEST ONES DIGIT FOR 0 THRU 9
008D  E00A          LIT = 10.
008E  F033          A2 = B.                     ONES DIGIT IN A2
008F  F11B          A2 - LIT.
0090  F0B7          IF NOT AOV SKIP.
0091  4147          MPCR = INVALIDPORT - 1.     ONES DIGIT > 9
                *
0092  E00A          LIT = 10.
0093  F066          B = A1.
0094  F0C3          IF NOT LST SKIP.
0095  F029          A2 = A2 + LIT.
0096  F068          B = A2.                     PORT ADDRESS IN B
                * SUBSTRACT 1 FROM PORT NUMBER TO GET PORT ADDRESS
0097  F162          B = 0 - B.
0098  F163          B = 0 - B - 1.
0099  803E          CPCR = STOREPORT - 1.
                *
                SPOTESTSELECTP.
009A  80DA          CPCR = SPOPRINT - 1.    PRINT SELECT TEST MESSAGE
009B  01D2          AMPCR = TESTPRINT.      ADDRESS OF MESSAGE
                *
                SPOTESTSELECT.
                * ENTRY POINT FOR NO PRINTING
009C  8117          CPCR = SETCONTADDRS - 1.
009D  F0E7          MIR = B001.
009E  F099          DW1.            ENABLE SPO INPUT
                * SELECT TEST # PER NUMERIC KEYS (00 THRU 99)
009F  8007          CPCR = SELECTTEST - 1.      FOR TENS DIGIT
00A0  F051          A3 = B.                     SAVE TENS DIGIT
00A1  8007          CPCR = SELECTTEST - 1.      FOR ONES DIGIT
                *       ONES DIGIT IN B
00A2  F0E6          MIR = 0.
00A3  F099          DW1.            DISABLE SPO INPUT
00A4  F033          A2 = B.         SAVE ONES DIGIT
                *  IF STINT GO TO SPO MEMORY MODIFY
00A5  F1B5          IF URQ SKIP.
00A6  40A8          MPCR = CSPACEP - 1.
                *
00A7  F096          DR1 BEX.        RESET STINT
00A8  4394          MPCR = SPO-MEM-MOD - 1.
                *
                CSPACEP.
00A9  80DA          CPCR = SPOPRINT - 1.    SPACE AFTER TESTNUMBER
00AA  00AE          AMPCR = SPACEPRINT.     ADDRESS OF PRINT MESSAGE
00AB  8117          CPCR = SETCONTADDRS - 1.
00AC  F068          B = A2.         ONES DIGIT TO B.
00AD  4058          MPCR = TENSLOOPCHECK - 1.
                *
                SPACEPRINT.
00AE  2080          CNST = @2080@.      - STOP
                *
                INVALIDTEST.
00AF  80B7          CPCR = ALARM - 1.       SOUND BELL
00B0  4045          MPCR = TESTSELECT - 1.
                *
                /
                INDICATE-ERROR.
                * SPO SYSTEMS- SOUND ALARM
                * CONSOLE SYSTEMS- SOUND ALARM AND TURN ERROR LIGHT ON
                *
00B1  F0DA          MIR = AMPCR.
00B2  F05F          B.
00B3  815D          CPCR = STACK - 1. SAVE AMPCR, A1, A2, A3
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                * SET FLAG 1 IN FLAG WORD 1 TO 1 TO INDICATE ERROR
00B4  C101          SAR = 1 LIT = 1.
00B5  81D5          CPCR = SETFLAGW1 - 1.
00B6  80B7          CPCR = ALARM - 1.       SOUND ALARM
00B7  417F          MPCR = UNSTACKRESTOREA - 1. RETURN TO MTR
                *
                ALARM.
                *
00B8  F0DA          MIR = AMPCR.
00B9  F05F          B.
00BA  815D          CPCR = STACK - 1.
00BB  8117          CPCR = SETCONTADDRS - 1.
00BC  807C          CPCR = TESTSPO-CONSOLE - 1.
00BD  40CE          MPCR = SPOALARM - 1.    SPO ON SYSTEM
                * CONSOLE ON SYSTEM
00BE  E008          LIT = @08@.
00BF  F0EA          MIR = LIT.
00C0  F099          DW1.
00C1  C207          SAR = 2 LIT = 7.
00C2  F089          B = LIT.
00C3  F0E2          MIR = B C.      ALARM DATA WORD FOR CONSOLE
00C4  F0FC          WHEN SRQ STEP.
00C5  F098          DW2.
00C6  F05F          B.
00C7  F0FC          WHEN SRQ STEP.
                * TURN ERROR LIGHT ON, IF ERROR FLAG IS ON
00C8  C100          SAR = 1 LIT = 0.
00C9  81F8          CPCR = TESTFLAGW1 - 1.
00CA  40D6          MPCR = CALARM - 1.      ERROR FLAG IS OFF
                * ERROR FLAG IS ON
00CB  812D          CPCR = LITEINDS - 1.
00CC  E004          LIT = @04@.             ERROR LIGHT
00CD  40D6          MPCR = CALARM - 1.
                *
00CE  40D6          MPCR = CALARM - 1.
                *
                SPOALARM.       SPO ON SYSTEM
00CF  F1D5          MIR = B001 + 1.     ENABLE OUTPUT
00D0  F099          DW1.
00D1  F0EA          MIR = LIT.
00D2  E007          LIT = @07@.     RING BELL
00D3  F0FC          WHEN SRQ STEP.
00D4  F098          DW2.
00D5  F05F          B.
00D6  F0FC          WHEN SRQ STEP.
                *
                CALARM.
00D7  F0E6          MIR = 0.        DISABLE SPO OR CONSOLE
00D8  F099          DW1.
00D9  812F          CPCR = SETPORTADDR - 1. BR1 = INST.  BR2 = DATA
00DA  417F          MPCR = UNSTACKRESTOREA - 1. RETURN
                *
                *
                *
                SPOPRINT.
                * SPO PRINT FROM MEMORY
                *
00DB  F0DA          MIR = AMPCR.
00DC  F05F          B.
00DD  815D          CPCR = STACK - 1.       STACK AMPCR AND A REGISTERS
00DE  8117          CPCR = SETCONTADDRS - 1.    SELECT SPO
00DF  81C2          CPCR = RDSTACKAMPCRTOB - 1.
00E0  F05B          AMPCR = B.      RETURN AMPCR FOR EXEC
00E1  F05F          B.
00E2  F09A          EXEC.       ADDRESS OF MESSAGE TO AMPCR
00E3  F0EA          MIR = LIT.
00E4  C802          SAR = 8 LIT = @02@.
00E5  F099          DW1.                    ENABLE SPO PRINTER
                SPOREADY.
00E6  F096          DR1 BEX.            READ SPO STATUS
00E7  F05F          B.
```

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00E8  F0C3          IF  NOT LST SKIP.     CHECK FOR READY
00E9  40E5          MPCR = SPOREADY  - 1.
                *
00EA  F0CF          MAR1 = AMPCR.         BR1  = ADDRESS OF MESSAGE
                SPOFETCH.
00EB  F0F1          MR1.
00EC  F0FA          WHEN RDC BEX MAR1 = BMAR + 1.
00ED  F07D          B = B C.
00EE  F0C4          IF  NOT MST SKIP.           MST = STOP CODE
00EF  40F9          MPCR = SPOSTOP  - 1.        END PRINT
00F0  F0FC          WHEN SRQ STEP.        WAIT  FOR PRINTER  INTERRUPT
00F1  F0E1          MIR = B.
00F2  F098          DW2.                  WRITE FIRST  CHARACTER
00F3  F07D          B = B C.
00F4  F0C4          IF  NOT MST SKIP.           MST = STOP CODE
00F5  40F9          MPCR = SPOSTOP  - 1.        END PRINT
00F6  F0E1          MIR = B.
00F7  F0FC          WHEN SRQ STEP.        WAIT  FOR PRINTER  INTERRUPT
00F8  F098          DW2.                  WRITE SECOND CHARACTER
00F9  40EA          MPCR = SPOFETCH  - 1.
                *
                SPOSTOP.
00FA  F0FC          WHEN SRQ STEP.        WAIT  FOR LAST CHARACTER TO PRINT
00FB  81E2          CPCR = RSTBR1  - 1.         RESTORE BR1
00FC  F096          DR1 BEX.                    RESET STINT
00FD  F0E6          MIR = B000.
00FE  F099          DW1.                        DISABLE SPO OUTPUT
00FF  812F          CPCR = SETPORTADDR  - 1.    RESTORE DEVICE PORT ADDRS
0100  417F          MPCR = UNSTACKRESTOREA  - 1.  RETURN
                *
                CLEARFLAGS.
0101  F023          A2 = AMPCR.                 SAVE RETURN
0102  F0E6          MIR = 0.
0103  F0CF          MAR1 = AMPCR.
0104  014C          AMPCR = PORTADDRESS.
0105  F0F3          MW1.                        CLEAR PORT ADDRESS
0106  F0CF          MAR1 = AMPCR.
0107  0214          AMPCR = MEMFLAGW1.
0108  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 1
0109  F102          AMPCR = A2.                 RESTORE RETURN
                CLEARFW2-3-4.
010A  F023          A2 = AMPCR.                 SAVE RETURN
010B  F0E6          MIR = 0.
010C  F0CF          MAR1 = AMPCR.
010D  0215          AMPCR = MEMFLAGW2.
010E  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 2
010F  F0CF          MAR1 = AMPCR.
0110  0216          AMPCR = MEMFLAGW3.
0111  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 3
0112  F0CF          MAR1 = AMPCR.
0113  0217          AMPCR = MEMFLAGW4.
0114  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 4
0115  F102          AMPCR = A2.                 RESTORE RETURN
0116  F05F          B.
0117  F0C9          JUMP.
                *
                SETCONTADDRS.
0118  F060          B = AMPCR.            SAVE  RETURN
0119  F0CF          MAR1 = AMPCR.
011A  014D          AMPCR = CONTPORTADDRESS.
011B  F05B          AMPCR = B.            RESTORE RETURN
011C  D800          SAR = 8.
011D  F0F1          MR1.
011E  F0F9          WHEN RDC BEX.         CONTROLLER ADDRESS TO B
011F  F07F          B = B R.
0120  F07C          B = B L.        CLEAR ALL BITS EXCEPT 5,6,7,8
0121  F078          B = B0TT.
0122  F16E          BR2 = B.              BR2 = 0000XXXX   DATA
0123  F07A          B = B1TT.
0124  F0D5          MAR1 = B.             BR1 = 1000XXXX   INSTRUCTION
0125  F0C9          JUMP.
                *
                LITEINDA.                   LIGHT A INDICATORS
0126  E06F          LIT = @6F@.
0127  F0CA          LCTR.
0128  F09A          EXEC.                 LOAD VARIABLE LIT
0129  F0EF          MIR = Z.
012A  F098          DW2.
012B  F0C9          JUMP.
                LITEINDB.                   LIGHT B INDICATORS
012C  E077          LIT = @77@.
012D  4126          MPCR = LITEINDA.
                *
                LITEINDS.                       LIGHT S INDICATORS
012E  E07E          LIT = @7E@.
012F  4126          MPCR = LITEINDA.
                *
                SETPORTADDR.
0130  F060          B = AMPCR.            SAVE  RETURN
0131  F0CF          MAR1 = AMPCR.
0132  014C          AMPCR = PORTADDRESS.
0133  F05B          AMPCR = B.            RESTORE RETURN
0134  F0F1          MR1.
0135  F0F9          WHEN RDC BEX.         PORT ADDRESS TO B
0136  F16E          BR2 = B.        BR2 FOR DATA
0137  F07A          B = B1TT.
0138  F0D5          MAR1 = B.       BR1 FOR INSTRUCTION
0139  F0C9          JUMP.
                *
                *
                CSAVEPORT.                  SAVE PORT ADDRESS  (DATA IN B)
                * TEST PORT ADDRESS FOR PORT 12 OR LESS
013A  E00B          LIT = 11.
013B  F017          A1 = B.
013C  F109          A1 - LIT - 1.
013D  F0B7          IF NOT AOV SKIP.
013E  4147          MPCR = INVALIDPORT  - 1.      PORT ADDRESS > 12
                * CLEAR ALL BITS EXCEPT 5,6,7,8
013F  F07C          B = B L.
0140  D400          SAR = 4.
0141  F0E5          MIR = B R.
0142  F060          B = AMPCR.    SAVE RETURN
0143  F0CF          MAR1 = AMPCR.
0144  014C          AMPCR = PORTADDRESS.
0145  F05B          AMPCR = B.    RESTORE RETURN
0146  F0F3          MW1.
0147  F0C9          JUMP.
                *
                INVALIDPORT.
                *
0148  80B7          CPCR = ALARM - 1.       SOUND BELL
                *
0149  807C          CPCR = TESTSPO-CONSOLE  - 1.
014A  4080          MPCR = SPOPORTSELECT    - 1.
014B  4030          MPCR = CONSPORTSELECT   - 1.
                PORTADDRESS.
014C  0000          CNST = @0000@.
                CONTPORTADDRESS.
014D  0000          CNST = @0000@.
                *
                BUSSTEST1.                      EXTERNAL BUSS TEST
014E  F0F9          WHEN RDC BEX.
014F  F0FF          0 EQV B.
0150  F09C          IF ABT JUMP.
0151  F0E1          MIR = B.
0152  F000          WAIT.
                *********EXTERNAL      BUSS FAILURE OR PARITY ERROR
                *********ERROR     # E1
0153  F0DA          MIR = AMPCR.
0154  F000          WAIT.
0155  7FFF          MPCR = STARTCONTROLLER  - 1.
```

```
                *
                 BUSSTEST.              EXTERNAL  BUSS  TEST
0156    F0F9             WHEN RDC BEX.
0157    F0FF             0 EQV B.
0158    F09C             IF  ABT  JUMP.
0159    F0DA             MIR = AMPCR.
015A    F000             WAIT.
                *********OBSERVE       MIR
                *********GO      TO  INCREMENTER  ADDRESS  DISPLAYED  IN  MIR
015B    F0E1             MIR = B.
015C    F000             WAIT.
015D    7FFF             MPCR = STARTCONTROLLER  - 1.
                /
                 STACK.
                *UNCONDITIONAL   SAVE  A1,  A2,  A3,  AMPCR  IN  MEMORY STACK
                *DISTROYS   - B,  SAR,  LIT,  MIR
                *ASSUMES  BR1,  BR2  DIFFER  BY  INST  BIT  ONLY
015E    F079             B = B100.
015F    D300             SAR = 3.
0160    F07F             B = B R.
0161    F0D5             MAR1 = B.             STACK  POINTER  = 4096
                 STACKW3.
0162    F0F1             MR1.
0163    F0F9             WHEN RDC BEX.            FETCH  POINTER
0164    F083             B = LIT  + B.              INCRAMENT  POINTER
0165    E004             LIT  = 4.
0166    F08C             BMI  MIR  = B.
0167    F0F3             MW1.                       RESTORE  NEW POINTER
0168    F08C             BMI  MIR  = B.
0169    F0D5             MAR1 = B.                  NEW STACK  ADDRESS
016A    F0F3             MW1.                       STORE  AMPCR TOP  OF  STACK
016B    F0DB             MIR = A1.
016C    F089             B = LIT.
016D    E003             LIT  = 3.
016E    F01C             A1  = BMAR.
016F    F064             B = A1  -  B.
0170    F0D5             MAR1 = B.       OLD  TOP  OF  STACK  ADDRESS  + 1.
0171    F08D             BMI.
0172    F017             A1  = B.          RESTORE  A1
0173    F0F3             MW1.                       SAVE  A1
0174    F0D7             MAR1 = BMAR  + 1.
0175    F0DD             MIR = A2.
0176    F0F3             MW1.                       SAVE  A2
0177    F0D7             MAR1 = BMAR  + 1.
0178    F0DE             MIR = A3.
0179    F0F3             MW1.                       SAVE  A3
017A    F05F             B.
017B    41E2             MPCR = RSTBR1  - 1.        RESTORE  BR1  EXIT
                 UNSTACK.
                *RESTORE   AMPCR  FROM  TOP  OF  MEMORY STACK
                *A  REGISTERS    REMAIN  UNCHANGED
017C    818F             CPCR = STACKR  - 1.
017D    F05B             AMPCR = B.                 RESTORE  AMPCR
017E    F05F             B.
017F    41E2             MPCR = RSTBR1  - 1.        RESTORE  BR1  EXIT
                 UNSTACKRESTOREA.
                *RESTORE   AMPCR  AND  A  REGISTERS    FROM  TOP  OF  STACK
0180    818F             CPCR = STACKR  - 1.
0181    F05B             AMPCR = B.                 RESTORE  AMPCR
0182    F08D             BMI.  (ADDRESS  - 1)  OF  STORED  A1
0183    F0D6             MAR1 = B + 1.
0184    F0F1             MR1.                       FETCH  A1
0185    F0F9             WHEN RDC BEX.
0186    F0D7             MAR1 = BMAR  + 1.
0187    F017             A1  = B.                   RESTORE  A1
0188    F0F1             MR1.                       FETCH  A2
0189    F0F9             WHEN RDC BEX.
018A    F0D7             MAR1 = BMAR  + 1.
018B    F033             A2  = B.                   RESTORE  A2
018C    F0F1             MR1.                       FETCH  A3
018D    F0F9             WHEN RDC BEX.
018E    F051             A3  = B.                   RESTORE  A3
018F    41E2             MPCR = RSTBR1  - 1.        RESTORE  BR1  AND  EXIT
                STACKR.
0190    F079             B = B100.
0191    D300             SAR = 3.
0192    F07F             B = B R.
0193    F0D5             MAR1 = B.             STACK  POINTER  = 4096
                STACKR1.
0194    F0F1             MR1.
0195    F0F9             WHEN RDC BEX.              FETCH  POINTER
0196    F0DD             MIR = A2.        SAVE  A2
0197    F033             A2  = B.
0198    E004             LIT  = 4.
0199    F146             B = A2  -  LIT.            DECRAMENT  STACK  POINTER
019A    F08C             BMI,  MIR  = B.            EXCHANGE  MIR  &  B
019B    F033             A2  = B.                   RESTORE  A2
019C    F08D             BMI.       POINTER  ADDRESS  TO  B
019D    F0F3             MW1.                       RESTORE  POINTER
019E    F083             B = LIT  + B.  ADDRESS  OF  SAVED  AMPCR  TO  B
                STACKR2.
019F    F0D5             MAR1 = B.
01A0    F0F1             MR1.                       FETCH  AMPCR  FROM  STACK
01A1    F0F9             WHEN RDC BEX.
01A2    F0C9             JUMP.
                INITMAINSTACK.                     INITIALIZE     STACK  POINTER
01A3    F079             B = B100.
01A4    D300             SAR = 3.
01A5    F07F             B = B R.
01A6    F0D5             MAR1 = B.
01A7    F0E1             MIR = B.
01A8    F0F3             MW1.                       POINTER  = 4096
01A9    F05F             B.
01AA    41E2             MPCR = RSTBR1  - 1.        RESTORE  BR1  EXIT
                INITFLOSTACK.                      INITIALIZE     FLO  POINTER
01AB    F082             B = LIT  L.
01AC    C70C             SAR = 7  LIT  = @0C@.
01AD    F0D5             MAR1 = B.
01AE    F0E1             MIR = B.
01AF    F0F3             MW1.              POINTER  = 6144
01B0    41E2             MPCR = RSTBR1  - 1.        RESTORE  BR1  EXIT
                MARKFLOSTACK.
                *SAVE  AMPCR  FROM  MAIN  PROGRAM  FLOW-FOR  GLOBAL  RETURN
                *ASSUMES  B,  MIR,  SAR,  LIT  CAN  BE  DISTROYED  AND  THAT
                *BR1,  BR2  DIFFER  BY  INST  BIT  ONLY
01B1    F0DA             MIR = AMPCR.
01B2    F082             B = LIT  L.
01B3    C70C             SAR = 7  LIT  = @0C@.
01B4    F0D5             MAR1 = B.             FLO  POINTER  = 6144
01B5    4161             MPCR = STACKW3  - 1.       WRITE  AMPCR  TO  STACK
                FLOSTACKRDDEC.
                *RESTORE   AMPCR  FROM  TOP  OF  FLOW STACK  AND  DECRAMENT
                *STACK   POINTER
01B6    F082             B = LIT  L.
01B7    C70C             SAR = 7  LIT  = @0C@.
01B8    F0D5             MAR1 = B.             FLOW  STACK  POINTER  = 6144
01B9    8193             CPCR = STACKR1  - 1.       READ  POINTER  AND  AMPCR
01BA    417C             MPCR = UNSTACK.            OPTIONAL  NO  A  WD  RESTORE
                FLOSTACKRD.
                *RESTORE   AMPCR  FROM  TOP  OF  FLOW STACK  WITHOUT
                *DECRAMENTING   FLOW  STACK  POINTER.
01BB    F082             B = LIT  L.
01BC    C70C             SAR = 7  LIT  = @0C@.
01BD    F0D5             MAR1 = B.             FLO  STACK  POINTER  = 6144
01BE    F0F1             MR1.
01BF    F0F9             WHEN RDC BEX.              FETCH  POINTER
01C0    F05F             B.
01C1    819E             CPCR = STACKR2  - 1.       READ  TOP  OF  STACK
01C2    417C             MPCR = UNSTACK.            OPTIONAL  NO  A  WD  RESTORE
```

```
                    RDSTACKAMPCRTOB.
                    *READ  TOP  AMPCR  IN  STACK  TO  B  REG  -  USE  FOR
                    *NESTED  EXEC.
01C3  F079              B  =  B100.
01C4  D300              SAR  =  3.
01C5  F07F              B  =  B  R.
01C6  F0D5              MAR1  =  B.             POINTER  ADDRESS  =  4096
01C7  F0F1              MR1.                    FETCH  POINTER
01C8  F0F9              WHEN RDC  BEX.
01C9  F0D5              MAR1  =  B.             TOP  OF  STACK  ADDRESS
01CA  F0F1              MR1.
01CB  F0F9              WHEN RDC  BEX.                B  =  AMPCR  FROM  STACK
01CC  F05F              B.
01CD  41E2              MPCR  =  RSTBR1  -  1         RESTORE  BR1  EXIT


                    PORTPRINT.
01C?—?—]              +  STOP
                    TESTPRINT.
01D2  0D0A              CNST  =  @0D0A@.              CRLF
01D3  5445              CNST  =  @5445@.        TE
01D4  5354              CNST  =  @5354@.        ST
01D5  2080              CNST  =  @2080@.        -  STOP
                    /
                    *  TEST  FLAG  AND  SET  FLAG  ROUTINES
                    *
                    SETFLAGW1.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01D6  F060              B  =  AMPCR.    SAVE  RETURN
01D7  F0CF              MAR1  =  AMPCR.         ADDRESS  OF  FLAG  WORD  1  TO  MAR1
01D8  0214              AMPCR  =  MEMFLAGW1.
                    *
                    SETFLAGS.               COMMON POINT  TO  SETFLAGW1-2-3-4
01D9  F0F1              MR1.
01DA  F05B              AMPCR  =  B.    RESTORE  RETURN
01DB  F0F9              WHEN RDC  BEX.          FLAG  WORD  TO  B
01DC  F092              CSAR.                   CHANGE  VALUE  TO  SHIFT  FLAG  TO  LSB
01DD  F172              CSAR  B  =  B  C.       MOVE  FLAG  IN  B  TO  LSB
01DE  F075              B  =  BTT0.
01DF  F087              B  =  LIT  OR  B.       SET  FLAG  PER  LIT
01E0  F07D              B  =  B  C.     SHIFT  FLAGS  BACK  TO  POSITION
01E1  F0E1              MIR  =  B.      MODIFIED  FLAG  WORD  TO  MIR
01E2  F0F3              MW1.            FLAG  WORD  TO  MEMORY
                    *
                    RESTORE-BR1.
                    RSTBR1.                 COMMON POINT  FROM  ABOVE  AND  -
                    *                       AND  TESTFLAGW1-2-3-4
01E3  F0E1              MIR  =  B.              SAVE  B
01E4  F05D              ASE.            SELECT  BR2
01E5  F080              B  =  BMAR.
                    *  GENERATE  NEW  BR1   (MSB  INST-DATA  SET  OPPOSITE  BR2)
01E6  F159              B  =  BFTF.
01E7  D800              SAR  =  8.
01E8  F07F              B  =  B  R.
01E9  F07C              B  =  B  L.     CLEAR  MAR  (DO  NOT  USE  LIT  HERE)
01EA  F0D5              MAR1  =  B.
01EB  F08D              BMI.                    RESTORE  B
01EC  F0C9              JUMP.           RETURN
                    *
                    SETFLAGW2.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01ED  F060              B  =  AMPCR.    SAVE  RETURN
01EE  F0CF              MAR1  =  AMPCR.         ADDRESS  OF  FLAG  WORD  2  TO  MAR1
01EF  0215              AMPCR  =  MEMFLAGW2.
01F0  41D8              MPCR  =  SETFLAGS  -  1.
                    *
                    SETFLAGW3.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01F1  F060              B  =  AMPCR.    SAVE  RETURN
01F2  F0CF              MAR1  =  AMPCR.         ADDRESS  OF  FLAG  WORD  3  TO  MAR1
01F3  0216              AMPCR  =  MEMFLAGW3.
01F4  41D8              MPCR  =  SETFLAGS  -  1.
                    *
                    SETFLAGW4.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01F5  F060              B  =  AMPCR.    SAVE  RETURN
01F6  F0CF              MAR1  =  AMPCR.         ADDRESS  OF  FLAG  WORD  4  TO  MAR1
01F7  0217              AMPCR  =  MEMFLAGW4.
01F8  41D8              MPCR  =  SETFLAGS  -  1.
                    *
                    TESTFLAGW1.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
01F9  F060              B  =  AMPCR.    SAVE  RETURN
01FA  F0CF              MAR1  =  AMPCR.         ADDRESS  OF  FLAG  WORD  1  TO  MAR1
01FB  0214              AMPCR  =  MEMFLAGW1.
                    *
                    TESTFLAGS.              COMMON POINT  TO  TESTFLAGW1-2-3-4
01FC  F0F1              MR1.
01FD  F05B              AMPCR  =  B.    RESTORE  RETURN
01FE  F0F9              WHEN RDC  BEX.          FLAG  WORD  TO  B
01FF  F092              CSAR.
0200  F07F              B  =  B  R.     SHIFT  FLAG  TO  LSB
0201  F157              B  =  BT0T.
0202  F078              B  =  B0TT.
0203  F05F              B.
0204  F0CB              LIT  EQV  B.
0205  F09D              IF  ABT  SKIP.
0206  F105              AMPCR  =  AMPCR  +  1.        SET  AMPCR  FOR  FALSE  RETURN
0207  41E2              MPCR  =  RSTBR1  -  1.
                    *
                    TESTFLAGW2.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
0208  F060              B  =  AMPCR.    SAVE  RETURN
0209  F0CF              MAR1  =  AMPCR.         ADDRESS  OF  FLAG  WORD  2  TO  MAR1
020A  0215              AMPCR  =  MEMFLAGW2.
020B  41FB              MPCR  =  TESTFLAGS  -  1.
                    *
                    TESTFLAGW3.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
020C  F060              B  =  AMPCR.    SAVE  RETURN
020D  F0CF              MAR1  =  AMPCR.         ADDRESS  OF  FLAG  WORD  3  TO  MAR1
020E  0216              AMPCR  =  MEMFLAGW3.
020F  41FB              MPCR  =  TESTFLAGS  -  1.
                    *
                    TESTFLAGW4.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
0210  F060              B  =  AMPCR.    SAVE  RETURN
0211  F0CF              MAR1  =  AMPCR.         ADDRESS  OF  FLAG  WORD  4  TO  MAR11
0212  0217              AMPCR  =  MEMFLAGW4.
0213  41FB              MPCR  =  TESTFLAGS  -  1.
                    *
                    *  MEMORY WORDS FOR PROGRAM FLAGS
                    MEMFLAGW1.
0214  0000              CNST  =  @0000@.        FLAGS  1  THRU  16  OF  WORD  1
                    MEMFLAGW2.
0215  0000              CNST  =  @0000@.        FLAGS  1  THRU  16  OF  WORD  2
                    MEMFLAGW3.
0216  0000              CNST  =  @0000@.        FLAGS  1  THRU  16  OF  WORD  3
                    MEMFLAGW4.
0217  0000              CNST  =  @0000@.        FLAGS  1  THRU  16  OF  WORD  4
                    *  END  OF  FLAG  ROUTINES
                    *
                    READDATAKEYTOA1.
                    *  SUB-ROUTINE  TO  READ  1  DATA  CHARACTER  FROM  SPO  OR  -
                    *    CONSOLE  AND  RETURN  WITH  CHARACTER  IN  A1
                    *    A2  AND  A3  ARE  SAVED
                    *    ALL  OTHER  REGISTERS  ARE  DESTROYED
                    *
0218  F0DA              MIR  =  AMPCR.
0219  F05F              B.
021A  815D              CPCR  =  STACK  -  1.   SAVE  AMPCR  FOR  RETURN
021B  8117              CPCR  =  SETCONTADDRS  -  1.
021C  807C              CPCR  =  TESTSPO-CONSOLE  -  1.
021D  422D              MPCR  =  SPOKEY  -  1.        SPO  ON  SYSTEM
                    *
                    *  CONSOLE  ON  SYSTEM
021E  F1D5              MIR  =  B001  +  1.     ENABLE  KEYBOARD
021F  F099              DW1.
0220  812D              CPCR  =  LITEINDS  -  1.
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0221  E008        LIT  = 8.          LIGHT  NUMERIC  INDICATOR
0222  F0FC        WHEN SRQ  STEP.
0223  F097        DR2  BEX.
0224  F017        A1  = B.          SAVE  DATA  CHARACTER  IN  A1.
0225  F009        A1  = A1  AND LIT.     USE  ONLY  LOWER  DIGIT
0226  E00F        LIT  = @0F@.
              *  DISPLAY   LOWER  DIGIT   IN  B  INDICATORS
0227  F082        B  = LIT  L  .
0228  C888        SAR  = 8  LIT  = @88@.
0229  F0DC        MIR  = A1  + B.
022A  F098        DW2.
022B  812D        CPCR  = LITEINDS  - 1.
022C  E000        LIT  = 0.         TURN  NUMERIC  INDICATOR   OFF
022D  4234        MPCR  = EXITDKEY  - 1.
              *
              SPOKEY.        SPO  ON  SYSTEM
022E  F0E7        MIR  = B001.
022F  F099        DW1.       ENABLE  SPO  INPUT
0230  F0FC        WHEN SRQ  STEP.
0231  F097        DR2  BEX.
0232  F017        A1  = B.          SAVE  DATA  CHARACTER  IN  A1
0233  F009        A1  = A1  AND LIT.     USE  ONLY  LOWER  DIG
0234  E00F        LIT  = @0F@.
              *
              EXITDKEY.
0235  F0E6        MIR  = 0.
0236  F099        DW1.       DISABLE  SPO  OR  CONSOLE
0237  812F        CPCR  = SETPORTADDR  - 1.       RESTORE  BR1  AND  BR2
0238  817B        CPCR  = UNSTACK  - 1.       RETURN  (CHARACTER  IN  A1)
              *
              / SIMULATED  REGISTERS     SIMREG1,    SIMREG2,    SIMREG3
              ZROSREG1.
0239  F0E6        MIR  = B000.
              WRSREG1.
023A  F060        B  = AMPCR.
023B  F0CF        MAR1  = AMPCR.
023C  0278        AMPCR  = SIMREG1.
              ZROSREG1A.
023D  F05B        AMPCR  = B.
023E  F0F3        MW1.
023F  F05F        B.
0240  4263        MPCR  = INCSREG1A   - 1.
              ZROSREG2.
0241  F0E6        MIR  = B000.
              WRSREG2.
0242  F060        B  = AMPCR.
0243  F0CF        MAR1  = AMPCR.
0244  0279        AMPCR  = SIMREG2.
0245  423C        MPCR  = ZROSREG1A   - 1.
              ZROSREG3.
0246  F0E6        MIR  = B000.
              WRSREG3.
0247  F060        B  = AMPCR.
0248  F0CF        MAR1  = AMPCR.
0249  027A        AMPCR  = SIMREG3.
024A  423C        MPCR  = ZROSREG1A   - 1.
              RDSREG1.
024B  F060        B  = AMPCR.
024C  F0CF        MAR1  = AMPCR.
024D  0278        AMPCR  = SIMREG1.
              RDSREG1A.
024E  F05B        AMPCR  = B.
024F  F0F1        MR1.
0250  F0F9        WHEN RDC  BEX.
0251  F0E1        MIR  = B.
0252  4263        MPCR  = INCSREG1A   - 1.
              RDSREG2.
0253  F060        B  = AMPCR.
0254  F0CF        MAR1  = AMPCR.
0255  0279        AMPCR  = SIMREG2.
0256  424D        MPCR  = RDSREG1A      1.
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              RDSREG3.
0257  F060        B  = AMPCR.
0258  F0CF        MAR1  = AMPCR.
0259  027A        AMPCR  = SIMREG3.
025A  424D        MPCR  = RDSREG1A   - 1.
              INCSREG1.
025B  F060        B  = AMPCR.
025C  F0CF        MAR1  = AMPCR.
025D  0278        AMPCR  = SIMREG1.
              INCSREG1B.
025E  F05B        AMPCR  = B.
025F  F0F1        MR1.
0260  F0F9        WHEN RDC  BEX.
0261  F07E        B  = B  + 1.
0262  F0E1        MIR  = B.
0263  F0F3        MW1.
              INCSREG1A.
0264  41E2        MPCR  = RESTORE-BR1    - 1.
              INCSREG2.
0265  F060        B  = AMPCR.
0266  F0CF        MAR1  = AMPCR.
0267  0279        AMPCR  = SIMREG2.
0268  425D        MPCR  = INCSREG1B   - 1.
              INCSREG3.
0269  F060        B  = AMPCR.
026A  F0CF        MAR1  = AMPCR.
026B  027A        AMPCR  = SIMREG3.
026C  425D        MPCR  = INCSREG1B   - 1.
              DECSREG2.
026D  F060        B  = AMPCR.
026E  F0CF        MAR1  = AMPCR.
026F  0279        AMPCR  = SIMREG2.
0270  F05B        AMPCR  = B.
0271  F0F1        MR1.
0272  F0F9        WHEN RDC  BEX.
0273  F162        B  = 0  -  B.
0274  F163        B  = 0  -  B  -  1.
0275  F0E1        MIR  = B.
0276  F0F3        MW1.
0277  4263        MPCR  = INCSREG1A   - 1.
              SIMREG1.
0278  0000        CNST  = @0000@.
              SIMREG2.
0279  0000        CNST  = @0000@.
              SIMREG3.
027A  0000        CNST  = @0000@.
              SET-CONT-DINT.
              *  SET  CONTROLLER  DATA  INTERRUPT,    RESTORE  PORT  ADDRESS
              *  IN  BR1  AND  BR2  THEN  JUMP
027B  F0DA        MIR  = AMPCR.
027C  F05F        B.
027D  815D        CPCR  = STACK  - 1.  SAVE  AMPCR,  A1,A2,A3     IN  STACK
027E  8117        CPCR  = SETCONTADDRS   - 1.
027F  807C        CPCR  = TESTSPO-CONSOLE     - 1.
0280  4282        MPCR  = SCDINT  - 1.        SPO  ON  SYSTEM
              *
              *  CONSOLE  ON  SYSTEM
0281  E004        LIT  = @04@.     ENABLE  CONSOLE  PRINTER  DINT
0282  F0F7        SKIP.
              SCDINT.
0283  E002        LIT  = @02@.     ENABLE  SPO  OUTPUT
0284  F0EA        MIR  = LIT.
0285  F099        DW1.
0286  F0FC        WHEN SRQ  STEP.
              ********       STOP  HERE  IF  CONTROLLER  ENABLE  DOES  NOT  CAUSE
              *               SRQ    (NOTE-   SPO  SRQ  HAS  BEEN  USED  PRIOR  TO
              *                        THIS  STOP
              *              RUN  SPO  OR  CONSOLE  MTR
              *
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                RSCDINT.
0287    812F            CPCR = SETPORTADDR - 1.          RESTORE BR1 AND BR2
0288    417F            MPCR = UNSTACKRESTOREA - 1. RETURN
                RESET-CONT-DINT.
                *  DISABLE CONTROLLER, RESTORE PORT ADDRESS IN BR1 AND
                *  BR2, THEN JUMP
0289    F0DA            MIR = AMPCR.
028A    F05F            B.
028B    815D            CPCR = STACK - 1. SAVE AMPCR,A1,A2,A3      IN STACK
028C    8117            CPCR = SETCONTADDRS - 1.
028D    F0E6            MIR = 0.
028E    F099            DW1.
028F    F05F            B.
0290    4286            MPCR = RSCDINT - 1.
                MEM-MOD-SETLC3.      SET WRITE-BEFORE-READ     FLAG
                *  JUMP TO ABOVE LABEL FROM UPPER CASE RESET KEY CODE
                *  ALLOWS WRITE-BEFORE-READ     OF FIRST ADDRESS
0291    F01A            SET LC3.
0292    F0F7            SKIP.
                MEMORY-MODIFY.
0293    F0AD            IF LC3 STEP.
0294    F01F            RESET GC2.
0295    F0A9            IF LC2 STEP.
0296    8117            CPCR = SETCONTADDRS - 1.
                *  RETURNS WITH BR1 = INSTRUCTION,    BR2 = DATA
0297    F0EA            MIR = LIT.
0298    C881            SAR = 8 LIT = @81@.
0299    F082            B = LIT L.
029A    F0EC            MIR = LIT OR B.
029B    E009            LIT = 9.
029C    F098            DW2.
029D    F0EA            MIR = LIT.
029E    E010            LIT = @10@.
029F    F099            DW1.
02A0    F082            B = LIT L.
02A1    C803            SAR = 8, LIT = @03@.
02A2    F0E1            MIR = B.
02A3    F0FC            WHEN SRQ STEP.
02A4    F098            DW2.                                    READY THE R
02A5    F0EA            MIR = LIT.
02A6    E008            LIT = @08@.
02A7    F0FC            WHEN SRQ STEP.
02A8    F099            DW1.
02A9    F082            B = LIT L.
02AA    E0C0            LIT = @C0@.
02AB    F0ED            MIR = LIT + B.
02AC    E004            LIT = @04@.
02AD    F0FC            WHEN SRQ STEP.
02AE    F098            DW2.
02AF    034D            AMPCR = MM-POSITION - 1.
02B0    F01D            A1 = LIT.
02B1    E00A            LIT = @0A@.
02B2    F091            CALL.                                   POSITION RIG
                MM-LIST-NEXT.
02B3    033C            AMPCR = MM-ADVANCE - 1.
02B4    F091            CALL.                                   ADVANCE I L E
02B5    F018            SET LC1.
02B6    F019            SET LC2.
02B7    F0CA            LCTR.
02B8    E003            LIT = @03@.
02B9    02EB            AMPCR = MM-KYBD - 1.
02BA    F091            CALL.                                   ACCEPT AND P N
02BB    F0D1            MAR1 = A2.
02BC    F0E7            MIR = B001.
02BD    F0AF            IF LC3 SET LC3 ELSE SKIP.
02BE    F0F3            MW1.      WRITE BEFORE TO PREVENT PE.
                *  DELAY REQUIRED HERE FOR WRITE BEFORE READ ON 711
02BF    F0F1            MR1.
02C0    F0F9            WHEN RDC BEX.                           GET THE CONT T
02C1    F033            A2 = B.
02C2    E003            LIT = @03@.
02C3    02CB            AMPCR = MM-CONTENTS - 1.
02C4    F041            A3 = AMPCR.
02C5    F0CA            LCTR.
02C6    034D            AMPCR = MM-POSITION - 1.
02C7    F01D            A1 = LIT.
02C8    E003            LIT = @03@.
02C9    F091            CALL.
02CA    035F            AMPCR = MM-PRINT - 1.
02CB    F0C9            JUMP.                                   PRINT THE CO E
                MM-CONTENTS.
02CC    F0CA            LCTR.
02CD    E000            LIT = @00@.
02CE    F00C            RESET GC1.
02CF    F0AD            IF LC3 STEP.          RESET WRITE-BEFORE-READ FLAG
02D0    02D5            AMPCR = RESET-GC1LC3 - 1. FOR RETURN FROM MM-KYBD
02D1    42EB            MPCR = MM-KYBD - 1.
                *
                *  MM-KYBD JUMPS HERE FOR OCK I,II,III      KEYS
                SET-LC3GC1.
02D2    F01A            SET LC3.
                SET-GC1.
02D3    F006            SET GC1.
02D4    F0F7            SKIP.
                SET-LC3.
02D5    F01A            SET LC3.
                RESET-GC1LC3.
02D6    F0CA            LCTR.
02D7    E003            LIT = @03@.
02D8    034D            AMPCR = MM-POSITION - 1.
02D9    F01D            A1 = LIT.
02DA    F091            CALL.
02DB    F018            SET LC1.
02DC    02EB            AMPCR = MM-KYBD - 1.
02DD    F091            CALL.                                   ACCEPT AND P N
02DE    F0DD            MIR = A2.
02DF    F0F3            MW1.
02E0    0293            AMPCR = MEMORY-MODIFY.
02E1    F19C            IF NOT GC1 JUMP.
02E2    F019            SET LC2.                                POS TO LEFT.
02E3    F01D            A1 = LIT.
02E4    E012            LIT = @12@.
02E5    034D            AMPCR = MM-POSITION - 1.
02E6    F0D7            MAR1 = BMAR + 1.
02E7    F035            A2 = BMAR.
02E8    F091            CALL.
02E9    02B2            AMPCR = MM-LIST-NEXT - 1.
02EA    F0F6            SET GC2.
02EB    F0C9            JUMP.
                MM-KYBD.
02EC    F041            A3 = AMPCR.                             SAVE RETURN D
02ED    F081            B = NOT CTR R.
02EE    D800            SAR = 8.
02EF    035F            AMPCR = MM-PRINT - 1.
02F0    F0A2            IF GC2 SKIP.
02F1    42F3            MPCR = MM-NANO-SAVE - 1.
02F2    F01F            RESET GC2.
02F3    F0C9            JUMP.
                MM-NANO-SAVE.
02F4    F017            A1 = B.
02F5    F05D            ASE.      SELECT BR2
02F6    F080            B = BMAR.
02F7    F16F            BR2 = BITT.          BR2 = CONTROL PORT
02F8    F1DB            MIR = 0 + Z.
02F9    E002            LIT = @02@.
02FA    F098            DW2.                                    ENABLE KBD D A
02FB    F034            A2 = B000.
02FC    F05D            ASE.      SELECT BR2
02FD    F080            B = BMAR.
02FE    F078            B = B0TT.
02FF    F16E            BR2 = B.             BR2 = DATA PORT
                MM-KYBD-LOOP.
0300    F0C5            IF SRQ DR2 BEX SKIP.
0301    42FF            MPCR = MM-KYBD-LOOP - 1.
0302    0293            AMPCR = MEMORY-MODIFY.
```

```
0303  F0CB          LIT   EQV   B.
0304  E01F          LIT   = @1F@.     RESET  KEY  LOWER  SHIFT   MECHANICAL
0305  F09B          IF  ABT  LUOP  JUMP.   RESET  KEY   START   OVER
0306  E0AB          LIT   = @AB@.     RESET  KEY  LOWER  SHIFT   ELECTRONIC
0307  F09B          IF  ABT  LUOP  JUMP.   RESET  KEY   START   OVER
0308  0290          AMPCR = MEM-MOD-SETLC3    - 1.
0309  E09F          LIT   = @9F@.     RESET  KEY  UPPER  SHIFT   MECHANICAL
030A  F09B          IF  ABT  LUOP  JUMP.
030B  E08B          LIT   = @8B@.     RESET  KEY  UPPER  SHIFT   ELECTRONIC
030C  F09B          IF  ABT  LUOP  JUMP.
030D  038E          AMPCR = MICRO-TOOL    - 1.
030E  E04C          LIT   = @4C@.          OCK  IIII    KEY  MECHANICAL
030F  F09B          IF  ABT  LUOP  JUMP.   OCK  IIII    KEY   GO  TO  END
0310  E0A0          LIT   = @A0@.          OCK  IIII    KEY  ELECTRONIC
0311  F09B          IF  ABT  LUOP  JUMP.   OCK  IIII    KEY   GO  TO  END
0312  02D1          AMPCR = SET-LC3GC1    - 1.
0313  E0CE          LIT   = @CE@.          OCK  II   UPPER  SHIFT   MECHANICAL
0314  F09B          IF  ABT  LUOP  JUMP.
0315  E083          LIT   = @83@.          OCK  II   UPPER  SHIFT   ELECTRONIC
0316  F09B          IF  ABT  LUOP  JUMP.
0317  02D2          AMPCR = SET-GC1    - 1.
0318  E04E          LIT   = @4E@.          OCK  II   LOWER  SHIFT   MECHANICAL
0319  F09B          IF  ABT  LUOP  JUMP.
031A  E0A3          LIT   = @A3@.          OCK  II   LOWER  SHIFT   ELECTRONIC
031B  F09B          IF  ABT  LUOP  JUMP.
031C  02D4          AMPCR = SET-LC3    - 1.
031D  E0CD          LIT   = @CD@.          OCK  I    UPPER  SHIFT   MECHANICAL
031E  F09B          IF  ABT  LUOP  JUMP.
031F  E081          LIT   = @81@.          OCK  I    UPPER  SHIFT   ELECTRONIC
0320  F09B          IF  ABT  LUOP  JUMP.
0321  F0E1          MIR = B.
0322  F07F          B = B R.
0323  C400          SAR = 4  LIT  = 0.
0324  032B          AMPCR = ABCDEF-KEY    - 1.
0325  E004          LIT   = @04@.     UPPER  DIGIT   FOR  ALPHA  ELECTRONIC
0326  F0CB          LIT   EQV  B.
0327  F09B          IF  ABT  LUOP  JUMP.
0328  E005          LIT   = @05@.     UPPER  DIGIT   FOR  ALPHA  MECHANICAL
0329  F09B          IF  ABT  LUOP  JUMP.
032A  E000          LIT   = 0.
032B  F0F7          SKIP.                  NUMERIC  KEY  ENTERED
              ABCDEF-KEY.                  ALPHA  KEY  ENTERED
032C  E009          LIT   = @09@.
032D  F08D          BMI.              RESTORE  B (CHARACTER   ENTERED)
032E  F083          B  = LIT  + B.   ADD 9  IF  ALPHA  KEY
032F  F086          B  = LIT   AND   B.
0330  CC0F          SAR   = 12,     LIT    = @0F@.
0331  F025          A2    =   A2   C.
0332  F031          A2    .=   A2   +   B.                          CONCATENATE
0333  02FF          AMPCR  =   MM-KYBD-LOOP    -   1.
0334  F030          INC.
0335  F0B9           IF  NOT  COV    JUMP.                          TEST  FOR  A
0336  F066          B   =   A1.
0337  F095          CTR    =   B.                                   RESTORE  COUN   R
0338  035F          AMPCR  =    MM-PRINT    -   1.
0339  F0A6          IF    LC1     JUMP.                             PRINT  FLAG.
033A  F101          AMPCR  =   A3.
033B  F05F          B.
033C  F0C9          JUMP.
            MM-ADVANCE.
033D  F05D          ASE.        SELECT   BR2
033E  F080          B  = BMAR.
033F  F16F          BR2  = BITT.            BR2  =  CONTROL  PORT
0340  F0EA          MIR    =   LIT.
0341  E008          LIT    =   @08@.
0342  F098          DW2.                                          ENABLE    FORM    I
0343  F082          B  = LIT   L.
0344  E0C0          LIT    =   @C0@.
0345  F0ED           MIR    =   LIT   +  B.
0346  E050          LIT    =   @50@.
0347  F05D          ASE.        SELECT   BR2
0348  F080          B  = BMAR.
0349  F078          B  = B0TT.
034A  F16E          BR2  = B.               BR2  =  DATA  PORT
034B  F0FC          WHEN SRQ  STEP.
034C  F098          DW2.
034D  F0C9          JUMP.
            MM-POSITION.
034E  F05D          ASE.        SELECT   BR2
034F  F080          B  = BMAR.
0350  F16F          BR2  = BITT.            BR2  =  CONTROL  PORT
0351  F0EA           MIR    =   LIT.
0352  C810          SAR  = 8,   LIT   = @10@.
0353  F098          DW2.                                          ENABLE  CARRI
0354  E001          LIT   = @01@.                                 LEFT  POSITIO     P
0355  F015          IF  LC2  SKIP.
0356  E000          LIT   = @00@.                                 RIGHT  POSITI
0357  F082          B  = LIT   L.
0358  F0DC          MIR    =   A1    +  B.
0359  F05D          ASE.        SELECT   BR2
035A  F080          B  = BMAR.
035B  F078          B  = B0TT.
035C  F16E          BR2  = B.               BR2  =  DATA  PORT
035D  F0FC           WHEN SRQ  STEP.
035E  F098          DW2.
035F  F0C9           JUMP.
            MM-PRINT.
0360  F0A5           IF  LC1    STEP.
0361  F1DB          MIR    =   0    +   Z.
0362  E004          LIT    =   @04@.
0363  F05D          ASE.        SELECT   BR2
0364  F080          B  = BMAR.
0365  F16F          BR2  = BITT.            BR2  =  CONTROL  PORT
0366  F098          DW2.                                          ENABLE  PRINT
0367  C84B          SAR  = 8,   LIT   = @4B@.
0368  F015          IF  LC2  SKIP.                                LC2  MEANS  RE     R
0369  C849          SAR  = 8,   LIT   = @49@.
036A  F089          B    =   LIT.
036B  F01B          A1   =  B  L.
036C  F081           B   =   NOT   CTR    R.
036D  F07C          B   =  B   L.
036E  DE00          SAR    =  14.
036F  F05F          B.
0370  F0F4          SAR    =  B.
0371  F025          A2   =  A2  C.
0372  F05D          ASE.        SELECT   BR2
0373  F080          B  = BMAR.
0374  F078          B  = B0TT.
0375  F16E          BR2  = B.               BR2  =  DATA  PORT
            MM-PRINT-LOOP.
0376  F147          B    =   A2    C.
0377  D400          SAR    =   4.
0378  F07F          B    =   B    R.
0379  DC00          SAR  = 12.                                    ISOLATE    NEXT    I
037A  F0CC           LIT    -   B.
037B  E009           LIT    =   @09@.
037C  F09E          IF  AOV  SKIP.
037D  F018          SET   LC1.                                    UNDIGIT
037E  E037          LIT    =   @37@.
037F  F014          IF    LC1    SKIP.
0380  E030          LIT    =   @30@.
0381  F083          B  = LIT   + B.                               PUT  ZONE  ON.
0382  F0DC          MIR  = A1  + B.
0383  F0FC          WHEN SRQ  STEP.
0384  F098           DW2.
0385  F030           INC.
0386  F0C5          IF  SRQ  DR2  BEX  SKIP.
0387  F101          AMPCR  =   A3.
            MM-NANO-DUMB.
0388  F0C5          IF  SRQ  DR2  BEX  SKIP.
0389  4387          MPCR = MM-NANO-DUMB    - 1.
038A  F09F          IF    COV  JUMP.                              END  OF  PRINT
038B  F025          A2    =   A2    C.
```

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038C   DC00        SAR = 12.                                        LINE UP NEXT  I
038D   0375        AMPCR  =  MM-PRINT-LOOP   -   1.
038E   F0C9        JUMP.
            ***********************************************************                    *
            MICRO-TOOL.                           PRESS  OCK  IIII
          *  MEMORY-MODIFY  USES  LC1,LC2,LC3,GC1,GC2
038F   F0AD        IF  LC3  STEP.
0390   F0A5        IF  LC1  STEP.
0391   F0A9        IF  LC2  STEP.
0392   F00C        RESET  GC1.
0393   F01F        RESET  GC2.
0394   4045        MPCR  =  TESTSELECT   -  1.
            /
            SPO-MEM-MOD.
0395   F0A9        IF  LC2  STEP.   RESET  WRITE-BEFORE-READ     FLAG
0396   8117        CPCR  =  SETCONTADDRS  -  1.
          *   RETURN  WITH  BR1  =  INST,   BR2  =  DATA
0397   F0A5        IF  LC1.
            SMM-NEW-ADDRESS.
0398   83C2        CPCR  =  SMM-ENABLE-OUT   -  1.
0399   E00D        LIT  =  @0D@.
039A   83FF        CPCR  =  SMM-DEV-WT-LIT    -  1.
039B   E00A        LIT  =  @0A@.
039C   83FF        CPCR  =  SMM-DEV-WT-LIT    -  1.
039D   83CA        CPCR  =  SMM-SPACE-4   -  1.
039E   83BF        CPCR  =  SMM-ENABLE-IN    -  1.
039F   F0A8        IF  LC1  SET  LC1  SKIP.
03A0   83D3        CPCR  =  SMM-ACCEPT-4   -  1.
03A1   83C2        CPCR  =  SMM-ENABLE-OUT   -  1.
03A2   F0BF        IF  NOT  LC1  SKIP.
03A3   83E4        CPCR  =  SMM-PRINT-4   -  1.
03A4   83CA        CPCR  =  SMM-SPACE-4   -  1.
03A5   F0D1        MAR1  =  A2.
03A6   F0E7        MIR  =  B001.
03A7   F0AB        IF  LC2  SET  LC2  ELSE  SKIP.
03A8   F0F3        MW1.    WRITE  BEFORE  READ   PREVENT  PE
          *   DELAY  REQUIRED  HERE  FOR  WRITE  BEFORE  READ  ON  711
03A9   F0F1        MR1.
03AA   F0F9        WHEN  RDC  BEX.
03AB   F033        A2  =  B.
03AC   83E4        CPCR  =  SMM-PRINT-4   -  1.
03AD   83BF        CPCR  =  SMM-ENABLE-IN   -  1.
            SMM-WHAT-TO-DO.
03AE   83F8        CPCR  =  SMM-DEV-RD  -  1.
03AF   F0CB        LIT  EQV  B.
03B0   E020        LIT  =  @20@.
03B1   03B6        AMPCR  =  SMM-NEW-CONTENT  -  1.
03B2   F09B        IF  ABT  LUOP  JUMP.
03B3   E01B        LIT  =  @1B@.
03B4   F09D        IF  ABT  SKIP.
03B5   43AD        MPCR  =  SMM-WHAT-TO-DO   -  1.
03B6   F018        SET  LC1.
            SMM-NEW-CONTENT.
03B7   83C2        CPCR  =  SMM-ENABLE-OUT   -  1.
03B8   83CA        CPCR  =  SMM-SPACE-4   -  1.
03B9   83BF        CPCR  =  SMM-ENABLE-IN   -  1.
03BA   83D3        CPCR  =  SMM-ACCEPT-4   -  1.
03BB   F0DD        MIR  =  A2.
03BC   F0F3        MW1.
03BD   F0FB        WHEN  RM1  MAR1  =  BMAR  +  1.
03BE   F035        A2  =  BMAR.
03BF   4397        MPCR  =  SMM-NEW-ADDRESS   -  1.
            SMM-ENABLE-IN.
03C0   F0FC        WHEN  SRQ  STEP.
03C1   F0E7        MIR  =  B001.
03C2   43C3        MPCR  =  SMM-SEND-CW   -  1.
            SMM-ENABLE-OUT.
03C3   F1D5        MIR  =  B001   +  1.
            SMM-SEND-CW.
03C4   F05D        ASE.
03C5   F080        B  =  BMAR.
03C6   F16F        BR2  =  BITT.
03C7   F098        DW2.
03C8   F05F        B.
03C9   F16E        BR2  =  B.
03CA   F0C9        JUMP.
            SMM-SPACE-4.
03CB   F007        A1  =  AMPCR.
03CC   F05F        B.
03CD   F05F        B.
03CE   E020        LIT  =  @20@.
03CF   83FF        CPCR  =  SMM-DEV-WT-LIT    -  1.
03D0   8400        CPCR  =  SMM-DEV-WT   -  1.
03D1   8400        CPCR  =  SMM-DEV-WT   -  1.
03D2   8400        CPCR  =  SMM-DEV-WT   -  1.
03D3   43F5        MPCR  =  SMM-JUMP-A1   -  1.
            SMM-ACCEPT-4.
03D4   F007        A1  =  AMPCR.
03D5   F0CA        LCTR.
03D6   CC02        SAR  =  12,   LIT  =  2.
03D7   F034        A2  =  B000.
            SMM-ACCEPT-LOOP.
03D8   F026        A2  =  A2  L.
03D9   83F8        CPCR  =  SMM-DEV-RD   -  1.
03DA   F0CC        LIT  -  B.
03DB   E040        LIT  =  @40@.
03DC   F09E        IF  AOV  SKIP.
03DD   F083        B  =  LIT  +  B.
03DE   E009        LIT  =  9.
03DF   F086        B  =  LIT  AND  B.
03E0   E00F        LIT  =  @0F@.
03E1   F031        A2  =  A2  +  B.
03E2   F0C8        INC  IF  COV  SKIP.
03E3   43D7        MPCR  =  SMM-ACCEPT-LOOP   -  1.
03E4   43F5        MPCR  =  SMM-JUMP-A1   -  1.
            SMM-PRINT-4.
03E5   F007        A1  =  AMPCR.
03E6   F0CA        LCTR.
03E7   CC02        SAR  =  12,   LIT  =  2.
            SMM-PRINT-LOOP.
03E8   F025        A2  =  A2  C.
03E9   F06D        B  =  A2  AND  LIT.
03EA   E00F        LIT  =  @0F@.
03EB   F0CC        LIT  -  B.
03EC   E009        LIT  =  9.
03ED   F09E        IF  AOV  SKIP.
03EE   F083        B  =  LIT  +  B.
03EF   E007        LIT  =  @07@.
03F0   F0ED        MIR  =  LIT  +  B.
03F1   E030        LIT  =  @30@.
03F2   8400        CPCR  =  SMM-DEV-WT   -  1.
03F3   F0C8        INC  IF  COV  SKIP.
03F4   43E7        MPCR  =  SMM-PRINT-LOOP   -  1.
03F5   43F5        MPCR  =  SMM-JUMP-A1   -  1.
            SMM-JUMP-A1.
03F6   F05C        AMPCR  =  A1.
03F7   F05F        B.
03F8   F0C9        JUMP.
            SMM-DEV-RD.
03F9   F1AE        IF  NOT  URQ  SKIP.
03FA   4405        MPCR  =  SMM-STINTS   -  1.
03FB   F0C5        IF  SRQ  DR2  BEX  SKIP.
03FC   43F8        MPCR  =  SMM-DEV-RD   -  1.
03FD   F086        B  =  LIT  AND  B.
03FE   E07F        LIT  =  @7F@.
03FF   F0C9        JUMP.
            SMM-DEV-WT-LIT.
0400   F0EA        MIR  =  LIT.
            SMM-DEV-WT.
0401   F1AE        IF  NOT  URQ  SKIP.
0402   4405        MPCR  =  SMM-STINTS   -  1.
0403   F0C6        IF  SRQ  DW2  SKIP.
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                    .
0404  4400          MPCR = SMM-DEV-WT   - 1.
0405  F0C9          JUMP.
                SMM-STINTS.
0406  F05D          ASE.
0407  F035          A2 = BMAR.
0408  F08E          BR2 = A2 OR B100.
0409  F097          DR2 BEX.
040A  F07D          B = B C.
040B  D300          SAR = 3.        ERROR STATUS TO LSB,  E-O-M  TO MSB
040C  F090          BR2 = A2.
040D  F05F          B.
                *
                * PUSH INPUT-REQUEST   TO RESET LC2 (NORMAL OPERATION
                *                      BEFORE ERROR WAS PUSHED)
                * PUSH ERROR TO SET LC2 (WRITE BEFORE READ FLAG)
                * PUSH END-OF-MESSAGE   TO EXIT SPO-MEMORY-MODIFY
040E  F0C4          IF NOT MST SKIP.
040F  4414          MPCR = SMM-EXIT   - 1.     E-O-M  STATUS
0410  F019          SET LC2.        WRITE-BEFORE-READ     FLAG
0411  F05F          B.
0412  F0B2          IF LST SKIP.
0413  4394          MPCR = SPO-MEM-MOD   - 1.       INPUT-REQUEST    STATUS
0414  4395          MPCR = SPO-MEM-MOD.   ERROR STATUS (LEAVE LC2 SET)
                SMM-EXIT.
                * SPO-MEM-MOD  USES LC1 AND LC2
0415  F0A5          IF LC1 STEP.
0416  F0A9          IF LC2 STEP.
0417  4045          MPCR = TESTSELECT   - 1.
                /
                TESTTABLE.
0418  4441          MPCR = TEST-0     - 1.
0419  47C1          MPCR = PAPMOTST  - 1.            TEST 01
041A  4724          MPCR = CHKSTAT   - 1.            TEST 02
041B  47B9          MPCR = LOPONWRT  - 1.            TEST 03
041C  48E3          MPCR = ALTERNATE   - 1.          TEST 04
041D  48F4          MPCR = MEMTEST   - 1.            TEST 05
041E  4441          MPCR = TEST6   - 1.              TEST 06
041F  48F6          MPCR = CHARSET96   - 1.          TEST 07
0420  4441          MPCR = TEST-8     - 1.
0421  4441          MPCR = TEST-9     - 1.
0422  4443          MPCR = TEST-10    - 1.
0423  4707          MPCR = TEST-11    - 1.
0424  470A          MPCR = TEST-12    - 1.
0425  470D          MPCR = TEST-13    - 1.
0426  4711          MPCR = TEST-14    - 1.
0427  4713          MPCR = TEST-15    - 1.
0428  4715          MPCR = TEST-16    - 1.
0429  465A          MPCR = TEST-17    - 1.
042A  4678          MPCR = TEST-18    - 1.
042B  4697          MPCR = TEST-19    - 1.
042C  4661          MPCR = TEST-20    - 1.
042D  4717          MPCR = TEST-21    - 1.
042E  471B          MPCR = TEST-22    - 1.
042F  4695          MPCR = TEST-23    - 1.
0430  465F          MPCR = TEST-24    - 1.
0431  4441          MPCR = TEST-25    - 1.
0432  4441          MPCR = TEST-26    - 1.
0433  4441          MPCR = TEST-27    - 1.
0434  4441          MPCR = TEST-28    - 1.
0435  4441          MPCR = TEST-29    - 1.
                NTRTSR.
0436  4A14          MPCR = SETLC1   - 1.             TEST 30
0437  49F2          MPCR = GC1SET   - 1.             TEST 31
0438  4904          MPCR = BLANCKTST   - 1.          TEST 32
0439  4A16          MPCR = PRINTTITLE    - 1.        TEST 33
043A  4967          MPCR = CHECKSTATUS   - 1.        TEST 34
043B  4B31          MPCR = PR011   - 1.              TEST 35
043C  4A90          MPCR = ROTALPHA  - 1.            TEST 36
043D  4920          MPCR = CHARROT  - 1.             TEST 37
043E  493B          MPCR = COLPRT   - 1.             TEST 38
043F  48F8          MPCR = ENABLESTATUS   - 1.       TEST 39
0440  49C4          MPCR = TOFSUBR  - 1.             TEST 40
0441  49D5          MPCR = SETLC2   - 1.             TEST 41
                * ADD TESTS  AS NEEDED
                * PROGRAM JUMPS TO LABELS TEST-0,TEST-1,       ETC PER
                * TEST-NUMBERS  ENTERED IN THE CONTROLLER
                * PROGRAM JUMPS TO MEMORY-MODIFY FOR ANY TEST-NUMBER,
                * IF STINT IS ON
                      TEST-0.
                      TEST-7.
                      TEST-8.
                      TEST-9.
                TEST-25.
                TEST-26.
                TEST-27.
                TEST-28.
                TEST-29.
                TEST6.
0442  40AE          MPCR = INVALIDTEST   - 1.   ILLEGAL  TEST  NUMBER
0443  F000          WAIT.
                /
                * ODEC PRINTER  MTR
                TEST-10.
                *  ENTER THIS TEST WITH PRINTER  NOT READY
0444  F0BD          IF NOT IRQ SKIP.
0445  4451          MPCR = UNEXP-IRQ   - 1.
0446  F1AD          IF NOT SRQ SKIP.
0447  F000          WAIT.           UNEXPECTED  SRQ
0448  F1AE          IF NOT URQ SKIP.
0449  F000          WAIT.           UNEXPECTED  URQ
                *  STATUS SHOULD BE NOT-READY BIT 16 ON
044A  F096          DR1 BEX.              STATUS  READ
044B  F05F          B.
044C  F0C3          IF NOT LST SKIP.
044D  4454          MPCR = NOT-RDY-ON   - 1.
                *
044E  F000          WAIT.           NOT-READY  BIT  OFF
                ********* ERROR # E200
                *
                LOOP-NOT-RDY.
044F  F096          DR1 BEX.
0450  F05F          B.
0451  444E          MPCR = LOOP-NOT-RDY   - 1.
                * LOOP TO METER PO1-2T  (PSREADN/)   AND PO1-1U  (PSINSTN)
                *
                UNEXP-IRQ.
0452  F108          ASR BEX.
0453  F0E1          MIR = B.
0454  F000          WAIT.     UNEXPECTED  IRQ (ADDRESS  & STATUS  IN  MIR)
                *
                NOT-RDY-ON.
0455  F0EE          MIR = LIT  L.  -        CW = BIT  8   LOAD PRINT  DATA
0456  C801          LIT  = 1 SAR = 8.
0457  F099          DW1.                    CONTROL
0458  F05F          B.                      DELAY FOR PRINTER  URQ
0459  F05F          B.                      DELAY FOR PRINTER  URQ
045A  F05F          B.                      DELAY FOR PRINTER  URQ
045B  F1B5          IF URQ SKIP.
045C  848E          CPCR =  NO-NOTRDYURQ  - 1.
                *
                * DWI WITH PRINTER  NOT READY CAUSE URQ
                * CHECK NOT READY STATUS  (BIT  16 ON,  BITS  1,15,12      OFF)
045D  F096          DR1 BEX.                STATUS
045E  F05F          B.
045F  F1AE          IF NOT URQ SKIP.
0460  F000          WAIT.
                ********* ERROR # E201
                *
0461  F05F          B.                      NOT READY BIT  16
0462  F0B2          IF LST  SKIP.
0463  F000          WAIT.
```

```
              *********    ERROR  #  E202
              *
0464   F05F        B.                      DATA  REQUEST  BIT  1
0465   F0C4        IF  NOT  MST  SKIP.
0466   F000        WAIT.
              *********    ERROR  #  E203
              *
0467   D100        SAR  =  1.
0468   F07F        B  =  B  R.             END  OF  PAGE  BIT  15
0469   F05F        B.
046A   F0C3        IF  NOT  LST  SKIP.
046B   F000        WAIT.
              *********    ERROR  #  E204
              *
046C   D300        SAR  =  3.
046D   F07F        B  =  B  R.             PRINT  COMPL  BIT  12
046E   F05F        B.
046F   F0C3        IF  NOT  LST  SKIP.
0470   F000        WAIT.
              *********    ERROR  #  E205
              *
0471   F097        DR2  BEX.               DATA  READ
0472   F05F        B.
0473   F0C3        IF  NOT  LST  SKIP.
0474   F000        WAIT.          NOT-READY  BIT  ON  WITH  DATA  READ
              *********    ERROR  #  E206
              *
0475   80B7        CPCR  =  ALARM  -  1.
0476   F000        WAIT.
              *
              *  DID  PRINTER  CHAIN  MOTOR  START  (MOTOR  OFF  INDICATOR
              *                                     FROM  ON  TO  OFF)
              *  IF  NO,
              *********    ERROR  #  E207
              *********    NOTE:  SINCE  IT  WILL  BE  DIFFICULT  TO  SEE  THE
              *           DSTB/  PULSE  IN  STEP  16  TRY  RUNNING  THE  MTR
              *           AGAIN  WITH  THE  MOTOR  SWITCH  TO  ALWAYS  ON.
              *           IF  THE  PRINTER  STARTS  PRINTING  JUNK  WHEN  MADE
              *           READY  TRY  CHANGING  PO1  C3,  E5,  D1,  B3,AND  C5
              *           FIRST.   NEXT,  IF  THE  PRINTER  DOES  ANY  SPACING
              *           OR  NORMAL  PRINTING  TRY  CHANGING  PO1  B1  FIRST.
              *
              *  IF  YES,
              *   PUT  PRINTER  IN  READY  STATE  THEN  FORCE  STEP
0477   F096        DR1  BEX.               STATUS
0478   F05F        B.
0479   F0C3        IF  NOT  LST  SKIP.
047A   F000        WAIT.
              *********    ERROR  #  E208
              *
047B   F099        DW1.     CONTROL    CW = 0100   (LOAD  DATA  BUFFER)
              *  FIRST  WRITE  TO  PRINTER  IN  READY  STATE
047C   F05F        B.                 TIME  RESET  PREVIOUS  SRQ
047D   F05F        B.
047E   F0FC   *    WHEN  SRQ  STEP.
              *  IF  MTR  HANGS  HERE,
              *********    ERROR  #  E209
047F   F1AD        IF  NOT  SRQ  SKIP.
0480   4491        MPCR  =  FIRST-SRQ   -  1.
              *
0481   F000        WAIT.
              *
             LOADPDATALOOP.
0482   F099        DW1.               CW  =  LOAD  PRINT  DATA
0483   F05F        B.
0484   F05F        B.
0485   F05F        B.
0486   4481        MPCR  =  LOADPDATALOOP  -  1.
              *
             LOADPDATALOOP2.
0487   F0F5        SAVE.
0488   F0CA        LCTR.
0489   E0FF        LIT  =  255.
048A   F0EA        MIR  =  LIT.
048B   E004        LIT  =  @04@.
048C   F099        DW1.
             TIMELPL.
048D   F1B7        INC  IF  COV  JUMP.
048E   448C        MPCR  =  TIMELPL  -  1.
              *
              *
             NO-NOTRDYURQ.
048F   F000        WAIT.
              *********    ERROR  #  E210
              ***  METER  STINT/
              *  METER  PSWRITN/   IN  FOLLOWING  LOOP
             PSWRTL.
0490   F099        DW1.
0491   448F        MPCR  =  PSWRTL  -  1.
              *
             FIRST-SRQ.
              *
0492   8155        CPCR  =  BUSSTEST  -  1.     FIRST  BUSS  TEST  WITH  SRQ  ON
              *  IF  BUSS  TEST  FAILS  HERE,  FAILURE  IS  PO1  E7
              *
0493   F0BD        IF  NOT  IRQ  SKIP.
0494   F000        WAIT.
              *********    ERROR  #  E211
              *
0495   F1AE        IF  NOT  URQ  SKIP.
0496   F000        WAIT.
              *********    ERROR  #  E212
              *  LOAD  PRINT  DATA  (BIT  8)  CW
              *  CHECK  STATUS  BITS
0497   F096        DR1  BEX.
0498   F05F        B.
0499   F0B3        IF  MST  SKIP.          DATA  REQUEST
049A   F000        WAIT.
              *********    ERROR  #  E213
              *
049B   F05F        B.
049C   F0C3        IF  NOT  LST  SKIP.     NOT  READY
049D   F000        WAIT.
              *********    ERROR  #  E214
              *
049E   F07F        B  =  B  R.
049F   D400        SAR  =  4.
04A0   F05F        B.
04A1   F0C3        IF  NOT  LST  SKIP.     PRINT  COMPL
04A2   F000        WAIT.
              *********    ERROR  #  E215
              *
              *  FIRST  SRQ  AND  STATUS  CHECKS  OK
              *
04A3   F099        DW1.               CW  =  LOAD  PRINT  DATA
04A4   F05F        B.                 TIME  TO  RESET  DINT/
04A5   F05F        B.                 TIME  TO  RESET  DINT/
04A6   F1AD        IF  NOT  SRQ  SKIP.
04A7   F000        WAIT.
              *********    ERROR  #  E216
              ***     DINT/  NOT  RESET
              *
04A8   F0FC        WHEN  SRQ  STEP.
              *  IF  MTR  HANGS  HERE
              *********    ERROR  #  E217
              ***  NO  SRQ  FROM  THIRD  DWI  (LOAD  PRINT  DATA)  (FIRST  DWI
              ***     WITH  PRINTER  NOT  READY,  SECOND  &  THIRD  DWI'S  WITH
              ***     PRINTER  READY)
              *
              *
```

```
                SECOND-SRQ.
               * SRQ'S  OK FROM 1ST  AND 2ND  DW1 (LOAD  PRINT  DATA)
               *
04A9  F0EA           MIR  = LIT.
04AA  E048           LIT  = @48@.     'H'
04AB  F0CA           LCTR.
04AC  E0FF           LIT  = @FF@.
04AD  F098           DW2.             FIRST  DATA WRITE
04AE  F05F           B.          TIME  TO RESET  DINT
04AF  F05F           B.          TIME  TO RESET  DINT
               *
04B0  F0FC           WHEN SRQ  STEP.
               * IF  MTR HANGS  HERE,
               *********       ERROR  # E218
               * PRESS  FORCE  TO GO TO PSINSTN   LOOP  BELOW
               *
04B1  F1AD           IF  NOT SRQ  SKIP.
04B2  44C3           MPCR = FIRSTDATA-SRQ    - 1.
               ***  NO SRQ FROM FIRST  DATA WRITE
                PSINSTNL.
04B3  F098           DW2.
04B4  44B2           MPCR = PSINSTNL   - 1.
04B5  F05F           B.
04B6  F05F           B.
               *
04B7  F1AE           IF  NOT URQ SKIP.
04B8  F000           WAIT.
04B9  F0BD           IF  NOT IRQ  SKIP.
04BA  F000           WAIT.
04BB  F000           WAIT.
                WRITEDATA-LOOP.
04BC  F0F5           SAVE.
04BD  F0CA           LCTR.
04BE  E0FF           LIT  = 255.
04BF  F0EA           MIR  = LIT.
04C0  E048           LIT  = @48@.     'H'
04C1  F098           DW2.
                TIMEDLP.
04C2  F1B7           INC  IF  COV  JUMP.
04C3  44C1           MPCR = TIMEDLP   - 1.
               *
               *
                FIRSTDATA-SRQ.
04C4  F0EA           MIR  = LIT.
04C5  E00F           LIT  = @0F@.     INVALID  CHR.    (PRINT  SP  A=0  B=1)
04C6  F098           DW2.             DATA.
04C7  F05F           B.               TIME  TO RESET  DINT/
04C8  F05F           B.               TIME  TO RESET  DINT/
04C9  F05F           B.               TIME  TO RESET  DINT/
04CA  F05F           B.               TIME  TO RESET  DINT/
04CB  F0FC           WHEN SRQ  STEP.
04CC  F0EA           MIR  = LIT.
04CD  E037           LIT  = @37@.     '7'
04CE  F098           DW2.             DATA
04CF  F05F           B.               TIME  TO RESET  DINT/
04D0  F05F           B.               TIME  TO RESET  DINT/
04D1  F05F           B.               TIME  TO RESET  DINT/
04D2  F05F           B.               TIME  TO RESET  DINT/
04D3  F0FC           WHEN SRQ  STEP.
               * IF  MTR HANGS  HERE
               *********       ERROR  # E 259
               *
               *
04D4  F0EA           MIR  = LIT.
04D5  E004           LIT  = 4.
04D6  F099           DW1.       CONTROL   CW = 0004   (SINGLE   SPACE)
04D7  F0FD           WHEN URQ  STEP.
               * IF  MTR HANGS  HERE,
               *********       ERROR  # E219
               * FIRST  FORMAT CONTROL  WRITE  TO PRINTER
04D8  F1AE           IF  NOT URQ SKIP.
04D9  44E7           MPCR = S-SPACE-URQ    - 1.
04DA  F000           WAIT.
               ***  URQ NOT SET  BY SINGLE  SPACE  CONTROL  WORD
04DB  F1AD           IF  NOT SRQ  SKIP.
04DC  F000           WAIT.
               ***
04DD  F0BD           IF  NOT IRQ  SKIP.
04DE  F000           WAIT.
               ***
04DF  F000           WAIT.
               *
                SINGLE-SPACE-LP.
04E0  F0F5           SAVE.
04E1  F0CA           LCTR.
04E2  E0FF           LIT  = 255.
04E3  F0EA           MIR  = LIT.
04E4  E004           LIT  = @04@.
04E5  F099           DW1.
                TIMESPL.
04E6  F1B7           INC  IF  COV  JUMP.
04E7  44E5           MPCR = TIMESPL   - 1.
               *
                S-SPACE-URQ.
               *
04E8  80B7           CPCR = ALARM  - 1.
04E9  F0BC           IF  NOT GC2  SKIP.
04EA  F0F7           SKIP.
04EB  F000           WAIT.
               * DID  PRINTER  PRINT  'H'  IN  COLUMN 1,  'SPACE'   IN COL.  2
               *        AND '7'   IN  COL  3,  AND SINGLE  SPACE
               * IF  YES,  PRESS  FORCE  STEP  TO CONTINUE  MTR
               * IF  NO,
               *********       ERROR  # E220
               *
               *   EXPLANATION  OF PRINTOUT
               *   'H'  IN  COL  1  AND '7'   IN  COLUMN 3 FORCES  EACH OF THE
               *        INTERFACE  LINES  B1  THRU B7  THROUGH BOTH  A 1
               *        AND 0  STATE
               *   PREVIOUS  MOTOR TURN ON FORCED  POSELATP  TO 0  AND
               *        POSELBTP  TO 0
               *   LOADING  'H'  AND '7'   FORCED  POSELATP  TO 1  AND
               *        POSELBTP  TO 1
               *   LOADING  THE ILLEGAL  CHARACTER FORCED  POSELATP  TO 0,
               *        AND POSELBTP  TO 1
               *   THE SINGLE  SPACE  FORCED  POSELATP  TO 1  AND
               *        POSELBTP  TO 0
               *   THE INTERFACE  SIGNALS  B1  THROUGH B7  AND THE S4
               *        ADDRESS  LINES  HAVE EACH BEEN  FORCED  THROUGH
               *        A 1  AND 0  STATE
               *
               *  CHECK  STATUS  BITS
04EC  F096           DR1  BEX.
04ED  F05F           B.
04EE  F1AE           IF  NOT URQ SKIP.
04EF  F000           WAIT.
               *********       ERROR  # E221
               ***     URQ NOT  RESET
04F0  F05F           B.
04F1  F0C4           IF  NOT MST SKIP.          DATA  REQUEST
04F2  F000           WAIT.
               *********       ERROR  # E222
               *
04F3  F0C3           IF  NOT LST  SKIP.         NOT  READY
04F4  F000           WAIT.
               *********       ERROR  # E223
               *
04F5  F07F           B = B R.
04F6  D100           SAR  = 1.
04F7  F05F           B.
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```
04F8  F0C3        IF  NOT LST  SKIP.            EOP
04F9  F000        WAIT.
                  *********      ERROR  #  E224
04FA  F07F        B  =  B  R.
04FB  D300        SAR  =  3.
04FC  F05F        B.
04FD  F0B2        IF  LST  SKIP.                PRINT  COMPL
04FE  F000        WAIT.
                  *********      ERROR  #  E225
                  *
                  *
                   PORT-SEL-TEST.
                  *  INST  WRITE  WITH  MIR  BIT  8  ON WILL  CAUSE  SRQ
                  *  INST  WRITE  WITH  MIR  BIT  14  ON WILL  CAUSE  URQ
                  *
04FF  F0EA        MIR  =  LIT.
0500  C804        LIT  =  @04@  SAR  =  8.
0501  F099        DW1.            CW  =  SINGLE  SPACE
0502  F0FD        WHEN URQ  STEP.
                  *  IF  MTR HANGS  HERE,
                  *********      ERROR  #  E226
0503  F108        ASR  BEX.
0504  F05F        B.
0505  F1B5        IF  URQ  SKIP.
0506  8648        CPCR  =  PSEL-ERROR   -  1.  ASR  DESELECTS
                  *********      ERROR  #  E230
0507  F0FF        0  EQV  B.  .                 CHECK  FOR  NO  ASR  RESPONSE
0508  F09D        IF  ABT  SKIP.
0509  8648        CPCR  =  PSEL-ERROR   -  1.  ASR  NOT  0  WITH  NO  IRQ
                  *********      ERROR  #  E231
                  *
050A  8653        CPCR  =  DESELECT   -  1.     URQ  SHOULD  CHANGE  TO  IRQ
050B  F18E        IF  IRQ  SKIP.
050C  8648        CPCR  =  PSEL-ERROR   -  1.         NO  STINT  IRQ
                  *********      ERROR  #  E232
                  *
050D  8155        CPCR  =  BUSSTEST   -  1.
                  *  FIRST  BUSS  TEST  WITH  PRINTER  IRQ  ON
                  *********      ERROR  #  E233
                  *
050E  F108        ASR  BEX.
050F  F033        A2  =  B.           SAVE  PRINTER  STATUS
0510  F07F        B  =  B  R.
0511  F052        A3  =  B  L.        CLEAR  STATUS  BITS
0512  F080        B  =  BMAR.         GET  PRINTER  ADDRESS
0513  F078        B  =  B0TT.
0514  F03C        A3  EQV  B.
0515  F09D        IF  ABT  SKIP.
0516  8648        CPCR  =  PSEL-ERROR   -  1.  ASR  ADDRESS  WRONG
                  *********      ERROR  #  E234
                  *  PRESS  FORCE  STEP  TO  DISPLAY  RECEIVED  ADDRESS  IN  MIR
                  *  PRESS  FORCE  STEP  TO  DISPLAY  CORRECT  ADDRESS  IN  MIR
                  *
0517  E010        LIT  =  @10@.       PRINTER  STATUS
0518  F06A        B  =  A2  L.
0519  F07F        B  =  B  R.         CLEAR  ADDRESS  BITS
051A  F0CB        LIT  EQV  B.
051B  F09D        IF  ABT  SKIP.
051C  8648        CPCR  =  PSEL-ERROR   -  1.  PRINTER  ASR  STATUS  ERROR
                  *********      ERROR  #  E235
                  *  PRESS  FORCE  STEP  2  TIMES  TO  DISPLAY  STATUS  IN  MIR
                  *  PRESS  FORCE  STEP  TO  DISPLAY  EXPECTED  STATUS  IN  MIR
                  *
051D  F0BD        IF  NOT IRQ  SKIP.
051E  8648        CPCR  =  PSEL-ERROR   -  1.  STINT  NOT  RESET
                  *********      ERROR  #  E236
                  *
051F  F0EE        MIR  =  LIT  L.
0520  C801        LIT  =  1  SAR  =  8.
0521  F099        DW1.            CW  =  LOAD  PRINT  DATA
0522  F0FC        WHEN SRQ  STEP.
                  *  IF  MTR HANGS  HERE,
                  *********      ERROR  #  E226
0523  8653        CPCR  =  DESELECT   -  1.     SRQ  SHOULD  BECOME  IRQ
0524  F18E        IF  IRQ  SKIP.
0525  8648        CPCR  =  PSEL-ERROR   -  1.  NO  DINT  IRQ
                  *********      ERROR  #  E237
                  *
0526  F096        DR1  BEX.
0527  F0FC        WHEN SRQ  STEP.       HANG  HERE  IF  NO  READ  SELECT
                  *********      ERROR  #  E238
                  *
                  *  VERIFY  THAT  ONLY  THE  PRINTER  PORT  ADDRESS  WILL  ACCESS
                  *  THE  PRINTER.     CHECK  THAT  A  STATUS  READ  TO  ALL  PORTS
                  *  EXCEPT  PRINTER  DOES  NOT  RESET  STINT
                  *
0528  F0EA        MIR  =  LIT.
0529  E004        LIT  =  4.
052A  F038        A2  =  LIT.
052B  C80F        LIT  =  15  SAR  =  8.
052C  F05E        ASR.            SELECT  BR1
052D  F056        A3  =  BMAR.    PRINTER  PORT  ADDRESS
052E  F099        DW1.            CW  =  SINGLE  SPACE
052F  F0FD        WHEN URQ  STEP.
                  *
                   ACCESSLOOP.
0530  F05D        ASE.            SELECT
0531  F026        A2  =  A2  L.
0532  F08E        BR2  =  A2  OR  B100.
0533  F035        A2  =  BMAR.    PORT  ADDRESS  TO  BE  ACCESSED
0534  F071        B  =  A3.       PRINTER  PORT  ADDRESS
0535  F116        A2  EQV  B.
0536  F09D        IF  ABT  SKIP.
0537  F097        DR2  BEX.       SKIP  IF  BR2  =  PRINTER  PORT  ADDRESS
0538  F05F        B.
0539  F0F8        WHEN IRQ  STEP.
                  *********      ERROR  #  E239
                  *  PRINTER  PORT  ACCESSED  BY  ANOTHER  PORT  ADDRESS
                  *
053A  F068        B  =  A2.
053B  F078        B  =  B0TT.
053C  F037        A2  =  B  R.
053D  F02B        A2  =  A2  -  1.
053E  F0B7        IF  NOT AOV  SKIP.
053F  452F        MPCR  =  ACCESSLOOP   -  1.
                  *
0540  F096        DR1  BEX.       RESET  URQ
0541  F05F        B.
0542  F071        B  =  A3.
0543  F078        B  =  B0TT.
0544  F16E        BR2  =  B.      RESTORE  BR2
                  *
                  *  ASR  PRIORITY  TEST
                  *
0545  F099        DW1.      CW  =  SINGLE  SPACE
0546  F0FD        WHEN URQ  STEP.
0547  827A        CPCR  =  SET-CONT-DINT     -  1.
0548  8653        CPCR  =  DESELECT   -  1.
0549  F0CF        MAR1  =  AMPCR.
054A  014D        AMPCR  =  CONTPORTADDRESS.
054B  F0F1        MR1.
054C  F0F9        WHEN RDC  BEX.
054D  F033        A2  =  B.       STORRED  CONTROLLER  STATUS
                  *                 SPO  =  8X00,    CONSOLE  =  8X20
054E  F108        ASR  BEX.
054F  F116        A2  EQV  B.     CHECK  CONTROLLER  ASR  RESPONSE
0550  F09D        IF  ABT  SKIP.
0551  8648        CPCR  =  PSEL-ERROR   -  1.
                  *********      ERROR  #  E 240
                  *
0552  8288        CPCR  =  RESET-CONT-DINT     -  1.
0553  827A        CPCR  =  SET-CONT-DINT     -  1.
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0554  F108          ASR  BEX.
0555  F033          A2  = B.              SAVE  PRINTER  STATUS
0556  F0CF          MAR1 = AMPCR.
0557  014C          AMPCR = PORTADDRESS.
0558  F0F1          MR1.
0559  F0F9          WHEN RDC BEX.
055A  F087          B = LIT  OR B.
055B  E010          LIT  = @10@.          PRINTER  STATUS
055C  F116          A2  EQV  B.
055D  F09D          IF  ABT  SKIP.
055E  8648          CPCR = PSEL-ERROR   - 1.   CONT ENST WENT TO PRINTER
                  *********      ERROR # E 241
                  *
055F  8288          CPCR = RESET-CONT-DINT     - 1.
0560  F0EE          MIR  = LIT  L.
0561  C801          LIT  = 1  SAR  = 8.
0562  F099          DW1.              CW = LOAD PRINT  DATA
0563  8653          CPCR = DESELECT   - 1.
0564  80B7          CPCR = ALARM  - 1.        ALERT  OPERATOR
0565  F05E          ASR.
0566  F000          WAIT.
                  *                 PORT  SELECT  CARD-ENABLE  STATUS  GATING  TEST
                  *                   TO VERIFY  ONLY THE DEVICE GENERATING  AN
                  *                   INTERRUPT  IS  ADDRESSED  BY  ASR,  METER THE
                  *                   FOLLOWING  SIGNALS
                  *
                  *                   ONLY THE SIGNALS  CORRESPONDING  TO  THE      C
                  *                   PORT  NUMBER  OF  THE  PRINTER  SHOULD  BE 0%  C
                  *                   ALL  OTHERS  SHOULD  BE  100%
                  *
                  *                   IF  YES    FORCE  STEP
                  *                   IF  NO     REPLACE  CHIPS  A5  B5  C5  C7
                  *                              OF  PS1  CARD  BEING  METERED
                  *
                  **    PORT          PS1-3
                  **
                  **     12          2J(PSENST12/)
                  **     11          1J(PSENST11/)
                  **     10          1K(PSENST10/)
                  **      9          2B(PSENST09/)
                  **                                 PS1-2
                  **
                  **      8                         2J(PSENST8/)
                  **      7                         1J(PSENST7/)
                  **      6                         1K(PSENST6/)
                  **      5                         2B(PSENST5/)
                  **                                                PS1-1
                  **
                  **      4                                        2J(PSENST4/)
                  **      3                                        1J(PSENST3/)
                  **      2                                        1K(PSENST2/)
                  **      1                                        2B(PSENST1/)
                  **
                  **   NOTE  -  SYSTEM  MAY USE  1,  2,  OR  3  PS1  CARDS
                  *
                  ***
                  *  RETURN TO TESTSELECT,    IF 'SINGLE   TEST'  WAS ENTERED
                  *  ELSE  CONTINUE  WITH  NEXT  TEST
0567  C201            SAR  = 2  LIT  = 1.          SINGLE  TEST  FLAG
0568  8207          CPCR = TESTFLAGW2   - 1.
0569  4044          MPCR = TESTSELECTCLEAR     - 1.        TRUE  RETURN
                  *
056A  86BB          CPCR = LPDATA  - 1.
056B  F0EA          MIR  = LIT.
056C  E048          LIT  = @48@.   'H'
056D  F0CA          LCTR.
056E  E083          LIT  = 131.
                  *
                    FIRST-FULL-LINE.
056F  F098          DW2.              LOAD  'H'
0570  F030          INC.
0571  F02E          IF  COV  SKIP.
0572  F0F7          SKIP.
0573  4575          MPCR = FIRST-FL-SRQ     - 1.      132  CHARACTERS  LOADED
0574  F0FC          WHEN SRQ  STEP.
0575  456E          MPCR = FIRST-FULL-LINE      - 1.
                  *
                    FIRST-FL-SRQ.
0576  F0FC          WHEN SRQ  STEP.
                  ***
0577  86CA          CPCR = SINGLE-SPACE     - 1.
0578  F01D          A1  = LIT.
0579  E020          LIT  = @20@.
                  *
                    LOOP-20-5F.
057A  F0DB          MIR  = A1.
057B  F098          DW2.              DATA
057C  F05F          B.          TIME  TO RESET  PREVIOUS  SRQ
057D  F05F          B.          TIME  TO RESET  PREVIOUS  SRQ
057E  F0FC          WHEN SRQ  STEP.
057F  F012          A1  = A1  + 1.   NEXT  CHARACTER
0580  E07F          LIT  = @7F@.          KATAKANA  CODE  LIMIT   @7E@
0581  F008          IF  GC1  SKIP.        KATAKANA  FLAG
0582  E060          LIT  = @60@.
0583  F111          A1  EQV  LIT.
0584  F09D          IF  ABT  SKIP.
0585  4579          MPCR = LOOP-20-5F     - 1.
                  *
0586  86CA          CPCR = SINGLE-SPACE     - 1.
                  *
0587  86BB          CPCR = LPDATA  - 1.
0588  E031          LIT  = @31@.          PRINT  '1'
0589  86C2          CPCR = LOADCHR  - 1.
058A  86C8          CPCR = CR-NO-SPACE     - 1.
058B  E055          LIT  = @55@.          PRINT  'U'
058C  86C2          CPCR = LOADCHR  - 1.
058D  86CA          CPCR = SINGLE-SPACE     - 1.
                  *
                  *
058E  F0BC          IF  NOT  GC2  SKIP.
058F  F0F7          SKIP.
0590  F000          WAIT.
                  *
                  *  DOES  PRINTOUT  AGREE  WITH  FOLLOWING  3  LINES  (S  SPACED)
                  *  LINE  1  -  FULL  LINE  OF  H'S
                  *  LINE  2  -  BEGIN  IN  COL.  1,  PRINT  ALL  CHARACTER  CODES
                  *              20  THRU  5F  (THRU  7E  FOR  KATAKANA),  REST  OF
                  *              LINE  BLANKS
                  *  LINE  3  -  1  OVERPRINTED   WITH  U  IN  COL  1
                  *
                  *  IF  YES,  PRESS  FORCE  STEP  TO  CONTINUE
                  *
                  *  IF  NO,
                  *********      ERROR  #  E  242
                  *
                  *  TEST  DOUBLE  SPACE
                  *  FIRST  TIME  THAT  2ND  DATA  STROBE  IS  USED
                  *
0591  F096          DR1  BEX.         RESET  URQ
                  *
0592  E044          LIT  = @44@.          PRINT  'D'
0593  86C2          CPCR = LOADCHR  - 1.
0594  E053          LIT  = @53@.          PRINT  'S'
0595  86C2          CPCR = LOADCHR  - 1.
0596  E031          LIT  = @31@.          PRINT  '1'
0597  86C2          CPCR = LOADCHR  - 1.
0598  F0EA          MIR  = LIT.
0599  E008          LIT  = @08@.
059A  F099          DW1.       CONTROL     FIRST  DOUBLE  SPACE
059B  F0FD          WHEN URQ  STEP.
                  *
059C  E044          LIT  = @44@.          PRINT  'D'
059D  86C2          CPCR = LOADCHR  - 1.
```

```
059E  E053        LIT  = @53@.          PRINT  'S'
059F  86C2        CPCR = LOADCHR - 1.
05A0  E032        LIT  = @32@.          PRINT  '2'
05A1  86C2        CPCR = LOADCHR - 1.
05A2  86CA        CPCR = SINGLE-SPACE   - 1.
                  *
                  * CLEAR BUFFER 7F/,   BK/ TEST
05A3  F01D        A1 = LIT.
05A4  E020        LIT = @20@.
                  LOOP-BK.
05A5  F0DB        MIR = A1.
05A6  F098        DW2.              DATA
05A7  F05F        B.          TIME TO RESET PREVIOUS SRQ
05A8  F05F        B.          TIME TO RESET PREVIOUS SRQ
05A9  F0FC        WHEN SRQ STEP.
05AA  F012        A1 = A1 + 1.
05AB  E060        LIT = @60@.
05AC  F111        A1 EQV LIT.
05AD  F09D        IF ABT SKIP.
05AE  45A4        MPCR = LOOP-BK - 1.
                  *
05AF  86BB        CPCR = LPDATA - 1.          CLEARS BUFFER
05B0  86CA        CPCR = SINGLE-SPACE - 1.    ERROR IF ANY PRINTING
                  *
                  * TEST BK/ FOR STUCK HIGH
05B1  E042        LIT = @42@.     PRINT 'B'
05B2  86C2        CPCR = LOADCHR - 1.
05B3  E04B        LIT = @4B@.     PRINT 'K'
05B4  86C2        CPCR = LOADCHR - 1.
05B5  E07F        LIT = @7F@.     PRINT '?'
                  * ERROR, IF 7F CLEARS BUFFER
05B6  86C2        CPCR = LOADCHR - 1.
05B7  86CA        CPCR = SINGLE-SPACE - 1.
                  * PRINT 'BK'  0N 48-CHR CHAIN, 'BK?'  ON 64-CHR CHAIN
                  *
05B8  80B7        CPCR = ALARM - 1.
05B9  F0BC        IF NOT GC2 SKIP.
05BA  F0F7        SKIP.
                  *
05BB  F000        WAIT.
                  * DOES PRINTOUT AGREE WITH THE FOLLOWING
                  * LINE 1 - DS1 IN COLUMNS 1,2,3
                  * LINE 2 - BLANK              (FIRST DOUBLE SPACE)
                  * LINE 3 - DS2 IN COLUMNS 1,2,3
                  * LINE 4 - BLANK (PRINTS CODES 20-5F IF NO BUFFER CLR)
                  * LINE 5 - BK IN COLUMS 1,2,  ? 0R BLANK IN COL 3
                  * IF YES, PRESS FORCE STEP TO CONTINUE
                  *
                  * IF NO,
                  ********* ERROR # E 243
                  *
                  *
                  EOP-STATUS-TEST.
                  * END OF PAGE LEVEL (EOPL) TEST
                  * END OF PAGE STATUS IS SET ON 12-CHANNEL FORMAT TAPE
                  *   PRINTERS ONLY
05BC  C101          SAR = 1 LIT = 1.
05BD  8207          CPCR = TESTFLAGW2 - 1.      2-CHANNEL FLAG
05BE  45F0          MPCR = CHANNEL-1-4-6-2 - 1.     SKIP EOP TEST
                  *
05BF  F096        DR1 BEX.
05C0  F05F        B.          TIME TO RESET EOP STATUS
05C1  F05F        B.          TIME TO RESET EOP STATUS
05C2  F096        DR1 BEX.
05C3  F07F        B = B R.
05C4  D100        SAR = 1.
05C5  F05F        B.
05C6  F0C3        IF NOT LST SKIP.
05C7  F000        WAIT.
                  ***
                  ST-EOP-LOOP.
05C8  F0CA        LCTR.
05C9  E043        LIT = 67.
                  EOP-LOOP.
05CA  86BB        CPCR = LPDATA - 1.
05CB  E045        LIT = @45@.   E
05CC  86C2        CPCR = LOADCHR - 1.
05CD  E04F        LIT = @4F@.   O
05CE  86C2        CPCR = LOADCHR - 1.
05CF  E050        LIT = @50@.   P
05D0  86C2        CPCR = LOADCHR - 1.
05D1  E043        LIT = @43@.   C
05D2  86C2        CPCR = LOADCHR - 1.
05D3  E031        LIT = @31@.   1
05D4  86C2        CPCR = LOADCHR - 1.
05D5  E032        LIT = @32@.   2
05D6  86C2        CPCR = LOADCHR - 1.
05D7  86CA        CPCR = SINGLE-SPACE - 1.
05D8  F096        DR1 BEX.
05D9  F07F        B = B R.
05DA  D100        SAR = 1.
05DB  F05F        B.
05DC  F0C3        IF NOT LST SKIP.
05DD  45E4        MPCR = EOP-STATUS - 1.
                  *
05DE  F0C8        INC IF COV SKIP.
05DF  45C9        MPCR = EOP-LOOP - 1.
                  * LOOP CONTINUOUSLY UNTIL EOP STATUS IS DETECTED, IF
                  *  SINGLE TEST FLAG IS SET
05E0  C201          SAR = 2 LIT = 1.        SINGLE TEST FLAG
05E1  8207          CPCR = TESTFLAGW2 - 1.
05E2  45C7          MPCR = ST-EOP-LOOP - 1.     TRUE RETURN
                  *
05E3  F000        WAIT.
                  * END OF PAGE STATUS WAS NOT SET WHILE PRINTING 1 PAGE
                  * 2-CHANNEL FORMAT CONTROL PRINTERS DO NOT SET
                  *       END OF PAGE STATUS
                  *
                  * IF 2-CHANNEL PRINTER, PRESS FORCE STEP TO CONTINUE
                  *
                  * IF 12-CHANNEL PRINTER
                  ********* ERROR # E 250
                  *
05E4  45F1        MPCR = CHANNEL-1-4-6-2.
                  *
                  EOP-STATUS.
                  *
05E5  80B7        CPCR = ALARM - 1.
05E6  F0BC        IF NOT GC2 SKIP.
05E7  F0F7        SKIP.
                  *
05E8  F000        WAIT.
                  * END OF PAGE STATUS
                  * DOES LAST 'EOPC12' PRINTED CORRESPOND TO THE PUNCHED
                  *   LINE # IN CHANNEL 12 OF THE FORMAT CONTROL TAPE
                  *   IF YES, PRESS FORCE STEP TO CONTINUE
                  *
                  *   IF NO,
                  ********* ERROR # E 251
                  *
05E9  F096        DR1 BEX.
05EA  F07F        B = B R.      SAR = 1
05EB  F05F        B.
05EC  F0C3        IF NOT LST SKIP.
05ED  F000        WAIT.
                  ********* ERROR # E 252
                  * EOP STATUS NOT RESET
                  *
                  * RETURN TO TESTSELECT,   IF 'SINGLE TEST' WAS ENTERED,
                  * ELSE CONTINUE WITH NEXT TEST
05EE  C201          SAR = 2 LIT = 1.        SINGLE TEST FLAG
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05EF  8207          CPCR = TESTFLAGW2 - 1.
05F0  4044          MPCR = TESTSELECTCLEAR - 1.          TRUE RETURN
                *
                CHANNEL-1-4-6-2.
05F1  86CE          CPCR = CHANNEL-1 - 1.
05F2  86CE          CPCR = CHANNEL-1 - 1.
05F3  86BB          CPCR = LPDATA - 1.
05F4  E043          LIT = @43@.     C
05F5  86C2          CPCR = LOADCHR - 1.
05F6  E031          LIT = @31@.     1
05F7  86C2          CPCR = LOADCHR - 1.
05F8  86D0          CPCR = CHANNEL-4-OR-2 - 1.
05F9  86BB          CPCR = LPDATA - 1.
05FA  E043          LIT = @43@.     C
05FB  86C2          CPCR = LOADCHR - 1.
05FC  E034          LIT = @34@.     4
05FD  86C2          CPCR = LOADCHR - 1.
05FE  86DD          CPCR = CHANNEL12-2 - 1.
05FF  86D2          CPCR = CHANNEL-6-OR-2 - 1.
0600  86BB          CPCR = LPDATA - 1.
0601  E043          LIT = @43@.     C
0602  86C2          CPCR = LOADCHR - 1.
0603  E036          LIT = @36@.     6
0604  86C2          CPCR = LOADCHR - 1.
0605  86DD          CPCR = CHANNEL12-2 - 1.
0606  86D4          CPCR = CHANNEL-2 - 1.
0607  86BB          CPCR = LPDATA - 1.
0608  E043          LIT = @43@.     C
0609  86C2          CPCR = LOADCHR - 1.
060A  E032          LIT = @32@.     2
060B  86C2          CPCR = LOADCHR - 1.
060C  86CA          CPCR = SINGLE-SPACE - 1.
                *
                *
060D  80B7          CPCR = ALARM - 1.
060E  F0BC          IF NOT GC2 SKIP.
060F  F0F7          SKIP.
                *
0610  F000          WAIT.
                * CHECK THAT LOCATIONS OF LINES FOR CHANNELS 1,4,6,AND
                *   2 CORRESPOND TO HOLES IN FORMAT CONTROL TAPE
                * THE PRINTOUTS ARE AS FOLLOWS
                * 'C1'   FOR CHANNEL 1
                * 'C4   ON 12-C,   C2 ON 2-C'  FOR CHANNEL 4 ON 12-CHANNEL
                *         PRINTERS,  CHANNEL 2 ON 2-CHANNEL  PRINTERS
                * 'C6   ON 12-C,   C2 ON 2-C'  FOR CHANNEL 4 ON 12-CHANNEL
                *         PRINTERS,  CHANNEL 2 ON 2-CHANNEL  PRINTERS
                * 'C2'   FOR CHANNEL 2
                *
                * IF NO,
                *********      ERROR # E 253
                *
                * IF YES,  PRESS FORCE STEP TO CONTINUE
                *
                *
                *
                * RETURN TO TESTSELECT,   IF 'SINGLE  TEST'  WAS ENTERED,
                * ELSE CONTINUE WITH NEXT TEST
0611  C201          SAR = 2 LIT = 1.          SINGLE TEST FLAG
0612  8207          CPCR = TESTFLAGW2 - 1.
0613  4044          MPCR = TESTSELECTCLEAR - 1.          TRUE RETURN
                *
                ROTATEODEC.
                *
0614  86BB          CPCR = LPDATA - 1.   NOT NECESSARY FOR A9249,
                *                          REQUIRED FOR TIREMAN
                *
0615  E05F          LIT = 95.    NUMBER OF LINES FOR KATAKANA PRINTER
0616  F008          IF GC1 SKIP.   KATAKANA FLAG
0617  E040          LIT = 64.    NUMBER OF LINES FOR DOMESTIC PRINTER
0618  F058          A3 = LIT.
0619  F076          B = B111.
061A  F049          A3 = A3 XOR B.
061B  F038          A2 = LIT.        FIRST CHARACTER OF EACH LINE
061C  E020          LIT = @20@.
061D  F013          A1 = A2.         FIRST CHARACTER
                NEXT-LINE.
061E  F0CA          LCTR.
061F  E082          LIT = 130.
                LPLOOP.
0620  F0DB          MIR = A1.
0621  F098          DW2.
0622  F012          A1 = A1 + 1.
0623  E07F          LIT = @7F@.          KATAKANA CHARACTER CODE LIMIT
0624  F008          IF GC1 SKIP.
0625  E060          LIT = @60@.
0626  F111          A1 EQV LIT.
0627  F0B5          IF NOT ABT SKIP.
0628  F01D          A1 = LIT.
0629  E020          LIT = @20@.
062A  F0FC          WHEN SRQ STEP.
062B  F0C8          INC IF COV SKIP.
062C  461F          MPCR = LPLOOP - 1.
062D  86CA          CPCR = SINGLE-SPACE - 1.
062E  F0BA          IF NOT EXT SKIP.
062F  F0A0          IF EXT SKIP.
0630  F0F7          SKIP.
0631  4634          MPCR = START-CHR - 1.          CONTINUOUS LOOP
                *
                *  END CHECK
0632  F04C          A3 = A3 + B001.
0633  F0B7          IF NOT AOV SKIP.
0634  463F          MPCR = END-ROTATE - 1.
                *
                START-CHR.
0635  F02A          A2 = A2 + 1.
0636  E07F          LIT = @7F@.          KATAKANA CHARACTER CODE LIMIT
0637  F008          IF GC1 SKIP.
0638  E060          LIT = @60@.
0639  F117          A2 EQV LIT.
063A  F0B5          IF NOT ABT SKIP.
063B  F038          A2 = LIT.
063C  E020          LIT = @20@.
063D  F013          A1 = A2.         FIRST CHARACTER OF NEXT LINE
                *
063E  86BB          CPCR = LPDATA - 1.   NOT NECESSARY FOR A9249,
                *                          REQUIRED FOR TIREMAN
                *
063F  461D          MPCR = NEXT-LINE - 1.
                *
                END-ROTATE.
                *
0640  F096          DR1 BEX.         RESET URQ
0641  80B7          CPCR = ALARM - 1.
                *
                * RETURN TO TESTSELECT,   IF 'SINGLE  TEST'  WAS ENTERED,
                * ELSE CONTINUE WITH NEXT TEST
0642  C201          SAR = 2 LIT = 1.          SINGLE TEST FLAG
0643  8207          CPCR = TESTFLAGW2 - 1.
0644  4044          MPCR = TESTSELECTCLEAR - 1.          TRUE RETURN
                *
0645  F0BC          IF NOT GC2 SKIP.
0646  F0F7          SKIP.
                *
0647  F000          WAIT.
                * END OF ROTATE PATTERN PRINTOUT
                * DESCRIPTION   OF PRINTOUT
                * NUMBER OF LINES IS 65 FOR DOMESTIC PRINTERS,  96 FOR
                *   KATAKANA PRINTERS(TEST  11 ENTERED TO SET KATA FLAG)
                * FIRST LINE BEGINS WITH CHARACTER CODE 20 AND
                *   INCREMENTS THRU 5F (7E FOR KATAKANA) THEN REPEATS
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```
                *    THRU 132  CHARACTERS.
                * ALL LINES  ARE SINGLE  SPACED
                * LINES  2 THRU THE LAST  LINE  ALL INCREMENT  THRU THE
                *    CHARACTER  CODES  THE SAME AS LINE  1.    THE CHARACTER
                *    CODE OF THE 1ST  CHARACTER  OF EACH LINE  IS  1 GREATER
                *    THAN THE CHARACTER CODE OF THE 1ST  CHARACTER  OF THE
                *    PREVIOUS  LINE.
                *
                *  IF  NO PREVIOUS  ERRORS HAVE BEEN  DETECTED,  AND
                *  IF  PRINTOUT  DOES NOT AGREE  WITH ABOVE DESCRIPTION
                *    PROBLEM  IS  IN  PRINTER  OR AN INTERMITENT  DDP ERROR.
                *
                *  PRESS  FORCE  STEP  TO CONTINUE  TO TESTSELECT
0648  4045          MPCR = TESTSELECT   - 1.
                *
                 PSEL-ERROR.
0649  F0DA          MIR = AMPCR.
064A  F000          WAIT.
                ********    OBSERVE  MIR
                ********    GO TO INCREMENTER  ADDRESS  DISPLAYED  IN  MIR
                *
064B  F0DE          MIR = A3.
064C  F000          WAIT.
064D  F0E1          MIR = B.
064E  F000          WAIT.
064F  F0EA          MIR = LIT.
0650  F000          WAIT.
0651  F0DD          MIR = A2.
0652  F000          WAIT.
0653  4045          MPCR = TESTSELECT   - 1.
                *
                 DESELECT.              WRITE  TO PORT  16
0654  F05D          ASE.
0655  F080          B = BMAR.
0656  F08F          BR2 = LIT  L.
0657  C80F          LIT = 15  SAR = 8.
0658  F098          DW2.
0659  F16E          BR2 = B.
065A  F0C9          JUMP.
                *
                *
                      TEST-17.
                 LOAD-PRINT-DATA.
065B  86BB          CPCR = LPDATA  - 1.
                * LOOP  IF  EXT  IS  ON
065C  F0BA          IF  NOT EXT  SKIP.
065D  F0A0          IF  EXT  SKIP.
065E  4044          MPCR = TESTSELECTCLEAR    - 1.
065F  465A          MPCR = LOAD-PRINT-DATA    - 1.
                *
                 TEST-24.
                * SEND  CONTROL  CHARACTER  TO PRINTER  IN  CONTINUOUS  LOOP
                *
0660  F018          SET  LC1.
0661  F0F7          SKIP.
                *
                 TEST-20.
                 VARIABLE-CONT.
0662  F0A5          IF  LC1  STEP.          RESET  LC1.
                * CONTROL  WRITE  TO PRINTER
                * LOOP,  IF  EXT  IS  ON
                *
0663  80B7          CPCR = ALARM - 1.
0664  F000          WAIT.
                * PRESS  FORCE  STEP  THEN
                * ENTER  THE 8-BIT  CONTROL  CODE  TO SEND  TO PRINTER
                * ENTER  1  OR 0  FOR EACH BIT  BEGINNING  WITH MIR BIT  16
                *      THROUGH MIR BIT  8
                * FOR CONSOLE,  PRESS  NUMERIC  1  OR 0  FOR EACH BIT
                * FOR SPO.  PRESS  1  OR 0  FOR EACH BIT
0665  867C          CPCR = ENTER-BITS   - 1.
                *
0666  80B7          CPCR = ALARM - 1.          ALERT  OPERATOR
0667  F0DD          MIR = A2.             CONTROL  CHARACTER
0668  F000          WAIT.
                * VERIFY  THAT  DESIRED  CONTROL  CODE  IS  IN  MIR
                * PRESS  FORCE  STEP  TO CONTINUE
0669  F096          DR1 BEX.                RESET  URQ
                *
066A  0671          AMPCR = VCON-LOOP   - 1.
066B  F0BE          IF  NOT LC1  JUMP.
                *
                * TEST-24    CONTINUOUS  CONTROL  LOOP
066C  F0F5          SAVE.
066D  F0CA          LCTR.
066E  E0FF          LIT = 255.       CHANGE LIT  VALUE  WITH MEMORY-MODIFY
                *                    TO CHANGE TIME  OF CONTROL  LOOP
066F  F099          DW1.
                 TIME-DLP.
0670  F1B7          INC  IF  COV  JUMP.
0671  466F          MPCR = TIME-DLP   - 1.
                *
                 VCON-LOOP.
0672  F099          DW1.       CONTROL
0673  F0FD          WHEN URQ  STEP.
0674  F096          DR1 BEX.                RESET  URQ
                * LOOP  IF  EXT  IS  ON
0675  F0BA          IF  NOT EXT  SKIP.
0676  F0A0          IF  EXT  SKIP.
0677  4045          MPCR = TESTSELECT   - 1.
0678  4671          MPCR = VCON-LOOP   - 1.
                *
                *
                 TEST-18.
                 SINGLE-SP-LOOP.
0679  F0EA          MIR = LIT.
067A  E006          LIT = @06@.
067B  F096          DR1 BEX.                RESET  URQ
067C  4671          MPCR = VCON-LOOP   - 1.
                *
                 ENTER-BITS.
067D  F0DA          MIR = AMPCR.
067E  F05F          B.
067F  815D          CPCR = STACK  - 1.          SAVE  AMPCR
0680  CF0F          SAR = 15  LIT = 15.
0681  F058          A3 = LIT.
0682  F034          A2 = B000.
0683  F05F          B.
0684  F05F          B.
                 DATATOA1.
0685  8217          CPCR = READDATAKEYTOA1   - 1.
0686  F009          A1 = A1  AND LIT.     ONLY  BIT  16  IS  USED
0687  E001          LIT = 1.
0688  F071          B = A3.
0689  F0F4          SAR = B.
068A  F061          B = A1  L.
068B  F028          A2 = A2  OR B.
068C  F05F          B.
068D  F077          B = B001.
068E  F131          A3 = A3  - B.
068F  F03E          A3  EQV  LIT.
0690  E007          LIT = 7.
0691  F09D          IF  ABT  SKIP.          SKIP  AFTER  8  BITS  ARE  ENTERED
0692  4684          MPCR = DATATOA1   - 1.
                *
0693  F027          A2 = A2  R.
0694  D100          SAR = 1.
0695  417B          MPCR = UNSTACK  - 1.       RETURN
                *
```

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                    TEST-23.
                  * SEND DATA CHARACTER TO PRINTER IN CONTINUOUS LOOP
                  *
0696    F018              SET LC1.
0697    F0F7              SKIP.
                  *
                    TEST-19.
0698    F0A5              IF LC1 STEP.          RESET LC1
                    PRINT-LINE.
                  * PRINT 1 LINE AND SINGLE SPACE
                  * LOOP, IF EXT IS ON
                  *
0699    80B7              CPCR = ALARM - 1.
069A    F000              WAIT.
                  * PRESS FORCE STEP THEN
                  * ENTER THE 8-BIT CHARACTER CODE OF CHARACTER TO PRINT
                  * ENTER 1 OR 0 FOR EACH BIT BEGINNING WITH MIR BIT 16
                  *     THROUGH MIR BIT 8
                  * FOR CONSOLE, PRESS NUMERIC 1 OR 0 FOR EACH BIT
                  * FOR SPO, PRESS 1 OR 0 FOR EACH BIT
069B    867C              CPCR = ENTER-BITS - 1.
                  *
069C    86BB              CPCR = LPDATA - 1.
069D    80B7              CPCR = ALARM - 1.          ALERT OPERATOR
069E    F0DD              MIR = A2.          CHARACTER TO BE PRINTED
069F    F000              WAIT.
                  * VERIFY THAT DESIRED CHARACTER CODE IS IN MIR
                  * PRESS FORCE STEP TO CONTINUE
                  *
06A0    06A7              AMPCR = PLEXTLOOP - 1.
06A1    F0BE              IF NOT LC1 JUMP.
                  *
                  * TEST-23      CONTINUOUS DATA LOOP
06A2    F0F5              SAVE.
06A3    F0CA              LCTR.
06A4    E0FF              LIT = 255.       CHANGE LIT VALUE WITH MEMORY-MODIFY
                  *                        TO CHANGE TIME OF DATA LOOP
06A5    F098              DW2.
                    TIME-D-LP.
06A6    F1B7              INC IF COV JUMP.
06A7    46A5              MPCR = TIME-D-LP - 1.
                  *
                  *
                    PLEXTLOOP.
06A8    F0CA              LCTR.
06A9    E082              LIT = 130.
06AA    F0DD              MIR = A2.
06AB    F096              DR1 BEX.          RESET URQ
                    VDPLOOP.
06AC    F098              DW2.
06AD    F1B8              INC IF NOT COV SKIP ELSE STEP.
06AE    46B0              MPCR = VDPSS - 1.          132 CHARACTERS
                  *
06AF    F0FC              WHEN SRQ STEP.
06B0    46AB              MPCR = VDPLOOP - 1.       LOAD NEXT CHARACTER
                  *
                    VDPSS.
06B1    F0FC              WHEN SRQ STEP.       LAST CHARACTER - PRINT CYCLE
06B2    F0EA              MIR = LIT.
06B3    E004              LIT = @04@.
06B4    F099              DW1.              SINGLE SPACE
06B5    F0FD              WHEN URQ STEP.
06B6    F096              DR1 BEX.          RESET URQ
                  *
                  * PRINT SAME LINE AGAIN IF EXT SWITCH IS ON
06B7    F0BA              IF NOT EXT SKIP.
06B8    F0A0              IF EXT SKIP.
06B9    4045              MPCR = TESTSELECT - 1.
06BA    86BB              CPCR = LPDATA - 1.    NOT NECESSARY FOR A9249,
                  *                             REQUIRED FOR TIREMAN
06BB    46A7              MPCR = PLEXTLOOP - 1.
                  *
```

```
                    LPDATA.
                  * LOAD PRINT DATA CW
06BC    F0EE              MIR = LIT L.
06BD    C801              LIT = 1 SAR = 8.
06BE    F099              DW1.
06BF    F05F              B.          TIME TO RESET PREVIOUS SRQ
06C0    F05F              B.          TIME TO RESET PREVIOUS SRQ
06C1    F0FC              WHEN SRQ STEP.
06C2    F0C9              JUMP.
                  *
                    LOADCHR.
                  * LOAD 1 PRINT CHARACTER FROM LIT
06C3    F0EA              MIR = LIT.
06C4    F098              DW2.
06C5    F05F              B.          TIME TO RESET PREVIOUS SRQ
06C6    F05F              B.          TIME TO RESET PREVIOUS SRQ
06C7    F0FC              WHEN SRQ STEP.
06C8    F0C9              JUMP.
                  *
                  *
                    CR-NO-SPACE.
06C9    E000              LIT = 0.
06CA    46D6              MPCR = CON-CONTROL - 1.
                  *
                    SINGLE-SPACE.
06CB    E004              LIT = @04@.
06CC    46D6              MPCR = CON-CONTROL - 1.
                  *
                    DOUBLE-SPACE.
06CD    E008              LIT = @08@.
06CE    46D6              MPCR = CON-CONTROL - 1.
                  *
                    CHANNEL-1.
06CF    E010              LIT = @10@.
06D0    46D6              MPCR = CON-CONTROL - 1.
                  *
                    CHANNEL-4-OR-2.
06D1    E080              LIT = @80@.
06D2    46D6              MPCR = CON-CONTROL - 1.
                  *
                    CHANNEL-6-OR-2.
06D3    E020              LIT = @20@.
06D4    46D6              MPCR = CON-CONTROL - 1.
                  *
                    CHANNEL-2.
06D5    E0C0              LIT = @C0@.
06D6    46D6              MPCR = CON-CONTROL - 1.
                  *
                    CON-CONTROL.
06D7    F096              DR1 BEX.          RESET PREVIOUS URQ
06D8    F05F              B.                TIME TO RESET URQ
06D9    F05F              B.                TIME TO RESET URQ
06DA    F0EA              MIR = LIT.        CONTROL WORD
06DB    F099              DW1.              CONTROL
06DC    F0FD              WHEN URQ STEP.
                  * IF MTR HANGS HERE DURING SKIP TO CHANNEL TEST,
                  ********* ERROR # E253
06DD    F0C9              JUMP.
                  *
                    CHANNEL12-2.
06DE    F0DA              MIR = AMPCR.
06DF    F05F              B.
06E0    815D              CPCR = STACK - 1.
06E1    E020              LIT = @20@.     SPACE
06E2    86C2              CPCR = LOADCHR - 1.
06E3    E04F              LIT = @4F@.     O
06E4    86C2              CPCR = LOADCHR - 1.
06E5    E04E              LIT = @4E@.     N
06E6    86C2              CPCR = LOADCHR - 1.
06E7    E020              LIT = @20@.     SPACE
06E8    86C2              CPCR = LOADCHR - 1.
```

```
06E9  E031          LIT  = @31@.    1
06EA  86C2          CPCR = LOADCHR - 1.
06EB  E032          LIT  = @32@.    2
06EC  86C2          CPCR = LOADCHR - 1.
06ED  E02D          LIT  = @2D@.    -
06EE  86C2          CPCR = LOADCHR - 1.
06EF  E043          LIT  = @43@.    C
06F0  86C2          CPCR = LOADCHR - 1.
06F1  E02C          LIT  = @2C@.    ,
06F2  86C2          CPCR = LOADCHR - 1.
06F3  E020          LIT  = @20@.    SPACE
06F4  86C2          CPCR = LOADCHR - 1.
06F5  E043          LIT  = @43@.    C
06F6  86C2          CPCR = LOADCHR - 1.
06F7  E032          LIT  = @32@.    2
06F8  86C2          CPCR = LOADCHR - 1.
06F9  E020          LIT  = @20@.    SPACE
06FA  86C2          CPCR = LOADCHR - 1.
06FB  E04F          LIT  = @4F@.    O
06FC  86C2          CPCR = LOADCHR - 1.
06FD  E04E          LIT  = @4E@.    N
06FE  86C2          CPCR = LOADCHR - 1.
06FF  E020          LIT  = @20@.    SPACE
0700  86C2          CPCR = LOADCHR - 1.
0701  E032          LIT  = @32@.    2
0702  86C2          CPCR = LOADCHR - 1.
0703  E02D          LIT  = @2D@.    -
0704  86C2          CPCR = LOADCHR - 1.
0705  E043          LIT  = @43@.    C
0706  86C2          CPCR = LOADCHR - 1.
0707  417B          MPCR = UNSTACK - 1.
                *
                 TEST-11.
                * SET GC1 (KATAKANA CODE FLAG), AND RETURN TO
                *  TESTSELECT
                * WITH GC1 SET, THIS MTR WILL CYCLE THROUGH DATA CODES
                *  20 THROUGH 7E FOR THE KATAKANA CODE SET
                *
                * WITH GC1 RESET, THIS MTR WILL CYCLE THROUGH DATA
                *  CODES 20 THROUGH 5F
                *
0708  F006          SET GC1.
0709  80B7          CPCR = ALARM - 1.
070A  4045          MPCR = TESTSELECT - 1.
                *
                 TEST-12.
                * SET GC2 (SKIP PRINTOUT CHECKS FLAG)
                * THIS MTR HAS SEVERAL WAITS AT WHICH THE OPERATOR
                * CHECKS PRINTER OPERATIONS. WITH GC2 SET THESE WAITS
                * WILL BE SKIPED AND ALL OF THE RESULTS CAN BE CHECKED
                * WHEN THE PRINTING STOPS
                * THIS (TEST-12 FLAG) IS ADDED HERE AS A CONVIENCE, AND
                *  IT SHOULD NOT BE USED UNTIL THE OPERATOR KNOWS THE
                *  EXPECTED OUTPUT OF THE MTR. RUN THE MTR WITH GC2
                *  RESET, AND FOLLOW INSTRUCTIONS AT WAITS FOR
                *  DIAGNOSIS.
070B  F0F6          SET GC2.
070C  80B7          CPCR = ALARM - 1.
070D  4045          MPCR = TESTSELECT - 1.
                 TEST-13.
                * SET 2-CHANNEL FORMAT CONTROL TAPE FLAG
                * FLAG 1 IN FLAG WORD 2
                * WITH THIS FLAG SET, THE MTR WILL SKIP THE END OF PAGE
                *  STATUS TEST
                * END OF PAGES STATUS IS SET ONLY ON 12-CHANNEL FORMAT
                *  TAPE PRINTERS
                *
070E  C101          SAR = 1 LIT = 1.
070F  81EC          CPCR = SETFLAGW2 - 1.
0710  80B7          CPCR = ALARM - 1.
0711  4045          MPCR = TESTSELECT - 1.
                 TEST-14.
0712  8719          CPCR = SET-1-TEST-FLAG - 1.
0713  45BB          MPCR = EOP-STATUS-TEST - 1.
                *
                 TEST-15.
0714  8719          CPCR = SET-1-TEST-FLAG - 1.
0715  45F0          MPCR = CHANNEL-1-4-6-2 - 1.
                *
                 TEST-16.
0716  8719          CPCR = SET-1-TEST-FLAG - 1.
0717  4613          MPCR = ROTATEODEC - 1.
                *
                 TEST-21.
0718  8719          CPCR = SET-1-TEST-FLAG - 1.
0719  44FE          MPCR = PORT-SEL-TEST - 1.
                *
                 SET-1-TEST-FLAG.
071A  C201          SAR = 2 LIT = 1.
071B  41EC          MPCR = SETFLAGW2 - 1.
                *
                 TEST-22.
                * VERIFY THAT MOTOR OFF COMMAND TO PRINTER DOES NOT
                *  GENERATE AN SRQ
                * VERIFY THAT MOTOR WILL TURN ON AFTER AFTER THE
                *  DDP HAS TIMED OUT AND TURNED THE MOTOR OFF
                * VERIFY THAT THE STOP AND PRINT BUTTONS ARE NOT
                *  DISABLED AFTER A SKIP COMMAND (CAUSED BY OPERATING
                *  A 2-CHANNEL PRINTER WITH A 12-CHANNEL DDP)
                *  ENTER TEST WITH MOTOR OFF (SW IN AUTO)
                *  AND PRINTER READY
                *
071C  86CA          CPCR = SINGLE-SPACE - 1.
                *  WAIT UNTIL MOTOR STOPS (64 SECONDS)
                *  THEN PRESS FORCE STEP
                ********* ERROR # E255 IF MOTOR DOES NOT STOP
071D  F000          WAIT.
071E  F1AD          IF NOT SRQ SKIP.
071F  F000          WAIT. MOTOR OFF COMMAND GENERATED AN SRQ
                ********* ERROR # E 256
                *
0720  86BB          CPCR = LPDATA - 1. TURNS MOTOR ON
                ********* ERROR # E 257 IF MOTOR DOES NOT START
0721  F000          WAIT.
                * PRESS FORCE STEP
0722  86D0          CPCR = CHANNEL-4-OR-2 - 1.
                *
                * IF STOP AND PRINT BUTTONS ARE DISABLED,
                ********* ERROR # E258
                *
                * NOTE: THE CURRENT PRINTERS ENABLE THE STOP AND PRINT
                *  PUSH BUTTONS ONLY AFTER RECEIVING A PAPER MOTION
                *  COMMAND. IF NEWER PRINTERS ARE MODIFIED TO REMOVE
                *  THIS RESTRICTION, E258 MAY NOT BE A VALID ERROR.
                *
0723  F000          WAIT.
                * END OF TEST
                * PRESS FORCE STEP TO RETURN TO TESTSELECT
0724  4045          MPCR = TESTSELECT - 1.
                *
                *
                /
                * 9247 PRINTER MTR (TIREMAN)
                 CHKSTAT.
0725  F108          ASR BEX.
0726  F0E1          MIR = B.
0727  F0CB          LIT EQV B.
0728  E000          LIT = 0.
0729  F09D          IF ABT SKIP.
072A  F000          WAIT.                    ERROR
                *                              EXTERNAL BUS FAULT - F4
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```
072B  F096          DR1  BEX.
072C  F0E1          MIR  =  B.
072D  F0CB          LIT  EQV  B.
072E  E000          LIT  =  @00@.
072F  F09D          IF  ABT  SKIP.
0730  F000          WAIT.                          ERROR  #E2
                  *                                  PRINTER  NOT  READY
0731  4731          MPCR  =  TOPFORM  -  1.
                TOPFORM.
0732  E012          LIT  =  @12@.
0733  F0EA          MIR  =  LIT.
0734  F099          DW1.                           SEND  TOP  OF  FORM
0735  F0CA          LCTR.
0736  E032          LIT  =  50.
0737  0740          AMPCR  =  DATATEST  -  1.
              TIMESTAT.
0738  F1AE          IF  NOT  URQ  SKIP.
0739  F0C9          JUMP.
073A  F0A0          IF  EXT  SKIP.
073B  F0F7          SKIP.
073C  F0C8          INC,  IF  COV  SKIP.
073D  4737          MPCR  =  TIMESTAT  -  1.
073E  F000          WAIT.                          ERROR  #E3
                  *                                  NO  STATUS  INTERRUPT  FOR
                  *                                  PAPER  MOTION
073F  F080          B  =  BMAR.
0740  4045          MPCR  =  GETTESTSEL  -  1.
              DATATEST.
0741  F096          DR1  BEX.
0742  F05F          B.
0743  F1AE          IF  NOT  URQ  SKIP.
0744  F000          WAIT.                          ERROR  #E15
                  *                                  STATUS  INT  NOT  RESET
0745  F0CA          LCTR.
0746  E004          LIT  =  4.
0747  DE00          SAR  =  14.
0748  F0EE          MIR  =  LIT  L.
0749  E041          LIT  =  @41@.
074A  F08D          BM1.
074B  F017          A1  =  B.                      A1  =  104
074C  F099          DW1.
074D  F05F          B.
074E  F1AD          IF  NOT  SRQ  SKIP.
074F  4752          MPCR  =  PRECHAR  -  1.
0750  F000          WAIT.                          ERROR
                  *                                  NO  DATA  INTERRUPT  -  F15
0751  F080          B  =  BMAR.
0752  4045          MPCR  =  GETTESTSEL  -  1.
              PRECHAR.
0753  F038          A2  =  LIT.                    A2  =  PRINT  SINGLE  SPACE
0754  E004          LIT  =  @04@.
0755  F0CA          LCTR.
0756  E083          LIT  =  131.
0757  F058          A3  =  LIT.
0758  E020          LIT  =  @20@.
0759  F101          AMPCR  =  A3.                  AMPCR  IS
                  *                                  'IST  CHAR  IN  EACH  LINE'
075A  F099          DW1.                           SEND  LOAD  BUFFER
075B  F05F          B.
075C  F1AD          IF  NOT  SRQ  SKIP.
075D  F000          WAIT.                          ERROR
                  *                                  DATA  INT  NOT  RESET  -  F15
075E  F099          DW1.
075F  F05F          B.
              DATA.
0760  F0DE          MIR  =  A3.
0761  F0C6          IF  SRQ  DW2  SKIP.
0762  475F          MPCR  =  DATA  -  1.
0763  F030          INC.
0764  F02E          IF  COV  SKIP.
0765  F0F7          SKIP.
0766  4771          MPCR  =  PRINT  -  1.
0767  E05F          LIT  =  @5F@.
0768  F0BC          IF  NOT  GC2  SKIP.
0769  E07F          LIT  =  @7F@.
076A  F03E          A3  EQV  LIT.
076B  F09D          IF  ABT  SKIP.
076C  476F          MPCR  =  NCHAR  -  1.
076D  F058          A3  =  LIT.
076E  E020          LIT  =  @20@.
076F  475F          MPCR  =  DATA  -  1.
              NCHAR.
0770  F04C          A3  =  A3  +  1.
0771  475F          MPCR  =  DATA  -  1.
              PRINT.
0772  F0DD          MIR  =  A2.
0773  F099          DW1.                                   PRINT  SINGLE  SPACE
0774  F05F          B.
0775  F0FD          WHEN URQ  STEP.
0776  F096          DR1  BEX.
0777  F105          AMPCR  =  AMPCR  +  1.
0778  F041          A3  =  AMPCR.
0779  E060          LIT  =  @60@.
077A  F0BC          IF  NOT  GC2  SKIP.
077B  E080          LIT  =  @80@.
077C  F03E          A3  EQV  LIT.
077D  F09D          IF  ABT  SKIP.
077E  47B4          MPCR  =  ROTATE  -  1.
077F  F000          WAIT.                          END  OF  ROTATE  PATTERN.
                  *                                  EACH  CHARACTER  IS  PRINTED  IN
                  *                                  ALL  COLUMNS.  IF  CHARACTERS
                  *                                  ARE  CONSTANT  IN  EACH  LINE  GO  TO
                  *                                  #F76.  IF  TWO  OR  MORE  BLANKS
                  *                                  ARE  ADJACENT  IN  EACH  LINE
                  *                                  OR  IF  INCORRECT  CHARACTERS  ARE
                  *                                  PRINTED  GO  TO  #E4.  IF  LINE
                  *                                  SPACING  IS  INCORRECT  GO  TO  #F26.
                  *  DESCRIPTION  OF  PRINTOUT
                  *  LINE  1  BEGINS  WITH  CHARACTER  CODE  @20@  AND  INCREMENTS
                  *  THROUGH  @5F@  (@7F@  FOR  TEST  07),  AND  THEN  REPEATS
                  *  THROUGH  132  CHARACTERS.
                  *  LINES  2  THRU  THE  LAST  LINE  ALL  INCREMENT  THRU  THE
                  *  CHARACTER  CODES  THE  SAME  AS  LINE  1.  THE  CHARACTER
                  *  CODE  OF  THE  FIRST  CHARACTER  OF  EACH  LINE  IS  1  GREATER
                  *  THAN  THE  CHARACTER  CODE  OF  THE  PREVIOUS  LINE.
                  *  ALL  LINES  ARE  SINGLE  SPACED.
                  *
                  *                                  PORT  SELECT  TEST.
0780  F0DA          MIR  =  AMPCR.
0781  0100          AMPCR  =  @0100@.
0782  F099          DW1.
0783  F0FC          WHEN SRQ  STEP.
0784  F01C          A1  =  BMAR.
0785  8288          CPCR  =  RESET-CONT-DINT  -  1.                                    C
0786  8653          CPCR  =  DESELECT  -  1.
0787  F0F8          WHEN IRQ  STEP.                NO  DINT  IRQ  -FAILURE  F84
0788  8155          CPCR  =  BUSSTEST  -  1.
                  *  FIRST  BUSS  TEST  WITH  PRINTER  IRQ  ON
                  *  IF  BUSS  TEST  FAILS  HERE,  FAILURE  IS  PRINTER  PORT
                  *  SELECT  CARD  B7
                  *
0789  F05E          ASR.
078A  F000          WAIT.
                  *                  PORT  SELECT  CARD-ENABLE  STATUS  GATING  TEST
                  *                  TO  VERIFY  ONLY  THE  DEVICE  GENERATING  AN
                  *                  INTERRUPT  IS  ADDRESSED  BY  ASR,  METER  THE
                  *                  FOLLOWING  SIGNALS
                  *
                  *                  ONLY  THE  SIGNALS  CORRESPONDING  TO  THE                C
                  *                  PORT  NUMBER  OF  THE  PRINTER  SHOULD  BE  0%            C
                  *                  ALL  OTHERS  SHOULD  BE  100%
                  *
```

```
                *                    IF  YES    FORCE  STEP
                *                    IF  NO     REPLACE  CHIPS  A5  B5  C5  C7
                *                               OF  PS1  CARD  BEING  METERED
                **  PORT             PS1-3
                **
                **   12              2J(PSENST12/)
                **   11              1J(PSENST11/)
                **   10              1K(PSENST10/)
                **    9              2B(PSENST09/)
                **                                  PS1-2
                **
                **    8                          2J(PSENST8/)
                **    7                          1J(PSENST7/)
                **    6                          1K(PSENST6/)
                **    5                          2B(PSENST5/)
                **                                             PS1-1
                **
                **    4                                      2J(PSENST4/)
                **    3                                      1J(PSENST3/)
                **    2                                      1K(PSENST2/)
                **    1                                      2B(PSENST1/)
                **
                **  NOTE - SYSTEM  MAY USE  1,  2,  OR 3  PS1  CARDS
                ***
078B  827A            CPCR  = SET-CONT-DINT     - 1.                          C
078C  F0D0            MAR1  = A1.
078D  F096            DR1  BEX.                 SELECT  WITH  READ
078E  F05F            B.
078F  F0FC            WHEN SRQ  STEP.           NO READ SELECT-FAILURE    F78
0790  8653            CPCR  = DESELECT  - 1.
0791  F0CF            MAR1  = AMPCR.
0792  014D            AMPCR = CONTPORTADDRESS.
0793  F0F1            MR1.
0794  F0F9            WHEN RDC  BEX.
0795  F051            A3  = B.          STORRED  CONTROLLER  STATUS
                *                       SPO  = 8X00,   CONSOLE  = 8X20
0796  F108            ASR  BEX.
0797  F0E1            MIR  = B.
0798  F03C            A3  EQV  B.
0799  F09D            IF  ABT  SKIP.
079A  F000            WAIT.                     ERROR  #E16
                *                               PORT  SELECT  PRIORITY
079B  8288            CPCR  = RESET-CONT-DINT   - 1.
079C  827A            CPCR  = SET-CONT-DINT     - 1.
079D  F079            B  = B100.
079E  F065            B  = A1  OR  B.
079F  F051            A3  = B.
07A0  F108            ASR  BEX.
07A1  F0E1            MIR  = B.
07A2  F03C            A3  EQV  B.
07A3  F09D            IF  ABT  SKIP.
07A4  F000            WAIT.                     ERROR  #E17
                *                               PRIORITY  RESPONSE  WRONG
07A5  8288            CPCR  = RESET-CONT-DINT   - 1.
07A6  F0EE            MIR  = LIT  L.
07A7  C801            LIT  = @01@  SAR  = 8.
07A8  F0D0            MAR1  = A1.
07A9  F099            DW1.
07AA  F000            WAIT.                PROG  STEP  7
                *                               SET  PRINTER  TO  NOT  RDY
                *                               THEN  FORCE  STEP
07AB  F096            DR1  BEX.
07AC  F05F            B.
07AD  F0B2            IF  LST,  SKIP.
07AE  F000            WAIT.                     NOT  RDY  STATUS  BIT  NOT  SET
                *                               ERROR  #E19
07AF  F0E6            MIR  = 0.
07B0  F099            DW1.                      SET  STATUS  INTERRUPT
07B1  F0FD            WHEN URQ  STEP.           NO  NOT  RDY  STINT
                *                    ERROR  #  E27
07B2  F096            DR1  BEX.                 RESET  STINT.
07B3  F080            B  = BMAR.
07B4  4045            MPCR  = GETTESTSEL  - 1.
                ROTATE.
07B5  F0CA            LCTR.
07B6  E083            LIT  = 131.
07B7  F0DB            MIR  = A1.
07B8  F099            DW1.
07B9  475F            MPCR  = DATA  - 1.
                LOPONWRT.
07BA  F0F5            SAVE.
07BB  F0CA            LCTR.
07BC  E0FF            LIT  = 255.
07BD  F0EA            MIR  = LIT.
07BE  E006            LIT  = @06@.
07BF  F099            DW1.                      SEND  PAPER  MOTION
                TIMWRT.
07C0  F1B7            INC,  IF  COV  JUMP.
07C1  47BF            MPCR  = TIMWRT  - 1.
                PAPMOTST.
07C2  F108            ASR  BEX.
07C3  F0E1            MIR  = B.
07C4  F0CB            LIT  EQV  B.
07C5  E000            LIT  = 0.
07C6  F09D            IF  ABT  SKIP.
07C7  F000            WAIT.                     ASR  RESPONSE
                *                               ERROR  #E18
07C8  F096            DR1  BEX.
07C9  F0E1            MIR  = B.
07CA  F0CB            LIT  EQV  B.
07CB  E000            LIT  = 0.
07CC  F09D            IF  ABT  SKIP.
07CD  F000            WAIT.                     ERROR  #E2
                *                                 PRINTER  NOT  READY
07CE  F0EA            MIR  = LIT.
07CF  E0C2            LIT  = @C2@.
07D0  F099            DW1.                      SEND  BOTTOM  OF  FORM
07D1  F0CA            LCTR.
07D2  E032            LIT  = 50.
07D3  07D4            AMPCR  = DINTTST  - 1.
07D4  4737            MPCR  = TIMESTAT  - 1.
                DINTTST.
07D5  F096            DR1  BEX.
07D6  F05F            B.
07D7  F1AE            IF  NOT  URQ  SKIP.
07D8  F000            WAIT.                     ERROR  #E15
                *                                 STATUS  INT  NOT  RESET
07D9  F0EA            MIR  = LIT.
07DA  E012            LIT  = @12@.
07DB  F099            DW1.
07DC  F0CA            LCTR.
07DD  E00C            LIT  = @0C@.
                MOTIONLATE.
07DE  F0A0            IF  EXT  SKIP.
07DF  47DD            MPCR  = MOTIONLATE  - 1.
07E0  F0C8            INC,  IF  COV  SKIP.
07E1  F0F7            SKIP.
07E2  F000            WAIT.                     ERROR  @E20
                *                                 DATA  INPUT  OR  PR2L/
                *                                 CIRCUIT  INCORRECT  - F75
07E3  F1B5            IF  URQ  SKIP.
07E4  47DD            MPCR  = MOTIONLATE  - 1.
07E5  F01C            A1  = BMAR.               STORE  PRESENT  ADDRESS
07E6  F080            B  = BMAR.
07E7  F078            B  = B0TT.
07E8  F0D5            MAR1  = B.
07E9  F0F1            MR1.
07EA  F0F9            WHEN RDC  BEX.
07EB  F05E            ASR.
07EC  F1B5            IF  URQ  SKIP.
```

```
07ED  F000          WAIT.                          ASR DESELECTS -FAILURE F78
                    *                                PORT SELECT
07EE  F079          B = B100.
07EF  F0D5          MAR1 = B.
07F0  F039          A2 = LIT L.
07F1  D800          SAR = 8.
07F2  E001          LIT = @01@.
07F3  F057          A3 = LIT L.
07F4  E08F          LIT = @8F@.
                PSTTEST.
07F5  F003          A1 EQV B.
07F6  F09D          IF ABT SKIP.
07F7  F096          DR1 BEX.
07F8  F080          B = BMAR.
07F9  F06B          B = A2 1.
07FE  F0D0          MAR1 = A1.
07FF  F0F8          WHEN IRQ STEP.                 NO STINT IRQ -FAILURE F79
0800  F098          DW2.                           RESELECT PRINTER
0801  F05F          B.
0802  F1B5          IF URQ SKIP.
0803  F000          WAIT.                          ERROR #E14
                    *                                PORT SELECT
0804  F096          DR1 BEX.
0805  F0DA          MIR = AMPCR.
0806  0100          AMPCR = @0100@.
0807  F099          DW1.                           SEND LOAD BUFFER
0808  F05F          B.
0809  F1AD          IF NOT SRQ SKIP.
080A  F0F7          SKIP.
080B  F000          WAIT.                          ERROR #E13
                    *                                NO DATA INTERRUPT
080C  F099          DW1.
080D  F05F          B.
080E  F1AD          IF NOT SRQ SKIP.
080F  F000          WAIT.                          ERROR
                    *                                DATA INT NOT RESET - F15
0810  F099          DW1.
0811  F0EA          MIR = LIT.
0812  E031          LIT = @31@.
0813  F0CA          LCTR.
0814  E082          LIT = 130.
                WRITLOOP.
0815  F0FC          WHEN SRQ STEP.
0816  F098          DW2.
0817  F1B8          INC, IF NOT COV SKIP.
0818  4814          MPCR = WRITLOOP - 1.
0819  F0EE          MIR = LIT L.
081A  C801          LIT = 1 SAR = 8.
081B  F099          DW1.
081C  F099          DW1.
081D  F0EA          MIR = LIT.
081E  E041          LIT = @41@.
081F  F0CA          LCTR.
0820  E083          LIT = 131.
                LINEA.
0821  F098          DW2.                           SEND 'A'
0822  F030          INC.
0823  F02E          IF COV SKIP.
0824  F0F7          SKIP.
0825  4829          MPCR = SINGLE - 1.
0826  F1AD          IF NOT SRQ SKIP.
0827  F0F7          SKIP.
0828  F000          WAIT.                          ERROR
                    *                                NO DATA INTERRUPT - F71
0829  4820          MPCR = LINEA - 1.
                SINGLE.
082A  F0FC          WHEN SRQ STEP.
082B  F0EA          MIR = LIT.
082C  E004          LIT = @04@.
082D  F099          DW1.                           SEND SINGLE SPACE
```

```
082E  F05F          B.
082F  F0CA          LCTR.
0830  E0FF          LIT = @FF@.
                PRINTEARLY.
0831  F05F          B.
0832  F05F          B.
0833  F0C8          INC, IF COV SKIP.
0834  4830          MPCR = PRINTEARLY - 1.
0835  F1AE          IF NOT URQ SKIP.
0836  F000          WAIT.                          ERROR #E5
                    *                                STATUS INT FOR PRINT
                    *                                TOO EARLY
0837  F0CA          LCTR.
0838  E004          LIT = 4.
                PRINTLATE.
0839  F0A0          IF EXT SKIP.
083A  4838          MPCR = PRINTLATE - 1.
083B  F0C8          INC, IF COV SKIP.
083C  F0F7          SKIP.
083D  F000          WAIT.                          ERROR #E6
                    *                                STATUS INT FOR PRINT
                    *                                TOO LATE
083E  F1B5          IF URQ SKIP.
083F  4838          MPCR = PRINTLATE - 1.
0840  F096          DR1 BEX.
0841  F05F          B.
0842  F0CA          LCTR.
0843  E083          LIT = 131.
0844  F0DA          MIR = AMPCR.
0845  F099          DW1.                           SEND LOAD BUFFER
0846  F05F          B.
0847  E042          LIT = @42@.
0848  F0EA          MIR = LIT.
0849  F0FC          WHEN SRQ STEP.
                LINEB.
084A  F098          DW2.
084B  F030          INC.
084C  F02E          IF COV SKIP.
084D  F0F7          SKIP.
084E  4850          MPCR = DOUBLE - 1.
084F  F0FC          WHEN SRQ STEP.
0850  4849          MPCR = LINEB - 1.
                DOUBLE.
0851  F0FC          WHEN SRQ STEP.
0852  F0EA          MIR = LIT.
0853  E008          LIT = @08@.
0854  F099          DW1.                           SEND DOUBLE SPACE
0855  F05F          B.
0856  F0FD          WHEN URQ STEP.
0857  F096          DR1 BEX.
0858  F05F          B.
0859  F089          B = LIT.
085A  E010          LIT = @10@.                    B CONTAINS COUNT OF 16
085B  F038          A2 = LIT.
085C  E020          LIT = @20@.
085D  F01D          A1 = LIT.
085E  E043          LIT = @43@.                    A1 CONTAINS CHARACTER
                SENDNLINE.
085F  F0CA          LCTR.
0860  E083          LIT = 131.
0861  F0DA          MIR = AMPCR.
0862  F099          DW1.                           SEND LOAD BUFFER
0863  F0FC          WHEN SRQ STEP.
                COUNT132.
0864  F0DB          MIR = A1.
0865  F098          DW2.
0866  F0FC          WHEN SRQ STEP.
0867  F030          INC.
0868  F02E          IF COV SKIP.
0869  4863          MPCR = COUNT132 - 1.
086A  F0DD          MIR = A2.
```

```
086B  F099          DW1.                        SEND  PRINT  &  PAPERMOTION
086C  F05F          B.
086D  F0FD          WHEN URQ STEP.              ERROR #E22
086E  F096          DR1 BEX.
086F  F089          B = LIT.
0870  E010          LIT = @10@.
0871  F117          A2 EQV LIT.
0872  E0B0          LIT = @B0@.
0873  F09D          IF ABT SKIP.
0874  487A          MPCR = UPDATE - 1.
0875  F01D          A1 = LIT.
0876  E04D          LIT = @4D@.                 A1 CONTAINS 'M'
0877  F038          A2 = LIT.
0878  E0C0          LIT = @C0@.                 A2 CONTAINS END OF PAGE
0879  F05F          B.
087A  485E          MPCR = 4it.
0889  E04E          LIT = @4E@.
              NEXTLAST.
088A  F098          DW2.
088B  F0FC          WHEN SRQ STEP.
088C  F030          LIT = @10@.
0891  F099          DW1.                        SEND TOF = LINE 1
0892  F0FD          WHEN URQ STEP.
0893  F096          DR1 BEX.
0894  F000          WAIT.                       SEE PROG STEP 4
0895  F0CA          LCTR.
0896  E03D          LIT = 61.
              LOPONSPACE.
0897  F0EA          MIR = LIT.
0898  E006          LIT = @06@.
0899  F099          DW1.                        SEND SINGLE SPACE
089A  F0FD          WHEN URQ STEP.
089B  F096          DR1 BEX.
089C  F01D          A1 = LIT.
089D  E012          LIT = @12@.
089E  F003          A1 EQV B.
089F  F09D          IF ABT SKIP.
08A0  F0F7          SKIP.
08A1  48B1          MPCR = BOTTOMFORM - 1.
08A2  F0C8          INC, IF COV SKIP.
08A3  4896          MPCR = LOPONSPACE - 1.
08A4  F0CA          LCTR.
08A5  E002          LIT = @02@.
              SEC.
08A6  F0A0          IF EXT SKIP.
08A7  48A5          MPCR = SEC - 1.
              SEC2.
08A8  F0A0          IF EXT SKIP.
08A9  48A7          MPCR = SEC2 - 1.
08AA  F0C8          INC, IF COV SKIP.
08AB  48A7          MPCR = SEC2 - 1.
08AC  F096          DR1 BEX.
08AD  F05F          B.
08AE  E002          LIT = @02@.
08AF  F0CB          LIT EQV B.
08B0  F09D          IF ABT SKIP.
08B1  F000          WAIT.                       ERROR #E7
                                                  NO END OF PAGE DETECTED
              *
              BOTTOMFORM.
08B2  F0DA          MIR = AMPCR.
08B3  0100          AMPCR = @0100@.
08B4  F099          DW1.
08B5  F0FC          WHEN SRQ STEP.
08B6  E03A          LIT = 58.
08B7  F0CA          LCTR.
08B8  F0EA          MIR = LIT.
08B9  E020          LIT = @20@.
              SPACE1.
08BA  F098          DW2.
08BB  F0FC          WHEN SRQ STEP.
08BC  F0C8          INC, IF COV SKIP.
08BD  48B9          MPCR = SPACE1 - 1.
08BE  08D7          AMPCR = ENDPAGE - 1.
              ENDPAGEDATA.
08BF  F09A          EXEC.
08C0  F1BA          LIT EQV 0.
08C1  F09D          IF ABT SKIP.
08C2  F0F7          SKIP.
08C3  48C9          MPCR = COMPLINE - 1.
08C4  F0EA          MIR = LIT.
08C5  F098          DW2.
08C6  F0FC          WHEN SRQ STEP.
08C7  F105          AMPCR = AMPCR + 1.
08C8  F05F          B.
08C9  48BE          MPCR = ENDPAGEDATA - 1.
              COMPLINE.
08CA  F0CA          LCTR.
08CB  E03B          LIT = 59.
08CC  F0EA          MIR = LIT.
08CD  E020          LIT = @20@.
              SPACE2.
08CE  F098          DW2.
08CF  F0FC          WHEN SRQ, STEP.
08D0  F0C8          INC, IF COV SKIP.
08D1  48CD          MPCR = SPACE2 - 1.
08D2  F0EA          MIR = LIT.
08D3  E000          LIT = @00@.
08D4  F099          DW1.
08D5  F0FD          WHEN URQ STEP.
08D6  F096          DR1 BEX.
08D7  4724          MPCR = CHKSTAT - 1.
              ENDPAGE.
08D8  E045          LIT = @45@.                 E
08D9  E04E          LIT = @4E@.                 N
08DA  E044          LIT = @44@.                 D
08DB  E020          LIT = @20@.                 SPACE
08DC  E04F          LIT = @4F@.                 O
08DD  E046          LIT = @46@.                 F
08DE  E020          LIT = @20@.                 SPACE
08DF  E050          LIT = @50@.                 P
08E0  E041          LIT = @41@.                 A
08E1  E047          LIT = @47@.                 G
08E2  E045          LIT = @45@.                 E
08E3  E000          LIT = @00@.                 NULL
              ALTERNATE.
08E4  F0DA          MIR = AMPCR.
08E5  0100          AMPCR = @0100@.
08E6  F099          DW1.
              AGAIN.
08E7  E0FF          LIT = @FF@.
08E8  F002          IF GC1 STEP ELSE SKIP.
08E9  E020          LIT = @20@.
08EA  F0EA          MIR = LIT.
08EB  F05F          B.
08EC  F098          DW2.
08ED  E000          LIT = @00@.
08EE  F002          IF GC1 STEP ELSE SKIP.
08EF  E030          LIT = @30@.
08F0  F0EA          MIR = LIT.
08F1  F05F          B.
08F2  F098          DW2.
08F3  F05F          B.
08F4  48E6          MPCR = AGAIN - 1.
              MEMTEST.
08F5  F006          SET GC1.
08F6  48E3          MPCR = ALTERNATE - 1.
              CHARSET96.
08F7  F0F6          SET GC2.
08F8  47C1          MPCR = PAPMOTST - 1.
                    /
                    * A988 PRINTER MTR
```

```
                ENABLESTATUS.                                          A
08F9  F0CE          LMAR.                                              A
08FA  E000          LIT  = 0.                                          A
08FB  F0DA          MIR  = AMPCR.                                      A
08FC  0100          AMPCR = @0100@.                                    A
08FD  F098          DW2.                                               A
08FE  F0FC          WHEN SRQ STEP.                                     A
08FF  F035          A2 = BMAR.                                         A
0900  F02B          A2 = A2. - 1.                                      A
0901  F090          BR2 = A2.                                          A
0902  F097          DR2 BEX.                                           A
0903  F05E          ASR.                                               A
0904  F000          WAIT.              END OF ROTATE PATTERN.
                    *                  EACH CHARACTER IS PRINTED IN ALL
                    *                  COLUMNS. (74 LINES ARE PRINTED)
                    *                  CHECK PRINTOUT WITH DESCRIPTION.
                    *                  IF THERE IS A DISCREPANCY GO TO
                    *                  ERROR # P38.
                    * DESCRIPTION OF PRINTOUT
                    * LINE 1 BEGINS WITH CHARACTER CODE @20@ AND INCREMENTS
                    * THROUGH @5F@, AND THEN REPEATS THROUGH 120 CHARACTERS
                    * LINES 2 THRU THE LAST LINE ALL INCREMENT THRU THE
                    * CHARACTER CODES THE SAME AS LINE 1. THE CHARACTER
                    * CODE OF THE FIRST CHARACTER OF EACH LINE IS 1 GREATER
                    * THAN THE CHARACTER CODE OF THE PREVIOUS LINE.
                    * ALL LINES ARE SINGLE SPACED.
                    * THE M'S THAT FOLLOW THE ROTATING CHARACTERS ARE FOR
                    * HAMMER ALIGNMENT
                    *
                    *                                                  A
                    *                  VERIFY THAT ONLY THE DEVICE GENERATING AN  A
                    *                  INTERRUPT IS ADDRESSED BY ASR. METER THE  A
                    *                  FOLLOWING SIGNALS.                        A
                    *                  ONLY THE SIGNAL CORRESPONDING TO THE      A
                    *                  PORT NUMBER SHOULD BE 0% ALL OTHERS       A
                    *                  SHOULD BE 100%.                           A
                    *                                                            A
                    *                  IF YES THE MTR TEST IS COMPLETE.          A
                    *                  IF NO FAILURE IN PORT SELECT CHIPS        A
                    *                  A5,B5,C5,C7                               A
                    *                                                            A
                    *                                  PORT      PS              A
                    *                                                            A
                    *       PADP5B  (PSENST1/)          1         1             A
                    *       PADP4K  (PSENST2/)          2         1             A
                    *       PADP4J  (PSENST3/)          3         1             A
                    *       PADP5J  (PSENST4/)          4         1             A
                    *                                                            A
                    *       PADP8B  (PSENST5/)          5         2             A
                    *       PADP7K  (PSENST6/)          6         2             A
                    *       PADP7J  (PSENSR7/)          7         2             A
                    *       PADP8J  (PSENST8/)          8         2             A
                    *                                                            A
                BLANCKTST.
0905  F16E          BR2 = B.
0906  F108          ASR BEX.
0907  F0CB          LIT EQV B.
0908  E000          LIT = 0.
0909  F09D          IF ABT SKIP.
090A  89EB          CPCR = PRTERR2 - 1.        ERROR # P3
090B  F0CA          LCTR.
090C  E00A          LIT = 10.
090D  891A          CPCR = PDELAY - 1.
090E  F05D          ASE.
090F  F080          B = BMAR.
0910  F16F          BR2 = BITT.
0911  F097          DR2 BEX.
0912  F0CB          LIT EQV B.
0913  E010          LIT = @10@.
0914  F09D          IF ABT SKIP.
```

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0915  89EB          CPCR = PRTERR2 - 1.        ERROR # P4
0916  F05D          ASE.
0917  F080          B = BMAR.
0918  F0A8          IF LC1 SET LC1 SKIP.
0919  49FB          MPCR = ISGCISET - 1.
091A  4904          MPCR = BLANCKTST - 1.
                PDELAY.
091B  F0A0          IF EXT SKIP.
091C  491A          MPCR = PDELAY - 1.
091D  F030          INC.
091E  F0B8          IF NOT COV SKIP.
091F  F091          CALL.
0920  491A          MPCR = PDELAY - 1.
                CHARROT.
0921  F01F          RESET GC2.
0922  F0CA          LCTR.
0923  E02D          LIT = 45.
0924  F0CF          MAR1 = AMPCR.
0925  0C06          AMPCR = TS1.
                CHARROT1.
0926  F0EA          MIR = LIT.
0927  E020          LIT = @20@.
0928  F0F3          MW1.
0929  F0FB          WHEN RMI MAR1 = BMAR + 1.
092A  F0F3          MW1.
092B  F0FB          WHEN RMI MAR1 = BMAR + 1.
092C  F0EA          MIR = LIT.
092D  E04D          LIT = @4D@.
092E  F0F3          MW1.
092F  F0FB          WHEN RMI MAR1 = BMAR + 1.
0930  F030          INC.                                               A
0931  F02E          IF COV SKIP.                                       A
0932  4925          MPCR = CHARROT1 - 1.                               A
0933  F01D          A1 = LIT.                                          A
0934  E04B          LIT = 75.                                          A
0935  0920          AMPCR = CHARROT - 1.                               A
0936  F0DA          MIR = AMPCR.                                       A
0937  F0CF          MAR1 = AMPCR.                                      A
0938  0C04          AMPCR = TS3.                                       A
0939  F0F3          MW1.                                               A
093A  F0FB          WHEN RMI MAR1 = BMAR + 1.                          A
093B  8AAE          CPCR = REPLOAD - 1.                                A
                COLPRT.                                                A
093C  F0CF          MAR1 = AMPCR.                                      A
093D  0C06          AMPCR = TS1.                                       A
093E  F0EA          MIR = LIT.                                         A
093F  E04D          LIT = @4D@.                                        A
0940  F0CA          LCTR.                                              A
0941  E084          LIT = 132.                                         A
0942  F0F3          MW1.                                               A
0943  F0FB          WHEN RMI MAR1 = BMAR + 1.                          A
0944  F0EA          MIR = LIT.                                         A
0945  E020          LIT = @20@.                                        A
0946  8A84          CPCR = PSPACE - 1.                                 A
0947  F01D          A1 = LIT.                                          A
0948  E041          LIT = 65.                                          A
                COLPRT1.
0949  F05D          ASE.
094A  F080          B = BMAR.
094B  F16F          BR2 = BITT.
094C  0100          AMPCR = @0100@.
094D  F0DA          MIR = AMPCR.
094E  F098          DW2.
094F  0C06          AMPCR = TS1.
0950  F023          A2 = AMPCR.
0951  F0CA          LCTR.
0952  E083          LIT = 131.
0953  8AFA          CPCR = LOADBUF - 1.
0954  F05D          ASE.
0955  F080          B = BMAR.
0956  F16F          BR2 = BITT.
```

```
0957  F0E6          MIR    = 0.
0958  F098          DW2.
0959  F0FD          WHEN URQ STEP.                ERROR # P7
095A  F097          DR2 BEX.
095B  F07D          B = B C.
095C  D400          SAR    = 4.
095D  F05F          B.
095E  F0B2          IF LST SKIP.
095F  F000          WAIT.                         FORCE STEP TO CONT TESTING
0960  F00A          A1 = A1 - LIT.
0961  E001          LIT = 1.
0962  F111          A1 EQV LIT.
0963  F09D          IF ABT SKIP.
0964  4948          MPCR = COLPRT1 - 1.
0965  F0A8          IF LC1 SET LC1 SKIP.
0966  49FB          MPCR = ISGCISET - 1.
0967  493B          MPCR = COLPRT - 1.
              CHECKSTATUS.
0968  F16F          BR2 = B1TT.
0969  F089          B = LIT.
096A  E012          LIT = @12@.
096B  F0E1          MIR = B.
096C  F098          DW2.
096D  F05F          B.
096E  F108          ASR BEX.
096F  F05F          B.
0970  F0FF          0 EQV B.
0971  F09D          IF ABT SKIP.
0972  89EB          CPCR = PRTERR2 - 1.           ERROR # P7
0973  F05D          ASE.
0974  F080          B = BMAR.
0975  F078          B = B0TT.
0976  F16E          BR2 = B.
0977  F089          B = LIT.
0978  E0FF          LIT = @FF@.
0979  F097          DR2 BEX.
097A  F05F          B.
097B  F0FF          0 EQV B.
097C  F09D          IF ABT SKIP.
097D  89EB          CPCR = PRTERR2 - 1.           ERROR # P7
097E  F080          B = BMAR.
097F  F16F          BR2 = B1TT.
0980  F097          DR2 BEX.
0981  F05F          B.
0982  F0B2          IF LST SKIP.
0983  89EB          CPCR = PRTERR2 - 1.           ERROR # P8
0984  E00F          LIT = 15.
0985  F0CA          LCTR.
0986  891A          CPCR = PDELAY - 1.
0987  F1B5          IF URQ SKIP.
0988  89EB          CPCR = PRTERR2 - 1.           ERROR # P9
0989  F089          B = LIT.
098A  E012          LIT = @12@.
098B  F0E1          MIR = B.
098C  F098          DW2.
098D  F076          B = B111.
098E  F0D5          MAR1 = B.
098F  F099          DW1.
0990  F1AD          IF NOT SRQ SKIP.
0991  89EB          CPCR = PRTERR2 - 1.           ERROR # P9
0992  F1AE          IF NOT URQ SKIP.
0993  89EB          CPCR = PRTERR2 - 1.           ERROR # P9
0994  F0CA          LCTR.
0995  E014          LIT = 20.
0996  891A          CPCR = PDELAY - 1.
0997  F18E          IF IRQ SKIP.
0998  89EB          CPCR = PRTERR2 - 1.           ERROR # P10
0999  F108          ASR BEX.
099A  F18E          IF IRQ SKIP.
099B  89EB          CPCR = PRTERR2 - 1.           ERROR # P10
099C  F18E          IF IRQ SKIP.
099D  F0F7          SKIP.
099E  89EB          CPCR = PRTERR2 - 1.           ERROR # P10
099F  F078          B = B0TT.
09A0  F07F          B = B R.
09A1  D800          SAR    = 8.
09A2  F051          A3 = B.
09A3  F0DE          MIR = A3.
09A4  F05D          ASE.
09A5  F080          B = BMAR.
09A6  F078          B = B0TT.
09A7  F07F          B = B R.
09A8  F03C          A3 EQV B.
09A9  F09D          IF ABT SKIP.
09AA  89EB          CPCR = PRTERR2 - 1.           ERROR # P11
09AB  F089          B = LIT.
09AC  E012          LIT = @12@.
09AD  F0E1          MIR = B.
09AE  F098          DW2.
09AF  F05F          B.
09B0  F099          DW1.
09B1  F0CA          LCTR.
09B2  E014          LIT = 20.
09B3  891A          CPCR = PDELAY - 1.
09B4  F108          ASR BEX.
09B5  F05F          B.
09B6  F0C3          IF NOT LST SKIP.
09B7  89EB          CPCR = PRTERR2 - 1.           ERROR # P12
09B8  F07D          B = B C.
09B9  D400          SAR = 4.
09BA  F05F          B.
09BB  F0B2          IF LST SKIP.
09BC  89EB          CPCR = PRTERR2 - 1.           ERROR # P13
09BD  F18E          IF IRQ SKIP.
09BE  F0F7          SKIP.
09BF  89EB          CPCR = PRTERR2 - 1.           ERROR # P3
09C0  F05D          ASE.
09C1  F080          B = BMAR.
09C2  F0A8          IF LC1 SET LC1 SKIP.
09C3  49FB          MPCR = ISGCISET - 1.
09C4  4967          MPCR = CHECKSTATUS - 1.
              TOFSUBR.
09C5  F16F          BR2 = B1TT.
09C6  0012          AMPCR = @0012@.
09C7  F0DA          MIR = AMPCR.
09C8  F098          DW2.
09C9  8A8A          CPCR = PBUSY1 - 1.
09CA  F05D          ASE.
09CB  F080          B = BMAR.
09CC  F0A8          IF LC1 SET LC1 SKIP.
09CD  49FB          MPCR = ISGCISET - 1.
09CE  49C4          MPCR = TOFSUBR - 1.
              PBUSY.
09CF  F0FD          WHEN URQ STEP.                ERROR # P15
09D0  F097          DR2 BEX.
09D1  E010          LIT = @10@.
09D2  F0CB          LIT EQV B.
09D3  F09D          IF ABT SKIP.
09D4  49EB          MPCR = PRTERR2 - 1.
09D5  F0C9          JUMP.
              SETLC2.
09D6  0045          AMPCR = TSELRTN - 1.
09D7  F1A6          IF NOT LC2 SET LC2 JUMP.
09D8  4045          MPCR = TSELRTN - 1.
              PARERR.
09D9  F0F9          WHEN RDC BEX.
09DA  F0FF          0 EQV B.
09DB  F09C          IF ABT JUMP.
09DC  F0E1          MIR = B.
09DD  F000          WAIT.                         ERROR # P17
                    *                             MEMORY ERROR CONDITIONS
```

```
09DE  F0DA        MIR = AMPCR.
09DF  F000        WAIT.
09E0  F0E9        MIR = BMAR.
09E1  F000        WAIT.                          ADDRESS FOUND ON BMAR
09E2  F0C9        JUMP.
                BUSS-TEST.
09E3  F0F9        WHEN RDC BEX.
09E4  F0E1        MIR = B.
09E5  F0FF        0 EQV B.
09E6  F09C        IF ABT JUMP.
09E7  F000        WAIT.                          ERROR # P17
09E8  F0DA        MIR = AMPCR.
09E9  F000        WAIT.
09EA  F09A        EXEC.
09EB  F0C9        JUMP.
                PRTERR2.
09EC  F193        IF LC2 SET LC2 JUMP.
09ED  F000        WAIT.                          RECORD MIR AND FORCE STEP
09EE  F0DA        MIR = AMPCR.
09EF  F000        WAIT.                          SEE MIR FOR ADDRESS
                *                                OF ERROR #
09F0  F0E1        MIR = B.
09F1  F080        WAIT.
09F2  F0C9        JUMP.
                GC1SET.
09F3  F006        SET GC1.
09F4  F1D5        MIR = B001 + 1.
09F5  0C05        AMPCR = TS2.
09F6  F0CF        MAR1 = AMPCR.
09F7  F0F3        MW1.
09F8  F0FB        WHEN RMI MAR1 = BMAR + 1.
09F9  F05D        ASE.
09FA  F080        B = BMAR.
09FB  4045        MPCR = TSELRTN - 1.
                ISGCISET.
09FC  F05D        ASE.
09FD  F080        B = BMAR.
09FE  F008        IF GC1 SKIP.
09FF  4045        MPCR = TSELRTN - 1.
0A00  F0CF        MAR1 = AMPCR.
0A01  0C05        AMPCR = TS2.
0A02  F0F1        MR1.
0A03  F0F9        WHEN RDC BEX.
0A04  F033        A2 = B.
0A05  F0CB        LIT EQV B.
0A06  E009        LIT = 9.
0A07  F0B5        IF NOT ABT SKIP.
0A08  49F2        MPCR = GC1SET - 1.
0A09  F07E        B = B + 1.
0A0A  F0E1        MIR = B.
0A0B  F0F3        MW1.
0A0C  F0FB        WHEN RMI MAR1 = BMAR + 1.
0A0D  0435        AMPCR = NTRTSR - 1.
0A0E  F023        A2 = AMPCR.
0A0F  F06B        B = A2 + B.
0A10  F05B        AMPCR = B.
0A11  F05D        ASE.
0A12  F080        B = BMAR.
0A13  F078        B = B0TT.
0A14  F091        CALL.
                SETLC1.
0A15  F018        SET LC1.
0A16  4045        MPCR = TSELRTN - 1.
                PRINTTITLE.
0A17  F05D        ASE.
0A18  F080        B = BMAR.
0A19  F16F        BR2 = B1TT.
0A1A  F0EA        MIR = LIT.
0A1B  E012        LIT = @12@.
0A1C  F098        DW2.
0A1D  F0CA        LCTR.
0A1E  E014        LIT = 20.
0A1F  891A        CPCR = PDELAY - 1.
0A20  F097        DR2 BEX.
0A21  0BF0        AMPCR = TITLECHARS.
0A22  F023        A2 = AMPCR.
0A23  F043        A3 = A2.
0A24  0C06        AMPCR = TS1.
0A25  F023        A2 = AMPCR.
0A26  F0D1        MAR1 = A2.
0A27  F0DA        MIR = AMPCR.
0A28  0020        AMPCR = @20@.
0A29  F0CA        LCTR.
0A2A  E084        LIT = 132.
0A2B  8A84        CPCR = PSPACE - 1.
0A2C  F0D2        MAR1 = A3.
0A2D  F0CA        LCTR.
0A2E  E014        LIT = 20.
0A2F  8B0C        CPCR = READ-WR - 1.
0A30  0100        AMPCR = @0100@.
0A31  F0DA        MIR = AMPCR.
0A32  F098        DW2.
0A33  0C07        AMPCR = TS1 + 1.
0A34  F023        A2 = AMPCR.
0A35  F0CA        LCTR.
0A36  E083        LIT = 131.
0A37  8AFA        CPCR = LOADBUF - 1.
0A38  F0FD        WHEN URQ STEP.                 ERROR # P18
0A39  F05D        ASE.
0A3A  F080        B = BMAR.
0A3B  F16F        BR2 = B1TT.
0A3C  F089        B = LIT.
0A3D  E010        LIT = 16.
0A3E  F07A        B = B1TT.
0A3F  F051        A3 = B.
0A40  F097        DR2 BEX.
0A41  F03C        A3 EQV B.
0A42  F09D        IF ABT SKIP.
0A43  89EB        CPCR = PRTERR2 - 1.            ERROR # P19
0A44  F1AE        IF NOT URQ SKIP.
0A45  89EB        CPCR = PRTERR2 - 1.            ERROR # P18
0A46  F0FC        WHEN SRQ STEP.                 ERROR # P20
0A47  F080        B = BMAR.
0A48  F078        B = B0TT.
0A49  F0D5        MAR1 = B.
0A4A  F099        DW1.
0A4B  F0FC        WHEN SRQ STEP.
0A4C  F0E6        MIR = 0.
0A4D  F098        DW2.
0A4E  F18E        IF IRQ SKIP.
0A4F  F0F7        SKIP.
0A50  89EB        CPCR = PRTERR2 - 1.            ERROR # P3
0A51  F097        DR2 BEX.
0A52  F05F        B.
0A53  F097        DR2 BEX.
0A54  F05F        B.
0A55  F0C4        IF NOT MST SKIP.
0A56  89EB        CPCR = PRTERR2 - 1.            ERROR # P19
0A57  F1AD        IF NOT SRQ SKIP.
0A58  89EB        CPCR = PRTERR2 - 1.            ERROR # P20
0A59  F0EA        MIR = LIT.                                              A
0A5A  E006        LIT = @06@.                                             A
0A5B  F098        DW2.                                                    A
0A5C  F0FD        WHEN URQ STEP.                                          A
0A5D  F01C        A1 = BMAR.          STORE PRESENT ADDRESS               A
0A5E  F0F1        MR1.                                                    A
0A5F  F0F9        WHEN RDC BEX.                                           A
0A60  F05E        ASR.                                                    A
0A61  F1B5        IF URQ SKIP.                                            A
0A62  F000        WAIT.           ERROR-PORT SELECT # P9
0A63  F079        B = B100.                                               A
0A64  F16E        BR2 = B.                                                A
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0A65  F039      A2  =  LIT  L.                                      A
0A66  D800      SAR  =  8.                                          A
0A67  E001      LIT  =  @01@.                                       A
0A68  F057      A3  =  LIT  L.                                      A
0A69  E08F      LIT  =  @8F@.                                       A
0A6A  F00D      A1  =  A1  R.                                       A
0A6B  F00B      A1  =  A1  L.                                       A
0A6C  F0CE      LMAR.                                               A
0A6D  E000      LIT  =  @00@.                                       A
            PSTEST.                                                 A
0A6E  F003      A1  EQV  B.                                         A
0A6F  F09D      IF  ABT  SKIP.                                      A
0A70  F097      DR2  BEX.                                           A
0A71  F080      B  =  BMAR.                                         A
0A72  F06B      B  =  A2  bt  SKIP.                                  A
0A76  4A6D      MPCR  =  PSTEST  -  1.                              A
0A77  F066      B  =  A1.                                           A
0A78  F017      A1  =  B.                                           A
0A79  F096      DR1  BEX.                                           A
0A7A  F05F      B.                                                  A
0A7B  F1B5      IF  URQ  SKIP.                                      A
0A7C  F000      WAIT.           ERROR-PORT  SELECT  #  P9
0A7D  F024      A2  =  A1.                                          A
0A7E  F090      BR2  =  A2.         RESTORE  ADDRESS                A
0A7F  F097      DR2  BEX.                                           A
0A80  F05F      B.                                                  A
0A81  F080      B  =  BMAR.
0A82  F0A8      IF  LC1  SET  LC1  SKIP.
0A83  49FB      MPCR  =  ISGCISET  -  1.
0A84  4A16      MPCR  =  PRINTTITLE  -  1.
            PSPACE.
0A85  F0F3      MW1.
0A86  F0FB      WHEN  RMI  MAR1  =  BMAR  +  1.
0A87  F0B8      IF  NOT  COV  SKIP.
0A88  F0C9      JUMP.
0A89  F030      INC.
0A8A  4A84      MPCR  =  PSPACE  -  1.
            PBUSY1.
0A8B  F0FD      WHEN  URQ  STEP.
0A8C  F097      DR2  BEX.
0A8D  F0E1      MIR  =  B.
0A8E  F0A8      IF  LC1  SET  LC1  SKIP.
0A8F  F000      WAIT.
0A90  F0C9      JUMP.
            ROTALPHA.
0A91  F01F      RESET  GC2.
0A92  F16E      BR2  =  B.
0A93  F034        A2  =  B000.
0A94  F0CF        MAR1  =  AMPCR.
0A95  0C07        AMPCR  =  TS1  +  1.
0A96  F05F        B.
            ROTALZ.
0A97  F058        A3  =  LIT.
0A98  E020        LIT  =  @20@.
            ROTALZ1.
0A99  F0DE      MIR  =  A3.
0A9A  F0F3        MW1.
0A9B  F0FB        WHEN  RMI  MAR1  =  BMAR  +  1.
0A9C  F04C        A3  =  A3  +  1.
0A9D  F03E        A3  EQV  LIT.
0A9E  E05F        LIT  =  @5F@.
0A9F  F09D        IF  ABT  SKIP.
0AA0  4A98        MPCR  =  ROTALZ1  -  1.
0AA1  F02A        A2  =  A2  +  1.
0AA2  F117        A2  EQV  LIT.
0AA3  E003        LIT  =  3.
0AA4  F09D        IF  ABT  SKIP.
0AA5  4A96      MPCR  =  ROTALZ  -  1.
0AA6  F01D      A1  =  LIT.
0AA7  E04B      LIT  =  75.
0AA8  0A90      AMPCR  =  ROTALPHA  -  1.
0AA9  F0DA      MIR  =  AMPCR.
0AAA  F0CF      MAR1  =  AMPCR.
0AAB  0C04      AMPCR  =  TS3.
0AAC  F0F3      MW1.
0AAD  F0FB      WHEN  RMI  MAR1  =  BMAR  +  1.
0AAE  8AAE      CPCR  =  RELOAD  -  1.
            REPLOAD.
            REPLOAD1.
0AAF  F05D      ASE.
0AB0  F080      B  =  BMAR.
0AB1  F16F      BR2  =  BITT.
0AB2  F097      DR2  BEX.
0AB3  F05F      B.
0AB4  F0C3      IF  NOT  LST  SKIP.
0AB5  4AAE      MPCR  =  REPLOAD1  -  1.
0AB6  F07D      B  =  B  C.
0AB7  D400      SAR  =  4.
0AB8  F05F      B.
0AB9  F0B2      IF  LST  SKIP.
0ABA  4AAE      MPCR  =  REPLOAD1  -  1.
0ABB  F07D      B  =  B  C.
0ABC  DD00      SAR  =  13.
0ABD  F05F      B.
0ABE  F0C3      IF  NOT  LST  SKIP.
0ABF  8B1C      CPCR  =  TOFROT  -  1.
0AC0  F077      B  =  B001.
0AC1  F07D      B  =  B  C.
0AC2  D800      SAR  =  8.
0AC3  F0E1      MIR  =  B.
0AC4  F098      DW2.
0AC5  0C07      AMPCR  =  TS1  +  1.
0AC6  F023      A2  =  AMPCR.
0AC7  F0CA      LCTR.
0AC8  E084      LIT  =  132.
0AC9  8AFA      CPCR  =  LOADBUF  -  1.
0ACA  F0D1      MAR1  =  A2.
0ACB  F0F1      MR1.
0ACC  F0F9      WHEN  RDC  BEX.
0ACD  F0E1      MIR  =  B.
0ACE  F05D      ASE.
0ACF  F080      B  =  BMAR.
0AD0  F16F      BR2  =  BITT.
0AD1  F0E6      MIR  =  0.
0AD2  F098      DW2.
0AD3  F0CA      LCTR.
0AD4  E084      LIT  =  132.
0AD5  0C06      AMPCR  =  TS1.
0AD6  F0CF      MAR1  =  AMPCR.
0AD7  F0F1      MR1.
0AD8  F0F9      WHEN  RDC  BEX.
0AD9  F0E1      MIR  =  B.
0ADA  0C8B      AMPCR  =  TS1  +  133.
0ADB  F0CF      MAR1  =  AMPCR.
0ADC  F0F3      MW1.
0ADD  F0FB      WHEN  RMI  MAR1  =  BMAR  +  1.
0ADE  0C06      AMPCR  =  TS1.
0ADF  F023      A2  =  AMPCR.
0AE0  F043      A3  =  A2.
0AE1  F04C      A3  =  A3  +  1.
0AE2  F0D2      MAR1  =  A3.
0AE3  8B0C      CPCR  =  READ-WR  -  1.
            REPLOAD2.
0AE4  F1B5      IF  URQ  SKIP.
0AE5  4AE3      MPCR  =  REPLOAD2  -  1.
0AE6  F00A      A1  =  A1  -  LIT.
0AE7  E001      LIT  =  1.
0AE8  F111      A1  EQV  LIT.
0AE9  F09D      IF  ABT  SKIP.
0AEA  4AAE      MPCR  =  REPLOAD  -  1.
0AEB  F0A2      IF  GC2  SKIP.
0AEC  89EB      CPCR  =  PRTERR2  -  1.     ERROR  #  P22
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0AED  F05D          ASE.
0AEE  F080          B   =   BMAR.
0AEF  F16F          BR2   = B1TT.
0AF0  F097          DR2  BEX.
0AF1  F0A8          IF  LC1  SET  LC1  SKIP.
0AF2  49FB          MPCR = ISGCISET    - 1.
0AF3  0C04          AMPCR = TS3.
0AF4  F0CF          MAR1 = AMPCR.
0AF5  F0F1          MR1.
0AF6  F0F9          WHEN RDC  BEX.
0AF7  F05B          AMPCR = B.
0AF8  F05D          ASE.
0AF9  F080          B = BMAR.
0AFA  F0C9          JUMP.
                LOADBUF.
0AFB  F05F          B.
                LOADBUF1.
0AFC  F0D1          MAR1 = A2.
0AFD  F02A          A2 = A2 + 1.
0AFE  F0F1          MR1.
0AFF  F0F9          WHEN RDC  BEX.
0B00  F0E1          MIR = B.
                CHECKRDY.
0B01  F0FC          WHEN SRQ  STEP.              ERROR  #  P23
0B02  F030          INC.
0B03  F051          A3   = B.
0B04  F05D          ASE.
0B05  F080          B = BMAR.
0B06  F078          B = B0TT.
0B07  F16E          BR2  = B.
0B08  F071          B = A3.
0B09  F098          DW2.
0B0A  F0B8          IF  NOT  COV  SKIP.
0B0B  F0C9          JUMP.
0B0C  4AFB          MPCR = LOADBUF1   - 1.
                READ-WR.
0B0D  F0F1          MR1.
0B0E  F0F9          WHEN RDC  BEX.
0B0F  F0D1          MAR1 = A2.
0B10  F0E1          MIR = B.
0B11  F02A          A2 = A2 + 1.
0B12  F0F3          MW1.
0B13  F0FB          WHEN RMI  MAR1 = BMAR + 1.
0B14  F04C          A3 = A3 + 1.
0B15  F0B8          IF  NOT  COV  SKIP.
0B16  F091          CALL.
0B17  F0D2          MAR1 = A3.
0B18  F030          INC.
0B19  4B0C          MPCR = READ-WR  - 1.
                TST-LC1.
0B1A  F0A8          IF  LC1  SET  LC1  SKIP.
0B1B  F000          WAIT.                        END  OF  PRINTER   MTR
0B1C  49F2          MPCR = GC1SET  - 1.
                TOFROT.
0B1D  F051          A3   = B.
0B1E  F089          B   = LIT.
0B1F  E012          LIT  = @12@.
0B20  F0E1          MIR   = B.
0B21  F098          DW2.
0B22  F0F6          SET  GC2.
0B23  F0FD          WHEN URQ  STEP.              ERROR  #  P24
0B24  4AAE          MPCR = REPLOAD1   - 1.
                PR005.
0B25  F05D          ASE.
0B26  F080          B = BMAR.
0B27  F078          B = B0TT.
0B28  F16E          BR2  = B.
                PR006.
0B29  F1AE          IF  NOT  URQ  SKIP.
0B2A  89EB          CPCR = PRTERR2  - 1.         ERROR  #  P25
                *                                TEST  FOR  ERROR  INTERRUPT
0B2B  F1AD          IF  NOT  SRQ  SKIP.
0B2C  F0F7          SKIP.
0B2D  4B28          MPCR = PR006   - 1.
0B2E  F0DE          MIR  = A3.
0B2F  F098          DW2.
0B30  F030          INC.
0B31  F0C9          JUMP.
                PR011.
0B32  F0EA          MIR  = LIT.
0B33  E012          LIT  = @12@.
0B34  F05D          ASE.
0B35  F080          B = BMAR.
0B36  F16F          BR2  = B1TT.
0B37  F098          DW2.                         TOP  OF  FORM
0B38  F0FD          WHEN URQ  STEP.              ERROR  #  P28
0B39  E010          LIT  = @10@.
0B3A  F097          DR2  BEX.
0B3B  F0CB          LIT  EQV  B.
0B3C  F09D          IF  ABT  SKIP.
0B3D  89EB          CPCR = PRTERR2  - 1.         ERROR  #  P29
                *                                STATUS  FAILURE
                TFDS1.                           PRINT  TOP  OF  FORM
0B3E  F038          A2  = LIT.
0B3F  E00A          LIT  = @0A@.                 CHAR  COUNT  11
0B40  F121          A2  = A2  XOR  B111.
0B41  0BBF          AMPCR = TFDS2  - 1.
0B42  F041          A3  = AMPCR.                 CHAR  ADDRESS
0B43  E008          LIT    =  8.
0B44  F01D          A1   = LIT.
0B45  8B8D          CPCR = PR012   - 1.
0B46  F0FD          WHEN URQ  STEP.              ERROR  #  P28
0B47  E010          LIT  = @10@.
0B48  F097          DR2  BEX.
0B49  F0CB          LIT  EQV  B.
0B4A  F09D          IF  ABT  SKIP.
0B4B  89EB          CPCR = PRTERR2  - 1.         ERROR  #  P29
                L3VS1.                           PRINT  LINE  3
0B4C  F038          A2  = LIT.
0B4D  E005          LIT  = 5.                    CHAR  COUNT  6
0B4E  F121          A2  = A2  XOR  B111.
0B4F  0BCA          AMPCR = L3VS2  - 1.
0B50  F041          A3  = AMPCR.                 CHAR  ADDRESS
0B51  E020          LIT  = @20@.
0B52  F01D          A1  = LIT.                   FORMS  VAR  SKIP   CH1
0B53  8B8D          CPCR = PR012   - 1.
0B54  F0FD          WHEN URQ  STEP.              ERROR  #  P28
0B55  E010          LIT  = @10@.
0B56  F097          DR2  BEX.
0B57  F0CB          LIT  EQV  B.
0B58  F09D          IF  ABT  SKIP.
0B59  89EB          CPCR = PRTERR2  - 1.         ERROR  #  P29
                L6VS1.                           PRINT  LINE  6
0B5A  F038          A2  = LIT.
0B5B  E005          LIT  = 5.                    CHAR  COUNT  6
0B5C  F121          A2  = A2  XOR  B111.
0B5D  0BD0          AMPCR = L6VS2  - 1.
0B5E  F041          A3  = AMPCR.
0B5F  E080          LIT  = @80@.
0B60  F01D          A1  = LIT.                   FORMS  VAR  SKIP   CH4
0B61  8B8D          CPCR = PR012   - 1.
0B62  F0FD          WHEN URQ  STEP.              ERROR  #  P28
0B63  E010          LIT  = @10@.
0B64  F097          DR2  BEX.
0B65  F0CB          LIT  EQV  B.
0B66  F09D          IF  ABT  SKIP.
0B67  89EB          CPCR = PRTERR2  - 1.         ERROR  #  P29
                L18BF1.                          PRINT  LINE  18
0B68  F038          A2  = LIT.
0B69  E006          LIT    =  6.
0B6A  F121          A2  = A2  XOR  B111.
0B6B  0BD6          AMPCR = L18BF2   - 1.
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0B6C  F041        A3  = AMPCR.                  CHAR ADDRESS
0B6D  E0C0        LIT  = @C0@.
0B6E  F01D        A1  = LIT.                   FORMS BOTTOM OF FORM
0B6F  8B8D        CPCR  = PR012  - 1.
0B70  F0FD        WHEN URQ STEP.               ERROR # P28
0B71  E010        LIT  = @10@.
0B72  F097        DR2  BEX.
0B73  F0CB        LIT  EQV B.
0B74  F09D        IF  ABT SKIP.
0B75  89EB        CPCR  = PRTERR2  - 1.        ERROR # P29
              BFTF1.
0B76  F038        A2  = LIT.
0B77  E00D        LIT  = @0D@.
0B78  F121        A2  = A2 XOR B111.
0B79  0BDD        AMPCR  =  BFTF2  - 1.
0B7A  F041        A3  =  AMPCR.
0B7B  E010        LIT  = @10@.
0B7C  F01D        A1  = LIT.
0B7D  8B8D        CPCR  = PR012  - 1.
0B7E  F0FD        WHEN URQ STEP.               ERROR # P28
0B7F  E010        LIT  = @10@.
0B80  F097        DR2  BEX.
0B81  F0CB        LIT  EQV B.
0B82  F09D        IF  ABT  SKIP.
0B83  89EB        CPCR  = PRTERR2  - 1.        ERROR # P29
0B84  F0EA        MIR  = LIT.
0B85  E00A        LIT  = @0A@.
0B86  F098        DW2.
0B87  F0FD        WHEN URQ STEP.
0B88  F097        DR2  BEX.
0B89  F1AD        IF  NOT SRQ SKIP.
0B8A  F000        WAIT.                        ERROR # P23
0B8B  F0A8        IF  LC1  SET  LC1  SKIP.
0B8C  49FB        MPCR  = ISGCISET  - 1.
0B8D  4B31        MPCR  = PR011  - 1.
              PR012.
0B8E  F0DA        MIR  = AMPCR.
0B8F  C709        SAR  = 7 LIT  = 9.
0B90  F082        B  = LIT  L.
0B91  F0D5        MAR1  = B.
0B92  F0F3        MW1.              STORE  ROUTINE  AT 4608
0B93  F071        B  = A3.
0B94  E03A        LIT  = @3A@.                 COUNT  = 59
0B95  F0CA        LCTR.
0B96  F0D5        MAR1  = B.                   DATA  LOCATION
0B97  E020        LIT  = @20@.
0B98  F058        A3  = LIT.                   A3  BLANK
0B99  D800        SAR  = 8.
0B9A  F077        B  = B001.
0B9B  F07D        B  = B C.
0B9C  F0DC        MIR  = A1  + B.
0B9D  F098        DW2.                         WRITE  LOAD  BUFFER
0B9E  F05F        B.
              PR013.
0B9F  8B24        CPCR  = PR005  - 1.
0BA0  0B9E        AMPCR  = PR013  - 1.
0BA1  F0B9        IF  NOT COV JUMP.
0BA2  E048        LIT  = @48@.
0BA3  F0CA        LCTR.
              PR014.
0BA4  F05E        ASR.                         SELECT  BR1
0BA5  F080        B  = BMAR.
0BA6  F05B        AMPCR  = B.
0BA7  F0D7        MAR1  = BMAR + 1.            INC  CHAR LOCATION
0BA8  F09A        EXEC.                        GET  CHARACTER
0BA9  F058        A3  = LIT.
0BAA  8B24        CPCR  = PR005  - 1.
0BAB  F02A        A2  = A2  + B001.
0BAC  F09E        IF  AOV SKIP.
0BAD  4BA3        MPCR  = PR014  - 1.
0BAE  F058        A3  =  LIT.
0BAF  E020        LIT  = @20@.
              PR015.
0BB0  8B24        CPCR  = PR005  - 1.
0BB1  0BAF        AMPCR  = PR015  - 1.
0BB2  F0B9        IF  NOT COV JUMP.
0BB3  F05D        ASE.
0BB4  F080        B  = BMAR.
0BB5  F16F        BR2  = BITT.
0BB6  F0DB        MIR  =  A1.
0BB7  F098        DW2.
0BB8  C709        SAR  = 7  LIT  = 9.
0BB9  F082        B  = LIT  L.
0BBA  F0D5        MAR1  = B.
0BBB  F0F1        MR1.
0BBC  F0F9        WHEN RDC BEX.
0BBD  F05B        AMPCR  = B.
0BBE  F05F        B.
0BBF  F0C9        JUMP.
              TFDS2.
0BC0  E054        LIT  = @54@.                 T
0BC1  E04F        LIT  = @4F@.                 O
0BC2  E050        LIT  = @50@.                 P
0BC3  E020        LIT  = @20@.                 SPACE
0BC4  E04F        LIT  = @4F@.                 O
0BC5  E046        LIT  = @46@.                 F
0BC6  E020        LIT  = @20@.                 SPACE
0BC7  E046        LIT  = @46@.                 F
0BC8  E04F        LIT  = @4F@.                 O
0BC9  E052        LIT  = @52@.                 R
0BCA  E04D        LIT  = @4D@.                 M
              L3VS2.
0BCB  E04C        LIT  = @4C@.                 L
0BCC  E049        LIT  = @49@.                 I
0BCD  E04E        LIT  = @4E@.                 N
0BCE  E045        LIT  = @45@.                 E
0BCF  E020        LIT  = @20@.                 SPACE
0BD0  E033        LIT  = @33@.                 3
              L6VS2.
0BD1  E04C        LIT  = @4C@.                 020        LIT  = @20@.
0BD6  E036        LIT  = @36@.                 6
              L18BF2.
0BD7  E04C        LIT  = @4C@.                 L
0BD8  E049        LIT  = @49@.                 I
0BD9  E04E        LIT  = @4E@.                 N
0BDA  E045        LIT  = @45@.                 E
0BDB  E020        LIT  = @20@.                 SPACE
0BDC  E031        LIT  = @31@.                 I
0BDD  E031        LIT  = @31@.
              BFTF2.
0BDE  E042        LIT  = @42@.                 B
0BDF  E04F        LIT  = @4F@.                 O
0BE0  E054        LIT  = @54@.                 T
0BE1  E054        LIT  = @54@.                 T
0BE2  E04F        LIT  = @4F@.                 O
0BE3  E04D        LIT  = @4D@.                 M
0BE4  E020        LIT  = @20@.                 SPACE
0BE5  E04F        LIT  = @4F@.                 O
0BE6  E046        LIT  = @46@.                 F
0BE7  E020        LIT  = @20@.                 SPACE
0BE8  E046        LIT  = @46@.                 F
0BE9  E04F        LIT  = @4F@.                 O
0BEA  E052        LIT  = @52@.                 R
0BEB  E04D        LIT  = @4D@.                 M
              BLANKP.
0BEC  0020        AMPCR  = @20@.
0BED  0020        AMPCR  = @20@.
0BEE  0020        AMPCR  = @20@.
0BEF  0020        AMPCR  = @20@.
```

```
                TITLECHARS.
0BF0  0020          AMPCR = @20@.
0BF1  0050          AMPCR = @50@.
0BF2  004F          AMPCR = @4F@.
0BF3  0054          AMPCR = @54@.
0BF4  0054          AMPCR = @54@.
0BF5  0045          AMPCR = @45@.
0BF6  0052          AMPCR = @52@.
0BF7  0020          AMPCR = @20@.
0BF8  0050          AMPCR = @50@.
0BF9  0052          AMPCR = @52@.
0BFA  0049          AMPCR = @49@.
0BFB  004E          AMPCR = @4E@.
0BFC  0054          AMPCR = @54@.
0BFD  0045          AMPCR = @45@.
0BFE  0052          AMPCR = @52@.
0BFF  0020          AMPCR = @20@.
0C00  004D          AMPCR = @4D@.
0C01  0054          AMPCR = @54@.
0C02  0052          AMPCR = @52@.
0C03  0020          AMPCR = @20@.
                TS3.
0C04  0000          AMPCR = 0.
                TS2.
0C05  0000          AMPCR   = 0.
                TS1.
0C06  0000          AMPCR = STARTCONTROLLER.        TEMPORARY  STORAGE
0C07  4000          CNST  = @4000@.
                FINISH.
```

MANUAL PROCEDURES

NOTE

ALL MTR METER READINGS + OR - 10% EXCEPT 0% AND 100%

THE PERIOD OF THE SCOPED PULSES CAN VARY + OR - 20% FOR ANY GIVEN CHAIN SPEED.

SCOPE AND METER MEASUREMENTS MUST BE MADE WHILE CHAIN IS STILL BEING DRIVEN - APP 3 MINUTES

THE PERIOD OF THE PULSE WILL BE AFFECTED BY THE NUMBER OF LINES PER MINUTE THAT ARE PRINTED AND THE CHARACTER SET SIZE IF IT IS A FUNCTION OF THE PRINTER CHAIN SYNC LEVEL SIGNAL (CSL/). SEE TABLE BELOW.

CHAR SET	TYPE 1		TYPE 2		TYPE 3	
96	113	MSEC	256	MSEC	113	MSEC
64	75.3	MSEC	170.6	MSEC	75.3	MSEC
48	56.5	MSEC	128	MSEC	56.5	MSEC
16	18.8	MSEC	42.6	MSEC	18.8	MSEC

TYPE 1 = 750 LPM PRINTER - STANDARD CHAIN
TYPE 2 = 750 LPM PRINTER - SUPERIOR QUALITY PRINT CHAIN
TYPE 3 = 400 LPM PRINTER - STANDARD CHAIN

E0	OPERATOR ACTION	MACHINE ACTION	A	D	C
1	METER PT1-1H #CG(CD)CLEAR(N)!WITH SYSTEM CLEAR PRESSED	READING = 100%	1A	F115	C
1A	OBSERVE MIR	DIGIT B = PRINTPORT-1	2	F1	C
2	OBSERVE MIR	BIT A8 IS ON (DINT/)	3	5	
3	INTERCHANGE PS CARDS RUN MTR PROBLEM GOES AWAY		4	F2	
4	RETURN CARDS TO ORIGINAL POS		F84		
5	INTERCHANGE PS CARDS RUN MTR PROBLEM GOES AWAY		4	F3	
E1	OPERATOR ACTION	MACHINE ACTION	A	D	
1	DIRECTED HERE BY FEMTMTR		3	2	
2	RUN FEMTMTR				
3	9247 PRINTER BEING TESTED		F4	4	
4	A9249 PRINTER BEING TESTED		5	7	
5	BIT 12 ON FROM FEMTMTR		F315	6	
6	METER PO1-2T (PSREADN/)	READING = 0%	F288	F316	
7	A988 PRINTER BEING TESTED		P1		
E2	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	BIT D1 IS ON	2	3	

2	METER PT1-1L (PR1L/)	READING 0%	F 5	6		
3	OBSERVE MIR (END OF PAGE)	BIT D2 IS ON	4	5		
4	METER PT2-2L (EOPL/)	READING 100%	F72	F73		
5	OBSERVE MIR (COMPLETE)	BIT C1 IS ON	F74	F4		
6	METER PT1-1I (DC1L/)	READING 100%	7	F98		
7	METER PT2-1X (PCTP/)	READING 50%	F 6	F99		
E3	OPERATOR ACTION	MACHINE ACTION	A	D		
1	OBSERVE PRINTER	IS THERE CONTUNUOUS PAPER MOTION	5	2		
2	OBSERVE PRINTER	PRINTER PAPER WENT 'TOP OF FORM'	3	5	C C	
3	METER PT1-2Y (SINT/)	READING 0%	F7	3A	C C C C	
3A	METER PT1-1H #CG(DC)CLEAR(N)!READING WITH SYSTEM CLEAR NOT PRESSED	0%	4	F115	C C	
4	METER PT1-P3 (COMP)	READING 100%	F 8	F 9		
5	METER PT1-D4 (PTPMOL)	READING 100%	10	6		
6	PRESS FORCE STEP SEE NOTE - TEST SELECT TABLE SELECT TEST 03 METER PT1-2X (PSWRIT/)	READING 0.2%	7	F11		
7	METER PT1-1U (PSINST)	READING 100%	F13	7		
8	INTERCHANGE PS CARDS RUN MTR	PROBLEM GOES AWAY	9	F12		
9	RETURN CARDS TO ORIGINAL P/S		F81			
10	METER PT2-2M (PCSL/)	READING 8.8%	11	F100		
11	METER PT2-1K (PAML/)	READING 100%	F10	F101		
E4	OPERATOR ACTION	MACHINE ACTION	A	D		
	FIRST LINE CONTAINS 'A'S' AND '1'S' & OTHER LINES CORRECT		F77	1		
1	METER PT4-4Q (96) ROTATE CHARACTER SET SWITCH	POSITION -4 READING 100% OTHERS 0%	2	9		
2	METER PT4-4I (64) ROTATE CHARACTER SET SWITCH	POSITION -1 READING 100% OTHERS 0%	3	9		
3	METER PT4-4J (16) ROTATE CHARACTER SET SWITCH	POSITION -3 READING 100% OTHERS 0%	4	9		
4	METER PT4-4H (48) ROTATE CHARACTER SET SWITCH	POSITION -2-5-6 READING 100% OTHERS 0%	5	9		
5	METER PT2-4N (EVEN)	READING 50%	6	F47		
6	SCOPE PT2-1L (PTBCLA/) DURING PRINT	NEG 4 US PULSE 500 US PERIOD (SEE NOTE)	7	F65		
7	SCOPE PT2-1R (PTPE)	NEG 150 US PULSE 500 US PERIOD (SEE NOTE)	8	F64		
8	METER PT2-1P (PFCL/)	READING 100%	12	F66		
9	METER PT4-2V (CS4L/) ROTATE CHARACTER SET SWITCH	POSITION -1-2-3-4 READING 100% OTHERS 0%	10	F16		
10	METER PT4-2G (CS2L/) ROTATE CHARACTER SET SWITCH	POSITION -1-2-5-6 READING 100% OTHERS 0%	11	F17		
11	METER PT4-1F (CS1L/) ROTATE CHARACTER SET SWITCH	POSITION -1-3-5-7 READING 100% OTHERS 0%	F19	F18		
12	PRESS SYSTEM CLEAR SELECT PRINTER PORT # SEE NOTE - TEST SELECT TABLE SELECT TEST 04 METER PT1-2B (PT108)	READING 42%	13	F27		B
13	METER PT1-1D (PT107)	READING 42%	14	F27		
14	METER PT1-2H (PT106)	READING 42%	15	F27		
15	METER PT1-2L (PT105)	READING 42%	16	F27		
16	METER PT1-1N (PT104)	READING 42%	17	F28		
17	METER PT1-2R (PT103)	READING 42%	18	F28		
18	METER PT1-2W (PT102)	READING 42%	19	F28		
19	METER PT1-2C (PT101)	READING 42%	20	F28		
20	PRESS SYSTEM CLEAR SELECT PRINTER PORT # SELECT TEST 05 METER PT3-4M (INV/)	READING 100%	21	F29		B
21	METER PT3-4U (PT01/)	READING 42%	22	F30		
22	METER PT3-4S (PT02/)	READING 42%	23	F31		
23	METER PT3-4W (PT03/)	READING 42%	24	F32		
24	METER PT3-3R (PT04/)	READING 42%	25	F33		
25	METER PT3-3T (PT05/)	READING 42%	26	F34		
26	METER PT3-4V (PT06/)	READING 42%	27	F35		
27	METER PT3-4X (PT07/)	READING 42%	28	F36		
28	METER PT4-2F (ISPC)	READING 25%	29	F62		
29	SCOPE PT4-1V (CSL/)	NEG 24 US PULSE (SEE NOTE AT START OF MANUAL PROCEDURE)	30	F67		
30	SCOPE PT4-2N (PTBCSL/)	NEG 24 US PULSE (SEE NOTE AT START OF MANUAL PROCEDURE)	31	F68		

31	METER PT4-4K (T.P.) ROTATE CHARACTER SET SWITCH	POSITION -1-3-4-7-8 READING 100% OTHERS 0%	32	F69	
32	METER PT3-2C (PTINC)	READING 14%	F70	F15	
E5	OPERATOR ACTION	MACHINE ACTION	A	D	
1	SCOPE PT2-1H (PT8SCL/)	NEG 24 US PULSE (SEE NOTE AT START OF MANUAL PROCEDURE)	2	F68	
2	METER PT2-2M (PCSL/)	READING 37% (X10)	3	F22	
3	METER PT2-1B (CDSCLK)	READING 44% (X10)	4	F23	
4	METER PT2-4N (EVEN)	READING 50%	F20	F41	
E6	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER PT2-2K (PRSL/)	READING 400 LPM 100% 750 LPM 0%	2	F102	
2	METER PT4-4Q (96) ROTATE CHARACTER SET SWITCH	POSITION -4 READING 100% OTHERS 0%	3	6	
3	METER PT4-4I (64) ROTATE CHARACTER SET SWITCH	POSITION -1 READING 100% OTHERS 0%	4	6	
4	METER PT4-4J (16) ROTATE CHARACTER SET SWITCH	POSITION -3 READING 100% OTHERS 0%	5	6	
5	METER PT4-4H (48) ROTATE CHARACTER SET SWITCH	POSITION -2 READING 100% OTHERS 0%	9	6	
6	METER PT4-2V (CS4L/) ROTATE CHARACTER SET SWITCH	POSITION -1-2-3-4 READING 100% OTHERS 0%	7	F16	
7	METER PT4-2G (CS2L/) ROTATE CHARACTER SET SWITCH	POSITION -1-2-5-6 READING 100% OTHERS 0%	8	F17	
8	METER PT4-1F (CS1L/) ROTATE CHARACTER SET SWITCH	POSITION -1-3-5-7 READING 100% OTHERS 0%	F19	F18	
9	SCOPE PT2-2M (PCSL/)	NEG 24 US PULSE (SEE NOTE AT START OF MANUAL PROCEDURE)	10	F43	
10	SCOPE PT4-1V (CSL/)	NEG 24 US PULSE (SEE NOTE AT START OF MANUAL PROCEDURE)	11	F44	
11	SCOPE PT2-1H (PTBCSL/)	NEG 24 US PULSE (SEE NOTE AT START OF MANUAL PROCEDURE)	12	F45	
12	METER PT2-4N (EVEN)	READING 50%	F48	F46	
E7	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER PT2-2L (EDPL/)	READING 0%	F24	F25	
1	METER PT1-D3 (PTJB)	READING 0%	2	F49	
2	METER PT2-3B (SCNRDY)	READING 0%	F51	F50	
E9	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER PT2-2R (DC2L/)	READING 100%	F52	2	
2	METER PT2-D3 (PTPMOL)	READING 0%	3	F53	
3	METER PT2-2B (PTCND)	READING 0%	F54	F55	
E10	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER PT2-1I (DC1L/)	READING 100%	F56	F57	
E11	OPERATOR ACTION	MACHINE ACTON	A	D	
1	METER PT2-1X (PCTP/)	READING 50%	F61	2	
2	METER PT2-1B (SCLK)	READING 45% (X10)	F62	F23	
E12	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER PT2-2X (DT1L/)	READING 100%	F59	F60	
E13	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER PT1-2N (DINT/)	READING 0%	F 7	F15	
E14	OPERATOR ACTION	MACHINE ACTION	A	D	
1	INTERCHANGE PS CARDS RUN MTR	PROBLEM GOES AWAY	2	F38	
2	RETURN CARDS TO ORIGINAL POS		F83		
E15	OPERATOR ACTION	MACHINE ACTION	A	D	
1	INTERCHANGE PS CARDS RUN MTR	PROBLEM GOES AWAY	2	F14	
2	RETURN CARDS TO ORIGINAL POS		F81		
E16	OPERATOR ACTION	MACHINE ACTION	A	D	
1			F85		
E17	OPERATOR ACTION	MACHINE ACTION	A	D	
1	INTERCHANGE PS CARDS RUN MTR	PROBLEM GOES AWAY	2	F87	
2	RETURN CARDS TO ORIGINAL POS		F88		
E18	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER PAFP7R (PSIRQ/)	READING 100%	2	F93	
2	METER PT1-2Y (SINT/)	READING 100%	3	4	
3	METER PT1-2N (DINT/)	READING 100%	F90	6	
4	INTERCHANGE PS CARDS RUN MTR	PROBLEM GOES AWAY	6	F89	
5	RETURN CARDS TO ORIGINAL POS		F92		
6	INTERCHANGE PS CARDS RUN MTR	PROBLEM GOES AWAY	7	F91	
7	RETURN CARDS TO ORIGINAL POS		F92		
E19	OPERATOR ACTION (NO NOT RDY STATUS BIT)	MACHINE ACTION	A	D	
1	METER PT1-1L (PRIL/)	READING 0%	F94	2	

2	PRINTER ERROR - PRIL			
E20	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTER	CHAIN MOTOR STARTED TO OPERATE	2	F110
2	METER PT2-2X (DT1L/)	READING 50%	F75	3
3	METER PT2-2X (DT1L/)	READING 0%	F111	F112
E21	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PT2-2K (PRSL/)	READING 400 LPM INTERFACE 100% B 750 LPM INTERFACE 0% B	2	F102
2	OBSERVE PRINTER	ERROR LITE ON	F104	3
3	OBSERVE PRINTER	PRINTING OCCURRED	4	F104
4	OBSERVE PRINTOUT	INCORRECT CHARACTERS	E4	5
5	METER PT1-2Q (DT2L/)	READING 100%	6	F103
6	SCOPE PT4-1V (CSL/)	NEG 24 US PULSE (SEE NOTE AT START OF MANUAL PROCEDURE)	F26	F44
E22	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTER	PAPER FED CONTINUOUSLY	F105	2
2	OBSERVE MIR	DIGIT C = 8	7	3
3	OBSERVE MIR	DIGIT C = 6	F106 F107	4
4	OBSERVE MIR	DIGIT C = 4	8	5
5	OBSERVE MIR	DIGIT C = A	F106 F108	6
6	OBSERVE MIR	DIGIT C = 2	9	
7	METER PT1-2U (DT8L/)	READING 0%	F107	F106
8	METER PT1-15 (KT4L/)	READING 0%	F108	F106
9	METER PT1-2Q (DT2L/)	READING 0%	F109	F106
E23	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE PRINTOUT	CHARACTERS CONSTANT IN EACH LINE	F76	2
2	OBSERVE PRINTOUT	CORRECT CHARACTERS INCORRECT LINE SPACING	F26	3
3	OBSERVE PRINTOUT	INCORRECT CHARACTERS	E4	
E24			F105	
E25			F104	
E26	OPERATOR ACTION	MACHINE ACTION	A	D
	METER PT2-2Y (MOST/)	READING 100%	F113	F110
E27			F114	

MANUAL PROCEDURES

E200	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRINTER IS NOT-READY		3	2
2	START TEST AGAIN WITH PRINTER NOT-READY			
3	METER PO1-1S (MA-STAT/)	READING 100%	4	F200
4	PRESS FORCE STEP TO START READ STATUS LOOP			
5	METER PO1-2T (PSREADN/)	READING 65 TO 75%	6	F201
6	METER PO1-1U (PSINSTN)	READING 100%	F203	F202
E201			F204	
E202	(NO DETECTED FAILURES)			
E203	OPERATOR ACTION	MACHINE ACTION		
1	METER PO2-1P (READY)	READING 100%	2	F205
2	METER PO2-1L (POREADY)	READING 0%	F206	F207
E204			F208	
E205			F209	
E206	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PO1-1U (PSINSTN)	READING 0%	F289	F202
E207	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PO2-1P (READY)	READING 100%	2	F205
2	METER PO2-1L (POREADY)	READING 0%	3	F207
3	METER PO2-2M (POSELATP)	READING 0%	4	F211
4	METER PO2-1N (POSELBTP)	READING 0%	5	F212
5	METER PO2-2L (B1)	READING 100%	6	F213
6	METER PO2-2K (B2)	READING 100%	7	F214
7	METER PO2-2X (B3)	READING 0%	8	F215
8	METER PO2-1X (B4)	READING 0%	9	F215
9	METER PO2-2R (B5)	READING 100%	10	F216
10	METER PO2-2Y (B6)	READING 0%	11	F217
11	METER PO2-1K (B7)	READING 0%	12	F218
12	M,ETER PO2-2E (PODSBIN/)	READING 100%	13	F219
13	METER PO1-1E (DSTB/)	READING 100%	15	14
14	METER PO1-1H (CGCLEAR) WHILE PRESSING SYSTEM CLEAR	READING 100%	F221	F220

15	METER P01-1H (CGCLEAR)	READING 0%	16	F220	
16	SCOPE P01-1E (DSTB/) WHILE STARTING MTR AGAIN	SCOPE SHOWS NEGATIVE PULSE AFTER TEST 10 IS ENTERED	F222	F223	
E208	OPERATOR ACTION	MACHINE ACTION	A	D	
1	PRINTER IN READY STATE		3	2	
2	RUN MTR AGAIN AND MAKE PRINTER READY AT E207 WAIT				
3	METER P01-1S (MA-STAT/)	READING 0%	F226	F225	
E209	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER P01-2N (DINT/)	READING 0%	2	9	
2	PRINTER READY AND CHAIN MOTOR ON		4	3	
3	RUN MTR AGAIN AND COMPLETE STEPS 4 AND 5 BEFORE MOTOR TIMES OUT OR PUT PRINTER MOTOR SWITCH IN ON POSITION				
4	METER PO2-1P (READY) WITH MOTOR ON AND PRINTER READY	READING 0%	5	F205	
5	METER PO2-1L (POREADY) WITH MOTOR ON AND PRINTER READY	READING 100%	6	F207	
6	DID PRINTER DO ANY LINE FEEDS AT PROGRAM STEP ABOVE AT FORCE STEP OR WHEN MADE READY. (COULD BE SPACING CONTINUIOUS NOW)		7	F227	
7	METER P01-1D (POMIRO8/)	READING 0%	8	F229	
8	SCOPE P01-2V (ACK/) WHILE STARTING MTR AGAIN	SCOPE SHOWS NEGATIVE PULSE AFTER TEST 10 IS ENTERED	F228	F235	
9	METER PS-2Q (PSSRQ/)	READING 0%	F294	10	
10	METER PS-1R (PSIRQ/)	READING 0%	F295	F296	
E210	OPERATOR ACTION	MACHINE ACTION	A	D	C
1	PRINTER IS NOT READY		2A	2	C C
2	MAKE PRINTER NOT READY AND RUN MTR AGAIN				C
2A	METER P01-2Y (SINT/)	READING 0%	7	3	C C
3	PRESS FORCE STEP TO PUT MTR IN WRITE LOOP		5		
5	METER P01-2X (PSWRITN/)	READING 45 TO 55%	6	F310	C
6	METER P01-1B (CDCLKPN)		9	F313	C C
7	METER PS1Q (PSURQ/)	READING 0%	F294	8	C
8	METER PS-1R (PSIRQ/)	READING 0%	F295	F296	

9	METER P01-1H #CG(DC)CLEAR(N)! WITH SYSTEM CLEAR NOT PRESSED	READING 0%	F230	F317	C C
E211			F231		
E212			F232		
E213			F297		
E214	(NO DETECTED FAILURES)				
E215			F209		
E216			F233		
E217	(NO DETECTED FAILURES)				
E218	OPERATOR ACTION	MACHINE ACTION	A	D	
1		PRINTER MAY BE SPACING NOW	F234		
E219	OPERATOR ACTION	MACHINE ACTION	A	D	
1	H(SPACE)7 PRINTED IN COLUMNS 1,2,3		F237	2	
2	METER P01-1D (POMIR08/)	READING 100%	F238	F236	

E220 THE PRINTER SHOULD HAVE PRINTED 'H' IN COLUMN 1, 'SPACE'(SP) IN COLUMN 2, AND '7' IN COLUMN 3, AND SINGLE SPACED.
ALL PRINTOUT DESCRIPTIONS ARE BASED ON THE 48 CHARACTER CHAIN. SUBSTITUTE THE APPROIATE CHARACTERS IF A PRINTER IS TESTED FOR WHICH CODE @20@ IS NOT (SP), @37@ IS NOT '7', OR @48@ IS NOT 'H'. FOR PRINTERS WITH OTHER THAN THE 48 CHARACTER CHAIN, SOME OF THE ERROR PRINTOUT SPACES MAY BE CHARACTERS THAT ARE NOT ON THE 48 CHARACTER CHAIN.
SOME OF THE ERROR PRINTOUTS BELOW CAN ALSO BE CAUSED BY PRINTER PROBLEMS. RUN ONE OF THE FUNCTIONAL TESTS (17,18,19,OR 20 ARE MOST USEFUL AT THIS ERROR) AND METER THE INTERFACE LINES TO SEPARATE DDP FROM PRINTER PROBLEMS.
MOST OF THE ERRORS THAT CAUSE THE 'H' TO BE SPACED OVER TO COLUMN 4 ARE CAUSED BY THE 'LOAD PRINT DATA' COMMAND SENDING SOME CHARACTER OTHER THAN @7F@ TO THE PRINTER.

	OPERATOR ACTION (READ ERROR PRINTOUT)	A	D
1	H(SP)6 OR (SP)(SP)(SP)H(SP)6	F240	2
2	I(SP)7	F240	3
3	H(SP)5 OR (SP)(SP)(SP)H(SP)5	F240	4
4	J(SP)7	F240	5
5	H(SP)3	F241	6
6	L(SP)7	F241	7
7	@(SP)7	F241	8
8	H(SP)'	F242	9
9	X(SP)7	F242	10
10	17	F242	11
11	(SP)(SP)7	F243	12

12	H0	F242	13
13	(SP)(SP)(SP)H(SP)7 (IF ANY OF THE FIRST 3 SPACES ARE ?'S CHANGE A5 & B5 FIRST FOR F244)	F244	14
14	H$3	F245	15
15	H7	F246	16
16	H(ANY CHARACTER)7 (CODE SET CNA BE USED TO NARROW THIS FAILURE TO 1 CHIP--COMPARE ERROR CHARACTER TO SP.)	F247	
17	(SP)(SP)(SP)H(SP)(SP)	F248	18
18	000H	F246	19
19	(SP)7(SP)	F249	
20	ANY PRINTOUT THAT CAN'T BE EXPLAINED WITH 1 INCORRECT BIT IN THE DATA CHARACTERS (H AND 7), AND IF YOU FORCE STEP TO CONTINUE, SPACING OR OVERPRINTING DOES NOT FUNCTION CORRECTLY. SOME OF THE ERROR PRINTOUTS WERE N(SP)8, (SP)(SP)(SP)J(SP)6, 0(SP)(SP)(SP), AND (SP)(SP)(SP)@(SP)0	F250	21
21	PAPER CLAMPS START OPENING AND CLOSING. PRINTOUT MAY BE (SP)7(SP) OR H(SP)7. ALSO, WHEN STARTING OVER, PUSHING SYSTEM CLEAR MAY START THE CHAIN MOTOR, AND THE PRINTER MAY START PRINTING JUNK WHEN MADE READY.	F251	22
22	H(SP)7 CORRECT, BUT SLEWS TO COME CHANNEL AFTER PRINTING	F252	23
23	NO PRINTING, BUT PRINTER SPACES	F258	24
24	NO PRINTING OR SPACING	F253	25
25	H(SP)7 CORRECT, BUT NO SINGLE SPACE AFTER PRINTING	F254	26
26	H(SP)7 CORRECT, AND THE PRINTER 'STOP' AND 'PRINT' BUTTONS ARE DISABLED	27	28
27	OUTPUT FROM REST OF MTR CORRECT	F256	F257
28	NONE OF THE ABOVE ERROR PRINTOUTS MATCH THE ACTUAL PRINTOUT (NOTE: FOR OTHER THAN THE 48 CHARACTER CHAIN SOME OF THE (SP)'S CAN BE CHARACTERS THAT ARE NOT ON THE 48 CHARACTER CHAIN.	1	

E222	OPERATOR ACTION	A	D
1	DOES THE PROGRAM STOP AT E222 ONLY ON THE FIRST RUN AFTER TURNING PROCESSOR POWER ON, AND STOP AT E260 ON NEXT RUN	F260	F261

E224	OPERATOR ACTION	A	D
1	IF TESTING A 12-CHANNEL PRINTER INSURE THAT CHANNEL 12 HAS NOT BEEN SENSED	2	
2	EOP STATUS HAS BEEN SENSED ON THE FIRST PAPER MOTION COMMAND. RUN TEST 14 TO FIND THE ERROR IF F262 DOES NOT CORRECT THE ERROR.	F262	

E225		F224	
E226		F263	
E230		F300	
E231		F301	

E232	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER PO1-2Y (STINT/)	READING 0%	F302	F303

E233		F304	
E234		F305	
E235		F306	
E236		F307	
E237		F308	
E238		F309	
E239		F310	

E240	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRINTER ON SAME PS CARD AS CONTROLLER (SPO OR CONSOLE)		F311	F312

E241	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRINTER ON SAME PS CARD AS CONTROLLER (SPO OR CONSOLE)		F311	F312

E242	OPERATION ACTION	A	D
1	ALL DDP ERRORS THAT WERE DETECTED BY LINES 1 AND 2 HAD ALREADY BEEN DETECTED AT A PREVIOUS ERROR STOP. LINE 1 IS THE FIRST FULL LINE (132 CHARACTERS) THAT IS PRINTED. LINE 2 IS INCLUDED JUST TO CHECK THAT THE PRINTER WILL PRINT ALL CHARACTERS.	2	2
2	LINE 3 (1 OVERPRINTED WITH U) DETECTED SEVERAL DDP ERRORS THAT HAD NOT BEEN DETECTED BY PREVIOUS ERROR STOPS. FOLLOW STEP 3 TO CHANGE ALL OF THE CHIPS FOR THIS ERROR, OR FOLLOW STEPS 4 THRU 7 FIRST TO TRY TO LOWER THE NUMBER OF CHIPS TO CHANGE.	3	3
3	1 NOT OVERPRINTED WITH U IN COLUMN 1	F265	
4	1 PRINTED IN COLUMN 1 AND SKIP TO SOME CHANNEL BEFORE PRINTING U IN COLUMN 1	F266	
5	1U PRINTED IN COLUMNS 1 AND 2	F267	
6	1 PRINTED IN COLUMN 1, THEN SINGLE SPACE AND PRINT U IN COLUMN 1	F268	
7	1 PRINTED IN COLUMN 1, THEN U PRINTED IN COLUMN 1 AFTER A VARIABLE NUMBER OF SINGLE SPACES (RUN MTR 4 OR 5 TIMES TO CHECK FOR THIS ERROR)	F269	

E243	OPERATOR ACTION	A	D
1	LINES 1 AND 3 ARE SINGLE SPACED (FIRST DOUBLE SPACE)	F270	2

2	LINE 4 IS NOT BLANK (WILL PRINT CODES @20@ THRU @5F@ IF NO BUFFER CLEAR) (THIS ERROR WAS FIRST DETECTED AT E220 WITH (SP)(SP)(SP)H(SP)7 OR ???H(SP)7)	F271	3	
3	LINE 5 IS NOT BK OR BK? (WILL BE BLANK IF A DATA @7F@ SENDS @7F@ INSTEAD OF @3F@)	F272	1	
E250	OPERATOR ACTION	A	D	
1	2-CHANNEL PRINTER BEING TESTED	2	3	
2	PRESS FORCE STEP TO CONTINUE (EOP IS NOT SET ON 2-CHANNEL PRINTERS)			
3	INSURE THAT CHANNEL 12 IS PUNCHED, THEN ENTER TEST 14. METER PO1-2U (EOPL) WHILE EOPC12 IS BEING PRINTED CONTINUOUSLY. THE METER READING CHANGES FROM 100% TO 0% WHEN CHANNEL 12 IS SENSED AND FROM 0% TO 100% WHEN CHANNEL 1 IS SENSED	F273	F274	
E251		F275		
E252		F276		
E253	OPERATOR ACTION	A	D	
1	SEE TEST 15 DESCRIPTION. RUN TEST 20 TO ISSUE SKIP COMMANDS AND SCOPE INTERFACE LINES TO ISOLATE DDP FROM PRINTER PROBLEMS.	F277		
E255		F278		
E256		F279		
E257		F280		
E258		F281		
E259		F282		

E260	OPERATOR ACTION	MACHINE ACTION	A	D	C
1	METER P01-1H #CG(CD)CLEAR(N)! WITH SYSTEM CLEAR PRESSED	READING 100%	2	F317	C
2	PUSH SYSTEM CLEAR WITH PRINTER NOT READY AND MOTOR OFF	CHAIN MOTOR STARTS	3	4	C
3	METER P01-2X (PSWRITN/)	READING = 0%	F284	F285	
4	METER PO1-2N (DINT/)	READING 0%	F286	F287	
E262	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER PO1-2W (POTMOUT/)	READING = 100%	2	F290	
2	PUSH PRINT TO MAKE PRINTER READY	PRINTER STARTS PRINTING	3	F291	
3	MAKE PRINTER NOT READY AND METER PO1-2X (PSWRITN/)	READIN = 100%	F293	F292	
E263			F298		

MANUAL PROCEDURES

P1	OPERATOR ACTION	MACHINE ACTION	A	D	A
	WERE YOU DIRECTED HERE BY FEMTMTR		F33	P17	A
P2	OPERATOR ACTION	MACHINE ACTION	A	D	A
1	INTERCHANGE PS1-1 AND PS1-2	PROBLEM GOES AWAY	2	F40	A
2	RETURN CARDS TO ORIGINAL POS POTTER DDP IN PORT# 1,2,3,4		F60A	3	A
3	POTTER DDP IN PORT# 5,6,7		F60B		A
P3	OPERATOR ACTION	MACHINE ACTION	A	D	
	FORCE STEP AND OBSERVE MIR	DOES 'B' DIGIT EQUAL PORT # -1	F21	1	
1	EXECUTE MTR OF DEVICE FOUND ON PORT # IN 'B'				
P4	OPERATOR ACTION	MACHINE ACTION	A	D	
	OBSERVE PAPER MOTION		2	1	
1	FORCE STEP READ AND RECORD MIR - GO TO 2				
2	PRESS CLEAR SELECT PRINTER PORT # SELECT TEST 30 (SET REPEAT FLAG) SELECT TEST 41 (SET INHIBIT ERROR FLAG) SELECT TEST 32				
	SCOPE FOLLOWING PINS		A	D	
	PP3-2J (V1)	GROUND	3	9	
3	PP3-1L (V2)	GROUND	4	9	
4	PP3-1J (FS)	- 4 V	5	9	
5	PP3-2K (CHRY)	- 4 V	6	9	
6	PP3-1R (F8)	- 4 V	7	9	
7	PP3-2Q (PR/)	- 4 V	8	17	
8	PP3-1Y (BOF)	GROUND	13	17	
9	MIR FROM STEP 1	MIR = 0000	9A	10	A
9A	INTERCHANGE PS1-1 AND PS1-2	PROBLEM GOES AWAY	9B	F22	A
9B	RETURN CARDS TO ORIGINAL POS POTTER DDP IN PORT# 1,2,3,4		F67A	9C	A
9C	POTTER DDP IN PORT# 5,6,7		F67B		A
10	MIR FROM STEP 1	MIR = 0011	10A	11	A

10A	INTERCHANGE PS1-1 AND PS1-2	PROBLEM GOES AWAY	10B	F22	A
10B	RETURN CARDS TO ORIGINAL POS POTTER DDP IN PORT# 1,2,3,4		F67A	10C	A
10C	POTTER DDP IN PORT# 5,6,7		F67B		A
11	MIR FROM STEP 1	MIR = 0012	F23	12	
12	MIR FROM STEP 1	MIR = 0001	F24	7	
13	MIR FROM STEP 1	MIR = 0000	13A	14	A
13A	INTERCHANGE PS1-1 AND PS1-2	PROBLEM GOES AWAY	13B	F22	A
13B	RETURN CARDS TO ORIGINAL POS POTTER DDP IN PORT# 1,2,3,4		F67A	13C	A
13C	POTTER DDP IN PORT# 5,6,7		F67B		A
14	MIR FROM STEP 1	MIR = 0011	14A	15	A
14A	INTERCHANGE PS1-1 AND PS1-2	PROBLEM GOES AWAY	14B	F22	A
14B	RETURN CARDS TO ORIGINAL POS POTTER DDP IN PORT# 1,2,3,4		F67A	14C	A
14C	POTTER DDP IN PORT# 5,6,7		F67B		A
15	MIR FROM STEP 1	MIR = 0012	F23	16	
16	MIR FROM STEP 1	MIR = 0001	F24	17	
17	PROBLEM IS IN POTTER PRINTER REFER TO POTTER CHECKOUT PROCEDURES				
P7		F41			
P8		F42			

P9	OPERATOR ACTION	MACHINE ACTION	A	D	
1	POTTER DDP IN PORT# 1,2,3,4		F61A	2	A
2	POTTER DDP IN PORT# 5,6,7		F61B		A

P10	OPERATOR ACTION	MACHINE ACTION	A	D	
1	INTERCHANGE PS1-1 AND PS1-2	PROBLEM GOES AWAY	2	F43	A
2	RETURN CARDS TO ORIGINAL POS POTTER DDP IN PORT# 1,2,3,4		F62A	3	A
3	POTTER DDP IN PORT# 5,6,7		F62B		A

P11	OPERATOR ACTION	MACHINE ACTION	A	D	
1	POTTER DDP IN PORT# 1,2,3,4		F63A	2	A
2	POTTER DDP IN PORT# 5,6,7		F63B		A

P12	OPERATOR ACTION	MACHINE ACTION	A	D	
1	POTTER DDP IN PORT# 1,2,3,4		F64A	2	A
2	POTTER DDP IN PORT# 5,6,7		F64B		A
P13		F44			
P15		F44			

P17	OPERATOR ACTION	MACHINE ACTION	A	D	
	OBSERVE CONSOLE INDICATORS	ERROR LITE ON	1	2	
1	GO TO FEMTMTR IF FEMTMTR INDICATES POTTER PORT FAILED - GO TO STEP 2				
2	INTERCHANGE PS1-1 AND PS1-2	PROBLEM GOES AWAY	3	F45	A
3	RETURN CARDS TO ORIGINAL POS				
	POTTER DDP IN PORT# 1,2,3,4		F65A	4	A
4	POTTER DDP IN PORT# 5,6,7		F65B		A

P18	OPERATOR ACTION	MACHINE ACTION	A	D	
	OBSERVE PRINTOUT	CONTINUOUS PAPER MOTION - NO PRINT	F2	1	
1	OBSERVE PRINTOUT	FIRST LINE PRINTED	F3	2	
2	PRESS CLEAR SELECT PRINTER PORT # SELECT TEST 30 (SET REPEAT FLAG) SELECT TEST 35				
	SCOPE FOLLOWING PINS		A	D	
	PP3-2J (V1)	VOLTAGE VARIES FROM GROUND TO - 4 V.	3	F27	
3	PP3-1L (V2)	VOLTAGE VARIES FROM GROUND TO - 4 V.	4	F28	
4	PP3-1J (FS)	- 4 V WITH POS PULSE	5	F29	
5	PP3-2K (CHRY)	- 4 V WITH POS PULSE	6	F30	
6	PP3-1R (F8)	- 4 V	7	F30	
7	PP3-2Q (PR/)	GROUND TO - 4 V WITH NEG PULSE	F31	8	
8	PP3-1Y (BOF)	GROUND	F26	8A	A

8A	INTERCHANGE PS1-1 AND PS1-2	PROBLEM GOES AWAY	8B	F25	
8B	RETURN CARDS TO ORIGINAL POS POTTER DDP IN PORT# 1,2,3,4		F68A	8C	
8C	POTTER DDP IN PORT# 5,6,7		F68B		
P19	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE PRINTOUT	FIRST LINE PRINTED	F4	2	
2	FORCE STEP TWICE READ MIR	MIR = 8001	F32	3	
3	READ MIR	MIR = 8009	F32	4	
4	GOT TO E18 - STEP 2				
P20	OPERATOR ACTION	MACHINE ACTION	A	D	
1	POTTER DDP IN PORT# 1,2,3,4		F66A	2	
2	POTTER DDP IN PORT# 5,6,7		F66B		
P22		F46			
P23	OPERATOR ACTION	MACHINE ACTION	A	D	
	OBSERVE PRINTOUT	PAPER MOTION WITHOUT PRINT	F4	F5	
P24		F47			
P25		F48			
P28	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE PRINTOUT	LAST LINE READS 'TOP OF FORM'	F6	2	
2	GO TO P18 - STEP 2				
P29	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE PRINTOUT	LAST LINE READS 'TOP OF FORM'	F7	2	
2	GO TO P18 - STEP 2				
P38	OPERATOR ACTION	MACHINE ACTION	A	D	
	OBSERVE PRINTOUT	CONTINUOUS TOP OF FORM PAPER MOTION	1	4	
1	PRESS CLEAR SELECT PRINTER PORT # SELECT TEST 30 (SET REPEAT FLAG) SELECT TEST 5				
	SCOPE PP3-2J (V1)	VOLTAGE LEVEL CHANGE FROM GND TO - 4 V	2	F8	
2	SCOPE PP3-1L (V2)	VOLTAGE LEVEL CHANGE FROM GND TO - 4 V	3	F8	
3	SCOPE PP3-1J (FS)	VOLTAGE LEVEL CHANGE FROM GND TO - 4 V	32	F10	
4	OBSERVE PRINTOUT	PRINT - IMPROPER SPACING	5	7	
5	PRESS CLEAR SELECT PRINTER PORT # SELECT TEST 30 (SET REPEAT FLAG) SELECT TEST 5				
	SCOPE PP3-2J (V1)	VOLTAGE LEVEL CHANGE FROM GND TO - 4 V	6	F8	
6	SCOPE PP3-1L (V2)	VOLTAGE LEVEL CHANGE FROM GND TO - 4 V	7	F8	
7	OBSERVE PRINTOUT (ROTATING ALPHA)	NO CHARACTERS PRINTED	25	8	
8	PRESS CLEAR SELECT PRINTER PORT # SELECT TEST 30 (SET REPEAT FLAG) SELECT TEST 5				
	SCOPE PP2-2N (IB8)	VOLTAGE LEVEL VARIES FROM 0 TO + 5 V	9	F11	
9	SCOPE PP2-2B (IB7)	VOLTAGE LEVEL VARIES FROM 0 TO + 5 V	10	F11	
10	SCOPE PP-2Q (IB6)	VOLTAGE LEVEL VARIES FROM 0 TO + 5 =	11	F11	
11	SCOPE PP2-1R (IB5)	VOLTAGE LEVEL VARIES FROM 0 TO + 5 V	12	F11	
12	SCOPE PP2-1H (IB4)	VOLTAGE LEVEL VARIES FROM 0 TO + 5 V	13	F12	
13	SCOPE PP2-1Q (IB3)	VOLTAGE LEVEL VARIES FROM 0 TO + 5 V	14	F12	
14	SCOPE PP2-1V (IB2)	VOLTAGE LEVEL VARIES FROM 0 TO + 5 V	15	F12	
15	SCOPE PP2-1L (IB1)	VOLTAGE LEVEL 0 V	16	F12	
16	SCOPE PP2-1X (Z8)	VOLTAGE LEVEL VARIES FROM 0 TO - 4V	17	F13	
17	SCOPE PP2-2R (Z4)	VOLTAGE LEVEL VARIES FROM 0 TO -4 V	18	F14	
18	SCOPE PP2-2X (Z2)	VOLTAGE LEVEL VARIES FROM 0 TO - 4V	19	F15	
19	SCOPE PP2-2Y (Z1)	VOLTAGE LEVEL VARIES FROM 0 TO - 4 V	20	F16	
20	SCOPE PP2-1K (N8)	VOLTAGE LEVEL VARIES FROM 0 TO - 4 V	21	F17	
21	SCOPE PP2-2K (N4)	VOLTAGE LEVEL VARIES FROM 0 TO - 4V	22	F18	
22	SCOPE PP2-2L (N2)	VOLTAGE LEVEL VARIES FROM 0 TO - 4 V	23	F19	
23	SCOPE PP2-1I (N1)	VOLTAGE LEVEL VARIES FROM 0 TO -4V	24	F20	

24	PROBLEM IN PRINTER				
25	PRESS CLEAR SELECT PRINTER PORT # SELECT TEST 30 (SET REPEAT FLAG) SELECT TEST 5				
	SCOPE PP3-2J (V1)	VOLTAGE LEVEL VARIES FROM GND TO - 4 V	26	F8	
26	SCOPE PP3-1L (V2)	VOLTAGE LEVEL VARIES FROM GND TO - 4 V	27	F9	
27	SCOPE PP3-1J (FS)	VOLTAGE LEVEL VARIES FROM GND TO - 4 V	28	F1(	
28	SCOPE PP3-2K (CHRY)	VOLTAGE LEVEL VARIES FROM GND TO - 4 V	29	F5	
29	SCOPE PP3-1R (F8)	VOLTAGE LEVEL VARIES FROM GND TO - 4 V	30	F5	
30	SCOPE PP3-2Q (PR/)	VOLTAGE LEVEL VARIES FROM GND TO - 4 V	F31	31	
31	SCOPE PP3-1Y (BOF)	VOLTAGE LEVEL - GND	F26	32	
32	OBSERVE PRINTOUT	PROPER SPACING BETWEEN LINES 6 & 11	F32	33	
33	OBSERVE PRINTOUT	PROPER SPACING BETWEEN LINE 11 AND BOTTOM OF FORM	F32	34	
34	OBSERVE PRINTOUT	PORPER SPACING BETWEEN LINES 3 & 6	F32	35	
35	OBSERVE PRINTOUT (ROTATING ALPHA)	BLANK LINES	F32	36	
36	PROBLEM IN PRINTER				

FAILURE DICTIONARY

F1	PS1-	A3,B3,B5,B7,C1,C5,D3,E3,F7
F2	PT1	B1,B5,C1,C5,F1
F3	PT1	C5,D5,E1,E3,E5,F3
F4	PT1 PT2	C1,E3,F7 F7
F5	PT1 PT2	A5,D1 E1,F7,C3
F6	PR1L/ SIGNAL FROM PRINTER INCORRECT OR DC1L/ OR PCTP/ SIGNAL TO PRINTER INCORRECT	
F7	PS1-	A3,A5,B3,C1,D1,D7,E3,E5,E7,F7
F8	PT2 PT1 PT4	A1,D1,E1,E3,E5,F1 D3,D5,E3 C1,D1,A5
F9	PT2 PT1 PT4	F1 A5,F3,E5,C5,D5,E3,E1 C1,D1
F10	PT2 PT1 OR PCSL/ OR PAML/ SIGNAL FROM PRINTER INCORRECT	A1,A5,C3,D1,E1,E3,E5,E7,F1,F3 A3,D3,D5,F3
F11	PS1-	C1,E5,E7,F7
F12	PT1	E1
F13	PT1	A3,B1,B3,C1,C3,C5,D1,D3,E1,E5,F3
F14	PT1	A7,C1,D5,E1,E3,F1
F15	PT1	B5,C1,F3,E1,A5,B1,C5
F16	CS4L/ SIGNAL FROM PRINTER NOT CORRECT	
F17	CS2L/ SIGNAL FROM PRINTER NOT CORRECT	
F18	CS1L/ SIGNAL FROM PRINTER NOT CORRECT	
F19	PT4	A1,A5,C1,A3,D1,D5
F20	PT2 PT4	F5,E3 A7,B3,B7
F22	PCSL/ SIGNAL FROM PRINTER NOT CORRECT	
F23	PROBLEM WITH SIGNAL SCLK	
F24	PT2 PT1	F7,B5,B3,B7,A7,C5 D5
F25	EDPL/ SIGNAL FROM PRINTER NOT CORRECT PT2	B7
F26	PT2 PT1	D1 A7,B3,B7,C3,C7,D3,E7,F7

F27	PT1	A5,A7,B3,B7,C7
	PT3	B7
F28	PT1	A7,C7,D7,E5
	PT3	C7
F29	PT3	A1,A5,A7,B1,B5,B7,C5,D1
	PT2	D3
F30	PT3	A1,A3,A7,B1,B3,C5,C7,D1,E3
	PT4	E3
F31	PT3	D3,A3,B3,B1,A1,A7,D1,C5,C7
	PT4	E3
F32	PT3	F3,A3,B3,B1,A1,A7,D1,C5,C7
	PT4	E3
F33	PT3	C3,A3,B3,B1,A1,D1,C5,C7
	PT4	E3
F34	PT3	D7,A3,B3,B1,A1,A7,B5,B7
	PT4	E7
F35	PT3	E7,A3,B3,B1,A7,B5,B7
	PT4	E7
F36	PT3	E7,A3,B3,B1,A1,A7,B5,B7
	PT4	E7
F37	PT4	E3,E7,E5,B5,D3,D7,C3,C7,A7
	PT2	E3
F38	PT1	E1
F39	PT2	B3,C1,E3,D5,A5
	PT3	B3,A3
F40	PT2	E7,D7,E3,F5,A7,C7
F41	PT2	E3,C1,C7,A7,B7,A5,A3
	PT1	A5,E3
F42	PT2	E3,E1,C3,C5,A1,A5,B3,B7,D5
F43	PT1	A3,A5
	OR	
	PCSL/	SIGNAL FROM PRINTER INCORRECT
F44	PT4	A5
	OR	
	CSL/	SIGNAL FROM PRINTER INCORRECT
F45	PT4	A5,C3,C7
	PT2	C7,B7
F46	PT2	A3,A5,B7,C1,C7,E3
F47	PT2	C7,A7,B7,A5,C1,E3
F48	PT2	D7,F5,E3,B5,A1,D3,C5
	PT1	A3,B3,D1,
F49	PT1	B3,D1,F3
F50	PT2	D7,F5,E3,B5,A1
F51	PT2	D3,D1,E5
F52	TROUBLE IN PRINTER	
F53	PT1	A3,B1,D1,D3,C3
F54	PT2	E1,A1,D1,E5,E7
F55	PT4	C1,D1,B3,B7
F56	TROUBLE IN PRINTER	
F57	PT2	E7,E5,D1,F1,D3
F58	PT2	F3,E6
	PT4	B5,E5
F59	PT2	E7,F1,F3
F60	TROUBLE IN PRINTER	
F61	TROUBLE IN PRINTER	
F62	PT2	A7,C7,D7,E7
F64	PT2	C1,A5,D5
F65	PT2	B3,C1,E3,A5,D5
F66	PFCL/	SIGNAL FROM PRINTER NOT CORRECT
F67	CSL/	SIGNAL FROM PRINTER NOT CORRECT
F68	PT4	A5,C3,C7
	PT2	C7
F69	PT4	A3,A7
F70	PT4	A5,A7,C3,C7,D3,D7,B5,E3,E7,E5
F71	PT1	F1,B1,B5,C5,C1,C3,A7
F72	PT2	B7,B3,B5,F7
F73	EDPL/	SIGNAL FROM PRINTER NOT CORRECT
F74	PT1	D5,C5,F3,B1
	PT2	F7
F75	PT1	B3,B7,C7,D7,E1,E5
	PT2	C3,C5
	OR	
	DT1L/	SIGNAL TO PRINTER INCORRECT
F76	PT2	D3,B3,C1
	PT1	C1
	PT3	A7,A3,B3
F77	PT2	B3
	PT3	A3,B3
F78	PS1	A5 B5 C1 5 6
F79	PS1-	A3,C1,C3,D3,D5
F81	PS1-	D1,E5,E7,F7
F82	PS1-	D1
F83	PS1-	A5,B5,C1,E7,F7
F84	PS1-	D5
F85	PS1	B3,B5,B7,C5 (ON PS USED BY PRINTER)
	PS1	B5 (ON ALL OTHER PS CARDS)

F87	PT1	E3
F88	PS1-	B3,B5,B7,D3
F89	PT1	C1,C5,D5,E3
F90	PS1-	C3,D3,D5
F91	PT1	B1,B5,C1,C5,F1
F92	PS1-	F5
F93	PS1-	B3,C5,D3
F94	PT1 PT2	A5 E1,F7
F95	PS1-	A5,B5,C5,C7
F96	PS1-1 PS1-2	A5,B3,B5,C5,D3 B5
F97	PS1-2	A5,B3,B5,C5,D3
F98	PT2	D1,D3,E5,E7
F99	PT2	A7,C7,D7,E7
F100	PT2 OR PCSL/	A3,A5 SIGNAL FROM PRINTER INCORRECT
F101	PT2 OR PAML/	E1 SIGNAL FROM PRINTER INCORRECT
F102	PT2 OR PRSL/	B3,C3 SIGNAL FROM PRINTER INCORRECT
F103	PT1 OR DT2L/	E7,F7 SIGNAL FROM PRINTER INCORRECT
F104	PT2 OR PFCL/	D3,F1 SIGNAL FROM PRINTER INCORRECT
F105	PT2 OR DC1L/	E5,E7 SIGNAL FROM PRINTER INCORRECT
F106	PT1	B3,B7,E7,F7
F107	DT8L/	SIGNAL TO PRINTER INCORRECT
F108	DT4L/	SIGNAL TO PRINTER INCORRECT
F109	DT2L/	SIGNAL TO PRINTER INCORRECT
F110	PT2 OR MOST/	A1,A5,C3,E1,F7 SIGNAL TO PRINTER INCORRECT
F111	PT2 OR DT1L/	E7 SIGNAL TO PRINTER INCORRECT
F112	PT2	E7,F1,F3
F113	MOST/	SIGNAL TO PRINTER INCORRECT
F114	PT1	E3,A5
F115	CG1	C1 (IF B721 CG2 C1, AND CD2 A5)

C

F200	MA-STAT/ SIGNAL FROM PRINTER INCORRECT
F201	PS E7 F7
F202	PS D1
F203	P01 D5 E5 E7 E3
F204	P01 C7
F205	READY SIGNAL FROM PRINTER INCORRECT (CORRECT VALUES ARE 100% WITH MOTOR OFF, 0% WITH PRINTER READY AND MOTOR ON)
F206	P01 D1
F207	PO2 C1
F208	PO2 E7 A5 D1 PO2 E5
F209	PO1 B5
F211	PO2 D1 C3 (F3 E7 E3)
F212	PO2 C3 (D1 F3 E7 E3)
F213	PO2 E5 E3 OR PRINTER SIGNAL B1
F214	PO2 E5 E3 OR PRINTER SIGNAL B2
F215	PO2 F7 E7 C1
F216	P02 F7 F3 OR PRINTER SIGNAL B5
F217	P02 F7 F3
F218	PO2 B1 D1
F219	PO2 B1
F220	PROBLEM WITH SIGNAL CGCLEAR
F221	PO2 E7 B7 B1 OR PRINTER SIGNAL DSTB/
F222	PROBLEM IN PRINTER
F223	PO1 E7 B7 C5 C3 B3 A5 D5 E5 C1 B1 A7
F224	PO1 E5
F225	PROBLEM WITH PRINTER SIGNAL MA-STAT/
F226	P01 A1 E3 E7
F227	PO1 D1 B7 B3 A3 C5 B5
F228	PO1 B1 D3 A3 D1 F1 C1
F229	PROBLEM WITH SIGNAL POMIRO8/
F230	PO1 D5 D7 C7 C3 AU A7 B1
F231	PO1 D7
F232	PO1 D7 B3

F233 PO1 D1 B7

F234 PO1 D3

F235 PROBLEM WITH PRINTER SIGNAL ACK/

F236 PROBLEM WITH SIGNAL POMIR08/

F237 PO1 B3 A3 E5 B1 D7 A5

F238 PO1 B1 D3
PO2 D1 E1 (PO1-D1 PIN 3 LOW)

F240 P02 C7 E3

F241 P02 C7 E7

F242 P02 B7 F3

F243 P02 B7 B1 F3 A7 E1 D1

F244 P02 B7 E7 A5 B5

F245 P02 E7

F246 P02 F3

F247 P02 E3 E7 F3

F248 P02 F3 F7

F249 P02 B5 D7 D5 C5

F250 P02 C7

F251 P01 B3 C3 A5 E5 D5

F252 P02 E3 D3 C3 C5

F253 PO1 C5
PO2 E3 E7 F3 D3 B1 C5 E1 B3

F254 PO2 C7 C5

F256 PO2 B1 D1
PO1 E7

F257 PO1 C3 C5 E5 B3 D7 D5

F258 PO1 C5 D7 B3
PO2 B7 B5 C1

F260 P01 C5 B5

F261 P01 C5 E5 B3 A3

F262 P01 D1 C1

F263 P01 C3 D3
P02 B1

F264 P01 E5
PS

F265 PO2 D1 B1 E1 D3 C1 B3 C5 D5 E3 ED A7 C7
P01 D7 D5

F266 P02 E3 D3 C3 C5 D5

F267 P02 E7 D1 B1 E1 D5 C1 D3 A7 B3
P01 D5 D7

F268 P02 E3 D3 C3 A7
PO1 D5 D7

F269 P02 D3

F270 PO2 B1 D1 B3 C1 C5
P01 C5

F271 P01 B5 A5

F272 P01 B5 A5 D7 D5 C5

F273 PO1 E7 A5 D1 C1 E3 D3 A1

F274 PROBLEM WITH PRINTER SIGNAL EOPL

F275 PROBLEM WITH PRINTER
NOISE ON EOPL SIGNAL LINE
P01 R10

F276 PO1 A5 D3 C1

F277 P02 B1 D1 E1 B3 C5 C3 C1

F278 PO1 C3 C7 F7 F3 A7 E1
P02 E3

F279 P01 B3

F280 PO1 D3 F1 D1 A1

F281 P02 D1
12-CHANNEL DDP AND 2-CHANNEL PRINTER
PROBLEM WITH PRINTER

F282 P02 C3 (PIN 3 NET IS LOW)

F283 P01 C5

F284 PS E7

F285 P01 D5

F286 PO1 D5 C5 B5

F287 PO1 D7 C7 B1 B3

F288 PS1 E7

F289 PO1 E5 D5

F290 P01 C7 F7 (C1 OR SIGNAL CGCLEAR PIN PO1-1H POSSIBLE)

F291 P01 C3 C5 A5

F292 PS1

F293 P01 E5 D5 B3 C3 A5

F293 P01 E5 D5 B3 C3 A5

F294 CU1 BC3

F295 PS C1 A3 E5 E7 A5

F296 PS C1 D1 B3 D7 E3

F297 P01 E7 B5

F298 PO1 A7 F3 F7 C7

F300	PS A5 B5 A7 C1 C3	
F301	PS B3 AND D3 OF ALL PS CARDS	
F302	PS A3 C1 C3 D3 D5 E3 E5	
F303	PS F7 B3 B5 MU4 D5	
F304	PS B5	
F305	PS C5 B7	
F306	PS C7 B5 C5 A5	
F307	PS A5 C7 P01 E5	
F308	PS D5	
F309	PS A5 B5 C1	
F310	PS E7 F7 MU4 D5	
F311	PS A5 B5 C5 C7	
F312	PS B3 (ON PS USED BY PRINTER) PS B5 (ON ALL OTHER PS CARDS) P01 E5	
F313	SIGNAL CDSCLKPN	
F315	PO2 E5	
F316	PO1 D5 E5 E7	C
		C
F317	CG1 (IF B721 CG2 C1, AND DC2 A5)	C
F1	PP4-D7,C3,A3,B3,B1,E3,C5,B5 PP3-B5,F7,C7,F5 PP3- Q1,Q7,CR1,CR2,CR3,CR4	
F2	PP3-B5,D7,B7,E7,A7,C7 PP3- Q6,Q12,CR14,CR15,CR16	
F3	PP4-A3,A1,C3,B1,E3,A5,B7,D3	
F4	PP4-A3,B1,B3,C3,E3,C5,B5,B7,A1,E1,A77 PP3-C7,F7	
F5	PP4- A1,A3,B1,B5,C5,D3,E1 PP3-B7,C7,E7,A7 PP3-Q6,Q12,CR14,CR15,CR16	
F6	PP3- B5,B7,C7,D7 PP3- Q5,Q11,CR12,CR13 PP4-C5,B5,B7,E3	
F7	PP4-A3,A5,D3,B1,B3,B7,E3,C3	
F8	PP3- B5,F7 PP3- Q3,Q9,CR8,CR9 PP4-D5,F5,F7,D7,E5,D3,A7	
F9	PP3-Q4,Q10,CR11,CR10,Q13	
F10	PP3-B7,A7,D7,C7,E7,B5 PP3-Q5,Q11,CR12,CR13 PP4-D3,C5,E5,F5,B5	
F11	PP4-C7,A7,D7,E5,A5,C5	
F12	PP4-E7,F7,D7,E5,A5	
F13	Z8 SIGNAL BAD PP2- D3F4 (ROM) PP2- Q1,Q2,CR1,CR2 PROBLEM IN PRINTER	
F14	Z4 SIGNAL BAD PP2- D3F4 (ROM) PP2- Q3,Q4,CR3,CR4 PROBLEM IN PRINTER	
F15	Z2 SIGNAL BAD PP2- D3F4 (ROM) PP2- Q5,Q6,CR5,CR6 PROBLEM IN PRINTER	
F16	Z1 SIGNAL BAD PP2- D3F4 (ROM) PP2- Q7,Q8,CR7,CR8 PROBLEM IN PRINTER	
F17	N8 SIGNAL BAD PP2- C4F4 (ROM) PP2- Q 9,Q10,CR 9,CR10 PROBLEM IN PRINTER	
F18	N4 SIGNAL BAD PP2- C4F4 (ROM) PP2- Q11,Q12,CR11,CR12 PROBLEM IN PRINTER	
F19	N2 SIGNAL BAD PP2- C4F4 (ROM) PP2- Q13,Q14,CR13,CR14 PROBLEM IN PRINTER	
F20	N1 SIGNAL BAD PP2- C4F4 (ROM) PP2- Q53,Q16,CR15,CR16 PROBLEM IN PRINTER	
F21	PP4-B3,C5,B5,D5,A5,E5	A
		A
F22	PP4-D7,C3,A3,B3,B1,A5	A
F23	PP3- B5,B7 PP3- Q5,Q11,CR12,CR13 PP4- A5,B5,C5,D3,F5	
F24	PP3- C7,F7 PP3- Q1,Q7,CR2,CR3,CR4 PP4- B1,B3,B5,C5,E5	
		A
		A
F25	PROBLEM IN POTTER	A
F26	PP4- A7,B5,C7,F5,F7 PP3- CR5,CR6,CR7	C
F27	PP4-D5,D7,D3,F5,F7,C5,E5,A5 PP3-Q3,Q9,CR9,CR8	
F28	PP4-D5,D7,D3,F5,F7,C5,E5,A5 PP3-Q4,Q10,CR10,CR11	
F29	PP3- A7,B7,D7 PP3- Q5,Q11,CR12,CR13	

F30	PP3-	A7,B7,C7,D7,E7	
	PP3-	Q6,Q12,CR14,CR16	
F31	PP4-	C7,F7	
	PP3-	Q1,Q7,CR1,CR2,CR3	C
F32	PP3-F5,D3,F7,E5,B7		
F33	PP3-	F7	
	PP4-	C3,D7	
F40	PP4-	A1,A3,B1,B3,B5,B7,C5,E3,E5,F5	
F41	PP4-	C3,D7	
F42	PP3-	B5,Q5,Q11,CR12	
	PP4-	A5,B5,C5,D3,F5	
F43	PP4-	B7,C3,D7	
F44	PP4-	C3,D7	
F45	PP3-	F7	
	PP4-	C3,D7	
F46	PP3-	A7,B5,C7,D3,F5,F7	
	PP3-	Q2,Q8,CR5,CR6,CR7	
F47	PP3-	B5,C7	
	PP4-	B1,B7	
F48	PP4-	A5,A7,B5,D3	

PORT # 1, 2, 3, 4			PORT # 5, 6, 7		
F60A	PS1-1	C3,D3,D5,D7,E3	F60B	PS1-2	C3,D3,D5,D7,E3
F61A	PS1-1	A3,A5,B5,C1,C3 D3,D5,E5,E7,F7	F61B	PS1-2	A3,A5,B5,C1,C3 D3,D5,E5,E7,F7
F62A	PS1-1	A7,B5,C3,C7,D3 D5,E7	F62B	PS1-2	A7,B5,C3,C7,D3 D5,E7
F63A	PS1-1	A5,B3,B5,C3,C5 C7,D3	F63B	PS1-2	A5,B3,B5,C3,C5 C7,D3
F64A	PS1-1	C3,C5,C7,D3	F64B	PS1-2	C3,C5,C7,D3
F65A	PS1-1	A5,B5,C5,C7,D3 E7	F65B	PS1-2	A5,B5,C5,C7,D3 E7
F66A	PS1-1	A3,C1,D7,E5	F66B	PS1-2	A3,C1,D7,E5
F67A	PS1-1	A5,C5,C7,D3,E7	F67B	PS1-2	A5,C5,C7,D3,E7
F68A	PS1-1	A3,B3,C1,D1,D7 E3	F68B	PS1-2	A3,B3,C1,D1,D7 E3

PTAPMTR PAPER TAPE
9122 AND 9222 PAPER TAPE UNITS
B 121 AND B 221 I/O CONTROLS

```
PROGRAM-ID  PTAPMTR.
    TESTNUMBERLIMIT  VALUE IS 9.
*  THIS  MTR APPLIES  TO                                          *
*        PAPER  TAPE  PUNCH  MODEL A9222-1     DDP  B0221        *
*        PAPER  TAPE  READER  MODEL A9122      DDP  B0391        *
*                                                                *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * MTR SET  UP  INSTRUCTIONS                                    *
* *                                                              *
* * PLACE  MTR/MEM SWITCH  IN  MTR POSITION.                     *
* * PLACE  IRQ/EXT  SWITCH  IN  CENTER  POSITION.                *
* * PLACE  NORMAL/LOAD SWITCH  IN  LOAD POSITION.                *
* * LOAD  MTR PROGRAM 2603-5410                                  *
* * PLACE  NORMAL/LOAD  SWITCH  IN  NORMAL POSITION.             *
* * PRESS  SYSTEM  CLEAR.                                        *
* *                                                              *
* *                          NOTES                               *
* *                                                              *
* *                                                              *
* * ANY DISAGREEMENT  WITH SET  UP INSTRUCTIONS   SEE            *
* * INCREMENTER  ADDRESS  FOR FURTHER  ACTION.                   *
* *                                                              *
* * ABBREVIATIONS   IN  OPERATOR  INSTRUCTIONS   ARE             *
* * DEFINED   AS  FOLLOWS:                                       *
* *      CON  =  SERIES   L  TYPE  OPERATOR  CONSOLE.            *
* *      SP0  =  TELETYPE   STYLE  OPERATOR  KEYBOARD.           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*  PROG  STEP     INCR          OPERATOR  ACTION                 *
*  ____  ____     ____          ________  ______                 *
*    1            0015          VERIFY  MIR  =  SYSTEM  CONFIG.  *
*                               IF  AGREE  PRESS  CON  READY  OR *
*                               SPO  INPUT  REQUEST.             *
*                               NO  -  SEE  INCR  ADDR  FOR  INST.*
*                                                                *
*    2            0007    CON  PK1-12   ON                       *
*                               PRESS  PK  CORRESPONDING  TO     *
*                               THE  PORT  NUMBER  OF  THE  DEVICE*
*                               TO  BE  TESTED.                  *
*                            SPO  READY  ON                      *
*                               PRESS  TWO  NUMERIC  KEYS        *
*                               WHICH  CORRESPOND  TO  THE  PORT *
*                               OF  THE  DEVICE  BEING  TESTED.  *
*                               EXAMPLE  -  PORT  5  KEY  05  ON *
*                               KYBD.                            *
*                                                                *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*              PAPER  TAPE  PUNCH  MODEL  A9222-1                *
*                                                                *
*  TURN  PAPER  TAPE  PUNCH  OFF.                                *
*  LOAD  BLANK  PAPER  TAPE  CORRECTLY  ON  THE  PUNCH.          *
*  ANY  DISAGREEMENT  WITH  PUNCH  -  REFER  TO  M31             *
*  IF  TESTING  PUNCH,  CONTINUE  PROG  STEPS  3  THRU  16       *
*                                                                *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*              PAPER  TAPE  READER  MODEL  A9122                 $
*                                                                *
*  ANY  DISAGREEMENT  WITH  READER  -  REFER  TO  M140          *
*  IF  TESTING  READER,  SKIP  TO  PROG  STEP  17                *
```

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*    3          0008          TEST  SELECT                       *
*                        CON  NUM  ON                            *
*                        SPO  READY  ON                          *
*                             PRESS  TWO  NUMERIC  KEYS          *
*                             FOR  SELECTION  OF  TESTS.         *
*                                                                *
*                             01  -  06  ARE  DIAGNOSTIC  TESTS *
*                                    FOR  PAPER  TAPE  PUNCH     *
*                                                                *
*                             PRESS  01  ON  KYBD.               *
*                               TEST  PUNCH  DDP  WITH  PUNCH    *
*                               POWER  OFF.                      *
*                                                                *
*                             PRESS  02  ON  KYBD.               *
*                                                                *
*    4          04A0          MOUNT  BLANK  TAPE  CORRECTLY  ON*
*                             PUNCH.  TURN  POWER  ON.  PRESS    *
*                             FEED  KEY  UNTIL  SATISFIED  THAT*
*                             TAPE  FEEDS,SPROCKET  HOLES  ARE*
*                             PUNCHED  AND  NO  DATA  IS  PUNCH-*
*                             ED  OR  OPTION  SELECTED  DATA  IS*
*                             PUNCHED.  IF  DISAGREE  WITH  ANY*
*                             FEED  FUNCTIONS  ERROR  #M31.      *
*                             AGREE  FORCE  STEP.                *
*                                                                *
*    5          04B2          PORT-SELECT  GATING  TEST.  SEE   *
*                             INCR  ADDRESS  FOR  DETAILS.  IF   *
*                             AGREE  FORCE  STEP.  SEE  NOTE  1.*
*                                                                *
*    6          0008          TEST  SELECT                       *
*                             PRESS  03  ON  KYBD                *
*                                                                *
*    7          05B0          ALLOW  MEDIA  DETECTOR  TO  DROP  *
*                             TO  SIMULATE  A  MEDIA  BREAK.     *
*                             FORCE  STEP.                       *
*                                                                *
*    8          0008          TEST  SELECT                       *
*                             PRESS  04  ON  KYBD                *
*                                                                *
*    9          05C4          MAKE  PUNCH  READY                 *
*                             (LOAD  TAPE,  TURN  POWER  ON)     *
*                             FORCE  STEP.                       *
*                                                                *
*    10         05C6          TURN  PUNCH  POWER  OFF.           *
*                             IF  INCREMENTER  DOES  NOT  STEP   *
*                             ERROR  #M33.                       *
*                                                                *
*    11         0008          TEST  SELECT                       *
*                             PRESS  05  ON  KYBD                *
*                                                                *
*    12         05C9          CARDLOC  TEST.                     *
*                             SEE  INCR  ADDRESS  IN  PROGRAM    *
*                             FOR  INSTRUCTIONS.                 *
*                             FORCE  STEP.                       *
*                                                                *
*  * * *  END  OF  PAPER  TAPE  PUNCH  MTR  * * *               *
*                                                                *
*    13         0008          TEST  SELECT  -  DIAG  TEST  ONLY  *
*                             PRESS  06  ON  KYBD                *
*                             SEE  NOTE  2.                      *
*                                                                *
*    14         0222    CON                                     *
*               (0233)  SPO                                      *
*                             KEY  DESIRED  UPPER  DIGIT  OF     *
*                             PUNCHED  CHARACTER.SEE  NOTE  3.*
*                                                                *
*    15         0222    CON                                     *
*               (0233)  SPO                                      *
*                             KEY  DESIRED  LOWER  DIGIT  OF     *
*                             PUNCHED  CHARACTER,SEE  NOTE  3.*
```

16	0222 (0233)	CON SPO	SELECT A CONTROL KEY (L OR M) FROM ALPHA KYBD. L = CONTINUOUS PUNCHING OF THE PREVIOUSLY SELECTED CHARACTER UNTIL TERMINATED. A NEW CHARACTER MAY BE SELECTED BY KEYING IN A NEW UPPER AND LOWER DIGIT. PUNCHING WILL STOP UNTIL NEW CONTROL KEY IS DEPRESSED. M = PUNCHES SINGLE CHAR. PER ENTRY.

NOTE 1

THE RESULTANT PUNCHED TAPE FROM TEST 02 IS NEEDED FOR TEST 08 OF THE PAPER TAPE READER MTR. DO NOT DESTROY.

NOTE 2

TEST 06 IS USED AS A PUNCH LOOP FOR DEBUG, FORCING ECHO CHECK OR GENERATING TAPE.

NOTE 3

CON USE NUMERIC KYBD FOR SELECTION OF DATA CHAR
EXAMPLE: PUNCHED CHARACTER @45@ -
PRESS NUM 4 - THEN NUM 5
FOR CONTROL KEY PRESS L OR M OF
ALPHA KYBD (SEE STEP 16)

SPO USE NUMERIC 0 - 9 AND ALPHA A - F KEYS TO GENERATE CHARACTERS
TO TERMINATE CONTINUOUS PUNCHING, PRESS SPO INPUT REQUEST. SELECT NEW DATA KEYS AS ABOVE

PAPER TAPE READER

17	0008	TEST SELECT CON NUM ON SPO READY ON PRESS TWO NUMERIC KEYS FOR SELECTION OF TESTS. 07 - 09 ARE DIAGNOSTIC TESTS FOR PAPER TAPE READER PRESS 07 ON KYBD
18	061F	TURN POWER ON. REMOVE ALL PAPER TAPE FROM READER, CLOSE MEDIA CLAMP AND PRESS READ KEY. FAILURES NOTED DURING SET-UP GO TO M140. FORCE STEP.
19	0008	TEST SELECT PRESS 08 ON KYBD
20	0652	VERIFY MEDIA CLAMP IS CLOSED IF DISAGREE ERROR M139. PLACE TEST TAPE (SEE NOTE 4) IN READER AND CLOSE MEDIA CLAMP. MANUALLY ADVANCE TAPE SO THAT FIRST CHARACTER IS DIRECTLY OVER READ STATION. PRESS READ KEY. IF TAPE ADVANCES WHEN READ KEY IS DEPRESSED ERROR M112. FORCE STEP.
21	069E	VERIFY TAPE STOPPED ON THIRD CHARACTER AND MEDIA CLAMP REMAINED CLOSED. DISAGREE ERROR M126. FORCE STEP. TAPE SHOULD BE READ. ASSURE THAT TEST TAPE REMAINS OVER THE MEDIA PRESENT DETECTOR AND MEDIA CLAMP OPENS. DISAGREE RESTART TEST.
22	0704	CLOSE MEDIA CLAMP AND PRESS READ KEY. CLAMP REMAIN CLOSED DISAGREE ERROR M134. AGREE

END OF PTAPMTR

NOTE 4

TEST TAPE IS GENERATED BY TEST 02 OF THE PAPER TAPE PUNCH MTR. IF NO PUNCH AVAILABLE USE TEST TAPE #1448-7037

PROGRAM LISTING

```
                *
                 STARTCONTROLLER.          START  FROM SYSTEM  CLEAR
0000  8155             CPCR = BUSSTEST1   - 1.    TEST  EXTERNAL  BUSS
                **********ERROR      #M1.
0001  F18E             IF  IRQ  SKIP.           TEST  FOR  ERROR  IRQ
0002  400C             MPCR = IRQOFF   - 1.
0003  F108             ASR  BEX.
0004  F0E1             MIR  = B.
0005  F000             WAIT.      UNEXPECTED  IRQ,  ADDRESS  IN  MIR
                **********ERROR      #M2.
                 SELECTPORT.
                *
                *
0006  F0DE             MIR  = A3.       CONTROLLER  ADDRESS  (ASR  AFTER  IRQ)
0007  F0FC             WHEN SRQ  STEP.
                * CONTROLLER  ADDRESS  IS  DISPLAYED  IN  MIR
                * IF  CONTROLLER  ADDRESS  IS  NOT CORRECT,  RUN SPO  OR
                *                                          CONSOLE  MTR
                * IF  CONTROLLER  ADDRESS  IS  CORRECT,  ENTER  PORT  NUMBER
                *         OF  DEVICE  THAT  IS  BEING  TESTED
                *  FOR  CONSOLE  SYSTEMS
                *         PRESS  PK  UNDER  LIGHTED  A  AND  B  INDICATORS
                *         (LEFT  TO  RIGHT)  FOR  PORTS  1  THROUGH  12
                *  FOR  SPO  SYSTEMS
                *         PRESS  2  NUMERIC  KEYS  FOR  PORTS  01  THROUGH  12
                *         'PORT'  IS  PRINTED
                *
                * NOTE-IF  AN  INVALID  PORT  NUMBER  IS  ENTERED,  THE  MTR
                *       SOUNDS  THE  ALARM  AND  RETURNS  FOR  ANOTHER  PORT
                *       NUMBER.  (ONLY  THE  LOWER  4  BITS  OF  EACH
                *       CHARACTER  ARE  USED  IN  THIS  CHECK-PRESS  CORRECT
                *       KEYS)
                *
                *
                 SELECTTEST.
0008  F0FC             WHEN SRQ  STEP.
                * PRESS  2  NUMERIC  KEYS  TO  SELECT  TEST
                *   FOR  CONSOLE  SYSTEMS
                *         PRESS  KEYS  ON  NUMERIC  KEYBOARD
                *   FOR  SPO  SYSTEMS
                *         'TEST'  IS  PRINTED
                *         PRESS  NUMERIC  KEYS
                *
                *
                * NOTE-IF  AN  INVALID  TEST  NUMBER  IS  ENTERED,  THE  MTR
                *       SOUNDS  THE  ALARM  AND  RETURNS  FOR  ANOTHER  TEST
                *         NUMBER.  (ONLY  THE  LOWER  4  BITS  OF  EACH
                *         CHARACTER  ARE  USED  IN  THIS  CHECK-PRESS  CORRECT
                *         KEYS)
                *
                *
0009  F097             DR2  BEX.
000A  F086             B  = LIT  AND  B.       STRIP  UPPER  DIGIT
000B  E00F             LIT  = @0F@.
000C  F0C9             JUMP.
                *
                *
                 IRQOFF.
000D  F17D             DLD.                    READ  CONFIGURATION  CARD
000E  F0F9             WHEN RDC  BEX.
000F  F0E1             MIR  = B.         SYSTEM  CONFIGURATION  IN  MIR
0010  F017             A1  = B.
0011  F0F9             WHEN RDC  BEX.
0012  F0FF             0  EQV  B.
0013  F09D             IF  ABT  SKIP.
0014  F000             WAIT.             CONFIG  FF  NOT RESET  BY  BEX-
                **********                FAILURE  IS  CON1  CHIP  D7
                *
0015  F0F8             WHEN IRQ  STEP.
                * VERIFY  CORRECT  SYSTEM  CONFIGURATION  DISPLAYED  IN  MIR
                * IF  YES,  PUSH  READY  BUTTON  ON  CONSOLE  OR
                *           INPUT  REQUEST  ON  SPO.    IF  PROGRAM  HANGS  HERE
                *           (NO  RESPONSE  TO  INPUT  REQUEST  OR  READY
                *           BUTTON)  RUN SPO  OR  CONSOLE  MTR
                * IF  NO,  PRESS  FST
                *
                * METER  CON1  PIN  2K
                *  IF  0%  REPLACE  CHIPS  D5,D3,C7,D7       ON  CON1  CARD
                *  IF  NOT 0%  REPLACE  CHIPS  D5,A5,A7,F5,F7       ON  CON1  CARD
                *
0016  F18E             IF  IRQ  SKIP.
0017  4079             MPCR = CON1LOOP  - 1.
                *
0018  814D             CPCR = BUSSTEST  - 1.    FIRST  BUSS  TEST  WITH  IRQ  ON
                * IF  BUSS  TEST  FAILS  HERE,  FAILURE  IS  CONTROLLER  PORT
                *     SELECT  CARD  B7
                *
0019  F108             ASR  BEX.
001A  F051             A3  = B.          SAVE  CONTROLLER  ADDRESS
001B  F07A             B  = BITT.        SET  STATUS  WORD DATA  REQUEST  BIT
001C  C820             SAR  = 8  LIT  = @20@.
001D  F07F             B  = B XR.
001E  F036             A2  = B  L.       CLEAR  BITS  9-16
001F  F066             B  = A1.  SYSTEM  CONFIGURATION  FOR  SPO-CONSOLE  CHECK
0020  F0C3             IF  NOT LST  SKIP.     SPO-CONSOLE  CHECK
0021  E000             LIT  = 0.              SPO  ON  SYSTEM
0022  F1CC             MIR  = A2  OR  LIT.
                * FOR  SPO  CONTPORTADDRESS          = 1000XXXX00000000
                * FOR  CONSOLE  CONTPORTADDRESS      = 1000XXXX00100000
0023  F0CF             MAR1  = AMPCR.
0024  014D             AMPCR = CONTPORTADDRESS.
0025  F0F3             MW1.              STORE  CONTROLLER  PORT  ADDRESS
0026  8100             CPCR = CLEARFLAGS  - 1.     CLEAR  ALL  FLAGS
0027  8117             CPCR = SETCONTADDRS  - 1.
0028  81A2             CPCR = INITMAINSTACK  - 1.     SET  MAIN  STACK  ADDRESS
0029  81AA             CPCR = INITFLOSTACK  - 1.    SET  FLOW  STACK  ADDRESS
002A  0030             AMPCR = CONSPORTSELECT  - 1.
                **
002B  F0DE             MIR  = A3.
002C  F066             B  = A1.  SYSTEM  CONFIGURATION  FOR  SPO-CONSOLE  CHECK
                **
002D  F0C2             IF  NOT LST  JUMP.
002E  C001             SAR  = 0  LIT  = 1.
                * SET  FLAG  0  IN  FLAG  WORD 1  TO  1  FOR  SPO,  0  FOR  CONSOLE
002F  81D5             CPCR = SETFLAGW1  - 1.
0030  407E             MPCR = SPOPORTSELECTP  - 1.
                *
                 CONSPORTSELECT.
                * CONSOLE  ON  SYSTEM
                * PORT  SELECT,  OPERATOR  ENTERS  PK  1-12  TO  INDICATE-
                * THE  PORT  NUMBER  OF  THE  DEVICE  TO  BE  TESTED
                *
0031  8117             CPCR = SETCONTADDRS  - 1.
0032  F1D5             MIR  = B001  + 1.     ENABLE  KEYBOARD.
0033  F099             DW1.
0034  8125             CPCR = LITEINDA  - 1.
0035  E0FF             LIT  = @FF@.                LIGHT  PK  1-8
0036  812B             CPCR = LITEINDB  - 1.
0037  E00F             LIT  = @0F@.                LIGHT  PK  9-12
                * GET  PORT  NUMBER  (PK  KEY  1-12)
0038  8005             CPCR = SELECTPORT  - 1.
0039  F017             A1  = B.          SAVE  PORT  ADDRESS
003A  8125             CPCR = LITEINDA  - 1.
003B  E000             LIT  = 0.                   TURN  OFF  PK  1-8
003C  812B             CPCR = LITEINDB  - 1.
003D  E000             LIT  = 0.                   TURN  OFF  PK  9-11
003E  F066             B  = A1.          PORT  ADDRESS  TO  B  FOR  SAVEPORT
```

```
                STOREPORT.              FROM SPO  PORT  SELECT
003F  8139          CPCR  = CSAVEPORT  - 1.    SAVE  PORT  ADDRESS
0040  CF01          SAR   = 15  LIT   = 1.          SET  FLAG  15  TO  INDICATE-
0041  81D5          CPCR  = SETFLAGW1  - 1.    PORT  HAS  BEEN  SELECTED
                  * PRINT  TEST  SELECT  MESSAGE  FOR  FIRST  ENTRY  TO  SPO-
                  * TEST  SELECT
0042  C001          SAR   = 0  LIT   = 1.
0043  81F8          CPCR  = TESTFLAGW1  - 1.  TEST  SPO-CONSOLE  FLAG
0044  4099          MPCR  = SPOTESTSELECTP  - 1.  TRUE  RETURN  SPO
                  *
                TESTSELECTCLEAR.              PROGRAM  JUMPS  HERE  TO  CLEAR-
                  * MEMORY  FLAG  WORDS  2,3,AND  4  BEFORE  ALLOWING  THE-
                  * OPERATOR  TO  SELECT  A  TEST.  MEMORY  FLAG  WORD  1  AND-
                  * THE  PORT  ADDRESS  ARE  NOT  CHANGED.
0045  8109          CPCR  = CLEARFW2-3-4  - 1.
                TESTSELECT.                   PROGRAM  JUMPS  HERE  TO  ALLOW  THE-
                  *                 OPERATOR  TO  SELECT  A  TEST.  THE  MEMORY-
                  *                 FLAG  WORDS  2,3,4  ARE  NOT  CHANGED
                  * CLEAR  ERROR  FLAG,  IF  ON  IT  REFERS  TO  LAST  TEST
0046  C100          SAR   = 1  LIT   = 0.
0047  81D5          CPCR  = SETFLAGW1  - 1.
0048  8117          CPCR  = SETCONTADDRS  - 1.
0049  F096          DR1  BEX.          RESET  STATUS  INTERRUPT
004A  807C          CPCR  = TESTSPO-CONSOLE  - 1.
004B  409B          MPCR  = SPOTESTSELECT  - 1.  SPO  ON  SYSTEM
                  *
                  * CONSOLE  ON  SYSTEM
                  *
004C  812B          CPCR  = LITEINDB  - 1.
004D  E000          LIT   = 0.                    CLEAR  B  INDICATORS
004E  F1D5          MIR   = B001  + 1.      ENABLE  KEYBOARD
004F  F099          DW1.
                  *
0050  812D          CPCR  = LITEINDS  - 1.
0051  E008          LIT   = 8.              LIGHT  NUMERIC  INDICATOR
                  *
                  *
                  * GET  FIRST  DIGIT  OF  TEST  NUMBER  (10  S  DIGIT)
0052  8007          CPCR  = SELECTTEST  - 1.
0053  F051          A3  = B.          SAVE  (10  S  DIGIT)
                  *
                  * GET  SECOND  DIGIT  OF  TEST  NUMBER  (1  S  DIGIT)
0054  8007          CPCR  = SELECTTEST  - 1.
                  *
0055  812D          CPCR  = LITEINDS  - 1.
0056  E000          LIT   = 0.              TURN  OFF  NUMERIC  INDICATOR
                  * IF  STATUS  INT.  GO  TO  MEMORY-MODIFY  FOR  ANY  TEST  #
0057  F1AE          IF  NOT  URQ  SKIP.          CONSOLE  URQ  TEST
0058  4295          MPCR  = MEMORY-MODIFY  - 1.
                  *
                TENSLOOPCHECK.
                  * TEST  TENS  DIGIT  FOR  0  THRU  9
0059  E00A          LIT   = 10.
005A  F032          A2  = A3.
005B  F11B          A2  - LIT.
005C  F0B7          IF  NOT  AOV  SKIP.
005D  40AE          MPCR  = INVALIDTEST  - 1.
                  * TEST  ONES  DIGIT  FOR  0  THRU  9
005E  F033          A2  = B.
005F  F11B          A2  - LIT.
0060  F0B7          IF  NOT  AOV  SKIP.
0061  40AE          MPCR  = INVALIDTEST  - 1.
                  *
                TENSLOOP.
0062  F04B          A3  = A3  - 1.
0063  E00A          LIT   = 10.
0064  F09E          IF  AOV  SKIP.
0065  4067          MPCR  = ENDTENSLOOP  - 1.
0066  F083          B  = LIT  + B.
0067  4061          MPCR  = TENSLOOP  - 1.

                ENDTENSLOOP.
0068  F017          A1  = B.                SAVE  TEST  NUMBER
                  * INSURE  THAT  TEST  NUMBER  IS  NOT  GREATER  THAN  THE  UPPER
                  * LIMIT  FOR  THIS  MTR  (SEE  DEFINE  TESTNUMBERLIMIT)
0069  E009          LIT   = TESTNUMBERLIMIT.
006A  F109          A1  - LIT  - 1.
006B  F0B7          IF  NOT  AOV  SKIP.
006C  40AE          MPCR  = INVALIDTEST  - 1.  ILLEGAL  TEST  NUMBER
                  *
                  * DISPLAY  TEST  NUMBER  IN  A  INDICATORS
006D  F082          B  = LIT  L.
006E  C890          SAR   = 8  LIT  = @90@.
006F  F0DC          MIR   = A1  + B.
0070  F098          DW2.
                  * DISABLE  SYSTEM  CONTROLLER  (SPO  OR  CONSOLE)
0071  F0E6          MIR   = 0.
0072  F099          DW1.
                  * INSURE  THAT  BOTH  STATUS  AND  DATA  INTERRUPTS  FROM  SPO-
                  * OR  CONSOLE  ARE  CLEARED  BEFORE  JUMPING  TO  MTR
0073  F096          DR1  BEX.          RESET  STATUS  INTERRUPT
0074  F097          DR2  BEX.          RESET  DATA  INTERRUPT
                  *
0075  812F          CPCR  = SETPORTADDR  - 1.  BR1  = INST.  BR2  = DATA
0076  0419          AMPCR  = TESTTABLE  - 1.
0077  F100          AMPCR  = A1  + AMPCR.
0078  F05F          B.
0079  F0C9          JUMP.
                / SUBROUTINES
                  * LOOP  USED  TO  METER  PIN  2K  (TP  92)  ON  CON1  CARD
                CON1LOOP.
007A  F17D          DLD.
007B  F0F9          WHEN  RDC  BEX.
007C  4079          MPCR  = CON1LOOP  - 1.
                  *
                TESTSPO-CONSOLE.
007D  C001          SAR   = 0  LIT   = 1.  SPO-CONSOLE  FLAG  (1  = SPO)
007E  41F8          MPCR  = TESTFLAGW1  - 1.
                  *                .
                  *
                SPOPORTSELECTP.
                  * ENTER  HERE  TO  PRINT  SELECT  PORT  MESSAGE
007F  80DA          CPCR  = SPOPRINT  - 1.
0080  01CE          AMPCR  = PORTPRINT.
                SPOPORTSELECT.
                  * ENTER  HERE  TO  AVOID  PRINTING
0081  8117          CPCR  = SETCONTADDRS  - 1.
0082  F0E7          MIR   = B001.
0083  F099          DW1.              ENABLE  SPO  INPUT
                  * SELECT  PORT  #  PER  NUMERIC  KEYS  (01  THRU  12)
0084  8005          CPCR  = SELECTPORT  - 1.        FOR  TENS  DIGIT
0085  F017          A1  = B.                        SAVE  TENS  DIGIT
0086  8005          CPCR  = SELECTPORT  - 1.        FOR  ONES  DIGIT
                  *       ONES  DIGIT  IS  IN  B
                  * OPERATOR  ENTERS  PORT  NUMBER  (1  THROUGH  12)
0087  F0E6          MIR   = 0.
0088  F099          DW1.              DISABLE  SPO  INPUT
                  * TEST  TENS  DIGIT  FOR  0  OR  1
0089  E001          LIT   = 1.
008A  F109          A1  - LIT  - 1.
008B  F0B7          IF  NOT  AOV  SKIP.
008C  4147          MPCR  = INVALIDPORT  - 1.       TENS  DIGIT  > 1
                  * TEST  ONES  DIGIT  FOR  0  THRU  9
008D  E00A          LIT   = 10.
008E  F033          A2  = B.                        ONES  DIGIT  IN  A2
008F  F11B          A2  - LIT.
0090  F0B7          IF  NOT  AOV  SKIP.
0091  4147          MPCR  = INVALIDPORT  - 1.       ONES  DIGIT  > 9
                  *
0092  E00A          LIT   = 10.
0093  F066          B  = A1.
```

```
0094  F0C3        IF  NOT LST  SKIP.
0095  F029        A2  = A2  + LIT.
0096  F068        B  = A2.                    PORT  ADDRESS  IN  B
                * SUBSTRACT  1  FROM PORT  NUMBER TO  GET  PORT  ADDRESS
0097  F162        B  = 0  -  B.
0098  F163        B  = 0  -  B  -  1.
0099  803E        CPCR  =  STOREPORT  -  1.
                *
                SPOTESTSELECTP.
009A  80DA        CPCR  =  SPOPRINT  -  1.      PRINT  SELECT  TEST  MESSAGE
009B  01D2        AMPCR  =  TESTPRINT.          ADDRESS  OF  MESSAGE
                *
                SPOTESTSELECT.
                * ENTRY  POINT  FOR  NO PRINTING
009C  8117        CPCR  =  SETCONTADDRS  -  1.
009D  F0E7        MIR  =  B001.
009E  F099        DW1.              ENABLE  SPO  INPUT
                * SELECT  TEST  #  PER  NUMERIC  KEYS  (00  THRU  99)
009F  8007        CPCR  =  SELECTTEST  -  1.          FOR  TENS  DIGIT
00A0  F051        A3  =  B.                           SAVE  TENS  DIGIT
00A1  8007        CPCR  =  SELECTTEST  -  1.          FOR  ONES  DIGIT
                *       ONES  DIGIT  IN  B
00A2  F0E6        MIR  =  0.
00A3  F099        DW1.              DISABLE  SPO  INPUT
00A4  F033        A2  =  B.         SAVE  ONES  DIGIT
                *  IF  STINT  GO TO  SPO  MEMORY MODIFY
00A5  F1B5        IF  URQ  SKIP.
00A6  40A8        MPCR  =  CSPACEP  -  1.
                *
00A7  F096        DR1  BEX.         RESET  STINT
00A8  4396        MPCR  =  SPO-MEM-MOD  -  1.
                *
                CSPACEP.
00A9  80DA        CPCR  =  SPOPRINT  -  1.      SPACE  AFTER  TESTNUMBER
00AA  00AE        AMPCR  =  SPACEPRINT.         ADDRESS  OF  PRINT  MESSAGE
00AB  8117        CPCR  =  SETCONTADDRS  -  1.
00AC  F068        B  =  A2.         ONES  DIGIT  TO  B.
00AD  4058        MPCR  =  TENSLOOPCHECK  -  1.
                *
                SPACEPRINT.
00AE  2080        CNST  =  @2080@.          -  STOP
                *
                INVALIDTEST.
00AF  80B7        CPCR  =  ALARM  -  1.         SOUND  BELL
00B0  4045        MPCR  =  TESTSELECT  -  1.
                *
                /
                INDICATE-ERROR.
                * SPO  SYSTEMS-  SOUND  ALARM
                * CONSOLE  SYSTEMS-  SOUND  ALARM  AND  TURN  ERROR  LIGHT  ON
                *
00B1  F0DA        MIR  =  AMPCR.
00B2  F05F        B.
00B3  815D        CPCR  =  STACK  -  1.  SAVE  AMPCR,  A1,  A2,  A3
                * SET  FLAG  1  IN  FLAG  WORD  1  TO  1  TO  INDICATE  ERROR
00B4  C101        SAR  =  1  LIT  =  1.
00B5  81D5        CPCR  =  SETFLAGW1  -  1.
00B6  80B7        CPCR  =  ALARM  -  1.         SOUND  ALARM
00B7  417F        MPCR  =  UNSTACKRESTOREA  -  1.  RETURN  TO  MTR
                *
                ALARM.
                *
00B8  F0DA        MIR  =  AMPCR.
00B9  F05F        B.
00BA  815D        CPCR  =  STACK  -  1.
00BB  8117        CPCR  =  SETCONTADDRS  -  1.
00BC  807C        CPCR  =  TESTSPO-CONSOLE  -  1.
00BD  40CE        MPCR  =  SPOALARM  -  1.      SPO  ON  SYSTEM
                * CONSOLE  ON  SYSTEM
00BE  E008        LIT  =  @08@.
00BF  F0EA        MIR  =  LIT.
00C0  F099        DW1.
00C1  C207        SAR  =  2  LIT  =  7.
00C2  F089        B  =  LIT.
00C3  F0E2        MIR  =  B  C.     ALARM  DATA  WORD  FOR  CONSOLE
00C4  F0FC        WHEN SRQ  STEP.
00C5  F098        DW2.
00C6  F05F        B.
00C7  F0FC        WHEN SRQ  STEP.
                * TURN ERROR  LIGHT  ON,  IF  ERROR  FLAG  IS  ON
00C8  C100        SAR  =  1  LIT  =  0.
00C9  81F8        CPCR  =  TESTFLAGW1  -  1.
00CA  40D6        MPCR  =  CALARM  -  1.          ERROR  FLAG  IS  OFF
                * ERROR  FLAG  IS  ON
00CB  812D        CPCR  =  LITEINDS  -  1.
00CC  E004        LIT  =  @04@.             ERROR  LIGHT
00CD  40D6        MPCR  =  CALARM  -  1.
                *
00CE  40D6        MPCR  =  CALARM  -  1.
                *
                SPOALARM.      SPO  ON  SYSTEM
00CF  F1D5        MIR  =  B001  +  1.       ENABLE  OUTPUT
00D0  F099        DW1.
00D1  F0EA        MIR  =  LIT.
00D2  E007        LIT  =  @07@.     RING  BELL
00D3  F0FC        WHEN SRQ  STEP.
00D4  F098        DW2.
00D5  F05F        B.
00D6  F0FC        WHEN SRQ  STEP.
                *
                CALARM.
00D7  F0E6        MIR  =  0.          DISABLE  SPO  OR  CONSOLE
00D8  F099        DW1.
00D9  812F        CPCR  =  SETPORTADDR  -  1.  BR1  =  INST.  BR2  =  DATA
00DA  417F        MPCR  =  UNSTACKRESTOREA  -  1.  RETURN
                *
                *
                *
                SPOPRINT.
                * SPO  PRINT  FROM  MEMORY
                *
00DB  F0DA        MIR  =  AMPCR.
00DC  F05F        B.
00DD  815D        CPCR  =  STACK  -  1.          STACK  AMPCR  AND  A  REGISTERS
00DE  8117        CPCR  =  SETCONTADDRS  -  1.       SELECT  SPO
00DF  81C2        CPCR  =  RDSTACKAMPCRTOB  -  1.
00E0  F05B        AMPCR  =  B.      RETURN  AMPCR  FOR  EXEC
00E1  F05F        B.
00E2  F09A        EXEC.     ADDRESS  OF  MESSAGE  TO  AMPCR
00E3  F0EA        MIR  =  LIT.
00E4  C802        SAR  =  8  LIT  =  @02@.
00E5  F099        DW1.                          ENABLE  SPO  PRINTER
                SPOREADY.
00E6  F096        DR1  BEX.                 READ  SPO  STATUS
00E7  F05F        B.
00E8  F0C3        IF  NOT LST  SKIP.        CHECK  FOR  READY
00E9  40E5        MPCR  =  SPOREADY  -  1.
                *
00EA  F0CF        MAR1  =  AMPCR.           BR1  =  ADDRESS  OF  MESSAGE
                SPOFETCH.
00EB  F0F1        MR1.
00EC  F0FA        WHEN RDC  BEX  MAR1  =  BMAR  +  1.
00ED  F07D        B  =  B  C.
00EE  F0C4        IF  NOT MST  SKIP.            MST  =  STOP  CODE
00EF  40F9        MPCR  =  SPOSTOP  -  1.       END  PRINT
00F0  F0FC        WHEN SRQ  STEP.           WAIT  FOR  PRINTER  INTERRUPT
00F1  F0E1        MIR  =  B.
00F2  F098        DW2.                      WRITE  FIRST  CHARACTER
```

```
00F3  F07D        B = B C.
00F4  F0C4        IF NOT MST SKIP.              MST = STOP CODE
00F5  40F9        MPCR = SPOSTOP - 1.           END PRINT
00F6  F0E1        MIR = B.
00F7  F0FC        WHEN SRQ STEP.          WAIT FOR PRINTER INTERRUPT
00F8  F098        DW2.                    WRITE SECOND CHARACTER
00F9  40EA        MPCR = SPOFETCH - 1.
                *
              SPOSTOP.
00FA  F0FC        WHEN SRQ STEP.          WAIT FOR LAST CHARACTER TO PRINT
00FB  81E2        CPCR = RSTBR1 - 1.      RESTORE BR1
00FC  F096        DR1 BEX.                RESET STINT
00FD  F0E6        MIR = B000. -
00FE  F099        DW1.                    DISABLE SPO OUTPUT
00FF  812F        CPCR = SETPORTADDR - 1. RESTORE DEVICE PORT ADDRS
0100  417F        MPCR = UNSTACKRESTOREA - 1. RETURN
                *
              CLEARFLAGS.
0101  F023        A2 = AMPCR.             SAVE RETURN
0102  F0E6        MIR = 0.
0103  F0CF        MAR1 = AMPCR.
0104  014C        AMPCR = PORTADDRESS.
0105  F0F3        MW1.                    CLEAR PORT ADDRESS
0106  F0CF        MAR1 = AMPCR.
0107  0214        AMPCR = MEMFLAGW1.
0108  F0F3        MW1.                    CLEAR MEMORY FLAG WORD 1
0109  F102        AMPCR = A2.             RESTORE RETURN
              CLEARFW2-3-4.
010A  F023        A2 = AMPCR.             SAVE RETURN
010B  F0E6        MIR = 0.
010C  F0CF        MAR1 = AMPCR.
010D  0215        AMPCR = MEMFLAGW2.
010E  F0F3        MW1.                    CLEAR MEMORY FLAG WORD 2
010F  F0CF        MAR1 = AMPCR.
0110  0216        AMPCR = MEMFLAGW3.
0111  F0F3         MW1.                    CLEAR MEMORY FLAG WORD 3
0112  F0CF        MAR1 = AMPCR.
0113  0217        AMPCR = MEMFLAGW4.
0114  F0F3        MW1.                    CLEAR MEMORY FLAG WORD 4
0115  F102        AMPCR = A2.             RESTORE RETURN
0116  F05F        B.
0117  F0C9        JUMP.
                *
              SETCONTADDRS.
0118  F060        B = AMPCR.              SAVE RETURN
0119  F0CF        MAR1 = AMPCR.
011A  014D        AMPCR = CONTPORTADDRESS.
011B  F05B        AMPCR = B.              RESTORE RETURN
011C  D800        SAR = 8.
011D  F0F1        MR1.
011E  F0F9        WHEN RDC BEX.           CONTROLLER ADDRESS TO B
011F  F07F        B = B R.
0120  F07C        B = B L.          CLEAR ALL BITS EXCEPT 5,6,7,8
0121  F078        B = B0TT.
0122  F16E        BR2 = B.                BR2 = 0000XXXX DATA
0123  F07A        B = B1TT.
0124  F0D5        MAR1 = B.               BR1 = 1000XXXX INSTRUCTION
0125  F0C9        JUMP.
                *
              LITEINDA.                     LIGHT A INDICATORS
0126  E06F        LIT = @6F@.
0127  F0CA        LCTR.
0128  F09A        EXEC.                   LOAD VARIABLE LIT
0129  F0EF        MIR = Z.
012A  F098        DW2.
012B  F0C9        JUMP.
              LITEINDB.                     LIGHT B INDICATORS
012C  E077        LIT = @77@.
012D  4126        MPCR = LITEINDA.
              LITEINDS.                     LIGHT S INDICATORS
012E  E07E        LIT = @7E@.
012F  4126        MPCR = LITEINDA.
                *
              SETPORTADDR.
0130  F060        B = AMPCR.              SAVE RETURN
0131  F0CF        MAR1 = AMPCR.
0132  014C        AMPCR = PORTADDRESS.
0133  F05B        AMPCR = B.              RESTORE RETURN
0134  F0F1        MR1.
0135  F0F9        WHEN RDC BEX.           PORT ADDRESS TO B
0136  F16E        BR2 = B.          BR2 FOR DATA
0137  F07A        B = B1TT.
0138  F0D5        MAR1 = B.         BR1 FOR INSTRUCTION
0139  F0C9        JUMP.
                *
                *
              CSAVEPORT.                    SAVE PORT ADDRESS (DATA IN B)
              * TEST PORT ADDRESS FOR PORT 12 OR LESS
013A  E00B        LIT = 11.
013B  F017        A1 = B.
013C  F109        A1 - LIT - 1.
013D  F0B7        IF NOT AOV SKIP.
013E  4147        MPCR = INVALIDPORT - 1.       PORT ADDRESS > 12
              * CLEAR ALL BITS EXCEPT 5,6,7,8
013F  F07C        B = B L.
0140  D400        SAR = 4.
0141  F0E5        MIR = B R.
0142  F060        B = AMPCR.      SAVE RETURN
0143  F0CF        MAR1 = AMPCR.
0144  014C        AMPCR = PORTADDRESS.
0145  F05B        AMPCR = B.      RESTORE RETURN
0146  F0F3        MW1.
0147  F0C9        JUMP.
                *
              INVALIDPORT.
                *
0148  80B7        CPCR = ALARM - 1.       SOUND BELL
                *
0149  807C        CPCR = TESTSPO-CONSOLE - 1.
014A  4080        MPCR = SPOPORTSELECT - 1.
014B  4030        MPCR = CONSPORTSELECT - 1.
              PORTADDRESS.
014C  0000        CNST = @0000@.
              CONTPORTADDRESS.
014D  0000        CNST = @0000@.
                *
              BUSSTEST.                 EXTERNAL BUSS TEST
014E  F0F9        WHEN RDC BEX.
014F  F0FF        0 EQV B.
0150  F09C        IF ABT JUMP.
0151  F0DA        MIR = AMPCR.
0152  F000        WAIT.
              *********OBSERVE      MIR
              *********GO      TO INCREMENTER ADDRESS DISPLAYED IN MIR
0153  F0E1        MIR = B.
0154  F000        WAIT.
0155  7FFF        MPCR = STARTCONTROLLER - 1.
                *
              BUSSTEST1.                    EXTERNAL BUSS TEST
0156  F0F9        WHEN RDC BEX.
0157  F0FF        0 EQV B.
0158  F09C        IF ABT JUMP.
0159  F0E1        MIR = B.
015A  F000        WAIT.
              *********EXTERNAL      BUSS FAILURE OR PARITY ERROR
              *********ERROR      # E1
015B  F0DA        MIR = AMPCR.
015C  F000        WAIT.
015D  7FFF        MPCR = STARTCONTROLLER - 1.
```

```
                    /
                     STACK.
                    *UNCONDITIONAL   SAVE A1,  A2,  A3,  AMPCR IN MEMORY STACK
                    *DISTROYS   - B,  SAR,  LIT,  MIR
                    *ASSUMES  BR1,  BR2 DIFFER  BY INST  BIT  ONLY
015E  F079              B = B100.
015F  D300              SAR = 3.
0160  F07F              B = B R.
0161  F0D5              MAR1 = B.              STACK POINTER = 4096
                     STACKW3.
0162  F0F1              MR1.
0163  F0F9              WHEN RDC BEX.          FETCH POINTER
0164  F083              B = LIT + B.           INCRAMENT POINTER
0165  E004              LIT = 4.
0166  F08C              BMI MIR = B.
0167  F0F3              MW1.                   RESTORE NEW POINTER
0168  F08C              BMI MIR = B.
0169  F0D5              MAR1 = B.              NEW STACK ADDRESS
016A  F0F3              MW1.                   STORE AMPCR TOP OF STACK
016B  F0DB              MIR = A1.
016C  F089              B = LIT.
016D  E003              LIT = 3.
016E  F01C              A1 = BMAR.
016F  F064              B = A1 - B.
0170  F0D5              MAR1 = B.      OLD TOP OF STACK ADDRESS + 1.
0171  F08D              BMI.
0172  F017              A1 = B.        RESTORE A1
0173  F0F3              MW1.                   SAVE A1
0174  F0D7              MAR1 = BMAR + 1.
0175  F0DD              MIR = A2.
0176  F0F3              MW1.                   SAVE A2
0177  F0D7              MAR1 = BMAR + 1.
0178  F0DE              MIR = A3.
0179  F0F3              MW1.                   SAVE A3
017A  F05F              B.
017B  41E2              MPCR = RSTBR1 - 1.     RESTORE BR1 EXIT
                     UNSTACK.
                    *RESTORE  AMPCR FROM TOP OF MEMORY STACK
                    *A REGISTERS  REMAIN UNCHANGED
017C  818F              CPCR = STACKR - 1.
017D  F05B              AMPCR = B.             RESTORE AMPCR
017E  F05F              B.
017F  41E2              MPCR = RSTBR1 - 1.     RESTORE BR1 EXIT
                     UNSTACKRESTOREA.
                    *RESTORE  AMPCR AND A REGISTERS  FROM TOP OF STACK
0180  818F              CPCR = STACKR - 1.
0181  F05B              AMPCR = B.             RESTORE AMPCR
0182  F08D              BMI. (ADDRESS - 1) OF STORED A1
0183  F0D6              MAR1 = B + 1.
0184  F0F1              MR1.                   FETCH A1
0185  F0F9              WHEN RDC BEX.
0186  F0D7              MAR1 = BMAR + 1.
0187  F017              A1 = B.                RESTORE A1
0188  F0F1              MR1.                   FETCH A2
0189  F0F9              WHEN RDC BEX.
018A  F0D7              MAR1 = BMAR + 1.
018B  F033              A2 = B.                RESTORE A2
018C  F0F1              MR1.                   FETCH A3
018D  F0F9              WHEN RDC BEX.
018E  F051              A3 = B.                RESTORE A3
018F  41E2              MPCR = RSTBR1 - 1.     RESTORE BR1 AND EXIT
                     STACKR.
0190  F079              B = B100.
0191  D300              SAR = 3.
0192  F07F              B = B R.
0193  F0D5              MAR1 = B.              STACK POINTER = 4096
                     STACKR1.
0194  F0F1              MR1.
0195  F0F9              WHEN RDC BEX.          FETCH POINTER
0196  F0DD              MIR = A2.      SAVE A2
0197  F033              A2 = B.
0198  E004              LIT = 4.
0199  F146              B = A2 - LIT.          DECRAMENT STACK POINTER
019A  F08C              BMI, MIR = B.          EXCHANGE MIR & B
019B  F033              A2 = B.                RESTORE A2
019C  F08D              BMI.       POINTER ADDRESS TO B
019D  F0F3              MW1.                   RESTORE POINTER
019E  F083              B = LIT + B.  ADDRESS OF SAVED AMPCR TO B
                     STACKR2.
019F  F0D5              MAR1 = B.
01A0  F0F1              MR1.                   FETCH AMPCR FROM STACK
01A1  F0F9              WHEN RDC BEX.
01A2  F0C9              JUMP.
                     INITMAINSTACK.            INITIALIZE    STACK POINTER
01A3  F079              B = B100.
01A4  D300              SAR = 3.
01A5  F07F              B = B R.
01A6  F0D5              MAR1 = B.
01A7  F0E1              MIR = B.
01A8  F0F3              MW1.                   POINTER = 4096
01A9  F05F              B.
01AA  41E2              MPCR = RSTBR1 - 1.     RESTORE BR1 EXIT
                     INITFLOSTACK.             INITIALIZE    FLO POINTER
01AB  F082              B = LIT L.
01AC  C70C              SAR = 7 LIT = @0C@.
01AD  F0D5              MAR1 = B.
01AE  F0E1              MIR = B.
01AF  F0F3              MW1.           POINTER = 6144
01B0  41E2              MPCR = RSTBR1 - 1.     RESTORE BR1 EXIT
                     MARKFLOSTACK.
                    *SAVE  AMPCR FROM MAIN PROGRAM FLOW-FOR  GLOBAL RETURN
                    *ASSUMES  B,  MIR,  SAR,  LIT  CAN BE DISTROYED  AND THAT
                    *BR1,   BR2 DIFFER  BY INST  BIT  ONLY
01B1  F0DA              MIR = AMPCR.
01B2  F082              B = LIT L.
01B3  C70C              SAR = 7 LIT = @0C@.
01B4  F0D5              MAR1 = B.              FLO POINTER = 6144
01B5  4161              MPCR = STACKW3 - 1.    WRITE AMPCR TO STACK
                     FLOSTACKRDDEC.
                    *RESTORE  AMPCR FROM TOP OF FLOW STACK  AND DECRAMENT
                    *STACK  POINTER
01B6  F082              B = LIT L.
01B7  C70C              SAR = 7 LIT = @0C@.
01B8  F0D5              MAR1 = B.              FLOW STACK POINTER = 6144
01B9  8193              CPCR = STACKR1 - 1.    READ POINTER  AND AMPCR
01BA  417C              MPCR = UNSTACK.        OPTIONAL  NO A WD RESTORE
                     FLOSTACKRD.
                    *RESTORE  AMPCR FROM TOP OF FLOW STACK  WITHOUT
                    *DECRAMENTING  FLOW STACK  POINTER.
01BB  F082              B = LIT L.
01BC  C70C              SAR = 7 LIT = @0C@.
01BD  F0D5              MAR1 = B.              FLO STACK POINTER = 6144
01BE  F0F1              MR1.
01BF  F0F9              WHEN RDC BEX.          FETCH POINTER
01C0  F05F              B.
01C1  819E              CPCR = STACKR2 - 1.    READ TOP OF STACK
01C2  417C              MPCR = UNSTACK.        OPTIONAL  NO A WD RESTORE
                     RDSTACKAMPCRTOB.
                    *READ  TOP AMPCR IN  STACK  TO B REG - USE FOR
                    *NESTED  EXEC.
01C3  F079              B = B100.
01C4  D300              SAR = 3.
01C5  F07F              B = B R.
01C6  F0D5              MAR1 = B.              POINTER ADDRESS = 4096
01C7  F0F1              MR1.                   FETCH POINTER
01C8  F0F9              WHEN RDC BEX.
01C9  F0D5              MAR1 = B.              TOP OF STACK ADDRESS
01CA  F0F1              MR1.
01CB  F0F9              WHEN RDC BEX.          B = AMPCR FROM STACK
01CC  F05F              B.
01CD  41E2              MPCR = RSTBR1 - 1.     RESTORE BR1 EXIT
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                    PORTPRINT.
01CE  0D0A              CNST  = @0D0A@.              CR  LF
01CF  504F              CNST  = @504F@.        PO
01D0  5254              CNST  = @5254@.        RT
01D1  2080              CNST  = @2080@.        - STOP
                    TESTPRINT.
01D2  0D0A              CNST  = @0D0A@.              CRLF
01D3  5445              CNST  = @5445@.        TE
01D4  5354              CNST  = @5354@.        ST
01D5  2080              CNST  = @2080@.        - STOP
                    /
                    * TEST  FLAG  AND  SET  FLAG  ROUTINES
                    *
                    SETFLAGW1.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01D6  F060              B = AMPCR.      SAVE  RETURN
01D7  F0CF              MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 1  TO  MAR1
01D8  0214              AMPCR = MEMFLAGW1.
                    *
                    SETFLAGS.               COMMON POINT  TO  SETFLAGW1-2-3-4
01D9  F0F1              MR1.
01DA  F05B              AMPCR = B.      RESTORE  RETURN
01DB  F0F9              WHEN RDC  BEX.          FLAG  WORD  TO  B
01DC  F092              CSAR.           CHANGE  VALUE  TO  SHIFT  FLAG  TO  LSB
01DD  F172              CSAR  B = B C.          MOVE  FLAG  IN  B  TO  LSB
01DE  F075              B = BTT0.
01DF  F087              B = LIT  OR  B.         SET  FLAG  PER  LIT
01E0  F07D              B = B C.        SHIFT  FLAGS  BACK  TO  POSITION
01E1  F0E1              MIR = B.        MODIFIED  FLAG  WORD  TO  MIR
01E2  F0F3              MW1.            FLAG  WORD  TO  MEMORY
                    *
                    RESTORE-BR1.
                    RSTBR1.                 COMMON POINT  FROM  ABOVE  AND -
                    *                       AND TESTFLAGW1-2-3-4
01E3  F0E1              MIR = B.                SAVE  B
01E4  F05D              ASE.            SELECT  BR2
01E5  F080              B = BMAR.
                    * GENERATE  NEW BR1   (MSB  INST-DATA   SET  OPPOSITE   BR2)
01E6  F159              B = BFTF.
01E7  D800              SAR = 8.
01E8  F07F              B = B R.
01E9  F07C              B = B L.        CLEAR  MAR (DO  NOT  USE  LIT  HERE)
01EA  F0D5              MAR1 = B.
01EB  F08D              BMI.                    RESTORE  B
01EC  F0C9              JUMP.           RETURN
                    *
                    SETFLAGW2.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01ED  F060              B = AMPCR.      SAVE  RETURN
01EE  F0CF              MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 2  TO  MAR1
01EF  0215              AMPCR = MEMFLAGW2.
01F0  41D8              MPCR = SETFLAGS  - 1.
                    *
                    SETFLAGW3.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01F1  F060              B = AMPCR.      SAVE  RETURN
01F2  F0CF              MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 3  TO  MAR1
01F3  0216              AMPCR = MEMFLAGW3.
01F4  41D8              MPCR = SETFLAGS  - 1.
                    *
                    SETFLAGW4.              FLAG  NO.  IN  SAR,  STATE  IN  LIT
01F5  F060              B = AMPCR.      SAVE  RETURN
01F6  F0CF              MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 4  TO  MAR1
01F7  0217              AMPCR = MEMFLAGW4.
01F8  41D8              MPCR = SETFLAGS  - 1.
                    *
                    TESTFLAGW1.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
01F9  F060              B = AMPCR.      SAVE  RETURN
01FA  F0CF              MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 1  TO  MAR1
01FB  0214              AMPCR = MEMFLAGW1.
                    *
                    TESTFLAGS.              COMMON POINT  TO  TESTFLAGW1-2-3-4
01FC  F0F1              MR1.
01FD  F05B              AMPCR = B.      RESTORE  RETURN
01FE  F0F9              WHEN RDC  BEX.          FLAG  WORD  TO  B
01FF  F092              CSAR.
0200  F07F              B = B R.        SHIFT  FLAG  TO  LSB
0201  F157              B = BT0T.
0202  F078              B = B0TT.
0203  F05F              B.
0204  F0CB              LIT  EQV  B.
0205  F09D              IF  ABT  SKIP.
0206  F105              AMPCR = AMPCR + 1.      SET  AMPCR  FOR  FALSE  RETURN
0207  41E2              MPCR = RSTBR1  - 1.
                    *
                    TESTFLAGW2.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
0208  F060              B = AMPCR.      SAVE  RETURN
0209  F0CF              MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 2  TO  MAR1
020A  0215              AMPCR = MEMFLAGW2.
020B  41FB              MPCR = TESTFLAGS  - 1.
                    *
                    TESTFLAGW3.             FLAG  NO.  IN  SAR,  STATE  IN  LIT
020C  F060              B = AMPCR.      SAVE  RETURN
020D  F0CF              MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 3  TO  MAR1
020E  0216              AMPCR = MEMFLAGW3.
020F  41FB              MPCR = TESTFLAGS  - 1.
                    *
                    TESTFLAGW4.             FLAG  NQ.  IN  SAR,  STATE  IN  LIT
0210  F060              B = AMPCR.      SAVE  RETURN
0211  F0CF              MAR1 = AMPCR.           ADDRESS  OF  FLAG  WORD 4  TO  MAR11
0212  0217              AMPCR = MEMFLAGW4.
0213  41FB              MPCR = TESTFLAGS  - 1.
                    *
                    * MEMORY WORDS FOR PROGRAM FLAGS
                    MEMFLAGW1.
0214  0000              CNST  = @0000@.         FLAGS  1  THRU  16  OF  WORD 1
                    MEMFLAGW2.
0215  0000              CNST  = @0000@.         FLAGS  1  THRU  16  OF  WORD 2
                    MEMFLAGW3.
0216  0000              CNST  = @0000@.         FLAGS  1  THRU  16  OF  WORD 3
                    MEMFLAGW4.
0217  0000              CNST  = @0000@.         FLAGS  1  THRU  16  OF  WORD 4
                    * END OF FLAG ROUTINES
                    *
                    READDATAKEYTOA1.
                    * SUB-ROUTINE   TO READ 1 DATA CHARACTER FROM SPO OR -
                    *  CONSOLE  AND RETURN WITH CHARACTER  IN  A1
                    *  A2  AND A3  ARE SAVED
                    *  ALL  OTHER  REGISTERS   ARE DESTROYED
                    *
0218  F0DA              MIR = AMPCR.
0219  F05F              B.
021A  815D              CPCR = STACK - 1.  SAVE  AMPCR  FOR  RETURN
021B  8117              CPCR = SETCONTADDRS  - 1.
021C  807C              CPCR = TESTSPO-CONSOLE    - 1.
021D  422F              MPCR = SPOKEY  - 1.       SPO  ON  SYSTEM
                    *
                    * CONSOLE  ON SYSTEM
021E  F1D5              MIR = B001  + 1.        ENABLE  KEYBOARD
021F  F099              DW1.
0220  812D              CPCR = LITEINDS  - 1.
0221  E008              LIT  = 8.       LIGHT  NUMERIC  INDICATOR
0222  F0FC              WHEN SRQ  STEP.
0223  F097              DR2  BEX.
0224  F017              A1  = B.        SAVE  DATA  CHARACTER  IN  A1.
0225  F19E              IF  NOT GC1  STEP  ELSE  SKIP.
0226  F009              A1  = A1  AND LIT.      USE  ONLY  LOWER  DIGIT
0227  E00F              LIT  = @0F@.
                    * DISPLAY  LOWER  DIGIT  IN  B INDICATORS
0228  F082              B = LIT  L .
0229  C888              SAR = 8  LIT  = @88@.
022A  F0DC              MIR = A1  + B.
022B  F098              DW2.
022C  812D              CPCR = LITEINDS  - 1.
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022D  E000          LIT  = 0.          TURN NUMERIC INDICATOR OFF
022E  812F          CPCR = SETPORTADDR - 1.      RESTORE BR1 AND BR2.
022F  817B          CPCR = UNSTACK - 1.
                  SPOKEY.          SPO ON SYSTEM
0230  F0E7          MIR  = B001.
0231  F099          DW1.          ENABLE SPO INPUT
0232  F05F          B.            ALLOW TIME FOR SPO SRQ.
0233  F0FC          WHEN SRQ STEP.
0234  F097          DR2 BEX.
0235  F017          A1 = B.          SAVE DATA CHARACTER IN A1
0236  F19E          IF NOT GC1 STEP ELSE SKIP.
0237  873D          CPCR = NUMERICONV - 1.
                  *
                  EXITDKEY.
0238  F05F          B.
0239  F05F          B.
023A  812F          CPCR = SETPORTADDR - 1.          RESTORE BR1 AND BR2
023B  817B          CPCR = UNSTACK - 1.          RETURN (CHARACTER IN A1)
                  *
                  / SIMULATED REGISTERS     SIMREG1,    SIMREG2,    SIMREG3
                  ZROSREG1.
023C  F0E6          MIR  = B000.
                  WRSREG1.
023D  F060          B = AMPCR.
023E  F0CF          MAR1 = AMPCR.,
023F  027B          AMPCR = SIMREG1.
                  ZROSREG1A.
0240  F05B          AMPCR = B.
0241  F0F3          MW1.
0242  F05F          B.
0243  4266          MPCR = INCSREG1A  - 1.
                  ZROSREG2.
0244  F0E6          MIR  = B000.
                  WRSREG2.
0245  F060          B = AMPCR.
0246  F0CF          MAR1 = AMPCR.
0247  027C          AMPCR = SIMREG2.
0248  423F          MPCR = ZROSREG1A  - 1.
                  ZROSREG3.
0249  F0E6          MIR  = B000.
                  WRSREG3.
024A  F060          B = AMPCR.
024B  F0CF          MAR1 = AMPCR.
024C  027D          AMPCR = SIMREG3.
024D  423F          MPCR = ZROSREG1A  - 1.
                  RDSREG1.
024E  F060          B = AMPCR.
024F  F0CF          MAR1 = AMPCR.
0250  027B          AMPCR = SIMREG1.
                  RDSREG1A.
0251  F05B          AMPCR = B.
0252  F0F1          MR1.
0253  F0F9          WHEN RDC BEX.
0254  F0E1          MIR  = B.
0255  4266          MPCR = INCSREG1A  - 1.
                  RDSREG2.
0256  F060          B = AMPCR.
0257  F0CF          MAR1 = AMPCR.
0258  027C          AMPCR = SIMREG2.
0259  4250          MPCR = RDSREG1A  - 1.
                  RDSREG3.
025A  F060          B = AMPCR.
025B  F0CF          MAR1 = AMPCR.
025C  027D          AMPCR = SIMREG3.
025D  4250          MPCR = RDSREG1A  - 1.
                  INCSREG1.
025E  F060          B = AMPCR.
025F  F0CF          MAR1 = AMPCR.
0260  027B          AMPCR = SIMREG1.
                  INCSREG1B.
0261  F05B          AMPCR = B.
0262  F0F1          MR1.
0263  F0F9          WHEN RDC BEX.
0264  F07E          B = B + 1.
0265  F0E1          MIR  = B.
0266  F0F3          MW1.
                  INCSREG1A.
0267  41E2          MPCR = RESTORE-BR1  - 1.
                  INCSREG2.
0268  F060          B = AMPCR.
0269  F0CF          MAR1 = AMPCR.
026A  027C          AMPCR = SIMREG2.
026B  4260          MPCR = INCSREG1B  - 1.
                  INCSREG3.
026C  F060          B = AMPCR.
026D  F0CF          MAR1 = AMPCR.
026E  027D          AMPCR = SIMREG3.
026F  4260          MPCR = INCSREG1B  - 1.
                  DECSREG2.
0270  F060          B = AMPCR.
0271  F0CF          MAR1 = AMPCR.
0272  027C          AMPCR = SIMREG2.
0273  F05B          AMPCR = B.
0274  F0F1          MR1.
0275  F0F9          WHEN RDC BEX.
0276  F162          B = 0 - B.
0277  F163          B = 0 - B - 1.
0278  F0E1          MIR  = B.
0279  F0F3          MW1.
027A  4266          MPCR = INCSREG1A  - 1.
                  SIMREG1.
027B  0000          CNST = @0000@.
                  SIMREG2.
027C  0000          CNST = @0000@.
                  SIMREG3.
027D  0000          CNST = @0000@.
                  SET-CONT-DINT.
                  * SET CONTROLLER DATA INTERRUPT,  RESTORE PORT ADDRESS
                  * IN BR1 AND BR2 THEN JUMP
027E  F0DA          MIR  = AMPCR.
027F  F05F          B.
0280  815D          CPCR = STACK - 1. SAVE AMPCR, A1,A2,A3    IN STACK
0281  8117          CPCR = SETCONTADDRS - 1.
0282  807C          CPCR = TESTSPO-CONSOLE    - 1.
0283  4285          MPCR = SCDINT - 1.          SPO ON SYSTEM
                  *
                  * CONSOLE ON SYSTEM
0284  E004          LIT  = @04@.     ENABLE CONSOLE PRINTER DINT
0285  F0F7          SKIP.
                  SCDINT.
0286  E002          LIT  = @02@.     ENABLE SPO OUTPUT
0287  F0EA          MIR  = LIT.
0288  F099          DW1.
0289  F0FC          WHEN SRQ STEP.
                  ********      STOP HERE IF CONTROLLER ENABLE DOES NOT CAUSE
                  *               SRQ    (NOTE-  SPO SRQ HAS BEEN USED PRIOR TO
                  *                        THIS STOP
                  *             RUN SPO OR CONSOLE MTR
                  *
                  RSCDINT.
028A  812F          CPCR = SETPORTADDR - 1.          RESTORE BR1 AND BR2
028B  417F          MPCR = UNSTACKRESTOREA  - 1.  RETURN
                  *
                  *
                  RESET-CONT-DINT.
                  *  DISABLE CONTROLLER,  RESTORE PORT ADDRESS IN BR1 AND
                  *  BR2,  THEN JUMP
028C  F0DA          MIR  = AMPCR.
028D  F05F          B.
```

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028E  815D        CPCR = STACK - 1.  SAVE AMPCR,A1,A2,A3      IN STACK
028F  8117        CPCR = SETCONTADDRS - 1.
0290  F0E6        MIR = 0.
0291  F099        DW1.
0292  F05F        B.
0293  4289        MPCR = RSCDINT - 1.
                  *
                  /
                  MEM-MOD-SETLC3.      SET WRITE-BEFORE-READ     FLAG
                  *  JUMP TO ABOVE LABEL FROM UPPER CASE RESET KEY CODE
                  *  ALLOWS WRITE-BEFORE-READ     OF FIRST ADDRESS
0294  F01A        SET LC3.
0295  F0F7        SKIP.
                  TEST-0.
                  MEMORY-MODIFY.
0296  F0AD        IF LC3 STEP,
0297  F01F        RESET GC2.
0298  F0A9        IF LC2 STEP.
0299  8117        CPCR = SETCONTADDRS - 1.
                  * RETURNS WITH BR1 = INSTRUCTION,    BR2 = DATA
029A  F0EA        MIR = LIT.
029B  C881        SAR = 8 LIT = @81@.
029C  F082        B = LIT L.
029D  F0EC        MIR = LIT OR B.
029E  E009        LIT =, 9.
029F  F098        DW2.
02A0  E010        LIT = @10@.
02A1  F099        DW1.
02A2  F082        B = LIT L.
02A3  C803        SAR = 8,   LIT = @03@.
02A4  F0E1        MIR = B.
02A5  F0FC        WHEN SRQ STEP.
02A6  F098        DW2.                                        READY THE R
02A7  F0EA        MIR = LIT.
02A8  E008        LIT = @08@.
02A9  F0FC        WHEN SRQ STEP.
02AA  F099        DW1.
02AB  F082        B = LIT L.
02AC  E0C0        LIT = @C0@.
02AD  F0ED        MIR = LIT + B.
02AE  E004        LIT = @04@.
02AF  F0FC        WHEN SRQ STEP.
02B0  F098        DW2.
02B1  034F        AMPCR = MM-POSITION - 1.
02B2  F01D        A1 = LIT.
02B3  E00A        LIT = @0A@.
02B4  F091        CALL.                                       POSITION RIG
                  MM-LIST-NEXT.
02B5  033E        AMPCR = MM-ADVANCE - 1.
02B6  F091        CALL.                                       ADVANCE 1 L E
02B7  F018        SET LC1.
02B8  F019        SET LC2.
02B9  F0CA        LCTR.
02BA  E003        LIT = @03@.
02BB  02ED        AMPCR = MM-KYBD - 1.
02BC  F091        CALL.                                       ACCEPT AND P N
02BD  F0D1        MAR1 = A2.
02BE  F0E7        MIR = B001.
02BF  F0AF        IF LC3 SET LC3 ELSE SKIP.
02C0  F0F3        MW1.     WRITE BEFORE TO PREVENT PE.
                  *  DELAY REQUIRED HERE FOR WRITE BEFORE READ ON 711
02C1  F0F1        MR1.
02C2  F0F9        WHEN RDC BEX.                               GET THE CONT T
02C3  F033        A2 = B.
02C4  E003        LIT = @03@.
02C5  02CD        AMPCR = MM-CONTENTS - 1.
02C6  F041        A3 = AMPCR.
02C7  F0CA        LCTR.
02C8  034F        AMPCR = MM-POSITION - 1.
02C9  F01D        A1 = LIT.
02CA  E003        LIT = @03@.
02CB  F091        CALL.
02CC  0361        AMPCR = MM-PRINT - 1.
02CD  F0C9        JUMP.                                       PRINT THE CO E
                  MM-CONTENTS.
02CE  F0CA        LCTR.
02CF  E000        LIT = @00@.
02D0  F00C        RESET GC1.
02D1  F0AD        IF LC3 STEP.        RESET WRITE-BEFORE-READ     FLAG
02D2  02D7        AMPCR = RESET-GC1LC3 - 1.  FOR RETURN FROM MM-KYBD
02D3  42ED        MPCR = MM-KYBD - 1.
                  *
                  * MM-KYBD JUMPS HERE FOR OCK I,II,III      KEYS
                  SET-LC3GC1.
02D4  F01A        SET LC3.
                  SET-GC1.
02D5  F006        SET GC1.
02D6  F0F7        SKIP.
                  SET-LC3.
02D7  F01A        SET LC3.
                  RESET-GC1LC3.
02D8  F0CA        LCTR.
02D9  E003        LIT = @03@.
02DA  034F        AMPCR = MM-POSITION - 1.
02DB  F01D        A1 = LIT.
02DC  F091        CALL.
02DD  F018        SET LC1.
02DE  02ED        AMPCR = MM-KYBD - 1.
02DF  F091        CALL.                                       ACCEPT AND P N
02E0  F0DD        MIR = A2.
02E1  F0F3        MW1.
02E2  0296        AMPCR = MEMORY-MODIFY.
02E3  F19C        IF NOT GC1 JUMP.
02E4  F019        SET LC2.                                    POS TO LEFT.
02E5  F01D        A1 = LIT.
02E6  E012        LIT = @12@.
02E7  034F        AMPCR = MM-POSITION - 1.
02E8  F0D7        MAR1 = BMAR + 1.
02E9  F035        A2 = BMAR.
02EA  F091        CALL.
02EB  02B4        AMPCR = MM-LIST-NEXT - 1.
02EC  F0F6        SET GC2.
02ED  F0C9        JUMP.
                  MM-KYBD.
02EE  F041        A3 = AMPCR.                                 SAVE RETURN D
02EF  F081        B = NOT CTR R.
02F0  D800        SAR = 8.
02F1  0361        AMPCR = MM-PRINT - 1.
02F2  F0A2        IF GC2 SKIP.
02F3  42F5        MPCR = MM-NANO-SAVE - 1.
02F4  F01F        RESET GC2.
02F5  F0C9        JUMP.
                  MM-NANO-SAVE.
02F6  F017        A1 = B.
02F7  F05D        ASE.     SELECT BR2
02F8  F080        B = BMAR.
02F9  F16F        BR2 = BITT.          BR2 = CONTROL PORT
02FA  F1DB        MIR = 0 + Z.
02FB  E002        LIT = @02@.
02FC  F098        DW2.                                        ENABLE KBD D A
02FD  F034        A2 = B000.
02FE  F05D        ASE.     SELECT BR2
02FF  F080        B = BMAR.
0300  F078        B = B0TT.
0301  F16E        BR2 = B.             BR2 = DATA PORT
                  MM-KYBD-LOOP.
0302  F0C5        IF SRQ DR2 BEX SKIP.
0303  4301        MPCR = MM-KYBD-LOOP - 1.
0304  0296        AMPCR = MEMORY-MODIFY.
0305  F0CB        LIT EQV B.
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0306  E01F          LIT  = @1F@.     RESET  KEY  LOWER  SHIFT   MECHANICAL
0307  F09B          IF  ABT  LUOP  JUMP.  RESET  KEY   START   OVER
0308  E0AB          LIT  = @AB@.     RESET  KEY  LOWER  SHIFT   ELECTRONIC
0309  F09B          IF  ABT  LUOP  JUMP.  RESET  KEY   START   OVER
030A  0293          AMPCR = MEM-MOD-SETLC3   - 1.
030B  E09F          LIT  = @9F@.     RESET  KEY  UPPER  SHIFT   MECHANICAL
030C  F09B          IF  ABT  LUOP  JUMP.
030D  E08B          LIT  = @8B@.     RESET  KEY  UPPER  SHIFT   ELECTRONIC
030E  F09B          IF  ABT  LUOP  JUMP.
030F  0390          AMPCR = MICRO-TOOL   - 1.
0310  E04C          LIT  = @4C@.          OCK  IIII    KEY  MECHANICAL
0311  F09B          IF  ABT  LUOP  JUMP.  OCK  IIII    KEY   GO  TO  END
0312  E0A0          LIT  = @A0@.          OCK  IIII    KEY  ELECTRONIC
0313  F09B          IF  ABT  LUOP  JUMP.  OCK  IIII    KEY   GO  TO  END
0314  02D3          AMPCR = SET-LC3GC1    - 1.
0315  E0CE          LIT  = @CE@.          OCK  II   UPPER  SHIFT   MECHANICAL
0316  F09B          IF  ABT  LUOP  JUMP.
0317  E083          LIT  = @83@.          OCK  II   UPPER  SHIFT   ELECTRONIC
0318  F09B          IF  ABT  LUOP  JUMP.
0319  02D4          AMPCR = SET-GC1   - 1.
031A  E04E          LIT  = @4E@.          OCK  II   LOWER  SHIFT   MECHANICAL
031B  F09B          IF  ABT  LUOP  JUMP.
031C  E0A3          LIT  = @A3@.          OCK  II   LOWER  SHIFT   ELECTRONIC
031D  F09B          IF  ABT  LUOP  JUMP.
031E  02D6          AMPCR = SET-LC3   - 1.
031F  E0CD          LIT  = @CD@.          OCK  I    UPPER  SHIFT   MECHANICAL
0320  F09B          IF  ABT  LUOP  JUMP.
0321  E081          LIT  = @81@.          OCK  I    UPPER  SHIFT   ELECTRONIC
0322  F09B          IF  ABT  LUOP  JUMP.
0323  F0E1          MIR  = B.
0324  F07F          B  = B  R.
0325  C400          SAR  = 4  LIT  = 0.
0326  032D          AMPCR = ABCDEF-KEY   - 1.
0327  E004          LIT  = @04@.     UPPER  DIGIT   FOR  ALPHA  ELECTRONIC
0328  F0CB          LIT  EQV  B.
0329  F09B          IF  ABT  LUOP  JUMP.
032A  E005          LIT  = @05@.     UPPER  DIGIT   FOR  ALPHA  MECHANICAL
032B  F09B          IF  ABT  LUOP  JUMP.
032C  E000          LIT  = 0.
032D  F0F7          SKIP.                  NUMERIC  KEY  ENTERED
      ABCDEF-KEY.                          ALPHA  KEY  ENTERED
032E  E009          LIT  = @09@.
032F  F08D          BMI.              RESTORE  B (CHARACTER   ENTERED)
0330  F083          B  = LIT  + B.  ADD 9  IF  ALPHA  KEY
0331  F086          B  = LIT   AND  B.
0332  CC0F          SAR   = 12,    LIT   = @0F@.
0333  F025          A2    =  A2   C.
0334  F031          A2    =  A2   +  B.                          CONCATENATE
0335  0301          AMPCR  =  MM-KYBD-LOOP    -  1.
0336  F030          INC.
0337  F0B9          IF  NOT  COV    JUMP.                        TEST  FOR  A
0338  F066          B   =  A1.
0339  F095          CTR   =  B.                                  RESTORE  COUN   R
033A  0361          AMPCR  =  MM-PRINT   -  1.
033B  F0A6          IF   LC1    JUMP.                            PRINT  FLAG.
033C  F101          AMPCR  =  A3.
033D  F05F          B.
033E  F0C9          JUMP.
      MM-ADVANCE.
033F  F05D          ASE.       SELECT  BR2
0340  F080          B  = BMAR.
0341  F16F          BR2  = B1TT.          BR2  = CONTROL  PORT
0342  F0EA          MIR   =  LIT.
0343  E008          LIT   =  @08@.
0344  F098          DW2.                                         ENABLE   FORM   I
0345  F082          B  = LIT  L.
0346  E0C0          LIT   =  @C0@.
0347  F0ED          MIR   =  LIT  + B.
0348  E050          LIT   =  @50@.
0349  F05D          ASE.       SELECT  BR2
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034A  F080          B  = BMAR.
034B  F078          B  = B0TT.
034C  F16E          BR2  = B.             BR2  = DATA  PORT
034D  F0FC          WHEN SRQ  STEP.
034E  F098          DW2.
034F  F0C9          JUMP.
      MM-POSITION.
0350  F05D          ASE.       SELECT  BR2
0351  F080          B  = BMAR.
0352  F16F          BR2  = B1TT.          BR2  = CONTROL  PORT
0353  F0EA          MIR   =  LIT.
0354  C810          SAR  = 8,  LIT  = @10@.
0355  F098          DW2.                                         ENABLE  CARRI
0356  E001          LIT  = @01@.                                 LEFT  POSITIO    P
0357  F015          IF  LC2  SKIP.
0358  E000          LIT  = @00@.                                 RIGHT  POSITI
0359  F082          B  = LIT  L.
035A  F0DC          MIR   =  A1.  + B.
035B  F05D          ASE.       SELECT  BR2
035C  F080          B  = BMAR.
035D  F078          B  = B0TT.
035E  F16E          BR2  = B.             BR2  = DATA  PORT
035F  F0FC          WHEN SRQ  STEP.
0360  F098          DW2.
0361  F0C9          JUMP.
      MM-PRINT.
0362  F0A5          IF  LC1   STEP.
0363  F1DB          MIR   =  0   +  Z.
0364  E004          LIT   =  @04@.
0365  F05D          ASE.       SELECT  BR2
0366  F080          B  = BMAR.
0367  F16F          BR2  = B1TT.          BR2  = CONTROL  PORT
0368  F098          DW2.                                         ENABLE  PRINT
0369  C84B          SAR  = 8,  LIT  = @4B@.
036A  F015          IF  LC2  SKIP.                               LC2  MEANS  RE   R
036B  C849          SAR  = 8,  LIT  = @49@.
036C  F089          B   =  LIT.
036D  F01B          A1  = B  L.
036E  F081          B   =  NOT  CTR  R.
036F  F07C          B   =  B   L.
0370  DE00          SAR   =  14.
0371  F05F          B.
0372  F0F4          SAR   =  B.
0373  F025          A2  =  A2  C.
0374  F05D          ASE.       SELECT  BR2
0375  F080          B  = BMAR.
0376  F078          B  = B0TT.
0377  F16E          BR2  = B.             BR2  = DATA  PORT
      MM-PRINT-LOOP.
0378  F147          B   =  A2   C.
0379  D400          SAR   =  4.
037A  F07F          B   =  B   R.
037B  DC00          SAR  = 12.                                   ISOLATE   NEXT   I
037C  F0CC          LIT   -  B.
037D  E009          LIT   =  @09@.
037E  F09E          IF  AOV  SKIP.
037F  F018          SET   LC1.                                   UNDIGIT
0380  E037          LIT   =  @37@.
0381  F014          IF   LC1   SKIP.
0382  E030          LIT   =  @30@.
0383  F083          B  = LIT  + B.                               PUT  ZONE  ON.
0384  F0DC          MIR  = A1  + B.
0385  F0FC          WHEN SRQ  STEP.
0386  F098          DW2.
0387  F030          INC.
0388  F0C5          IF  SRQ  DR2  BEX  SKIP.
0389  F101          AMPCR  =  A3.
      MM-NANO-DUMB.
038A  F0C5          IF  SRQ  DR2  BEX  SKIP.
038B  4389          MPCR = MM-NANO-DUMB  -  1.
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038C  F09F      IF   COV  JUMP.                                END  OF  PRINT
038D  F025      A2    =    A2      C.
038E  DC00      SAR  =  12.                                    LINE   UP  NEXT     I
038F  0377      AMPCR   =    MM-PRINT-LOOP      -   1.
0390  F0C9      JUMP.
          *******************************************************                     *
          MICRO-TOOL.                            PRESS   OCK   IIII
          *  MEMORY-MODIFY   USES   LC1,LC2,LC3,GC1,GC2
0391  F0AD      IF   LC3   STEP.
0392  F0A5      IF   LC1   STEP.
0393  F0A9      IF   LC2   STEP.
0394  F00C      RESET   GC1.
0395  F01F      RESET   GC2.
0396  4045      MPCR  =  TESTSELECT    -  1.
          /
          SPO-MEM-MOD.
0397  F0A9      IF   LC2   STEP.    RESET   WRITE-BEFORE-READ      FLAG
0398  8117      CPCR   =  SETCONTADDRS    -  1.
          *    RETURN  WITH  BR1   =  INST,    BR2   =  DATA
0399  F0A5      IF  LC1.
          SMM-NEW-ADDRESS.
039A  83C4      CPCR   =  SMM-ENABLE-OUT     -   1.
039B  E00D      LIT    =  @0D@.
039C  8401      CPCR   =  SMM-DEV-WT-LIT      -   1.
039D  E00A      LIT    =  @0A@.
039E  8401      CPCR   =  SMM-DEV-WT-LIT      -   1.
039F  83CC      CPCR   =  SMM-SPACE-4     -   1.
03A0  83C1      CPCR   =  SMM-ENABLE-IN      -   1.
03A1  F0A8      IF   LC1   SET   LC1   SKIP.
03A2  83D5      CPCR   =  SMM-ACCEPT-4     -   1.
03A3  83C4      CPCR   =  SMM-ENABLE-OUT     -   1.
03A4  F0BF      IF   NOT  LC1   SKIP.
03A5  83E6      CPCR   =  SMM-PRINT-4      -   1.
03A6  83CC      CPCR   =  SMM-SPACE-4      -   1.
03A7  F0D1      MAR1  =  A2.
03A8  F0E7      MIR   =  B001.
03A9  F0AB      IF   LC2   SET   LC2   ELSE   SKIP.
03AA  F0F3      MW1.       WRITE   BEFORE   READ     PREVENT   PE
          *    DELAY  REQUIRED   HERE  FOR  WRITE   BEFORE   READ  ON  711
03AB  F0F1      MR1.
03AC  F0F9      WHEN  RDC  BEX.
03AD  F033      A2   =  B.
03AE  83E6      CPCR   =  SMM-PRINT-4      -   1.
03AF  83C1      CPCR   =  SMM-ENABLE-IN      -   1.
          SMM-WHAT-TO-DO.
03B0  83FA      CPCR   =  SMM-DEV-RD    -   1.
03B1  F0CB      LIT   EQV   B.
03B2  E020      LIT    =  @20@.
03B3  03B8      AMPCR   =  SMM-NEW-CONTENT     -   1.
03B4  F09B      IF   ABT   LUOP   JUMP.
03B5  E01B      LIT    =  @1B@.
03B6  F09D      IF   ABT   SKIP.
03B7  43AF      MPCR   =  SMM-WHAT-TO-DO     -   1.
03B8  F018      SET   LC1.
          SMM-NEW-CONTENT.
03B9  83C4      CPCR   =  SMM-ENABLE-OUT     -   1.
03BA  83CC      CPCR   =  SMM-SPACE-4     -   1.
03BB  83C1      CPCR   =  SMM-ENABLE-IN      -   1.
03BC  83D5      CPCR   =  SMM-ACCEPT-4     -   1.
03BD  F0DD      MIR   =  A2.
03BE  F0F3      MW1.
03BF  F0FB      WHEN  RMI   MAR1   =  BMAR  +  1.
03C0  F035      A2   =  BMAR.
03C1  4399      MPCR   =  SMM-NEW-ADDRESS     -   1.
          SMM-ENABLE-IN.
03C2  F0FC      WHEN  SRQ   STEP.
03C3  F0E7      MIR   =  B001.
03C4  43C5      MPCR   =  SMM-SEND-CW     -   1.
          SMM-ENABLE-OUT.
03C5  F1D5      MIR   =  B001     +  1.
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          SMM-SEND-CW.
03C6  F05D      ASE.
03C7  F080      B  =  BMAR.
03C8  F16F      BR2   =  BITT.
03C9  F098      DW2.
03CA  F05F      B.
03CB  F16E      BR2   =  B.
03CC  F0C9      JUMP.
          SMM-SPACE-4.
03CD  F007      A1   =  AMPCR.
03CE  F05F      B.
03CF  F05F      B.
03D0  E020      LIT    =  @20@.
03D1  8401      CPCR   =  SMM-DEV-WT-LIT      -   1.
03D2  8402      CPCR   =  SMM-DEV-WT    -   1.
03D3  8402      CPCR   =  SMM-DEV-WT    -   1.
03D4  8402      CPCR   =  SMM-DEV-WT    -   1.
03D5  43F7      MPCR   =  SMM-JUMP-A1     -   1.
          SMM-ACCEPT-4.
03D6  F007      A1   =  AMPCR.
03D7  F0CA      LCTR.
03D8  CC02      SAR   =  12,    LIT    =  2.
03D9  F034      A2   =  B000.
          SMM-ACCEPT-LOOP.
03DA  F026      A2   =  A2   L.
03DB  83FA      CPCR   =  SMM-DEV-RD    -   1.
03DC  F0CC      LIT   -   B.
03DD  E040      LIT    =  @40@.
03DE  F09E      IF   AOV  SKIP.
03DF  F083      B   =  LIT    +  B.
03E0  E009      LIT    =  9.
03E1  F086      B  =  LIT   AND  B.
03E2  E00F      LIT    =  @0F@.
03E3  F031      A2   =  A2   +  B.
03E4  F0C8      INC  IF   COV   SKIP.
03E5  43D9      MPCR   =  SMM-ACCEPT-LOOP      -   1.
03E6  43F7      MPCR   =  SMM-JUMP-A1     -   1.
          SMM-PRINT-4.
03E7  F007      A1   =  AMPCR.
03E8  F0CA      LCTR.
03E9  CC02      SAR   =  12,    LIT    =  2.
          SMM-PRINT-LOOP.
03EA  F025      A2   =  A2   C.
03EB  F06D      B   =  A2   AND  LIT.
03EC  E00F      LIT    =  @0F@.
03ED  F0CC      LIT   -   B.
03EE  E009      LIT    =  9.
03EF  F09E      IF   AOV  SKIP.
03F0  F083      B   =  LIT    +  B.
03F1  E007      LIT    =  @07@.
03F2  F0ED      MIR   =  LIT    +  B.
03F3  E030      LIT    =  @30@.
03F4  8402      CPCR   =  SMM-DEV-WT    -   1.
03F5  F0C8      INC  IF   COV   SKIP.
03F6  43E9      MPCR   =  SMM-PRINT-LOOP     -   1.
03F7  43F7      MPCR   =  SMM-JUMP-A1     -   1.
          SMM-JUMP-A1.
03F8  F05C      AMPCR   =  A1.
03F9  F05F      B.
03FA  F0C9      JUMP.
          SMM-DEV-RD.
03FB  F1AE      IF   NOT   URQ  SKIP.
03FC  4407      MPCR   =  SMM-STINTS     -   1.
03FD  F0C5      IF   SRQ   DR2   BEX   SKIP.
03FE  43FA      MPCR   =  SMM-DEV-RD    -   1.
03FF  F086      B  =  LIT   AND  B.
0400  E07F      LIT    =  @7F@.
0401  F0C9      JUMP.
          SMM-DEV-WT-LIT.
0402  F0EA      MIR   =  LIT.
```

```
                SMM-DEV-WT.
0403  F1AE          IF NOT URQ SKIP.
0404  4407          MPCR = SMM-STINTS - 1.
0405  F0C6          IF SRQ DW2 SKIP.
0406  4402          MPCR = SMM-DEV-WT - 1.
0407  F0C9          JUMP.
                SMM-STINTS.
0408  F05D          ASE.
0409  F035          A2 = BMAR.
040A  F08E          BR2 = A2 OR B100.
040B  F097          DR2 BEX.
040C  F07D          B = B C.
040D  D300          SAR = 3.        ERROR STATUS TO LSB, E-O-M TO MSB
040E  F090          BR2 = A2.
040F  F05F          B.
                *
                * PUSH INPUT-REQUEST TO RESET LC2 (NORMAL OPERATION
                *                    BEFORE ERROR WAS PUSHED)
                * PUSH ERROR TO SET LC2 (WRITE BEFORE READ FLAG)
                * PUSH END-OF-MESSAGE TO EXIT SPO-MEMORY-MODIFY
0410  F0C4          IF NOT MST SKIP.
0411  4416          MPCR = SMM-EXIT - 1.    E-O-M STATUS
0412  F019          SET LC2.        WRITE-BEFORE-READ FLAG
0413  F05F          B.
0414  F0B2          IF LST SKIP.
0415  4396          MPCR = SPO-MEM-MOD - 1.       INPUT-REQUEST STATUS
0416  4397          MPCR = SPO-MEM-MOD.  ERROR STATUS (LEAVE LC2 SET)
                SMM-EXIT.
                * SPO-MEM-MOD USES LC1 AND LC2
0417  F0A5          IF LC1 STEP.
0418  F0A9          IF LC2 STEP.
0419  4045          MPCR = TESTSELECT - 1.
                /
                TESTTABLE.
041A  4295          MPCR = TEST-0 - 1.
041B  4423          MPCR = TEST-1 - 1.
041C  449F          MPCR = TEST-2 - 1.
041D  45A1          MPCR = TEST-3 - 1.
041E  45BC          MPCR = TEST-4 - 1.
041F  45C8          MPCR = TEST-5 - 1.
0420  4534          MPCR = TEST-6 - 1.
0421  4610          MPCR = TEST-7 - 1.
0422  464D          MPCR = TEST-8 - 1.
0423  4704          MPCR = TEST-9 - 1.
                TEST-1.
                START.
0424  85EF          CPCR = BUSS1 - 1.       TEST EXT BUSS
0425  F0E6          MIR = B000.
0426  F00C          RESET GC1.
0427  F01F          RESET GC2.
0428  F18E          IF IRQ SKIP.
0429  4430          MPCR = PTRRDY - 1.
042A  F108          ASR BEX.
042B  F0E1          MIR = B.
042C  F000          WAIT.
                *********IRQ      DETECTED
                *********ERROR      #M2
042D  F18E          IF IRQ SKIP.
042E  F000          WAIT.
                *********IRQ      RESET BY READING.
042F  F05F          B.
0430  F000          WAIT.
                *********IRQ      NOT RESET.
                PTRRDY.
0431  F096          DR1 BEX.                READ DEV STATUS
0432  F0CB          LIT EQV B.
0433  E005          LIT = @05@.
0434  F09D          IF ABT SKIP.
0435  85D0          CPCR = TSTAT1A - 1.
                *********STATUS      FAILURE ON FIRST READ ATTEMPT
                *********ERROR      #M3
0436  0430          AMPCR = PTRRDY - 1.     LOOPING
                PTRRDYA.
0437  F0E7          MIR = B001.             SET READ BIT
0438  F099          DW1.                    FORCE STINT
0439  F05F          B.
043A  F05F          B.
043B  F1AD          IF NOT SRQ SKIP.
043C  85CF          CPCR = TSTAT1 - 1.
                *********DINT      SET WITH PUNCH NOT READY
                *********ERROR      #M8
043D  0436          AMPCR = PTRRDYA - 1.
043E  F1B5          IF URQ SKIP.
043F  85D7          CPCR = PTSTAT2 - 1.
                *********FIRST      ATTEMPT TO SET STINT FAILED
                *********ERROR      #M4
0440  0436          AMPCR = PTRRDYA - 1.    LOOPING
                PTRRDYB.
0441  8606          CPCR = TDSEL1 - 1.      DESELECT
0442  F18E          IF IRQ SKIP.
0443  F000          WAIT.
                *********IRQ      NOT SET BY STINT
                *********ERROR      #M5
0444  F108          ASR BEX.
0445  F05F          B.
0446  F0BD          IF NOT IRQ SKIP.
0447  85D0          CPCR = TSTAT1A - 1.
                *********STINT      NOT RESET BY ENST
                *********ERROR      #M6
0448  0440          AMPCR = PTRRDYB - 1.
0449  F04A          A3 = A3 OR LIT.
044A  E005          LIT = @05@.             ADD STAT TO DEVICE ADDR
044B  F03C          A3 EQV B.
044C  F09D          IF ABT SKIP.
044D  85D0          CPCR = TSTAT1A - 1.
                *********STATUS      FAILURE
                *********ERROR      #M7
044E  F0E6          MIR = B000.
044F  F099          DW1.                    TERMINATE
0450  F05F          B.
0451  F05F          B.
0452  F1AE          IF NOT URQ SKIP.
0453  85CF          CPCR = TSTAT1 - 1.
                *********STINT      SET BY TERMINATE ATTEMPT
                *********ERROR      #M10
                PTINREAD.
0454  F10F          A1 = B000.
0455  F097          DR2 BEX.                INST NOT READ
0456  F0FF          0 EQV B.
0457  F09D          IF ABT SKIP.
0458  85D0          CPCR = TSTAT1A - 1.
                *********DATA      READ FAILED.
                *********ERROR      #M11
0459  0453          AMPCR = PTINREAD - 1.
045A  F0E7          MIR = B001.
045B  F098          DW2.                    INST NOT WRITE
045C  F05F          B.
045D  F1AE          IF NOT URQ SKIP.
045E  F000          WAIT.
                *********WRITE      WITH INST BIT RESET CAUSED STINT
                *********ERROR      #M9
                PRITST.
045F  F0E7          MIR = B001.
0460  F099          DW1.                    PUNCH
0461  F05F          B.
0462  F0F1          MR1.
0463  F05F          B.
0464  827D          CPCR = SET-CONT-DINT - 1.
0465  8606          CPCR = TDSEL1 - 1.      STRIP INST BIT
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0466  F0CF          MAR1 = AMPCR.
0467  014D          AMPCR = CONTPORTADDRESS.
0468  F0F1          MR1.
0469  F0F9          WHEN RDC BEX.
046A  F017          A1 .= B.
046B  812F          CPCR = SETPORTADDR - 1.
046C  F108          ASR BEX.
046D  F05F          B.
046E  F003          A1 EQV B.
046F  F09D          IF ABT SKIP.
0470  85D8          CPCR = TSTAT2A - 1.
                 *********ERROR #M26.
0471  828B          CPCR = RESET-CONT-DINT - 1.
0472  827D          CPCR = SET-CONT-DINT - 1.
0473  F108          ASR BEX.
0474  F017          A1 = B.
0475  F05F          B.
0476  F05D          ASE.
0477  F080          B = BMAR.
0478  F03C          A3 EQV B.
0479  F09D          IF ABT SKIP.
047A  85D8          CPCR = TSTAT2A - 1.
                 *********ERROR #M27.
047B  F0E7          MIR = B001.
047C  F099          DW1.
047D  F05F          B.
047E  C8FF          SAR = 8 LIT = @FF@.
047F  F039          A2 = LIT L.
0480  85E3          CPCR = TTIME1 - 1.
0481  F1D5          MIR = B001 + 1.
0482  F099          DW1.
0483  F0E7          MIR = B001.
0484  F098          DW2.
0485  F080          B = BMAR.
0486  F017          A1 = B.
0487  F108          ASR BEX.
0488  F08F          BR2 = LIT L.
0489  C87F          SAR = 8 LIT = @7F@.
              MWRTSL.
048A  F080          B = BMAR.
048B  F07F          B = B R.
048C  F07E          B = B + 1.
048D  F0CB          LIT EQV B.
048E  E090          LIT = @90@.
048F  F0B5          IF NOT ABT SKIP.
0490  4496          MPCR .= PORTSELT - 1.
0491  F07C          B = B L.
0492  F16E          BR2 = B.
0493  F003          A1 EQV B.
0494  F09D          IF ABT SKIP.
0495  F097          DR2 BEX.
0496  4489          MPCR = MWRTSL - 1.
              PORTSELT.
0497  F066          B = A1.
0498  F16E          BR2 = B.
0499  F078          B = B0TT.
049A  F0D5          MAR1 = B.
049B  F096          DR1 BEX.
049C  F05F          B.
049D  F1B5          IF URQ SKIP.
049E  F000          WAIT.
                 ********STINT RESET
                 *********ERROR #M32
049F  4045          MPCR = TESTSELECT - 1.
               TEST-2.
               PALCHAR.
04A0  F000          WAIT.
                 *********MOUNT BLANK TAPE CORRECTLY IN THE PUNCH.
                 *********ASSURE THAT TAPE PUNCH POWER IS ON.
                 *********PRESS FEED KEY ON PUNCH UNTIL SATISFIED THAT
                 *********TAPE FEEDS, SPROCKET HOLES ARE PUNCHED AND
                 *********NO DATA IS PUNCHED OR OPTION SELECTED DATA
                 *********IS PUNCHED. IT MAY BE NECESSARY TO MANUALLY
                 *********PULL TAPE UNTIL SPROCKET PUNCHES CATCH IN
                 *********FEED SPROCKET. IF DISAGREE WITH ANY TAPE
                 *********FEED FUNCTIONS - ERROR #M31.
                 *********IF AGREE FORCE STEP
04A1  F096          DR1 BEX.
04A2  F0FF          0 EQV B.
04A3  F09D          IF ABT SKIP.
04A4  85D0          CPCR = TSTAT1A - 1.
                 *********STATUS WITH READER READY FAILED
                 *********ERROR #M12
04A5  F0E7          MIR = B001.
04A6  F099          DW1. START TAPE
04A7  F05F          B.
04A8  F1AE          IF NOT URQ SKIP.
04A9  85CF          CPCR = TSTAT1 - 1.
                 *********STINT SET WITH PUNCH READY
                 *********ERROR #M13
04AA  F1AD          IF NOT SRQ SKIP.
04AB  F0F7          SKIP.
04AC  85CF          CPCR = TSTAT1 - 1.
                 *********FIRST DINT NOT SET.
                 *********ERROR #M14
04AD  85FF          CPCR = TDSEL - 1. DESELECT PUNCH PORT
04AE  F18E          IF IRQ SKIP.
04AF  F000          WAIT.
                 *********IRQ NOT SET BY DINT
                 *********ERROR #M15 .
04B0  85F7          CPCR = BUSS - 1. TEST BUSS EXT 1 SET
                 *********EXTERNAL BUSS FAILURE
                 *********ERROR #M16
04B1  F05E          ASR.
04B2  F000          WAIT.
                 *                PORT SELECT CARD-ENABLE STATUS GATING TEST
                 *                TO VERIFY ONLY THE DEVICE GENERATING AN
                 *                INTERRUPT IS ADDRESSED BY ASR, METER THE
                 *                FOLLOWING SIGNALS.
                 *                ONLY THE SIGNAL CORRESPONDING TO THE
                 *                PORT NUMBER OF PUNCH, SHOULD BE 0%.
                 *                ALL OTHERS SHOULD BE 100%
                 *
                 *                IF YES FORCE STEP.
                 *                IF NO FAILURE IS PS A5 B5 C5 C7.
                 *       NOTE - SYSTEM MAY HAVE 1 2 OR 3 PS1 CARDS.
                 *
                 *       PORT      PS1-3
                 *       ----      ------
                 *        12   2J(PSENST12/)
                 *        11    1J(PSENST11/)
                 *        10    1K(PSENST10/)
                 *         9    2B(PSENST09/)
                 *                          PS1-2
                 *                          -----
                 *         8                2J(PSENST8/)
                 *         7                1J(PSENST7/)
                 *         6                1K(PSENST6/)
                 *         5                2B(PSENST5/)
                 *                                   PS1-1
                 *                                   -----
                 *         4                         2J(PSENST4/)
                 *         3                         1J(PSENST3/)
                 *         2                         1K(PSENST2/)
                 *         1                         2B(PSENST1/)
                 *
                 *
                 *
04B3  F079          B = B100.
04B4  F051          A3 = B.
04B5  F096          DR1 BEX.
04B6  F03C          A3 EQV B.                STATUS = 8000
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04B7  F09D          IF  ABT  SKIP.
04B8  85D0          CPCR  =  TSTAT1A  -  1.
                  *********STATUS       FAILURE
                  *********ERROR        #M17
                   PFRDW.
04B9  F0EA          MIR  =  LIT.
04BA  E0FF          LIT  =  @FF@.
04BB  F01D          A1  =  LIT.
04BC  F098          DW2.                              FIRST   DATA  WRITE
04BD  F05F          B.
04BE  F05F          B.
04BF  F1AD          IF  NOT  SRQ  SKIP.               DINT  RESET  BY  DATA  WRITE
04C0  85CF          CPCR  =  TSTAT1  -  1.
                  *********DINT       NOT  RESET  BY  DATA  WRITE
                  *********ERROR        #M18
04C1  04B8          AMPCR  =  PFRDW  -  1.            LOOPING
04C2  C828          SAR  =  8  LIT  =  @28@.          DELAY  SET  UP  32MSEC
04C3  F039          A2  =  LIT  L.
04C4  85E3          CPCR  =  TTIME1  -  1.
                   CPSTST.
04C5  F05F          B.
04C6  F108          ASR  BEX.
04C7  F05F          B.
04C8  F1AD          IF  NOT  SRQ  SKIP.
04C9  F0F7          SKIP.
04CA  F000          WAIT.
                  *********ERROR        #M28
04CB  44D0          MPCR  =  PDINST  -  1.
04CC  F1AD          IF  NOT  SRQ  SKIP.
04CD  44D0          MPCR  =  PDINST  -  1.
04CE  F0E6          MIR  =  B000.
04CF  F099          DW1.                              DISABLE   PUNCH
04D0  F000          WAIT.
                  *********DINT       NOT  SET  SECOND  TIME
                  *********ERROR        #M19
                   PDINST.
04D1  F0E6          MIR  =  B000.
04D2  F098          DW2.                              WRITE  DATA
04D3  C81E          SAR  =  8  LIT  =  @1E@.          DELAY  SET  UP  23MSEC
04D4  F039          A2  =  LIT  L.
04D5  85E3          CPCR  =  TTIME1  -  1.
04D6  F034          A2  =  B000.
04D7  F1AE          IF  NOT  URQ  SKIP.
04D8  85D7          CPCR  =  PTSTAT2  -  1.
                  *********STINT       SET
                  *********ERROR        #M20
04D9  F0FC          WHEN SRQ  STEP.
04DA  F0EA          MIR  =  LIT.
04DB  E0FE          LIT  =  @FE@.
04DC  F098          DW2.
04DD  F013          A1  =  A2.
04DE  F038          A2  =  LIT.
04DF  F098          DW2.                              WRITE  W/DINT  NOT  SET
04E0  F05F          B.
04E1  F098          DW2.                              WRITE  W/DINT  NOT  SET
04E2  F05F          B.
                   TRDAT.
04E3  F0E7          MIR  =  B001.
04E4  F055          A3  =  B001.
04E5  F099          DW1.                              START  TAPE
04E6  F05F          B.
                   PTLOOP.
04E7  F1AE          IF  NOT  URQ  SKIP.               TEST  FOR  ERROR  INTERRUPT
04E8  85D7          CPCR  =  PTSTAT2  -  1.
                  *********STINT       DETECTED
                  *********ERROR        #M29
04E9  F1AD          IF  NOT  SRQ  SKIP.
04EA  F0F7          SKIP.
04EB  44E6          MPCR  =  PTLOOP  -  1.
04EC  F013          A1  =  A2.
04ED  F032          A2  =  A3.
04EE  F0DE          MIR  =  A3.
04EF  F098          DW2.                              WRITE  DATA
04F0  F05F          B.
04F1  E0FF          LIT  =  @FF@.
04F2  F03E          A3  EQV  LIT.                     LAST  CHAR  CHECK
04F3  F0B5          IF  NOT  ABT  SKIP.
04F4  44F6          MPCR  =  PTWCRD1  -  1.
04F5  F04C          A3  =  A3  +  1.                  INCREMENT  EXPECTED  CHAR
04F6  44E6          MPCR  =  PTLOOP  -  1.
                   PTWCRD1.
04F7  F058          A3  =  LIT.
04F8  E0FF          LIT  =  @FF@.                     START  CHAR
04F9  F0CA          LCTR.
04FA  E006          LIT  =  @06@.                     CHAR  AMT
04FB  8514          CPCR  =  PTWCRDR  -  1.
                   PTWCRD2.
04FC  F058          A3  =  LIT.
04FD  E00F          LIT  =  @0F@.                     START  CHAR
04FE  F0CA          LCTR.
04FF  E007          LIT  =  @07@.                     CHAR  AMT
0500  F0F6          SET  GC2.                         COMP  FLAG
0501  8514          CPCR  =  PTWCRDR  -  1.
                   PTWCRD3.
0502  F058          A3  =  LIT.
0503  E055          LIT  =  @55@.                     START  CHAR
0504  F0CA          LCTR.
0505  E007          LIT  =  @07@.                     CHAR  AMT
0506  8514          CPCR  =  PTWCRDR  -  1.
                   PTWCRD4.
0507  F01F          RESET  GC2.
0508  F058          A3  =  LIT.
0509  E000          LIT  =  @00@.                     START  CHAR
050A  F0CA          LCTR.
050B  E007          LIT  =  @07@.                     CHAR  AMT
050C  8514          CPCR  =  PTWCRDR  -  1.
                   PTWCRD5.
050D  F0F6          SET  GC2.                         COMP  FLAG
050E  F058          A3  =  LIT.
050F  E0FF          LIT  =  @FF@.                     START  CHAR
0510  F0CA          LCTR.
0511  E00A          LIT  =  @0A@.
0512  8514          CPCR  =  PTWCRDR  -  1.
0513  F01F          RESET  GC2.
0514  4524          MPCR  =  PNDTRDAT  -  1.
                   PTWCRDR.
0515  F1AE          IF  NOT  URQ  SKIP.
0516  85D7          CPCR  =  PTSTAT2  -  1.
                  *********STINT       DETECTED
                  *********ERROR        #M29
0517  F1AD          IF  NOT  SRQ  SKIP.
0518  F0F7          SKIP.
0519  4514          MPCR  =  PTWCRDR  -  1.
051A  F013          A1  =  A2.
051B  F032          A2  =  A3.
051C  F0DE          MIR  =  A3.
051D  F098          DW2.
051E  F05F          B.
051F  E0FF          LIT  =  @FF@.
0520  F030          INC.
0521  F0BC          IF  NOT  GC2  SKIP.
0522  F136          A3  =  A3  XOR  LIT.
0523  F09F          IF  COV  JUMP.
0524  4514          MPCR  =  PTWCRDR  -  1.
                   PNDTRDAT.
0525  F0FC          WHEN SRQ  STEP.
0526  F0E6          MIR  =  B000.
0527  F099          DW1.                              DISABLE   PUNCH
0528  F05F          B.
0529  F05F          B.
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052A  F1AD          IF  NOT  SRQ  SKIP.
052B  F000          WAIT.
                  *********DINT       NOT  RESET  BY  DISABLE
                  *********ERROR      #M21
052C  F1AE          IF  NOT  URQ  SKIP.
052D  85D0          CPCR  =  TSTAT1A  -  1.
                  *********STINT      SET
                  *********ERROR      #M12
052E  F013          A1  =  A2.
052F  C820          SAR  =  8  LIT  =  @20@.        DELAY  SET  UP  24MSEC
0530  F039          A2  =  LIT  L.
0531  85E3          CPCR  =  TTIME1  -  1.          WAIT  FOR  LAST  ECH0
0532  F1AE          IF  NOT  URQ  SKIP.
0533  85D7          CPCR  =  PTSTAT2  -  1.
                  *********STINT      SET
                  *********ERROR      #M23
0534  4045          MPCR  =  TESTSELECT  -  1.
                  TEST-6.
                  TSTPATRN.
0535  8217          CPCR  =  READDATAKEYTOA1  -  1.
0536  8549          CPCR  =  NUMCONVTST  -  1.
0537  F0F7          SKIP.
0538  454F          MPCR  =  ITISADATAWRD  -  1.
                  READY4CONTROL.
0539  F006          SET  GC1.
053A  8217          CPCR  =  READDATAKEYTOA1  -  1.  WAITING  FOR  CONTROL.
053B  E04F          LIT  =  @4F@.
053C  F009          A1  =  A1  AND  LIT.
053D  F05F          B.
053E  F111          A1  EQV  LIT.
053F  E04C          LIT  =  @4C@.                   CONTROL  =  L.
0540  F0B5          IF  NOT  ABT  SKIP.
0541  455E          MPCR  =  DOITALOT  -  1.
0542  F111          A1  EQV  LIT.
0543  E04D          LIT  =  @4D@.                   CONTROL  =  M.
0544  F0B5          IF  NOT  ABT  SKIP.
0545  455D          MPCR  =  DOIT  -  1.
0546  F111          A1  EQV  LIT.                   CONTROL  =  N.
0547  E04E          LIT  =  @4E@.
0548  F0B5          IF  NOT  ABT  SKIP.
0549  8045          CPCR  =  TESTSELECT  -  1.
                  NUMCONVTST.
054A  F009          A1  =  A1  AND  LIT.
054B  E04F          LIT  =  @4F@.
054C  F109          A1  -  LIT  -  1.
054D  E03F          LIT  =  @3F@.
054E  F0B7          IF  NOT  AOV  SKIP.             NUMERIC  KYBD.
054F  8736          CPCR  =  HEXKEYCONV  -  1.
                  ITISADATAWRD.
0550  F0C0          IF  NOT  LC2  SKIP.             FIRST  DIGIT.
0551  4556          MPCR  =  SAVEDATAWORD  -  1.    SECOND  DIGIT.
0552  F019          SET  LC2.
0553  F00B          A1  =  A1  L.
0554  DC00          SAR  =  12.
0555  F042          A3  =  A1.                      A3  CONTAINS  UPPER  DIGIT.
0556  4534          MPCR  =  TSTPATRN  -  1.
                  SAVEDATAWORD.
0557  F066          B  =  A1.
0558  F06F          B  =  A3  OR  B.
0559  F051          A3  =  B.                       UPPER  AND  LOWER  HERE.
055A  4538          MPCR  =  READY4CONTROL  -  1.
055B  4045          MPCR  =  TESTSELECT  -  1.
                  INVALIDKEY.
055C  80B7          CPCR  =  ALARM  -  1.           PRESSED  WRONG KEY
055D  4045          MPCR  =  TESTSELECT  -  1.      START  OVER.
                  DOIT.
055E  F019          SET  LC2.
                  DOITALOT.
055F  F0E7          MIR  =  B001.                   START  PUNCH
0560  F099          DW1.                            START  PUNCH
                  DOITA.
0561  F1AE          IF  NOT  URQ  SKIP.
0562  857B          CPCR  =  CHKSTAT  -  1.
0563  F1AD          IF  NOT  SRQ  SKIP.
0564  F0F7          SKIP.
0565  4560          MPCR  =  DOITA  -  1.
0566  F0DE          MIR  =  A3.
0567  F098          DW2.                            WRITE  DATA
0568  F18E          IF  IRQ  SKIP.                  ANY  ONE  REQUESTING
0569  4572          MPCR  =  LOPTST  -  1.
056A  F108          ASR  BEX.
056B  F05F          B.
056C  F017          A1  =  B.
056D  F05F          B.
056E  F111          A1  EQV  LIT.
056F  E04E          LIT  =  @4E@.
0570  F0B5          IF  NOT  ABT  SKIP.
0571  4045          MPCR  =  TESTSELECT  -  1.
0572  4534          MPCR  =  TSTPATRN  -  1.
                  LOPTST.
0573  F015          IF  LC2  SKIP.                  1  CHAR  MODE
0574  4560          MPCR  =  DOITA  -  1.
0575  C820          SAR  =  8  LIT  =  @20@.        DELAY  SET  UP  =  24  MSEC
0576  F039          A2  =  LIT  L.
0577  F0FC          WHEN SRQ  STEP.
0578  85E3          CPCR  =  TTIME1  -  1.          1  CHAR  MODE  WAIT  FOR  ECH0
0579  F1AE          IF  NOT  URQ  SKIP.
057A  857B          CPCR  =  CHKSTAT  -  1.
057B  4534          MPCR  =  TSTPATRN  -  1.
                  CHKSTAT.
057C  F096          DR1  BEX.
057D  F033          A2  =  B.
057E  D400          SAR  =  4.
057F  F07D          B  =  B  C.
0580  F05F          B.
0581  F0B2          IF  LST  SKIP.
0582  459E          MPCR  =  ENDLOP  -  1.
                  SNDALM.
0583  F01C          A1  =  BMAR.
0584  F08F          BR2  =  LIT  L.
0585  C887          SAR  =  8  LIT  =  @87@.
0586  F0EA          MIR  =  LIT.
0587  E00A          LIT  =  @0A@.
0588  F099          DW1.                            ENABLE  FORMS
0589  F08F          BR2  =  LIT  L.
058A  E007          LIT  =  @07@.
058B  F0CA          LCTR.
058C  E03F          LIT  =  @3F@.
058D  F0EF          MIR  =  Z.
058E  E001          LIT  =  @01@.
058F  F0FC          WHEN SRQ  STEP.
0590  F099          DW1.                            SOUND  ALARM
0591  F0EF          MIR  =  Z.
0592  E000          LIT  =  @00@.
0593  F0FC          WHEN SRQ  STEP.
0594  F099          DW1.                            DUMMY FORMS
0595  F08F          BR2  =  LIT  L.
0596  E087          LIT  =  @87@.
0597  F0FC          WHEN SRQ  STEP.
0598  F0EA          MIR  =  LIT.
0599  E002          LIT  =  @02@.
059A  F099          DW1.                            ENABLE  KEYBOARD
059B  F066          B  =  A1.
059C  F16F          BR2  =  B1TT.
059D  F096          DR1  BEX.                       SELECT  PUNCH
059E  F0C9          JUMP.
                  ENDLOP.
059F  F0E6          MIR  =  B000.
05A0  F099          DW1.                            DISABLE  PUNCH
05A1  4045          MPCR  =  TESTSELECT  -  1.
```

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                    TEST-3.
                    PMBRK.
05A2  F0E7              MIR = B001.
05A3  F099              DW1.                        ENABLE PUNCH
05A4  F05F              B.
05A5  F1B5              IF URQ SKIP.                WAS PUNCH RDY
05A6  45AA              MPCR = PBUSYA - 1.
05A7  F096              DR1 BEX.
05A8  F0E1              MIR = B.                    STATUS TO MIR
05A9  F000              WAIT.
                    *********MAKE     PUNCH READY (LOAD TAPE TURN POWER ON).
                    *********FORCE      STEP.
05AA  45A1              MPCR = PMBRK - 1.
                    PBUSYA.
05AB  F0FC              WHEN SRQ STEP.
05AC  F079              B = B100.
05AD  F051              A3 = B.
05AE  F04A              A3 = A3 OR LIT.             STATUS COMPARE = 8003
05AF  E003              LIT = @03@.
05B0  F000              WAIT.
                    *********ALLOW      MEDIA DETECTOR TO DROP TO SIMULATE
                    *********A      MEDIA BREAK.
                    *********FORCE      STEP.
05B1  F096              DR1 BEX.
05B2  F03C              A3 EQV B.
05B3  F09D              IF ABT SKIP.
05B4  85D0              CPCR = TSTAT1A - 1.
                    *********STATUS       FAILURE
                    *********ERROR      #M7
05B5  F0E6              MIR = B000.
05B6  F098              DW2.
05B7  F05F              B.
05B8  F05F              B.
05B9  F1B5              IF URQ SKIP.
05BA  F000              WAIT.
                    *********STINT      NOT SET BY DATA WRITE WITH MEDIA BREAK
                    *********ERROR      #M24
05BB  F096              DR1 BEX.                    RESET STINT
05BC  459E              MPCR = ENDLOP - 1.
                    TEST-4.
                    PBUSYTST.
05BD  F0E7              MIR = B001.
05BE  F099              DW1.                        ENABLE PUNCH
05BF  F05F              B.
05C0  F1B5              IF URQ SKIP.
05C1  45C5              MPCR = PBUSY - 1.
05C2  F096              DR1 BEX.
05C3  F0E1              MIR = B.                    STATUS TO MIR
05C4  F000              WAIT.
                    *********MAKE     PUNCH READY (LOAD TAPE, TURN POWER ON).
                    *********FORCE      STEP.
05C5  45BC              MPCR = PBUSYTST - 1.
                    PBUSY.
05C6  F0FD              WHEN URQ STEP.
                    *********FORCE      STINT WHILE PUNCH IS BUSY.
                    *********TURN     PUNCH POWER OFF. IF INCREMENTER DOES
                    *********NOT     STEP - ERROR #M33.
05C7  F096              DR1 BEX.
05C8  459E              MPCR = ENDLOP - 1.
                    TEST-5.
                    CRDLOC.
05C9  F000              WAIT.
                    *********ASSURE      THAT PUNCH POWER IS ON.
                    *********REMOVE      ALL PAPER TAPE FROM PUNCH, TO
                    *********INCLUDE      THE SUPPLY REEL.
                    *********ALLOW      TAPE LOW DETECTOR TO DROP.
                    *********INSERT      ANY BLANK PUNCH CARD INTO THE EDGE
                    *********PUNCHED      CARD SLOT TO LIMIT AGAINST CARD
                    *********DETECTOR      BUT DO NOT COVER REAR SPROCKET FEED
                    *********WHEEL.      PRESS CARD LOCK KEY AND VERIFY CARD
                    *********PRESENT      DETECTOR IS RETRACTED AND CARD LOCK
                    *********KEY      STAYS DOWN. IF DISAGREE - ERROR #M35.
                    *********POSITION      CARD DIAGONALLY SO THAT CARD DETECTOR
                    *********REMAINS      COVERED,FEED SPROCKET IS NOT COVERED,*
                    *********AND      THE CORNER OF THE CARD IS OVER THE PUNCH
                    *********PINS.      PRESS FEED KEY, THEN REMOVE CARD AND
                    *********VERIFY      THAT NO SPROCKET HOLES WERE PUNCHED.
                    *********IF      DISAGREE - ERROR #M34.
                    *********REINSERT      CARD AS DESCRIBED ABOVE AND
                    *********FORCE      STEP.
05CA  F096              DR1 BEX.
05CB  F0CB              LIT EQV B.
05CC  E008              LIT = @08@.                 TAPE LOW
05CD  F09D              IF ABT SKIP.
05CE  85D0              CPCR = TSTAT1A - 1.
                    *********STATUS       FAILURE
                    *********ERROR      #M7
05CF  4045              MPCR = TESTSELECT - 1.
                    TSTAT1.
05D0  F096              DR1 BEX.
                    TSTAT1A.
05D1  F0BB              IF NOT GC1 SKIP.
05D2  45E9              MPCR = TEXLOOP - 1.
05D3  F0DA              MIR = AMPCR.
05D4  F000              WAIT.
                    *********OBSERVE      MIR
                    *********GO      TO INCREMENT ADDRESS DISPLAYED IN MIR
05D5  F0E1              MIR = B.
05D6  F000              WAIT.
                    *********STATUS       WORD
05D7  45E9              MPCR = TEXLOOP - 1.
                    PTSTAT2.
05D8  F096              DR1 BEX.
                    TSTAT2A.
05D9  F0BB              IF NOT GC1 SKIP.
05DA  45E9              MPCR = TEXLOOP - 1.
05DB  F0DA              MIR = AMPCR.
05DC  F000              WAIT.
                    *********OBSERVE      MIR
                    *********GO      TO INCREMENT ADDRESS DISPLAYED IN MIR.
05DD  F0E1              MIR = B.
05DE  F000              WAIT.
                    *********MIR      = STATUS WORD
05DF  F0DB              MIR = A1.
05E0  F000              WAIT.
                    *********NEXT      TO LAST CHAR PUNCHED
05E1  F0DD              MIR = A2.
05E2  F000              WAIT.
                    *********LAST      CHAR PUNCHED
05E3  45E9              MPCR = TEXLOOP - 1.
                    TTIME1.                         3 USEC PER CNT
05E4  F0A1              IF GC1 JUMP.
05E5  F121              A2 = A2 XOR B111.           TIMER SET-UP
                    TTIMEA.
05E6  F02A              A2 = A2 + 1.
05E7  F09E              IF AOV SKIP.
05E8  45E5              MPCR = TTIMEA - 1.
05E9  F0C9              JUMP.
                    TEXLOOP.
05EA  F0BA              IF NOT EXT SKIP.
05EB  F0A0              IF EXT SKIP.
05EC  F0C9              JUMP.
05ED  F09A              EXEC.
05EE  F006              SET GC1.
05EF  F0C9              JUMP.
                    BUSS1.
05F0  F0F9              WHEN RDC BEX.
05F1  F0FF              0 EQV B.
05F2  F09C              IF ABT JUMP.
05F3  F0E1              MIR = B.
05F4  F000              WAIT.
```

```
                    *********EXT      BUSS FAILURE OR PARITY ERROR
                    *********IF       PUNCH GO TO M1.
                    *********IF       READER GO TO M101.
05F5  F0DA                MIR = AMPCR.
05F6  F000                WAIT.
05F7  4423                MPCR = START - 1.
                    BUSS.
05F8  F0F9                WHEN RDC BEX.
05F9  F0FF                0 EQV B.
05FA  F09C                IF ABT JUMP.
05FB  F0DA                MIR = AMPCR.
05FC  F000                WAIT.
                    *********OBSERVE      MIR
                    *********GO      TO INCREMENT ADDRESS DISPLAYED IN MIR
05FD  F0E1                MIR = B.
05FE  F000                WAIT.
                    *********ERROR      BITS ON BUSS
05FF  F0C9                JUMP.
                    TDSEL.
0600  F05E                ASR.
0601  F056                A3 = BMAR.                    STORE BR1 A3 = PARTIAL STAT
0602  C88F                SAR = 8 LIT = @8F@.
0603  F16C                BR1 = LIT L.
0604  F099                DW1.                          UNSELECT
0605  F0D2                MAR1 = A3.                    RESTORE BR1
0606  F0C9                JUMP.
                    TDSEL1.
0607  F05E                ASR.
0608  F056                A3 = BMAR.
0609  F071                B = A3.
060A  F078                B = B0TT.
060B  F051                A3 = B.
060C  C88F                SAR = 8 LIT = @8F@.
060D  F16C                BR1 = LIT L.
060E  F099                DW1.
060F  F0D2                MAR1 = A3.
0610  F0C9                JUMP.
                    TEST-7.
0611  85EF                CPCR = BUSS1 - 1.             TEST EXT BUSS
0612  F0E6                MIR = B000.
0613  F18E                IF IRQ SKIP.
0614  F01F                RESET GC2.
0615  F00C                RESET GC1.
0616  461D                MPCR = TRSET - 1.
0617  F108                ASR BEX.
0618  F0E1                MIR = B.
0619  F000                WAIT.
                    *********IRQ      DETECTED
                    *********ERROR      #M102
061A  F18E                IF IRQ SKIP.
061B  F000                WAIT.
                    *********IRQ      RESET BY READING.
061C  F05F                B.
061D  F000                WAIT.
                    *********IRQ      NOT RESET.
                    TRSET.
061E  F05F                B.
061F  F000                WAIT.
                    *********TEST      INSTRUCTIONS
                    *********TURN      TAPE READER POWER ON
                    *********REMOVE      ALL PAPER TAPE FROM READER
                    *********CLOSE      PAPER TAPE READER MEDIA CLAMP
                    *********PRESS      READ KEY ON TAPE READER
                    *********PLACE      MTR/MEM SWITCH IN MTR POSITION
                    *********PLACE      IRQ/EXT SWITCH IN CENTER POSITION
                    *********FAILURES      NOTED DURING SET-UP REFER TO M#140.
                    *********PRESS      FORCE STEP.
                    RTRRDY.
0620  F096                DR1 BEX.                      READ DEV STATUS
0621  F0CB                LIT EQV B.
0622  E001                LIT = @01@.
0623  F09D                IF ABT SKIP.
0624  85D0                CPCR = TSTAT1A - 1.
                    *********STATUS      FAILURE ON FIRST READ ATTEMPT
                    *********ERROR      #M103
0625  061F                AMPCR = RTRRDY - 1.           LOOPING
                    RTRRDYA.
0626  F0E7                MIR = B001.                   SET READ BIT
0627  F099                DW1.                          FORCE STINT
0628  F05F                B.
0629  F05F                B.
062A  F1B5                IF URQ SKIP.
062B  8720                CPCR = TSTAT2 - 1.
                    *********FIRST      ATTEMPT TO SET STINT FAILED
                    *********ERROR      #M104
062C  0625                AMPCR = RTRRDYA - 1.          LOOPING
                    RTRRDYB.
062D  8606                CPCR = TDSEL1 - 1.
062E  F18E                IF IRQ SKIP.
062F  F000                WAIT.
                    *********IRQ      NOT SET BY STINT
                    *********ERROR      #M105
0630  F108                ASR BEX.
0631  F05F                B.
0632  F0BD                IF NOT IRQ SKIP.
0633  85D0                CPCR = TSTAT1A - 1.
                    *********STINT      NOT RESET BY ENST
                    *********ERROR      #M106
0634  062C                AMPCR = RTRRDYB - 1.
0635  F04C                A3 = A3 + 1.                  ADD BIT 16 TO DEV ADDR
0636  F03C                A3 EQV B.
0637  F09D                IF ABT SKIP.
0638  85D0                CPCR = TSTAT1A - 1.
                    *********STATUS      FAILURE
                    *********ERROR      #M107
0639  F0E6                MIR = B000.
063A  F099                DW1.                          TERMINATE
063B  F05F                B.
063C  F05F                B.
063D  F1AE                IF NOT URQ SKIP.
063E  F000                WAIT.
                    *********STINT      SET BY TERMINATE ATTEMPT
                    *********ERROR      #M110
                    RTINREAD.
063F  F10F                A1 = B000.
0640  F097                DR2 BEX.                      READ DATA BUFFER
0641  F0FF                0 EQV B.
0642  F09D                IF ABT SKIP.
0643  8710                CPCR = TDAT - 1.
                    *********EMPTY      BUFF DATA READ FAILURE
                    *********ERROR      #M111
0644  063E                AMPCR = RTINREAD - 1.
0645  F0E7                MIR = B001.
0646  F098                DW2.                          INST NOT WRITE
0647  F05F                B.
0648  F1AE                IF NOT URQ SKIP.
0649  F000                WAIT.
                    *********WRITE      WITH INST BIT RESET CAUSED STINT
                    *********ERROR      #M109
064A  C8FF                SAR = 8 LIT = @FF@.
064B  F039                A2 = LIT L.
064C  85E3                CPCR = TTIME1 - 1.
064D  4045                MPCR = TESTSELECT - 1.
                    TEST-8.
                    TRDRTST.
064E  F0EA                MIR = LIT.
064F  E002                LIT = 2.
0650  F099                DW1.                          OPEN CLAMP WHEN NOT READY
0651  F0E7                MIR = B001.
0652  F000                WAIT.
```

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                *********VERIFY       TAPE  READER  MEDIA  CLAMP  IS  CLOSED
                *********IF       DISAGREE  ERROR  #M139
                *********IF       AGREE  PERFORM  FOLLOWING.
                *********OPERATOR       PLACE  TEST  TAPE  #  1448   7037   IN  PAPER
                *********TAPE       READER  AND  CLOSE  MEDIA  CLAMP.
                *********MANUALLY       ADVANCE  TEST  TAPE  SO  THAT  FIRST
                *********PUNCHED       CHARACTER  IS  DIRECTLY  OVER  READ
                *********STATION
                *********PRESS       READ  KEY  ON  TAPE  READER
                *********IF       TEST  TAPE  ADVANCED  WHEN  READ  KEY  PRESSED
                *********ERROR       #M112.
                *********PRESS       FORCE  STEP
                 TMOTST.
0653    F0EA            MIR  =  LIT.
0654    E002            LIT  =  2.
0655    F0E7            MIR  =  B001.
0656    F099            DW1.                            START  TAPE
0657    F05F            B.
0658    F1AE            IF  NOT  URQ  SKIP.
0659    85CF            CPCR  =  TSTAT1  -  1.
                *********STINT       SET  WITH  DEVICE  READY
                *********ERROR       #M113
065A    F05F            B.
065B    F1AD            IF  NOT  SRQ  SKIP.             FIRST  DINT  CHECK
065C    465D            MPCR  =  TMOTSTA  -  1.
065D    85CF            CPCR  =  TSTAT1  -  1.          ADD  BRANCH
                *********DINT       DID  NOT  SET
                *********ERROR       #M135
                 TMOTSTA.
065E    85FF            CPCR  =  TDSEL  -  1.           DESELECT
065F    F18E            IF  IRQ  SKIP.
0660    F000            WAIT.
                *********IRQ       NOT  SET  BY  DINT
                *********ERROR       #M116
0661    85F7            CPCR  =  BUSS  -  1.            BUSS  CHECK
                *********EXTERNAL       BUSS  FAILURE
                *********ERROR       #M119
0662    F079            B  =  B100.
0663    F051            A3  =  B.
0664    F096            DR1  BEX.
0665    F03C            A3  EQV  B.
0666    F09D            IF  ABT  SKIP.
0667    85D0            CPCR  =  TSTAT1A  -  1.
                *********STATUS       FAILURE
                *********ERROR       #M117
                 TMOTSTB.
0668    F097            DR2  BEX.                       FIRST  DATA  READ
0669    F05F            B.
066A    F1AD            IF  NOT  SRQ  SKIP.
066B    F0F7            SKIP.
066C    4670            MPCR  =  TMOTSTC  -  1.
066D    F008            IF  GC1  SKIP.                  TEST  FOR  LOOPING
066E    F000            WAIT.
                *********DINT       NOT  RESET  WITH  DATA  READ
                *********ERROR       #M120
066F    85E9            CPCR  =  TEXLOOP  -  1.
0670    0667            AMPCR  =  TMOTSTB  -  1.
                 TMOTSTC.
0671    F058            A3  =  LIT.
0672    E0FF            LIT  =  @FF@.
0673    F03C            A3  EQV  B.
0674    F09D            IF  ABT  SKIP.
0675    8710            CPCR  =  TDAT  -  1.
                *********FIRST       DATA  READ  FAILURE
                *********ERROR       #M121
0676    C821            SAR  =  8  LIT  =  @21@.
0677    F039            A2  =  LIT  L.                  DELAY  SET  UP  25  MSEC
0678    85E3            CPCR  =  TTIME1  -  1.
0679    F1AD            IF  NOT  SRQ  SKIP.             DINT  AFTER  ADV  CHECK
067A    4681            MPCR  =  TDINTADV  -  1.
067B    E006            LIT  =  @06@.
067C    F039            A2  =  LIT  L.
067D    85E3            CPCR  =  TTIME1  -  1.          WAIT  ADDITIONAL  4.5  MSEC
 TNOADV.
067E    F1AD            IF  NOT  SRQ  SKIP.             RECHECK  DINT
067F    4681            MPCR  =  TDINTADV  -  1.
0680    8728            CPCR  =  TSTAT3  -  1.
                *********DINT       NOT  SET  AFTER  FIRST  ADV  ATTEMPT
                *********ERROR       #M123
0681    067D            AMPCR  =  TNOADV  -  1.         LOOPING
 TDINTADV.
0682    F0E6            MIR  =  B000.
0683    F05F            B.
0684    F1AD            IF  NOT  SRQ  SKIP.
0685    F0F7            SKIP.
0686    F000            WAIT.
                *********DINT       RESET  BY  MIR  ZERO
                *********ERROR       #M137
0687    C818            SAR  =  8  LIT  =  @18@.        DELAY  SET  UP  18  MSEC
0688    F039            A2  =  LIT  L.
0689    85E3            CPCR  =  TTIME1  -  1.
068A    F096            DR1  BEX.
068B    F07D            B  =  B  C.
068C    D100            SAR  =  1.
068D    F05F            B.
068E    F0C3            IF  NOT  LST  SKIP.
068F    F000            WAIT.
                *********SERVICE       LATE  SET  EARLY
                *********ERROR       #M124
0690    C810            SAR  =  8  LIT  =  @10@.        DELAY  SET  UP  12  MSEC
0691    F039            A2  =  LIT  L.
0692    85E3            CPCR  =  TTIME1  -  1.
0693    F096            DR1  BEX.
0694    F07D            B  =  B  C.
0695    D100            SAR  =  1.
0696    F05F            B.
0697    F0C3            IF  NOT  LST  SKIP.
0698    469C            MPCR  =  TMOTSTD  -  1.
0699    F000            WAIT.
                *********SERVICE       LATE  NOT  SET
                *********ERROR       #M125
069A    F096            DR1  BEX.
069B    F0E1            MIR  =  B.
069C    F000            WAIT.
 TMOTSTD.
069D    85F7            CPCR  =  BUSS  -  1.            BUSS  CHECK
                *********EXTERNAL       BUSS  FAILURE
                *********ERROR       #M136
069E    F000            WAIT.
                *********OPERATOR       VERIFY  TEST  TAPE  STOPPED  FEEDING  ON
                *********THIRD       CHARACTER  AND  MEDIA  CLAMP  REMAINED
                *********CLOSED.
                *********IF       DISAGREE  ERROR  M126.
                *********AFTER       FORCE  STEP,  THE  OPERATOR  SHOULD  MOVE  TO
                *********THE       PAPER  TAPE  READER  AND  ASSURE  THAT  THE  TEST
                *********TAPE       REMAINS  OVER  THE  MEDIA  PRESENT  DETECTOR
                *********AFTER       THE  MEDIA  CLAMP  OPENS.  IF  TAPE  LIFTS,
                *********RESTART       TEST.
                *********FORCE       STEP
069F    F0E6            MIR  =  B000.
06A0    F099            DW1.                            NULL  ATTEMPT
06A1    F05F            B.
06A2    F1AD            IF  NOT  SRQ  SKIP.
06A3    F000            WAIT.
                *********DINT       NOT  RESET  BY  TERMINATE
                *********ERROR       #M127
06A4    F099            DW1.                            SECOND  NULL
06A5    F039            A2  =  LIT  L.
06A6    C825            SAR  =  8  LIT  =  @25@.        DELAY  SET  UP  28  MSEC
06A7    85E3            CPCR  =  TTIME1  -  1.
06A8    F1AD            IF  NOT  SRQ  SKIP.
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06A9  F000          WAIT.
                    *********TAPE       ADVANCED ON SECOND NULL
                    *********ERROR      #M138
06AA  F097          DR2 BEX.
06AB  F054          A3 = B000.
06AC  F03C          A3 EQV B.
06AD  F09D          IF ABT SKIP.
06AE  8710          CPCR = TDAT - 1.
                    *********DATA       FAILURE
                    *********ERROR      #M122
06AF  F0E7          MIR = B001.
06B0  F099          DW1.                          START TAPE
06B1  F05F          B.
06B2  F0FC          WHEN SRQ STEP.
06B3  F097          DR2 BEX.                      READ DATA
06B4  F058          A3 = LIT.
06B5  E0FE          LIT = @FE@.                   EXPECTED DATA
06B6  F03C          A3 EQV B.
06B7  F09D          IF ABT SKIP.
06B8  8710          CPCR = TDAT - 1.
                    *********DATA       READ AFTER NULL FAILED
                    *********ERROR      #M128
                    TRDAT1.
06B9  F055          A3 = B001.
06BA  F0EA          MIR = LIT.
06BB  E001          LIT = @01@.
06BC  F099          DW1.
                    RTLOOP.
06BD  F1AE          IF NOT URQ SKIP.              TEST FOR ERROR INTERRUPT
06BE  85CF          CPCR = TSTAT1 - 1.
                    *********STINT      DETECTED
                    *********ERROR      #M129
06BF  F1AD          IF NOT SRQ SKIP.
06C0  F0F7          SKIP.
06C1  46BC          MPCR = RTLOOP - 1.
06C2  F097          DR2 BEX.
06C3  F03C          A3 EQV B.
06C4  F09D          IF ABT SKIP.
06C5  8710          CPCR = TDAT - 1.
                    *********DATA       ERROR
                    *********ERROR      #M130
06C6  E0FF          LIT = @FF@.
06C7  F03E          A3 EQV LIT.                   LAST CHAR CHECK
06C8  F0B5          IF NOT ABT SKIP.
06C9  46CB          MPCR = RTWCRD1 - 1.
06CA  F04C          A3 = A3 + 1.                  INCREMENT EXPECTED CHAR
06CB  46BC          MPCR = RTLOOP - 1.
                    RTWCRD1.
06CC  F058          A3 = LIT.
06CD  E0FF          LIT = @FF@.                   START CHAR
06CE  F0CA          LCTR.
06CF  E006          LIT = @06@.                   CHAR AMT
06D0  86E9          CPCR = RTWCRDR - 1.
                    RTWCRD2.
06D1  F058          A3 = LIT.
06D2  E00F          LIT = @0F@.                   START CHAR
06D3  F0CA          LCTR.
06D4  E007          LIT = @07@.                   CHAR AMT
06D5  F0F6          SET GC2.                      COMP FLAG
06D6  86E9          CPCR = RTWCRDR - 1.
                    RTWCRD3.
06D7  F058          A3 = LIT.
06D8  E055          LIT = @55@.                   START CHAR
06D9  F0CA          LCTR.
06DA  E007          LIT = @07@.                   CHAR AMT
06DB  86E9          CPCR = RTWCRDR - 1.
                    RTWCRD4.
06DC  F01F          RESET GC2.
06DD  F058          A3 = LIT.
06DE  E000          LIT = @00@.                   START CHAR
06DF  F0CA          LCTR.
06E0  E007          LIT = @07@.                   CHAR AMT
06E1  86E9          CPCR = RTWCRDR - 1.
                    RTWCRD5.
06E2  F0F6          SET GC2.                      COMP FLAG
06E3  F058          A3 = LIT.
06E4  E0FF          LIT = @FF@.                   START CHAR
06E5  F0CA          LCTR.
06E6  E00A          LIT = @0A@.                   CHAR AMT
06E7  86E9          CPCR = RTWCRDR - 1.
06E8  F01F          RESET GC2.
06E9  46F9          MPCR = RNDTRDAT - 1.
                    RTWCRDR.
06EA  F0FC          WHEN SRQ STEP.
06EB  F097          DR2 BEX.                      READ CHARACTER
06EC  F03C          A3 EQV B.
06ED  F0B5          IF NOT ABT SKIP.
06EE  46F3          MPCR = RTWCRDR1 - 1.
06EF  F007          A1 = AMPCR.
06F0  F05F          B.
06F1  8710          CPCR = TDAT - 1.
                    *********DATA       FAILURE
                    *********ERROR      #M130
06F2  F05C          AMPCR = A1.
06F3  F05F          B.
                    RTWCRDR1.
06F4  E0FF          LIT = @FF@.
06F5  F030          INC.
06F6  F0BC          IF NOT GC2 SKIP.
06F7  F136          A3 = A3 XOR LIT.
06F8  F09F          IF COV JUMP.
06F9  46E9          MPCR = RTWCRDR - 1.
                    RNDTRDAT.
06FA  F0EA          MIR = LIT.
06FB  E003          LIT = @03@.
06FC  F099          DW1.                          OPEN CLAMP
06FD  F0FD          WHEN URQ STEP.
                    *********STINT       NOT SET ON OPEN CLAMP ATTEMPT
                    *********ERROR      #M132
06FE  F096          DR1 BEX.
06FF  F05F          B.
0700  F05F          B.
0701  F1AE          IF NOT URQ SKIP.
0702  F000          WAIT.
                    *********ENABLE       NOT RESET BY STINT
                    *********ERROR      #M133
0703  F05F          B.
0704  F000          WAIT.
                    *********OPERATOR       CLOSE MEDIA CLAMP AND PRESS READ
                    *********KEY      ON TAPE READER.
                    *********VERIFY       MEDIA CLAMP REMAINS CLOSED.
                    *********IF       DISAGREE ERROR M134.
                    *********IF       AGREE - TAPE READER TEST COMPLETE
                    TEST-9.
                    RDRLOP.
0705  F0E7          MIR = B001.
0706  F099          DW1.                          START TAPE
0707  F0FC          WHEN SRQ STEP.
0708  F097          DR2 BEX.
0709  F0E1          MIR = B.
070A  F18E          IF IRQ SKIP.                  TST CONSOLE RDY BUTTON
070B  4706          MPCR = RDRLOP + 1.
070C  F108          ASR BEX.
070D  F0E6          MIR = B000.
070E  F099          DW1.                          DISABLE
070F  F05F          B.
0710  4045          MPCR = TESTSELECT - 1.
                    TDAT.
0711  F0BB          IF NOT GC1 SKIP.
0712  45E9          MPCR = TEXLOOP - 1.
0713  F0E6          MIR = B000.
0714  F099          DW1.                          NULL
```

```
0715  F0DA        MIR = AMPCR.
0716  F000        WAIT.
                  *********OBSERVE      MIR
                  *********GO     TO INCREMENT ADDRESS DISPLAYED IN MIR
0717  F0E1        MIR = B.
0718  F000        WAIT.
                  *********MIR      = FAILED CHARACTER
0719  F0DE        MIR = A3.
071A  F000        WAIT.
                  *********MIR      = EXPECTED CHARACTER
071B  F097        DR2 BEX.
071C  F0E1        MIR = B.
071D  F000        WAIT.                          REREAD CHAR
071E  F0E7        MIR = B001.
071F  F099        DW1.                           RESTART TAPE
0720  45E9        MPCR = TEXLOOP - 1.
                  TSTAT2.
0721  F0BB        IF NOT GC1 SKIP.
0722  45E9        MPCR = TEXLOOP - 1.
0723  F0DA        MIR = AMPCR.
0724  F000        WAIT.
                  *********OBSERVE      MIR
                  *********GO     TO INCREMENT ADDRESS DISPLAYED IN MIR
0725  F096        DR1 BEX.
0726  F0E1        MIR = B.
0727  F000        WAIT.
                  *********STATUS     DISPLAYED IN MIR
0728  45E9        MPCR = TEXLOOP - 1.
                  TSTAT3.
0729  F0BB        IF NOT GC1 SKIP.
072A  472F        MPCR = TSTAT3A - 1.
072B  F0DA        MIR = AMPCR.
072C  F000        WAIT.
                  *********OBSERVE      MIR.
                  *********GO     TO INCREMENT ADDRESS DISPLAYED IN MIR
072D  F096        DR1 BEX.
072E  F0E1        MIR = B.
072F  F000        WAIT.
                  *********STATUS     DISPLAYED IN MIR
                  TSTAT3A.
0730  F0E7        MIR = B001.
0731  F099        DW1.
0732  F05F        B.
0733  F0FC        WHEN SRQ STEP.
                  *******LOOP     ATTEMPT FAILED
0734  F097        DR2 BEX.
0735  F05F        B.
0736  45E9        MPCR = TEXLOOP - 1.
                  HEXKEYCONV.
0737  F011        A1 = A1 + LIT.
0738  E009        LIT = 9.
0739  F009        A1 = A1 AND LIT.
073A  E00F        LIT = @0F@.
073B  F0C9        JUMP.
                  OPERTST0.
073C  F000        WAIT.
073D  F05F        B.
                  NUMERICONV.
073E  F009        A1 = A1 AND LIT.
073F  E04F        LIT = @4F@.
0740  F109        A1 - LIT - 1.
0741  E03F        LIT = @3F@.
0742  F0B7        IF NOT AOV SKIP.
0743  8736        CPCR = HEXKEYCONV - 1.
0744  F011        A1 = A1 + LIT.
0745  E00F        LIT = @0F@.
0746  8237        CPCR = EXITDKEY - 1.
                  FINISH.
0747  4045        MPCR = TESTSELECT - 1.
```

MANUAL PROCEDURES

NOTE

M1 THRU M39 REPRESENT THE PAPER TAPE PUNCH MANUAL PROCEDURES
M101 THRU M140 REPRESENT THE TAPE READER MANUAL PROCEDURES

	OPERATOR ACTION	MACHINE ACTION	A	D	
M1					
1	WERE YOU DIRECTED HERE BY FEMTR.		F71	2	
2	OBSERVE CONSOLE D8 OR E02 ERROR IND.	ON	F1	3	
3	OBSERVE MIR	BIT D1 ON	F2	4	
4	OBSERVE MIR	BIT D2 ON	F3	5	
5	OBSERVE MIR	BIT D4 ON	F3	6	
6	OBSERVE MIR	BIT D8 ON	F3	7	
7	OBSERVE MIR	BIT C1 ON	F3	F13	
M2	OPERATOR ACTION	MACHINE ACTION	A	D	
1	OBSERVE MIR	DIGIT B = PAPER TAPE PUNCH PORT - 1	1A	9	
1A	METER TPP1 1H (CGCLEARN) PRESS CLEAR BUTTON	0% 100%	2	F228	A A
2	METER TPP1-2N (DINT/)	100%	3	F7	A A A
3	METER TPP1-2Y (SINT/)	100%	F21	4	A
4	OBSERVE MIR	MIR = 0X00	F4	5	
5	OBSERVE MIR	MIR = 0X05	F5	6	
6	OBSERVE MIR	MIR = 8X07	F6	7	
7	OBSERVE MIR	MIR = 8X05	F7	8	
8	OBSERVE MIR	MIR = 0000	F8		
9		DIGIT B = PAPER TAPE READER PORT - 1.	F102	F46	
M3	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER TPP1 1B (CDSCLKN)	3-5%	3	F97	
3	METER TPP1 1K (POFP/)	0%	11	F35	
4	FORCE STEP AND OBSERVE MIR	MIR = 0004	F36	5	
5	OBSERVE MIR	MIR = 0007	6	7	
6	METER TPP1 2V (TBKP	0%	F37	F10	
7	OBSERVE MIR	MIR = 000D	8	9	
8	METER TPP1 2U (TLWP)	0%	F11	F12	
9	OBSERVE MIR	MIR = 8005	F38	10	
10	OBSERVE MIR	MIR = 0015	F39	F82	
11	METER TPP1 2T (PSREAD/)	90-95%	12	F208	
12	METER TPP2 B3 (RDST)	5-10%	F34	F209	
M4	OPERATOR ACTION	MACHINE ACTION	A	D	

1	SET EXT SWITCH TO EXT PRESS FST 4 TIMES METER TPP1 2X (PSWRIT/)	90-95%	2	F45
2	METER TPP1 1U (PSINST)	100%	3	F213
3	METER PS1 1R (PSIRQ/)	100% SEE F204	4	F211
4	METER CGCLEARN	0%	5	F228
5	METER TPP1 2Y (SINT/)	50-70%	F212	F44
M5	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR BIT D1 ON	F14	M6
M6	OPERATOR ACTION	MACHINE ACTION	A	D
1	FST AND OBSERVE MIR	MIR = 0000	F15	2
2	SET EXT SWITCH TO EXT FORCE STEP - FST 2 TIMES METER TPP1 1V (PSENST/)	70-80%	F16	3
3	IF PUNCH IN PORT 5-8		F215	F216
M7	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TPP1 2V (TBKP)	100%	F50	F219
M8	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F17	
M9	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F18	
M10	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F19	
M11	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F210	
M12	OPERATOR ACTION	MACHINE ACTION	A	D
1	FST AND OBSERVE MIR	MIR = 0005	4	2
2	OBSERVE MIR	MIR = 0004	F41	3
3	OBSERVE MIR	MIR = 0003	F49	4
4	METER TPP1 1K (POFP/)	100%	F40	F35
M13	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F21	
M14	OPERATOR ACTION	MACHINE ACTION	A	D
1	FST AND OBSERVE MIR	A8 ON	F217	F22
M15	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F23	
M16	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F24	
M17	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F25	
M18	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F26	
M19	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F27	
M20	OPERATOR ACTION	MACHINE ACTION	4	D
0	FORCE STEP 1 TIME AND OBSERVE MIR	BIT C1 ON	1	F218
1	PRESS CLEAR PB AND SELECT TEST 6			
2	REMOVE PAPER TAPE FROM PUNCH AREA BUT SUPPORT MEDIA DETECTOR GROUND TPP3-2H (TPECHOER)			
3	ENTER FF (DATA = ALL 1'S) AND ALPHA KEY L. IF YOU WERE DIRECTED HERE FROM M29 ENTER 00 (DATA = ALL 0'S) AND ALPHA KEY L.		4	
4	METER THE FOLLOWING TEST POINTS	DATA VALUE FROM STEP 3		

		TPP2	00	FF		
5	METER	2M (PCOS)	100%	95%	6	14
6	METER	2K (PC1S)	100%	95%	7	15
7	METER	1K (PC2S)	100%	95%	8	16
8	METER	2L (PC3S)	100%	95%	9	17
9	METER	1N (PC4S)	100%	95%	10	18
10	METER	2R (PC5S)	100%	95%	11	19
11	METER	1I (PC6S)	100%	95%	12	20
12	METER	2X (PC7S)	100%	95%	22	21
		TPP2	00	FF		
14	METER	1C (PC0)	100%	95%	F59	F67
15	METER	2C (PC1)	100%	95%	F60	F67
16	METER	2E (PC2)	100%	95%	F61	F67
17	METER	1G (PC3)	100%	95%	F62	F67
18	METER	1D (PC4)	100%	95%	F63	F68
19	METER	2G (PC5)	100%	95%	F64	F68

20	METER 1T (PC6)	100%	95%	F65	F68
21	METER 1Q (PC7)	100%	95%	F66	F68
22	REMOVE JUMPER AND METER TPP3 2H (TPECHOER)	0%		F58	23
23	REPLACE JUMPER AND RESTART TEST 06. MONITOR THE FOLLOWING TEST POINTS. SHOULD BE 100% IF ALL FAIL			F81	
24	METER TPP4 1E (PCOP/)	98-100%		25	F72
25	METER TPP4 1J (PC1P/)	98-100%		26	F73
26	METER TPP4 1U (PC2P/)	98-100%		27	F74
27	METER TPP4 2F (PC3P/)	98-100%		28	F75
28	METER TPP3 2J (PC4P/)	98-100%		29	F76
29	METER TPP3 1R (PC5P/)	98-100%		30	F77
30	METER TPP3 2Q (PC6P/)	98-100%		31	F78
31	METER TPP3 2K (PC7P/)	98-100%		F69	F79
32	DRIVE FAULT INTERMITTENT PUNCH CHECK ERROR PERFORM ECHO CHECK ADJUSTMENT.				
M21	OPERATOR ACTION	MACHINE ACTION		A	D
1	NONE			F29	
M23	OPERATOR ACTION	MACHINE ACTION		A	D
1	NONE			F20	
M24	OPERATOR ACTION	MACHINE ACTION		A	D
1	NONE			F51	
M26	OPERATOR ACTION	MACHINE ACTION		A	D
1	NONE			F30	
M27	OPERATOR ACTION	MACHINE ACTION		A	D
1	NONE			F31	
M28	OPERATOR ACTION	MACHINE ACTION		A	D
1	METER PS 2Q (PSSRQ/) (SEE F204)	100%		F227	F52
M29	OPERATOR ACTION	MACHINE ACTION		A	D
1	FORCE STEP 1 TIME AND OBSERVE MIR	MIR = 0005		F48	2
3	OBSERVE MIR	MIR = 0010		M20.1	F32
M31	OPERATOR ACTION	MACHINE ACTION		A	D
1	NONE	PAPER TAPE FEEDS CONTINOUSLY		M36	2
2	DEPRESS FEED KEY	PAPER TAPE FEEDS BUT DATA IS PUNCHED ON TAPE		M20	3
3	DEPRESS FEED KEY	PAPER TAPE WILL NOT FEED		M38	
M32	OPERATOR ACTION	MACHINE ACTION		A	D
1	METER PS 1R (PSIRQ) (SEE F204)	100%		F207	F210
M33	OPERATOR ACTION	MACHINE ACTION		A	D
1	NONE			F206	
M34	OPERATOR ACTION	MACHINE ACTION		A	D
1	METER TPP1 2E (CBKP)	0%		F80	F220
M35	OPERATOR ACTION	MACHINE ACTION		A	D
1	NONE			F33	
M36	OPERATOR ACTION (CONTINOUS FEED)	MACHINE ACTION		A	D
1	METER TPP2 1X (FEEDS)	0%		F92	2
2	METER TPP1 B3 (FEED/)	100%		F85	3
3	METER TPP1 1Q (XFEED/)	100%		F86	4
4	METER TPP1 1L (PUNCHF)	0%		F87	5
5	METER TPP1 1P (FEEDP)	0%		6	F88
6	METER TPP1 1X (TPFDEN)	0%		F89	F90
M38	OPERATOR ACTION (NO FEED)	MACHINE ACTION		A	D
1	PRESS FEED KEY METER TPP1 1P (FEEDP)	100%		2	F8
2	PRESS FEED KEY METER TPP1 1X (TPFDEN)	100%		6	3
3	METER TPP1 2M (TPTUFPF)	28-35%		F224	4
4	METER TPP3 E4 (TPCCS)	2-5%		5	F93
5	METER TPP3 1J (TUFP)	95-100%		F94	F95
6	PRESSING FEED KEY METER TPP1 1L (PUNCHF)	100%		7	F225
7	PRESSING FEED KEY METER TPP1 1Q (XFEED/)	65-70%		8	F226
8	PRESSING FEED KEY METER TPP1 B3 (FEED/)	65-70%		9	F86
9	PRESSING FEED KEY METER TPP1 E4 (SPKT/)	65-70%		11	10
10	METER TPP1 2E (CBKP)	100%		F80	F205
11	PRESSING FEED KEY METER TPP2 1X (FEEDS)	65-70%		12	F85
12	PRESSING FEED KEY METER TPP2 2Y (SPKTS)	65-70%		F99	F98

M39	OPERATOR ACTION	MACHINE ACTION	A	D
1	ONLY 1 OR 2 CHARACTERS PUNCHED ON TAPE		F221	2
2	ALL CHARACTERS PUNCHED BUT CONTINUED PUNCHING F'S UNTIL CLEARED.		F222	3
3	TEST 2 COMPLETED BUT DATA = ALL F'S		F70	4
4	NO DATA PUNCHED		F43	F223
M101	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE CONSOLE D8 OR EO2 ERROR IND	ERROR LITE ON	F101	2
2	WERE YOU DIRECTED HERE BY FEMTR.		3	F101
3	OBSERVE MIR.	MIR = 8000	F102	4
4	REMOVE TPR2 - PRESS CLEAR	PROG.STOPS AT ERROR M101	5	F103
5	METER TPR1-2T (READ/)	100%	6	F104
6	METER TPR1-1V (ENST/)	100%	F105	F106
M102	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	DIGIT B = TAPE READER PORT - 1.	1A	F107
1A	METER TPR1 1H (CGCLEARN) 0% PRESS CLEAR BUTTON GOES TO 100%		2	F228
2	METER TPR1-2N (DINT/)	100%	3	F109
3	METER TPR1-2Y (STINT/)	100%	7	4
4	OBSERVE MIR	MIR = 8X01 (X = DON'T CARE)	F108	5
5	OBSERVE MIR	MIR = 8X03 (X = DON'T CARE)	F198	6
6	METER TPR1-1P	0%	F110	F131
7	METER TPR1-1X (TRCLR/) PRESS AND HOLD CLEAR PB	09	F106	F112
M103	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND OBSERVE MIR	MIR = 0003	F113	2
2	OBSERVE MIR	BIT A8 ON	F102	3
3	METER TPR1-2U (CLOP/)	100%	4	F114
4	EXT/IRQ SW TO EXT - FORCE STEP 1 TIME AND METER TPR1-2T (READ/)	91-94%	5	F115
5	METER TPR1-1U (INST)	100%	F117	F116
M104	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TPR1-1X (TRCLR/)	100%	2	6
2	METER TPR1-1B (CDSCLK)	3-5%	3	F118
3	METER TPR1-2Y (STINT/)	0%	F120	4
4	EXT/IRQ SW TO EXT - FORCE STEP 2 TIMES AND METER TPR1-2X (WRITE/)	91-94%	5	F104
5	METER TPR1-1P	6-8%	F119	F197
6	METER TPR1 1H (CGCLEARN)	0%	F111	F228
M105	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F121	
M106	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND OBSERVE MIR	MIR = 8X01 (X = DON'T CARE)	F132	2
2	EXT/IRQ SW TO EXT - FORCE STEP 1 TIME AND METER TPR1-1V (ENST/)	75-78%	F122	F123
M107	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F124	
M109	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F125	
M110	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F133	
M111	OPERATOR ACTION	MACHINE ACTION	A	D

1 FORCE STEP 1 TIME AND OBSERVE MIR. SELECT AND METER ANY MIR BIT THAT IS ON USING THE TABLE BELOW.

MIR BIT	SIG	METER	READING		
D1	TRD0	TPR2-2B	0%	4	2
D2	TRD1	TPR2-1C	0%	4	2
D4	TRD2	TPR2-2C	0%	4	2
D8	TRD3	TPR2-1D	0%	4	2
C1	TRD4	TPR2-2E	0%	4	2
C2	TRD5	TPR2-1G	0%	4	2
C4	TRD6	TPR2-2G	0%	4	2
C8	TRD7	TPR2-1H	0%	4	2

2	METER TPR1-1X (TPCLR/) PRESS AND HOLD CLEAR PB	0%	F134	3
3	METER TPR1-1H (CLEAR) PRESS AND HOLD CLEAR PB	100%	F111	F118
4	FORCE STEP 2 TIMES AND METER TPR1-1U (INST)	100%	F135	F130

M112	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TPR1-2X (WRITE/)	100%	F136	F104
M113	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND OBSERVE MIR	MIR BIT A8 ON	F137	2
2	METER TPR1-2U (CLOP)	0%	3	F114
3	METER TPR1-1S (ROFP)	0%	F138	F139
M116	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TPR1-2N (DINT/)	0%	F141	F140
M117	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND OBSERVE MIR	MIR = 80FF	F142	2
2	OBSERVE MIR	MIR = 8002	F143	F102
M119	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND OBSERVE MIR	MIR = 8000	F102	2
2	OBSERVE MIR	MIR = 00FF	F144	F145
M120	OPERATOR ACTION	MACHINE ACTION	A	D
1	EXT/IRQ SW TO EXT AND FORCE STEP 1 TIME METER TPR1-2S (TREDATA)	91-94%	F146	F147
M121	OPERATOR ACTION	MACHINE ACTION	A	D
1	MANUALLY BACKSPACE TEST TAPE IN TAPE READER ONE (1) CHARACTER SO THAT CHARACTER FF IS DIRECTLY OVER READ STATION.FORCE STEP 1 TIME AND OBSERVE MIR	MIR = 0000	2	3
2	METER TPR2-2K (RT6)	100%	F144	F148
3	OBSERVE MIR. EXPECTED VALUE WAS 00FF, USE THE TABLE BELOW TO SELECT AND METER ANY MIR BITS THAT ARE INCORRECT.			

MIR BIT	SIG	METER	READING		
D1	(RT0)	TPR2-1I	100%	F151	F153
D2	(RT1)	TPR2-2R	100%	F152	F153
D4	(RT2)	TPR2-1P	100%	F151	F153
D8	(RT3)	TPR2-1N	100%	F152	F153
C1	(RT4)	TPR2-2L	100%	F150	F153
C2	(RT5)	TPR2-1K	100%	F150	F153
C4	(RT6)	TPR2-2K	100%	F149	F153
C8	(RT7)	TPR2-2M	100%	F149	F153

M122	OPERATOR ACTION	MACHINE ACTION	A	D
1	MANUALLY BACKSPACE TEST TAPE IN TAPE READER ONE (1) CHARACTER SO THAT BLANK CHARACTER IS DIRECTLY OVER READ STATION. FORCE STEP 1 TIME AND OBSERVE MIR. EXPECTED VALUE WAS 0000, USE THE TABLE BELOW TO SELECT AND METER ANY MIR BITS THAT ARE INCORRECT.			

MIR BIT	SIG	METER	READING		
D1	(RT0)	TPR2-1I	0%	F154	F153
D2	(RT1)	TPR2-2R	0%	F154	F153
D4	(RT2)	TPR2-1P	0%	F154	F153
D8	(RT3)	TPR2-1N	0%	F154	F153
C1	(RT4)	TPR2-2L	0%	F155	F153
C2	(RT5)	TPR2-1K	0%	F155	F153
C4	(RT6)	TPR2-2K	0%	F155	F153
C8	(RT7)	TPR2-2M	0%	F155	F153

M123	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE TAPE READER	FIRST CHARACTER OF TEST TAPE STILL OVER READ STATION	2	3
2	METER TPR1-1L (ADVANCE/)	0%	F157	F158
3	OBSERVE TAPE READER	TEST TAPE ONLY ADVANCED 1 CHARACTER	4	6
4	METER TPR1-2N (DINT/)	100%	5	9
5	METER TPR1-2C (ENA)	100%	F160	F200
6	OBSERVE TAPE READER	TEST TAPE FED TO THE END AND SPROCKET WHEELS ARE STILL TURNING.	7	8
7	METER TPR1-1E (SPKT)	100%	F161	F162
8	RESTART MTR			
9	REMOVE TEST TAPE AND REPLACE WITH A LOOPED TAPE OR LONG TAPE (DATA - DON'T CARE) TO ALLOW OPERATOR TO SCOPE. PRESS CLEAR PB,SELECT PORT,SELECT NUMERIC 3 FOR READ LOOP. SCOPE SIGNALS TPR1-1E (SPKT)AND TPR1-1L (ADVANCE/)AS DIRECTED IN WAVEFORMS SECTION AND COMPARE TIMES AC,AB AND BC.			

TIME	AB OUT OF TOLERANCE	F202	
TIME	AC OUT OF TOLERANCE	F159	
TIME	BC OUT OF TOLERANCE	F203	

M124	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE TAPE READER	TEST TAPE ADVANCED 1 CHARACTER	F195	F199
M125	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE TAPE READER	TEST TAPE ADVANCED TO THE END	F164	F165
M126	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE TAPE READER	MEDIA CLAMP OPEN	F166	2

2	OBSERVE TAPE READER	TEST TAPE ADVANCED PAST THIRD CHARACTER	F167	3
3	CONTINUE MTR			
M127	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F168	
M128	OPERATOR ACTION	MACHINE ACTION	A	D
1	NO FAILURES FOUND TO CAUSE THIS ERROR.			
M129	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND OBSERVE MIR	MIR BIT D1 ON	2	4
2	METER TPR1-2U (CLOP)	100%	F169	3
3	METER TPR1-1S (ROFP)	100%	F170	4
4	NONE		F171	
M130	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND NOTE VALUE IN MIR. THIS IS THE DATA WORD THAT FAILED. FORCE STEP 1 TIME AND NOTE VALUE IN MIR. THIS IS THE EXPECTED VALUE. MANUALLY BACKSPACE TEST TAPE 1 CHARACTER.	TEST TAPE CHARACTER OVER READ STATION = MIR (EXPECTED CHAR)	2	F172
2	REREAD CHARACTER. FORCE STEP 2 TIMES. WHEN 1 CHARACTER ADVANCE COMPLETE FORCE STEP 1 TIME AND OBSERVE MIR.	MIR IS THE SAME AS EXPECTED VALUE NOTED IN STEP 1.	F173	3
3	MANUALLY BACKSPACE TEST TAPE 1 CHARACTER. THE OPERATOR MUST USE ORIGINAL FAILED AND EXPECTED VALUES NOTED IN STEP 1 TO DETERMINE BIT(S) BEING PICKED UP OR DROPPED. USE TABLE BELOW TO TO DETERMINE IF DDP OR READER IS FAILING.			

MIR BIT	SIG	METER	READING		
D1	(TRD0)	TPR2-2B	SEE NOTE	F174	F175
D2	(TRD1)	TPR2-1C	SEE NOTE	F174	F175
D4	(TRD2)	TPR2-2C	SEE NOTE	F174	F175
D8	(TRD3)	TPR2-1D	SEE NOTE	F174	F175
C1	(TRD4)	TPR2-2E	SEE NOTE	F174	F175
C2	(TRD5)	TPR2-1G	SEE NOTE	F174	F175
C4	(TRD6)	TPR2-2G	SEE NOTE	F174	F175
C8	(TRD7)	TPR2-1H	SEE NOTE	F174	F175

NOTE - IF EXPECTED BIT SHOULD BE ON READING = 100%
IF EXPECTED BIT SHOULD BE OFF READING = 0%

M132	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE TAPE READER	MEDIA CLAMP IS OPEN	3	2
2	METER TPR1-2Q (SR7/-T)	0%	F176	F177
3	METER TPR1-1S (ROFP)	100%	F178	F179
M133	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F180	
M134	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F181	
M135	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE TAPE READER	TEST TAPE ADVANCED TO THE END.	F182	2
2	OBSERVE TAPE READER	TEST TAPE ADVANCED 1 CHARACTER	3	4
3	METER TPR1-2N (DINT/)	0%	F183	F184
4	METER TPR1-2C (ENA)	100%	5	F185
5	METER TPR1-2G (SP)	0%	F186	F187
M136	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F102	
M137	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F180	
M138	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F188	
M139	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE		F189	
M140	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	TAPE READER WILL NOT POWER UP.	F190	2
2	NONE	MEDIA CLAMP WILL NOT CLOSE	3	4
3	METER TPR1-2Q (SR7/-T)	100%	F191	F192
4	NONE	TAPE READER FEEDS WITH EACH CLEAR DEPRESSION	F193	5
5	NONE	TAPE READER FEED WHEELS RUNNING	6	7
6	METER TPR1-1L (ADVANCE/)	100%	F194	F196
7	CONTINUE MTR			

FAILURE DICTIONARY

F1 GO TO FEMTR

F2 TPP2 F5D8

F3 TPP2 F5D6

F4 TPP1 E3 B5

F5 TPP1 E3 F3 B5 C5 E7

F6 TPP1 D3

F7 TPP1 D3 B7 C7 E7

F8 TPP1 C7 D7

F10 TPP1 C23 OR PUNCH SIGNAL TBKP

F11 TPP1 A3 F5

F12 TPP1 F5 INSURE TAPE IS LOADED PROPERLY

F13 PS B3 B5 SEE F204

F14 IF B711 E01 B1
IF B721 E02 B5 A7 D3
PS C1 A3 C3 D3 A5 B5 D5
(SEE F204)

F15 PS B3 D3 A5 B5 C5 C7
(SEE F204)

F16 TPP1 B3 B5 C5
PS A5 B5 C5 C7
(SEE F204)

F17 TPP1 B3 D5 D7

F18 TPP1 F5
PS D1
(SEE F204)

F19 TPP1 E5 F5 E7

F20 TPP1 C5 D5
TPP3 B5

F21 TPP1 E5 A7

F22 TPP1 C3 D3 E3 A7
B7 C7 E7

F23 TPP1 F5 C7

F24 TPP1 F1 F7

F25 TPP1 D3 E3 B7 F7

F26 TPP1 C3 D3 E3 B7
C7 D7 E7
PS D1 (SEE F204)

F27 TPP1 C1 D1 A3 E5 F5
A7 B7 C7 D7
TPP3 C1

F29 TPP1 F5 E7

F30 PS A5 B5 C5 B7
C7 (SEE F204)

F31 PS A5 B5 F7 SEE F204
IF B711 E01 A1
IF B721 E02 A5

F32 TPP1 B3 F3 F5
TPP2 F2F6

F33 REFER TO TECH MANUAL
FOR ADJUSTMENTS.

F34 TPP1 E1 F1 B3 E7
TPP2 F2F6 F5D8
PS D1 E7 F7

F35 TPP1 C21
PUNCH FAULT - SIGNAL POFP/

F36 TPP1 B3 D5 A7
TPP2 F5D8

F37 TPP1 B3 D3
TPP2 F2F6

F38 TPP1 B7

F39 TPP1 C5 D5

F40 TPP1 B3 D5 A7 E7

F41 TPP1 B3

F43 TPP1 D3 F3
TPP3 A5

F44 TPP1 E3 F3 B5 D5
E5 A7 E7

F45 PS E7 F7 SEE F204
TPP1 B5

F46 GO TO CONSMTR

F48 POWER OFF IND. TURN POWER ON

F49 MEDIA BREAK - RELOAD TAPE

F50 TPP1 B3 D3 C23
TPP2 F2F6

F51 TPP1 F1 E3 E5

F52 PS A5 B5 E7 F7 SEE F204
B711 EO1 A1 B1
B721 EO2 A5 B5
TPP3 C1 A5
TPP4 B7B1

F58 TPP1 D5

F59 TPP2 B5E0 B4D6 B6E5
A8D6 A6E3

F60 TPP2 B7F4 B4F8 B6E9
A8F8 A6F1

F61 TPP2 D2F4 D1F8 D3E9
C5F8 C3F1

F62 TPP2 D2E0 D3D6 D3E5
C5D6 C3E3

F63 TPP2 D2C5 D1D1 D3C0
C5D1 C3C3

F64 TPP2 E9C6 E8D1 F1C1
E2D1 E0C3

F65 TPP2 D2B3 D1A8 D3B8
C5A8 C3B6

F66 TPP2 E9B3 E8A8 F1B8
E2A8 E0B6

F67 TPP3 D1 A7

F68 TPP3 D1 F7

F69 TPP3 B5 C5 D5 C7 D7

F70 TPP1 D1 A3 C7
TPP3 A3 B3 C3 D3 E3 F3

F71 TPP1 F1 F7
TPP3 F5D8 F2F6

F72 TPP4 B1F4 A9F9 B4F1 OR
PUNCH FAULT

F73 TPP4 D8F4 D6F9 E1F1 OR
PUNCH FAULT

F74 TPP4 D8E2 D6E7 E1D9 OR
PUNCH FAULT

F75 TPP4 B1E2 A9E7 B4D9 OR
PUNCH FAULT

F76 TPP4 B1C9 A9D4 B4C7 OR
PUNCH FAULT

F77 TPP4 E7F4 E5F9 F0F1 OR
PUNCH FAULT

F78 TPP4 E7E2 E5E7 F0D9 OR
PUNCH FAULT

F79 TPP4 E7C9 E5D4 F0C7 OR
PUNCH FAULT

F80 TPP1 C1 D3
REFER TO MANUAL FOR ADJUSTMENTS

F81 TPP3 C1
TPP4 D0F3 C5F1 D0E9
D0E4 B7B1 C8E7

F82 TPP1 C5 D5
TPP3 B5 C5

F83 TPP3 B5 C5

F84 TPP3 B5 D5

F85 TPP2 B5C6 B4D1 B6C1
A8D1 A6C3

F86 TPP1 C3

F87 TPP1 C1 E1 C3 B5

F88 TPP1 C17 OR PUNCH
FAULT - SIGNAL FEEDP OR 24V

F89 TPP1 D1 C3 E3 A5 E5
B7 C7 D7

F90 TPP1 C1 E1 B5

F92 PUNCH FAULT SIGNAL FEEDS

F93 TPP3 C1 D1 E1 C19

F94 TPP4 A9D4 B7B1 C5F1 D6E7 D0E4
A9E7 E1C7 C6A9 D6F9 D8C9
A9F9 E5D4 C9D2 D6D4 D7D8
C8E7 E5E7 C3D2 D0F3 D2E0
C3D5 E5F9 C8D0 D0E9

F95 TPP3 C1 D1

F97 CD1 C3 D5 C5 A5 B5

F98 TPP2 A8A8 B4A8 B7B8
A6B6 B5B3

F99 PUNCH FAULT SIGNAL SPKTS

F101 GO TO FEMTR

F102 TPR1 E7

F103 TPR2 E7 F7

F104 PS E7 SEE F204

F105 TPR1 E5 D7 E7

F106 PS A5 C7 SEE F204

F107 GO TO CONSMTR

F108 TPR1 B3 C3 A5 C5

F109 TPR1 B3 F5 D7

F110 TPR1 D5 B7 F7

F111 NOT USED

F112 TPR1 E1 A3 A5 B7 F7

F113 TPR1 D5 E7

F114 SIGNAL CLOP OR TAPE READER

F115 PS E7 F7 SEE F204

F116 PS D1 SEE F204

F117 TPR1 B5 E5 F5 D7 E7 F7

F118 CD1 C3 A5 B5 C5 D5

F119 TPR1 C3 D5 E5 A7 B7 D7 F7

F120	PS C1 D1 A3 B3 A5 B5 E5 D7 SEE F204
F121	PS C1 A3 C3 D3 E3 D5 E5 E7 SEE F204
F122	TPR1 E5 B7
F123	PS B3 A5 B5 C5 C7 SEE F204
F124	PS B7 SEE F204
F125	TPR1 F5
F130	PS D1 SEE F204
F131	TPR1 D3 A5 E5
F132	TPR1 B5 C5 A7
F133	TPR1 C3 D5 B7 F7
F134	TPR2 D5 C7 D7
F135	TPR1 E5 TPR2 E7 F7
F136	TPR1 C5 F5 F7
F137	TPR1 B5 D5
F138	TPR1 B5 F5 D7 F7
F139	SIGNAL ROFP,TAPE READER BAD OR 24V MISSING
F140	TPR1 B3 C3 E5
F141	PS D5 SEE F204
F142	TPR1 D3 E5
F143	TPR1 B3 A5 D5
F144	TPR2 D5 F5
F145	TPR2 E7 F7
F146	TPR1 B3 C3
F147	TPR1 D3 E5
F148	DEFECTIVE TAPE READER
F149	TPR2 D7 E7
F150	TPR2 D7 F7
F151	TPR2 C7 E7
F152	TPR2 C7 F7
F153	DATA LINE FAILING FROM READER (SIG SHOWN IN CHART)
F154	TPR2 C7
F155	TPR2 D7
F156	TPR1 A3 B3 A5 D7
F157	SIGNAL ADVANCE/ DEFECTIVE TAPE READER
F158	TPR1 B5 C7
F159	FIRST READ CYCLE FAILING TAPE READER FAULT SUGGEST RETRY
F160	TPR1 C3 A5
F161	SIGNAL SPKT FROM TAPE READER
F162	TPR1 A3 B3 B5 C15 OR R3 OUT OF TOLERANCE
F163	TPR1 A3 A5 C5 D5 OR OR R3 OPEN
F164	TPR1 E1 C3
F165	TPR1 C3 D5 E7
F166	TPR1 C5 D7
F167	TPR1 E1 C3 OR READER ADVANCE SOLENOID,CLAPPER OR ADJUSTMENTS
F168	TPR1 C3
F169	SIGNAL CLOP MEDIA PRESENT FROM READER FAILING CHECK ADJ.FOR INTERMITTENT FAILURES
F170	SIGNAL ROFP CLAMP OPEN, READER OFF SIGNAL FAILING INTERMITTENTLY
F171	SIGNAL CLOP OR ROFP IS INTERMITTENT.
F172	TPR1 F3 C5 OR READER FAULT
F173	TPR1 C7 D7 E7 F7 OR TAPE READER - SOLAR CELLS OR SLIPPING CLUTCH.
F174	TPR1 C7 D7 E7 F7
F175	READER FAILURE SOLAR CELL ADJUSTMENT OR DRIVER
F176	READER FAILURE SIGNAL ● (SR7/-T)
F177	TPR1 D3 C5 B7 D7 E7
F178	TPR1 A5 E5 F5 D7
F179	SIGNAL ROFP FROM READER FAILING
F180	TPR1 C3
F181	TPR1 D3 B7

F182 TPR1 B3 D3 F5

F183 PS C1 E3 D7 SEE F204

F184 TPR1 B3 D7

F185 TPR1 A5 A7

F186 TPR1 B3 C3 D3 A5 C5

F187 TPR1 D3 A5

F188 TPR1 C3 A5 C5

F189 TPR1 C5

F190 AC FUSE IN READER OR PROCESSOR

F191 TAPE READER FAILURE (CLAMP OPEN)

F192 TPR1 C5 B7 E7

F193 TPR1 C3 A5 C5

F194 TAPE READER FAILURE (TAPE FEED)

F195 TPR1 A3 F3 A5 F5 OR
DISCRETE COMPONENTS
C15 C24 R3 R5

F196 TPR1 B3 C3 D3 C5 C7

F197 TPR1 D3 E5 F5 F7

F198 TPR1 B3 F5

F199 TPR1 A3 B3 B5

F200 TPR1 A3 F3 A5 F3 OR C24 R5

F201 TPR1 C5

F202 READER CLUTCH OR SOL.CLAPPER
OUT OF ADJUSTMENT.

F203 TPR1 A3 F3 R3 R5 C15 C24

F204 FOR PS FAILURES OPERATOR MUST
DETERMINE WHICH PS CARD IS IN ERROR.
PS1-1 PORTS 1-4
PS1-2 PORTS 5-8
PS1-3 PORTS 9-12

F205 TPP1 C15 OR PUNCH
FAULT SIGNAL CBKP

F206 TPP1 E5 E7

F207 PS E7 F7 SEE F204
MU4 D5

F208 PS E7 F7 SEE F204
MU4 E3

F209 TPP1 F1 E7
TPP2 F5D8 F2F6

F210 PS E5 SEE F204

F211 PS C1 A3 E5 SEE F204

F212 PS D1 C1 B3 E3
D7 E7 SEE F204

F213 PS D1 SEE F204

F214 PS C3 D3 E3 D5
F5 SEE F204

F215 PS B3 D3 A5 B5
C5 C7 SEE F204

F216 PS B3 D3 A5 B5 C5
C7 SEE F204

F217 PS D7 SEE F204
TPP1 E7

F218 TPP1 F1 E3 E5 E7

F219 TPP1 C23 OR PUNCH
FAULT SIGNAL TBKP

F220 TPP1 C15 OR PUNCH
FAULT SIGNAL CBKP

F221 TPP1 D1 E1 C7

F222 TPP1 D1 A3 A5 B7 C7

F223 TPP1 D3 F3

F224 TPP1 C1 D1 E1 A3 C3
E3 F3 B5 E5 B7

F225 TPP1 D1 A5

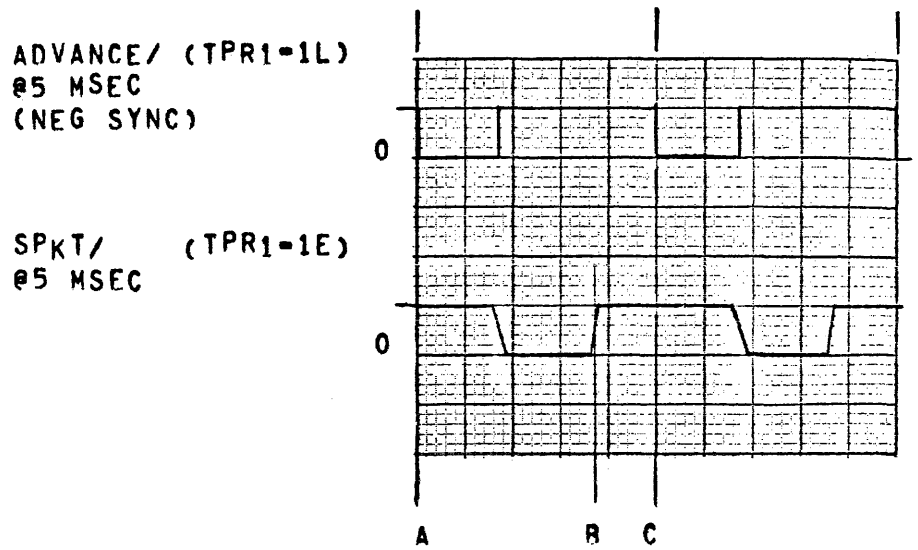
F226 TPP1 C1 OR PUNCH
FAULT SIGNAL TUFP

F227 TPP1 D1 A3

F228 CG1 C1 (IF B721 CG2 C3 CD2 A5)

ILLUSTRATIONS

TAPE READ CYCLE TIMING
TEST 3 READ LOOP



TIME AC (COMPLETE CYCLE) = 19 - 29 MSEC
TIME AB = 17 - 20 MSEC
TIME BC = 2 - 9 MSEC

TCMTR TAPE CASSETTE
9490-21/-25 MAGNETIC TAPE CASSETTE DRIVE
B 392 I/O CONTROL

```
      TESTNUMBERLIMIT   VALUE IS 14.
*                       OPERATOR ACTION
*
*                       LOAD PROG 1449  0916                              B
*                       INSTALL SCRATCH CASSETTE
*                       WITH 40 INCH BOT & WRITE ENABLED
*                       SET EXT SWITCH TO CENTER
*                       VERIFY 'WS' IND ON
*                       (DRIVE ERROR IF NOT)
*       NOTE
*         IF THE EXT SWITCH IS SET TO EXT ANY ERROR
*         OCCURRING IN TEST 1 (PROG STEP 3 TO 4)
*         WILL RESULT IN A PROGRAM LOOP ON TEST 1
*         FOR SCOPING PURPOSES. IF THE ERROR CONDITION
*         CLEARS TEST 1 WILL TERMINATE NORMALLY.
*          IN TESTS 3&4 EXT SWITCH INHIBITS REVERSE OR
*          HIGH SPEED 'DATA' TESTING
/
*  PROG     MACH
*  STEP     IND          OPERATOR ACTION
*
*                       PRESS CLEAR
*                       IF TAPE MOTION STARTS GO TO F129
*                       VERIFY DRIVE 'WS' IND ON
*                       IF NOT - DRIVE ERROR
*  0    INCR = 05B8             VERIFY MIR = SYS CONFIG                  D
*                               IF YES PRESS CONSOLE READY               B
*                               OR SPO INPUT REQ                         B
*                               IF NO SEE INCR FOR INST.                 B
*
*  1  CON PK'S ON               SELECT TC PORT NO BY PK                  B
*     SPO RDY ON                ENTER TC PORT NO (2 KEYS)                B
*
*  2  CON NUM ON                ENTER TEST NO '00'                       B
*     SPO RDY ON                                                         B
*                               SEE TEST TABLE
*         ANY TEST (1 THRU 14) MAY BE SELECTED
*         HOWEVER FOR FAILURE DIAGNOSIS TESTS
*         1 THRU 4 MUST BE PERFORMED IN SEQUENCE
*         TEST ZERO AUTOMATICALLY SEQUENCES                              B
*         TESTS 1 THRU 4 (MANUALLY SELECTING TESTS
*         1 THRU 4 GIVES SAME RESULTS EXCEPT PROG STEP
*         4 IS OMITTED-METERING AT PROG STEP 4 NEED NOT
*         BE REPEATED ON SUBSEQUENT PASSES THRU MTR)
*         AN ALARM DURING TESTS 1 THRU 4 INDICATES                       B
*         OPERATOR ACTION REQ'D-SEE INCR FOR INSRUCTION                  B
*         CONSOLE NUMERIC OR SPO READY INDICATOR WILL                    B
*         LITE AT END OF SUCCESSFUL TEST                                 B
*         ALL TESTS REQ 2 ENTRIES (00 THRU 14 DECIMAL)                   B
*         USE CONSOLE 'RESET' OR SPO 'ESC' FOR CANCEL                    B
*         CONSOLE A IND WILL DISPLAY BINARY TEST NO                      B
*         (LEFT MOST IND IS LEAST SIGNIFICANT BIT)                       B
*
*  3     MIR = 0008              OPEN CASSETTE-FORCE STEP                 B
*
*  4     INCR = 00D0             METER SIGNALS (SEE 00D0)                 B
*                                CLOSE CASSETTE-WHEN REWIND
*                                IS COMPLETE PRESS FST
*
*  5     MIR = 0138              OPEN & CLOSE CASSETTE                    B
*                                VERIFY DRIVE 'R' IND OFF
*                                IF YES FORCE STEP
*                                IF NO E121-1
*
*  6     MIR = 02A6              SET WRITE TAB FOR FILE                   B
*                                PROTECT-CLOSE CASSETTE
*                                VERIFY DRIVE 'WS' IND OFF
*                                IF YES FORCE STEP
*                                IF NO - DRIVE ERROR
*  7     MIR = 02C3              TURN CASS. CARTRIDGE OVER                B
*                                SET FILE PROTECT
*                                CLOSE CASSETTE-FORCE STEP
*
*  8     NUM/RDY ON              VERIFY DRIVE 'RE' IND ON                 B
*                                IF YES END OF MTR
*                                IF NO E121
*     MTR IS COMPLETED IF TESTS 1 THRU 4 RUN
*          TEST TABLE
*  TEST          FUNCTION                                                B
*                                                                        B
*  00            DO TESTS 1 THRU 4 SEQUENCIALLY                          B
*  01            DDP BUFFER TEST                                         B
*  02            TAPE MOTION (MUST BVE REWOUND BEFORE START              B
*  03            WRITE-READ DATA                                         B
*  04            TAPE MARK,TAPE ERROR & EOT                              B
*
*                TESTS 5 THRU 14 ARE MAINTENANCE TESTS AND               B
*                NEED NOT NORMALLY BE RUN                                B
*  05            WRITE5'S TO EOT (64 CHAR RCRDS,0.9 IN GAP)              B
*  06            WRITE 5'S TO EOT (64 CHAR RCRDS,2.9 IN GAP              B
*  07            READ TEST 5 RESULTS(HI-SPD INCREMENTAL)                 B
*  08            READ TEST 6 RESULTS (LOW SPD FLOW)                      B
*  09            BOT ALIGNMENT MOTION(15 SEC FOR/REV)                    B
*  10            MID-POINT ALIGNMENT (15 SEC FOR/REV)                    B
*  11            WRITE F'S TO EOT(INCREMENTAL-GAP= 0.9 IN)               B
*  12            READ TEST 11 RESULTS (LOW SPD FLOW)                     B
*  13            3/4 POINT ALIGNMENT (15 SEC FOR/REV)                    B
*  14            ISSUE REWIND COMMAND
*   MAINTENANCE TEST NOTES                                               B
*                WRITE OR READ TESTS (5,6,7,8,11,12)                     B
*                     ALARM INDICATES BOT                                B
*                     CONSOLE--ERROR COUNT IS DISPLAYED IN               B
*                              A INDICATORS,                             B
*                              ABNORMAL STATUS IN B IND                  B
*                              USE READY BUTTON TO TERMINAT              B
*                     SPO      ERROR COUNT & ABNORMAL STATU              B
*                              IF PRESENT WILL BE DISPLAYED              B
*                              IN MIR WHEN TEST ENDS-IF NO               B
*                              ERRORS TEST RETURNS TO PROG               B
*                              STEP 2-USE INPUT REQ TO TERM              B
*
*                ALIGNMENT TESTS (9,10,13)                               B
*                     THESE TESTS PROVIDE ALTERNATE FORWARD              B
*                     AND REVERSE TAPE MOTION FOR DRIVE                  B
*                     ADJUSTMENTS                                        B
*                          1 ALARM INDICATES FORWARD MOTION              B
*                          2 ALARMS INDICATE REVERSE MOTION              B
*
```

PROGRAM LISTING

```
0000  83C6        CPCR = PARERR - 1.
0001  F0BD        IF NOT IRQ SKIP.
0002  43D0        MPCR = ERRIRQ - 1.
0003  F1AE        IF NOT URQ SKIP.
0004  843A        CPCR = DIRECTERR - 1.   ERROR #E3  URQ = 1               D
0005  F1AD        IF NOT SRQ SKIP.
0006  843A        CPCR = DIRECTERR - 1.   ERROR #E4  SRQ = 1               D
0007  45AF        MPCR = STARTCONTROLLER - 1.                              D
*                                                                          D
      TCTST1.
0008  8596        CPCR = OPERATOR-ALERT - 1.  PROG STEP 3                  B
*****                 OPEN CASSETTE  THEN FORCE STEP                     B
      BUFTST.
0009  C001        LIT = 1 SAR = 0.  CHECK FOR DNR BIT = 1
000A  854F        CPCR = STBITCK - 1.     ERROR#  E8  NO DNR
000B  F1AE        IF NOT URQ SKIP.
000C  8417        CPCR = CLRERR - 2.      ERROR#  E69  PWRITE = 1
000D  845F        CPCR = TCWRT - 1.       WRITE
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000E  846D        CPCR = TCEDI - 1.          ENABLE DATA INTER
000F  F1B5        IF URQ SKIP.
0010  8417        CPCR = CLRERR - 2.         ERROR# E9 NO W/DNR STINT
0011  F0BD        IF NOT IRQ SKIP.
0012  841F        CPCR = TCERR - 1.          FAILURE F1 IRQ WHEN SELECTD
0013  CF01        LIT = 1 SAR = 15.  CHECK FOR DATA REQ BIT = 1
0014  854F        CPCR = STBITCK - 1.        ERROR# E10 NO DATA REQ
              WBUFD.
0015  F054        A3 = 0.       WRITE SEQ DATA INTO BUFFER
0016  84ED        CPCR = DWRTA3 - 1.         ERROR# E12 NO WRT SRQ
0017  8583        CPCR = INCA364 - 1.        IF 64 RETN ELSE JUMP.
0018  4015        MPCR = WBUFD.
              LDATWD.
0019  F1AD        IF NOT SRQ SKIP.
001A  841F        CPCR = TCERR - 1.          ERROR# E14 65TH WRT SRQ
001B  CF00        LIT = 0 SAR = 15.  CHECK FOR DATA REQ = 0
001C  854F        CPCR = STBITCK - 1.        ERROR# E11 DATA REQ = 1
001D  F054        A3 = 0.
001E  84D9        CPCR = TCCLR - 1.   RESET DNR/STINT EDGE DETECTOR
001F  8461        CPCR = TCREAD - 1.
0020  846D        CPCR = TCEDI - 1.  READ SEQ DATA FROM BUFFER
0021  F1B5        IF URQ SKIP.
0022  8417        CPCR = CLRERR - 2.         ERROR# E16 NO RD/DNR STINT
0023  F1AD        IF NOT SRQ SKIP.
0024  F0F7        SKIP.
0025  8417        CPCR = CLRERR - 2.         ERROR# E18 NO READ DINT
              RDBUFD.
0026  84E3        CPCR = DRDCMPA3 - 1.       ERROR# E20 DATA ERROR
                *                                    B = ACTUAL DATA
                *                                  A3 = EXPECTED DATA
0027  8583        CPCR = INCA364 - 1.        IF 64 RETN ELSE JUMP.
0028  4025        MPCR = RDBUFD - 1.
0029  F1AD        IF NOT SRQ SKIP.
002A  841F        CPCR = TCERR - 1.          ERROR# E22 DINT ON 65 RD
002B  858F        CPCR = DESELECT - 1.
002C  F18E        IF IRQ SKIP.
002D  841F        CPCR = TCERR - 1.          ERROR# E15 NO STINT IRQ
002E  F108        ASR BEX.
002F  F017        A1 = B.        STORE STATUS WORD IN A1
0030  F0B2        IF LST SKIP.       CHECK FOR DNR BIT = 1
0031  841F        CPCR = TCERR - 1.          ERROR# E13 NO ASR ST READ
0032  F07F        B = B R.       CLEAR STATUS BITS
0033  D800        SAR = 8.
0034  F052        A3 = B L.
0035  F080        B = BMAR.            GET DEVICE ADDRS
0036  F078        B = B0TT.
0037  F03C        A3 EQV B.
0038  F09D        IF ABT SKIP.
0039  841F        CPCR = TCERR - 1.          ERROR# E17 ASR ADDRS WRONG
003A  F0BD        IF NOT IRQ SKIP.
003B  841F        CPCR = TCERR - 1.          ERROR# E19 STINT NOT RESET
003C  845F        CPCR = TCWRT - 1.
003D  846D        CPCR = TCEDI - 1.
003E  F108        ASR BEX.
003F  F05F        B.
0040  F0BD        IF NOT IRQ SKIP.
0041  841F        CPCR = TCERR - 1.     FAILURE F178 (ASR DE-SELECTS)
0042  F0FF        0 EQV B.       CHECK FOR NO ASR RESPONCE
0043  F09D        IF ABT SKIP.
0044  841F        CPCR = TCERR - 1.  FAILURE F183  ASR NOT 0 W/ NO IRQ
0045  858F        CPCR = DESELECT - 1.
0046  F18E        IF IRQ SKIP.
0047  841F        CPCR = TCERR - 1.          ERROR# E23 NO DINT IRQ
0048  F096        DR1 BEX.       SELECT TC WITH READ
0049  F05F        B.
004A  F0BD        IF NOT IRQ SKIP.
004B  841F        CPCR = TCERR - 1.          FAILURE F178 NO READ SELECT
004C  845F        CPCR = TCWRT - 1.
004D  846D        CPCR = TCEDI - 1.
004E  F058        A3 = LIT.
004F  E0FF        LIT = @FF@.
              WIBUFD.
0050  84ED        CPCR = DWRTA3 - 1.         ERROR# E119 LDBUF = READ
0051  8589        CPCR = DECA364 - 1.        IF 64 RETN ELSE JUMP
0052  404F        MPCR = WIBUFD - 1.
0053  D800        SAR = 8.
0054  F139        A3 = B111 R.       SET FIRST DATA CHAR TO FF
0055  F05F        B.
0056  8461        CPCR = TCREAD - 1.
0057  F1AD        IF NOT SRQ SKIP.
0058  841F        CPCR = TCERR - 1.          ERROR# E109 R DINT W/O EDI
0059  846D        CPCR = TCEDI - 1.
              RIBUFD.
005A  84E3        CPCR = DRDCMPA3 - 1.       ERROR# E27 DATA ERROR
                *                                    B = ACTUAL DATA
                *                                  A3 = EXPECTED DATA
005B  8589        CPCR = DECA364 - 1.        IF 64 RETN ELSE JUMP
005C  4059        MPCR = RIBUFD - 1.
005D  845F        CPCR = TCWRT - 1.    CHECK BUFFER THRU-PUT TIME
005E  F098        DW2.                 DATA WRITE
005F  F0EA        MIR = LIT.
0060  E012        LIT = @12@.          SET READ & EDI CW
0061  F099        DW1.
0062  F0CA        LCTR.
0063  E00D        LIT = 13.
              DELAY.
0064  F0C8        INC, IF COV SKIP.
0065  4063        MPCR = DELAY - 1.
0066  F1AD        IF NOT SRQ SKIP.
0067  F0F7        SKIP.
0068  841F        CPCR = TCERR - 1.          ERROR# E25 BUFFER THRUPUT
                *                                       IS SLOW
0069  F080        B = BMAR.
006A  F078        B = B0TT.
006B  F0D5        MAR1 = B.            VERIFY MEM READ DOES NOT
006C  F0F1        MR1.                 GENERATE A DEVICE READ
006D  F058        A3 = LIT.
006E  C80F        LIT = 15 SAR = 8.
006F  F1AD        IF NOT SRQ SKIP.
0070  F0F7        SKIP.
0071  841F        CPCR = TCERR - 1.          FAILURE F180 (DR ON MR)
              CPSTST.
0072  F05D        ASE.
0073  F16D        BR2 = A3 L.          DO DATA READ ON ALL PORTS.
0074  F056        A3 = BMAR.           EXCEPT TC AND VERIFY
0075  F03C        A3 EQV B.            TC HAS NOT BEEN ACCESSED
0076  F09D        IF ABT SKIP.
0077  F097        DR2 BEX.
0078  F05E        ASR.
0079  F080        B = BMAR.
007A  F046        A3 = A3 R.
007B  F04B        A3 = A3 - 1.
007C  F0B7        IF NOT AOV SKIP.
007D  4071        MPCR = CPSTST - 1.
007E  F16E        BR2 = B.
007F  F07A        B = B1TT.
0080  F0D5        MAR1 = B.
0081  CF01        LIT = 1 SAR = 15.
0082  854F        CPCR = STBITCK - 1.        FAILURE F6 PS ADDR ERR
0083  855C        CPCR = RSTBUF - 2.         RSET BUFFER
0084  F1AD        IF NOT SRQ SKIP.
0085  841F        CPCR = TCERR - 1.          ERROR# E21 BUF NOT RESET
              T5MS.                TEST 5 MILLISECOND TIMER
0086  F0F6        SET GC2.             CHG LOOP RETN ADDRS TO T5MS
0087  F0EA        MIR = LIT.
0088  CC20        LIT = @20@ SAR = 12.                                  D
0089  F060        B = AMPCR.                                            D
008A  2F64        AMPCR = @2F64@.                                       D
008B  F07D        B = B C. SET B TO F642 (4986 MICRO-SEC)                D
008C  044E        AMPCR = TCTIMER - 1.                                  D
008D  F099        DW1.                 ENABLE 5MS
008E  F091        CALL.                                                 D
008F  F1AE        IF NOT URQ SKIP.
```

```
0090  83E4          CPCR = E5MSDIA - 1.
0091  F0AD          IF LC3.      RESET LC3 IF ERROR OVER-RIDE
                *****
                *                PORT SELECT CARD-ENABLE STATUS GATING TEST
                *                  TO VERIFY ONLY THE DEVICE GENERATING AN
                *                  INTERRUPT IS ADDRESSED BY ASR, METER THE
                *                  FOLLOWING SIGNALS
                *                  ONLY THE SIGNAL CORRESPONDING TO THE
                *                  PORT NO. OF CASSETTE SHOULD BE 0%
                *                  ALL OTHERS SHOULD BE 100%
                *
                *                  IF YES CLOSE CASSETTE,  WHEN REWIND
                *                        COMPLETES FORCE STEP
                *                  IF NO REPLACE CHIPS A5 B5 C5 C7                B
                *                        OF PS1 CARD BEING METERED                B
                **      PORT        PS1-3                                          B
                **                                                                 B
                **       12     2J(PSENST12/)                                      B
                **       11     1J(PSENST11/)                                      B
                **       10     1K(PSENST10/)                                      B
                **        9     2B(PSENST09/)                                      B
                **                          PS1-2                                  B
                **                                                                 B
                **        8                2J(PSENST8/)                            B
                **        7                1J(PSENST7/)                            B
                **        6                1K(PSENST6/)                            B
                **        5                2B(PSENST5/)                            B
                **                                          PS1-1                  B
                **                                                                 B
                **        4                                2J(PSENST4/)            B
                **        3                                1J(PSENST3/)            B
                **        2                                1K(PSENST2/)            B
                *         1                                2B(PSENST1/)            B
                **                                                                 B
                **  NOTE - SYSTEM MAY USE 1, 2, OR 3 PS1 CARDS                     B
                *
00D1  84D9          CPCR = TCCLR - 1.
00D2  F097          DR2 BEX.      RESET DINT
                /
                TCTST2.
00D3  F006          SET GC1.
00D4  E010          LIT = @10@.    CHECK FOR ST WD = BOT (0010)
00D5  84BE          CPCR = STRD0 - 1.        ERROR# E35 ST WD NOT 0010
00D6  845F          CPCR = TCWRT - 1.
00D7  84A1          CPCR = CNT3SEC - 1.
00D8  E010          LIT = @10@.    CHECK FOR EARLY BOT/
00D9  84BE          CPCR = STRD0 - 1.        ERROR# E104   BOT/ TOO SOON
00DA  84D9          CPCR = TCCLR - 1.
00DB  8467          CPCR = TCRWND - 1.
00DC  849F          CPCR = CNT2SEC - 1.
00DD  84D9          CPCR = TCCLR - 1.
00DE  848D          CPCR = CNT70MS - 1.
00DF  845F          CPCR = TCWRT - 1.   MOVE TO LOAD POINT
00E0  84A3          CPCR = CNT7SEC - 1.   40 INCH LEADER BOT TIME
00E1  C400          LIT = 0 SAR = 4.   CHECK FOR BOT= 0
00E2  854E          CPCR = STBITCK - 2.
00E3  F01E          IF LC3 SKIP.
00E4  43EA          MPCR = BOTDIA - 1.      GO TO BOT DIAGNOSTIC
00E5  84D9          CPCR = TCCLR - 1.     STOP TAPE
00E6  848D          CPCR = CNT70MS - 1.   ALLOW TAPE MOTION TO STOP
00E7  8467          CPCR = TCRWND - 1.      REWIND
00E8  849D          CPCR = CNT1SEC - 1.
00E9  F096          DR1 BEX.
00EA  F1B5          IF URQ SKIP.
00EB  83FA          CPCR = RWDDIA - 1.
00EC  F0AD          IF LC3.      RESET LC3 IF ERROR OVER-RIDE
00ED  F1AE          IF NOT URQ SKIP.
00EE  8417          CPCR = CLRERR - 2.   ERROR# E116 BOT STINT NOT RST
00EF  C401          LIT = 1 SAR = 4.   CHECK FOR BOT = 1
00F0  854F          CPCR = STBITCK - 1.      ERROR# E42 NO BOT STATUS
```

```
0092  F096          DR1 BEX.     1 MICRO-SEC DELAY & ST READ
0093  F1B5          IF URQ SKIP.
0094  841F          CPCR = TCERR - 1.        ERROR# E26 5MS = 0
0095  C701          LIT = 1 SAR = 7.
0096  8550          CPCR = STBITCK.          ERROR# E28 NO 5MS ST BIT
0097  F1AE          IF NOT URQ SKIP.
0098  8417          CPCR = CLRERR - 2.       ERROR# E30 5MS NOT RESET
0099  845F          CPCR = TCWRT - 1.      SET WOP & DISABLE 5MS
009A  F096          DR1 BEX.      RESET WOP/DNR STINT
009B  8470          CPCR = TCE5MS - 1.
009C  F0CA          LCTR.
009D  E009          LIT = 9.
009E  F08A          B = Z.
009F  E044          LIT = @44@.          WAIT FOR 4982 MICRO-SEC
                *                  TEST FOR EN5MS CTR RESET DURING WOP
00A0  844E          CPCR = TCTIMER - 1.
00A1  F1AE          IF NOT URQ SKIP.
00A2  8417          CPCR = CLRERR - 2.       ERROR# E32 NO WOP RESET
00A3  845F          CPCR = TCWRT - 1.
00A4  F096          DR1 BEX.    RESET WOP/DNR STINT
00A5  846D          CPCR = TCEDI - 1.  TEST FOR CTR NOT RESET IF
00A6  8470          CPCR = TCE5MS - 1.EN5MS  WHILE WOP & EDI = 1
00A7  F0CA          LCTR.
00A8  E009          LIT = @09@.
00A9  F08A          B = Z.
00AA  E044          LIT = @44@.          WAIT FOR 4982 MICRO-SEC
00AB  844E          CPCR = TCTIMER - 1.
                *                  SINCE CTR WAS NOT RESET
                *                    1ST 5MS WILL BE EARLY
00AC  F1B5          IF URQ SKIP.
00AD  8417          CPCR = CLRERR - 2.ERROR#  E117 CTR RST IS UNCONDAL
00AE  84D9          CPCR = TCCLR - 1.  DISABLE 5MS
00AF  8783          CPCR = SET-CONT-DINT - 1.  SET CONTROLLER DATA REQ     B
00B0  858F          CPCR = DESELECT - 1.     DESELECT CONTROLLER          B
00B1  F0CF          MAR1 = AMPCR.                                         B
00B2  06DE          AMPCR = CONTPORTADDRESS.                              B
00B3  F0F1          MR1.                                                  B
00B4  F0F9          WHEN RDC BEX.                                         B
00B5  F033          A2 = B.                                               B
00B6  86B9          CPCR = SETPORTADDR - 1.
00B7  F108          ASR BEX.
00B8  F116          A2 EQV B.      CHECK FOR CONTROLLER ASR RESPONSE      B
00B9  F09D          IF ABT SKIP.  WITH DATA REQ & PRTR RDY BITS
00BA  841F          CPCR = TCERR - 1.        ERROR# E123 PS PRIORITY
00BB  8791          CPCR = RESET-CONT-DINT - 1.                           B
00BC  8783          CPCR = SET-CONT-DINT - 1.   SELECT CONTROLLER         B
00BD  F108          ASR BEX.      READ CASSETTE STATUS
00BE  F05F          B.
00BF  C701          LIT = 1 SAR = 7.   CHECK FOR 5MS BIT = 1
00C0  8550          CPCR = STBITCK.          ERROR# E124(CONTROLLER ENST   B
                *                                        WENT TO TC)
00C1  CF00          LIT = 0 SAR = 15.   CHECK FOR DATA REQ BIT = 1
00C2  8550          CPCR = STBITCK.      ERROR# E125 TC ENST WENT TO CONS
00C3  8791          CPCR = RESET-CONT-DINT - 1.                           B
00C4  F01F          RESET GC2.
00C5  F0AC          IF LC2 SET LC2 SKIP.
00C6  4909          MPCR = MICRO-TOOL.   RESET ALL FLAGS EXCEPT GC2       B
                /
00C7  845F          CPCR = TCWRT - 1.
00C8  846D          CPCR = TCEDI - 1.        SET DATA REQ
00C9  84ED          CPCR = DWRTA3 - 1.
00CA  844B          CPCR = CNT25US - 1.
00CB  846B          CPCR = TCRDREV - 1.
00CC  846D          CPCR = TCEDI - 1.
00CD  858F          CPCR = DESELECT - 1.                                  B
00CE  8650          CPCR = ALARM - 1.   ALERT OPERATOR                    B
00CF  F05E          ASR.
00D0  F000          WAIT.     PROG STEP 4
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00F1  8499          CPCR  = CNT200MS   - 1.
00F2  845F          CPCR  = TCWRT  - 1.    MOVE TAPE  TO LOAD  POINT
00F3  8504          CPCR  = WFBOT0  - 1.        WAIT  FOR  LOAD  POINT
00F4  849F          CPCR  = CNT2SEC   - 1.
00F5  84D9          CPCR  = TCCLR  - 1.   STOP  TAPE
00F6  848D          CPCR  = CNT70MS   - 1.
00F7  8463          CPCR  = TCBKSP  - 1.    BACK  INTO  LOAD  POINT
00F8  849F          CPCR  = CNT2SEC   - 1.
00F9  8499          CPCR  = CNT200MS   - 1.
00FA  848F          CPCR  = CNT32MS   - 1.
00FB  F1AE          IF  NOT  URQ  SKIP.
00FC  4102          MPCR  = CTST2   - 1.
00FD  C401          LIT   = 1  SAR  = 4.    CHECK  FOR  BOT  = 1
00FE  854E          CPCR  = STBITCK   - 2.  IF  NO  DO  RETN
00FF  F01E          IF  LC3  SKIP.          IF  YES  DO  JUMP
0100  8410          CPCR  = BKSPDIA   - 1.
0101  8418          CPCR  = CLRERR  - 1.        ERROR#  E111   BK/BOT  STINT=0
0102  F0AD          IF  LC3.      RESET  LC3  IF  ERROR  OVER-RIDE
                CTST2.
0103  C300          LIT   = 0  SAR  = 3.  CHECK  FOR  EOT  = 0
0104  854F          CPCR  = STBITCK   - 1.  ERROR#  E114   EOT  ON  BK  TO  BOT
0105  84D9          CPCR  = TCCLR  - 1.   STOP  TAPE
0106  848D          CPCR  = CNT70MS   - 1.
0107  8469          CPCR  = TCERASE   - 1.  CHECK  FOR  ERASE  TAPE  MOTION
0108  849F          CPCR  = CNT2SEC   - 1.
0109  84D9          CPCR  = TCCLR  - 1.    STOP  TAPE
010A  848D          CPCR  = CNT70MS   - 1.
010B  C400          LIT   = 0    SAR  = 4.    CHECK  FOR  BOT  = 0
010C  854F          CPCR  = STBITCK   - 1.       ERROR#  E46   NO  ERASE  MOTION
010D  850B          CPCR  = RWDWFBOT  - 1.
010E  8499          CPCR  = CNT200MS   - 1.
010F  8461          CPCR  = TCREAD  - 1.  MOVE  FWD  WITH  READ
0110  84A3          CPCR  = CNT7SEC   - 1.     40  INCH  LEADER  BOT  TIME
0111  849B          CPCR  = CNT318MS   - 1.
0112  C400          LIT   = 0  SAR  = 4.    CHECK  FOR  BOT  = 0
0113  854F          CPCR  = STBITCK   - 1.       ERROR#  E48   NO  READ  MOTION
0114  84D9          CPCR  = TCCLR  - 1.    STOP  TAPE
0115  848D          CPCR  = CNT70MS   - 1.
0116  850B          CPCR  = RWDWFBOT  - 1.
0117  8499          CPCR  = CNT200MS   - 1.
0118  845F          CPCR  = TCWRT  - 1.
0119  8473          CPCR  = TCHISPD   - 1.
011A  84A1          CPCR  = CNT3SEC   - 1.     40  INCH  HI-SPD   BOT  TIME
011B  849B          CPCR  = CNT318MS   - 1.
011C  C400          LIT   = 0    SAR  = 4.    CHECK  FOR  BOT  = 0
011D  854E          CPCR  = STBITCK   - 2.       IF  NO  DO  RETN  -  YES  DO  JUMP
011E  412D          MPCR  = EOT  - 1.
011F  4402          MPCR  = HI-SPDD1A   - 1.
                /
0120  F041          A3  = AMPCR.          MOVE  TAPE  AT  HI-SPD
0121  125C          AMPCR  = 4700.      EOT  TIME-OUT   VALUE  IS  70  SEC
0122  F05F          B.
                HISPDLP.
0123  8491          CPCR  = CNT15MS   - 1.
0124  F04B          A3  = A3  - 1.
0125  F09E          IF  AOV  SKIP.
0126  8418          CPCR  = CLRERR  - 1.        ERROR#  E45   EOT  TIME-OUT
0127  C301          LIT   = 1  SAR  = 3.    CHECK  FOR  EOT  = 1
0128  854E          CPCR  = STBITCK   - 2.
0129  4275          MPCR  = FSTEST   - 1.
012A  C401          LIT   = 1  SAR  = 4.    CHECK  FOR  BOT  = 1
012B  854E          CPCR  = STBITCK   - 2.
012C  8418          CPCR  = CLRERR  - 1.        ERROR#  E43    NO  EOT
                *                 CASSETTE  MUST  BE  TURNED  OVER
012D  4122          MPCR  = HISPDLP   - 1.
                EOT.
012E  F0AD          IF  LC3.
012F  84D9          CPCR  = TCCLR  - 1.         STOP  TAPE
0130  8465          CPCR  = TCSFP   - 1.
0131  E004          LIT   = @04@.       CHECK  FOR  FILE  PROTECT  (0040)
0132  84BE          CPCR  = STRD0  - 1.         ERROR#  E90  ST  WD NOT 0040
0133  8499          CPCR  = CNT200MS   - 1.
0134  850B          CPCR  = RWDWFBOT  - 1.
0135  E014          LIT   = @14@.       CHECK  FOR  ST  WD =  FP  &  BOT
0136  84BE          CPCR  = STRD0  - 1.         ERROR#  E91   ST  WD NOT 0014
0137  84D9          CPCR  = TCCLR  - 1.       RESET  REWIND  BIT
0138  8596          CPCR  = OPERATOR-ALERT   - 1.    PROG  STEP  5                B
                *****           OPEN  &  CLOSE  CASSETTE  THEN  FORCE  STEP      B
                *                               THEN  FORCE  STEP.
0139  E010          LIT   = @10@.       CHECK  FOR  FILE  PROT/  (0000)
013A  84BE          CPCR  = STRD0  - 1.         ERROR#  E92   ST  WD NOT 0010
013B  F0AC          IF  LC2  SET  LC2  SKIP.
013C  4523          MPCR  = CLRTSEL   - 1.   ***  END  OF  TEST  2  ***          B
                /
                TCTST3.          TAPE  CASSETTE  TEST  3
013D  F006          SET  GC1.
013E  850B          CPCR  = RWDWFBOT  - 1.
013F  845F          CPCR  = TCWRT  - 1.    MOVE  TO  LOAD  POINT
0140  8504          CPCR  = WFBOT0  - 1.
0141  8497          CPCR  = CNT140MS   - 1.
0142  846D          CPCR  = TCEDI  - 1.         ENABLE  DATA  INTERRUPTS
0143  F054          A3  = 0.          SEQ  DATA  00  THRU  FF
                CWRTTST.
0144  84ED          CPCR  = DWRTA3  - 1.        ERROR#  E54   2MS  W/O  DINT
0145  8581          CPCR  = INCA3256   - 1.     IF  256   RETN  ELSE  JUMP.
0146  4143          MPCR  = CWRTTST   - 1.
0147  845F          CPCR  = TCWRT  - 1.         DISABLE  DATA  INT
0148  8493          CPCR  = CNT84MS   - 1.  WAIT  FOR  LAST  CHAR  TO  BE  WRTN
0149  F096          DR1  BEX.         STATUS  READ
014A  F1B5          IF  URQ  SKIP.
014B  8408          CPCR  = EODDIA   - 1.
014C  F0AD          IF  LC3.      RESET  LC3  IF  ERROR  OVER-RIDE
014D  E020          LIT   = @20@.       CHECK  FOR  ST  WD = EOD  (0020)
014E  84C6          CPCR  = SWCMP0  - 1.        ERROR#  E56   ST  WD NOT 0020
014F  8495          CPCR  = CNT100MS   - 1.     GEN  BIG  GAP  FOR  RD REV
0150  84D9          CPCR  = TCCLR  - 1.       STOP  TAPE
0151  848D          CPCR  = CNT70MS   - 1.
0152  850B          CPCR  = RWDWFBOT  - 1.      REWIND  &  WAIT  FOR  BOT
0153  8499          CPCR  = CNT200MS   - 1.
0154  8461          CPCR  = TCREAD  - 1.MOVE  TO  LOAD  POINT
0155  846D          CPCR  = TCEDI  - 1.   ENABLE  DATA  INT
0156  8504          CPCR  = WFBOT0  - 1.
0157  F1AD          IF  NOT  SRQ  SKIP.     CHECK  FOR  ERRONEOUS  DINT
0158  8417          CPCR  = CLRERR  - 2.        ERROR#  E58   DINT  BEFORE  LP
0159  C6C6          LIT   = 198   SAR  = 6.   ALLOW  200   MS  FOR  SRQ
015A  84F7          CPCR  = WFSRQ.              ERROR#  E60   NO  DINT
015B  E000          LIT   = 0.          CHECK  FOR  ST  WD = DATA  REQ  (8000)
015C  84C1          CPCR  = STRD1  - 1.         ERROR#  E62   ST  WD NOT 8000
015D  F054          A3  = 0.                SEQ  DATA  00  THRU  FF
                CRDTST.
015E  84E3          CPCR  = DRDCMPA3  - 1.      ERROR#  E64   DATA  ERROR
                *                                           A1  IS  TAPE  DATA
                *                                           A3  IS  EXPTD  DATA
015F  8581          CPCR  = INCA3256   - 1.     IF  256   RETN  ELSE  JUMP.
0160  415D          MPCR  = CRDTST   - 1.
0161  F1AD          IF  NOT  SRQ  SKIP.
0162  8418          CPCR  = CLRERR  - 1.        ERROR#  E72    257TH   DINT
0163  8487          CPCR  = CNT3MS   - 1.
0164  F1AE          IF  NOT  URQ  SKIP.
0165  8417          CPCR  = CLRERR  - 2.        ERROR#  E61    EOD  EARLY
0166  8485          CPCR  = CNT1MS   - 1.
0167  F096          DR1  BEX.         STATUS  READ
0168  F1B5          IF  URQ  SKIP.
0169  8418          CPCR  = CLRERR  - 1.        ERROR#  E67   NO  EOD  STINT
016A  E020          LIT   = @20@.         CHECK  FOR  ST  WD = EOD  (0020)
016B  84C6          CPCR  = SWCMP0  - 1.        ERROR#  E68   ST  WD NOT 0020
016C  8491          CPCR  = CNT15MS   - 1.      MOVE  INTO  GAP
016D  84D9          CPCR  = TCCLR  - 1.   STOP  TAPE
016E  848D          CPCR  = CNT70MS   - 1.
016F  846B          CPCR  = TCRDREV   - 1.      READ  REVERSE
0170  846D          CPCR  = TCEDI  - 1.         ENABLE  DATA  INT
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0171  F058        A3' = LIT.
0172  C9FF        LIT = @FF@ SAR = 9.  128  MS FOR DINT(0.5  MS X 257)
                  *                        LIT ALSO SETS DATA
0173  84F7        CPCR = WFSRQ.            ERROR# E47(A)  NO INIT SRQ
                RDREVTST.                        SEQ DATA-FF THRU 00
0174  84F6        CPCR = WFSRQ - 1.        ERROR# E47  2 MS W/O DINT
0175  8455        CPCR = TEXT - 1. NO DATA CHECK IF EXT SWITCH SET
0176  84DB        CPCR = RDREVCMPA3 - 1.   ERROR# E70  READ REV DATA
                  *                                  B = STATUS
                  *                                 A1 = ACTUAL DATA
                  *                                 A3 = EXPECTED DATA
0177  F04B        A3 = A3 - 1.
0178  F0B7        IF NOT AOV SKIP.
0179  4173        MPCR = RDREVTST - 1.
017A  8489        CPCR = CNT4MS - 1.
017B  F1AD        IF NOT SRQ SKIP.
017C  8418        CPCR = CLRERR - 1.       ERROR# E71  257TH RD DINT
017D  F096        DR1 BEX.
017E  F1B5        IF URQ SKIP.
017F  8418        CPCR = CLRERR - 1.       ERROR# E74  NO EOD STINT
0180  E020        LIT = @20@.        CHECK FOR ST WD = EOD (0020)
0181  84C6        CPCR = SWCMP0 - 1.       ERROR# E29  ST WD NOT 0020
0182  8491        CPCR = CNT15MS - 1.
0183  84D9        CPCR = TCCLR - 1.        TEST SERVICE TOO LATE
0184  848D        CPCR = CNT70MS - 1.
0185  8461        CPCR = TCREAD - 1.
0186  846D        CPCR = TCEDI - 1.
0187  F0FC        WHEN SRQ STEP.
0188  848D        CPCR = CNT70MS - 1.
              CSTLTST.
0189  F1AD        IF NOT SRQ SKIP.
018A  F097        DR2 BEX.
018B  F1B5        IF URQ SKIP.
018C  4188        MPCR = CSTLTST - 1.
018D  C601        LIT = 1 SAR = 6.  CHECK FOR STL BIT = 1
018E  854F        CPCR = STBITCK - 1.      ERROR# E37  NO LDBUF STL
018F  C600        LIT = 0 SAR = 6.    CHECK FOR STL BIT = 0
0190  854F        CPCR = STBITCK - 1.      ERROR# E41  STL NOT RESETP
0191  84D9        CPCR = TCCLR - 1.        STOP TAPE
0192  848D        CPCR = CNT70MS - 1.
0193  846B        CPCR = TCRDREV - 1.      READ REVERSE
0194  846D        CPCR = TCEDI - 1.        ENABLE DATA INT
0195  F0CA        LCTR.
0196  E0F0        LIT = 240.     SERVICE DATA INT UNTIL BUFFER WILL
                  *                  HOLD REST OF RECORD THEN STOP
                  *                  SERVICE & WAIT FOR EOD & CHECK STL
              CEODSTL.
0197  F0FC        WHEN SRQ STEP.           ERROR# E118  TWL TOGGLING
0198  F097        DR2 BEX.
0199  F0C8        INC IF COV SKIP.
019A  4196        MPCR = CEODSTL - 1.
019B  F0FD        WHEN URQ STEP.
              STLSTRD.
019C  E060        LIT = @60@.    CHECK FOR ST WD = DREQ,EOD,STL  (8060)
019D  84C1        CPCR = STRD1 - 1.        ERROR# E39  ST WD NOT 8060
019E  84D9        CPCR = TCCLR - 1.
019F  848D        CPCR = CNT70MS - 1.
01A0  845F        CPCR = TCWRT - 1.
01A1  846D        CPCR = TCEDI - 1.
01A2  84ED        CPCR = DWRTA3 - 1.
01A3  848D        CPCR = CNT70MS - 1.
01A4  845F        CPCR = TCWRT - 1.
01A5  848D        CPCR = CNT70MS - 1.
01A6  C601        LIT = 1 SAR = 6.  CHECK FOR STL BIT = 1
01A7  854F        CPCR = STBITCK - 1.      ERROR# E38  NO WRT STL
01A8  C501        LIT = 1 SAR = 5.    CHECK FOR EOD = 1
01A9  8550        CPCR = STBITCK.          ERROR# E93  NO EOD (STL)
01AA  84D9        CPCR = TCCLR - 1.
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01AB  848D        CPCR = CNT70MS - 1.
01AC  855D        CPCR = RSTBUF - 1.
01AD  F0AC        IF LC2 SET LC2 SKIP.
01AE  4523        MPCR = CLRTSEL - 1.  ***  END OF TEST 3 ***          B
                /
              TCTST4.    TEST 4 INCREMENTAL READ & TAPE MARK TEST
01AF  F019        SET LC2.
                  *  ON FIRST PASS THRU TEST 4 (LC2=1)  DATA IS
                  *  WRITTEN ON TAPE-ON SECOND (LC2=0)  DATA WITH
                  *  1 BIT DIFFERENCE IS OVERWRITTEN WITH FILE PROTECT
                  *  TO TEST READ AFTER WRITE TAPE ERROR LOGIC
01B0  F006        SET GC1.
01B1  850B        CPCR = RWDWFBOT - 1.
01B2  8499        CPCR = CNT200MS - 1.
01B3  845F        CPCR = TCWRT - 1.        WRITE
              T4WFBOT.
01B4  C100        LIT = 0 SAR = 1.  CHECK FOR TE = 0
01B5  854F        CPCR = STBITCK - 1.      ERROR# E115  BNWRITE=WRITE
01B6  C400        LIT = 0 SAR = 4.
01B7  F01A        SET LC3.
01B8  8550        CPCR = STBITCK.  IF BOT = 0 JUMP ELSE RETMN
01B9  F01E        IF LC3 SKIP.
01BA  41B3        MPCR = T4WFBOT - 1.
01BB  8497        CPCR = CNT140MS - 1.
01BC  F057        A3 = LIT L.
01BD  CC88        LIT = @88@ SAR = 12.  SET A3 = 0880
01BE  F0AC        IF LC2 SET LC2 SKIP.
01BF  F058        A3 = LIT.
                  *                WRITE FOLLOWING 8 WORDS TO TAPE
                  *                80-40-20-10-88-44-22-11
                  *                ON SECOND PASS (FILE PROTECT) WRITE
                  *                88-44-22-11-80-40-20-10  TO TEST
                  *                TAPE ERROR FOR 1 BIT DIFFERENCE
01C0  F0F7        SKIP.
              CTST4WRT.
01C1  848D        CPCR = CNT70MS - 1.
01C2  845F        CPCR = TCWRT - 1.
01C3  846D        CPCR = TCEDI - 1.        ENABLE DATA INT
01C4  84ED        CPCR = DWRTA3 - 1.       ERROR# E80  2 MS W/O DINT
01C5  844B        CPCR = CNT25US - 1.
01C6  845F        CPCR = TCWRT - 1.
01C7  8487        CPCR = CNT3MS - 1.
01C8  F1AE        IF NOT URQ SKIP.
01C9  8417        CPCR = CLRERR - 2.       ERROR# E105  WRT EOD EARLY
01CA  848F        CPCR = CNT32MS - 1.
01CB  F096        DR1 BEX.           STATUS READ
01CC  F1B5        IF URQ SKIP.
01CD  8418        CPCR = CLRERR - 1.       ERROR# E75  NO EOD STINT
01CE  E020        LIT = @20@.    CHECK FOR ST WD = EOD (0020)
01CF  F0AB        IF LC2 SET LC2 ELSE SKIP.
01D0  41D3        MPCR = CT4 - 1.
01D1  C101        LIT = 1 SAR = 1.  CHECK FOR TE BIT = 1
01D2  8550        CPCR = STBITCK.          ERROR# E49  NO TAPE ERROR
01D3  F0F7        SKIP.
              CT4.
01D4  84C6        CPCR = SWCMP0 - 1.       ERROR# E76  ST WD NOT 0020
01D5  F046        A3 = A3 R.
01D6  C108        LIT = 8 SAR = 1.
01D7  F0AC        IF LC2 SET LC2 SKIP.
01D8  E000        LIT = 0.
01D9  F03E        A3 EQV LIT.
01DA  F09D        IF ABT SKIP.
01DB  41C0        MPCR = CTST4WRT - 1.
01DC  F0AC        IF LC2 SET LC2 SKIP.
01DD  42C1        MPCR = FSTART - 1.
01DE  84D9        CPCR = TCCLR - 1.
01DF  848D        CPCR = CNT70MS - 1.
01E0  850B        CPCR = RWDWFBOT - 1.
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01E1  8499        CPCR  = CNT200MS   - 1.
01E2  F007        A1  = AMPCR  .
01E3  0880        AMPCR  = @0880@.
01E4  F05F        B.
              CINCRRD.
01E5  8461        CPCR  = TCREAD  - 1.          READ
01E6  846D        CPCR  = TCEDI   - 1.          ENABLE  DATA  INT
01E7  8565        CPCR  = SETDAT  - 1.
01E8  F0FC        WHEN SRQ  STEP.
01E9  84E3        CPCR  = DRDCMPA3  - 1.        ERROR#  E82   DATA ERROR
                  *                                       B  = STATUS
                  *                                       A1  = ACT DATA
                  *                                       A3  = EXPECTED   DATA
01EA  8489        CPCR  = CNT4MS  - 1.
01EB  E020        LIT  = @20@.     CHECK  FOR  ST  WD  =  EOD  (0020)
01EC  84BE        CPCR  = STRD0   - 1.          ERROR#  E83    ST  WD NOT  0020
01ED  84D9        CPCR  = TCCLR   - 1.          STOP  TAPE
01EE  848D        CPCR  = CNT70MS  - 1.
01EF  856A        CPCR  = SHFTDAT  - 1.         IF  END  OF  DATA  PATERN-RETN
                  *                             IF  NOT  DO  JUMP
01F0  41E4        MPCR  = CINCRRD  - 1.
                  *   WRITE  64  SEQ  1  CHAR  RECORDS,GAP=3.3      DATA=3F-00
                  *   AT  CENTER  OF  TAPE
01F1  845F        CPCR  = TCWRT  - 1.
01F2  8473        CPCR  = TCHISPD  - 1.         GO  TO  HI-SPEED
01F3  84B2        CPCR  = CNTPERAM  - 1.
01F4  0ED8        AMPCR  = 3800.          WAIT  FOR  1  MINUTE
01F5  845F        CPCR  = TCWRT  - 1.           GO  TO  LOW  SPEED
01F6  F058        A3  = LIT.
01F7  E03F        LIT  = 63.
01F8  F05F        B.
              CTMWRT.
01F9  849B        CPCR  = CNT318MS  - 1.
01FA  846D        CPCR  = TCEDI   - 1.
01FB  84ED        CPCR  = DWRTA3  - 1.          ERROR#  E77   2MS  W/O  DATA  INT
01FC  844B        CPCR  = CNT25US  - 1.
01FD  845F        CPCR  = TCWRT  - 1.           DISABLE   DATA  INT
01FE  848F        CPCR  = CNT32MS  - 1.
01FF  F096        DR1  BEX.          STATUS   READ
0200  F1B5        IF  URQ  SKIP.
0201  8418        CPCR  = CLRERR  - 1.          ERROR#  E78
0202  E020        LIT  = @20@.     CHECK  FOR  EOD  ST  WD  (0020)
0203  84C6        CPCR  = SWCMP0  - 1.          ERROR#  E79   ST  WD NOT  0020
0204  849B        CPCR  = CNT318MS  - 1.
0205  F04B        A3  = A3  - 1.
0206  F0B7        IF  NOT  AOV  SKIP.
0207  41F8        MPCR  = CTMWRT  - 1.
0208  84D9        CPCR  = TCCLR   - 1.          STOP  TAPE
0209  848D        CPCR  = CNT70MS  - 1.
020A  F054        A3  = 0.
              CHSRDREV.      READ  REVERSE-HIGH     SPEED
020B  846B        CPCR  = TCRDREV  - 1.
020C  8473        CPCR  = TCHISPD  - 1.
020D  8476        CPCR  = TCHITHR  - 1.
020E  846D        CPCR  = TCEDI   - 1.
020F  84F3        CPCR  = WFSRQD  - 1.          ERROR#  E52    NO  DINT
0210  8455        CPCR  = TEXT  - 1.
0211  84DB        CPCR  = RDREVCMPA3  - 1.  ERROR#  E110   HI-SPD   RD  REV  D   A
0212  F017        A1  = B.          SAVE  ACTUAL  DATA  IN  A1
                  *                                       B  = STATUS
                  *                                       A1  = ACTUAL  DATA
                  *                                       A3  = EXPECTED   DATA
0213  8489        CPCR  = CNT4MS  - 1.
0214  E020        LIT  = @20@.
0215  84BE        CPCR  = STRD0   - 1.          ERROR#  E120   HS  RDREV  STAT
0216  84D9        CPCR  = TCCLR   - 1.
0217  8499        CPCR  = CNT200MS  - 1.
0218  F04C        A3  = A3  + 1.
0219  F072        B  = A3  R.      IF  A3  =  0040   LAST  CHAR  HAS  BEEN  READ
021A  D600        SAR  = 6.
021B  F05F        B.
021C  F0B2        IF  LST  SKIP.
021D  420A        MPCR  = CHSRDREV  - 1.
021E  F058        A3  = LIT.
021F  E03F        LIT  = 63.
0220  F0F7        SKIP.      COMPLETE  LAST  INST  &  SKIP  CLR
              CHISRD.
0221  84D9        CPCR  = TCCLR   - 1.          STOP  TAPE  (LOOP)
0222  8499        CPCR  = CNT200MS  - 1.
0223  8461        CPCR  = TCREAD  - 1.          READ
0224  8473        CPCR  = TCHISPD  - 1.         SET  HI-SPEED
0225  8476        CPCR  = TCHITHR  - 1.         SET  HI-THRESHOLD
0226  846D        CPCR  = TCEDI   - 1.          ENABLE  DATA  INT
0227  84F3        CPCR  = WFSRQD  - 1.          ERROR#  E52    NO  DINT
0228  8455        CPCR  = TEXT  - 1.
0229  84E3        CPCR  = DRDCMPA3  - 1.        ERROR#  E86   HI-SPD   DATA
022A  F017        A1  = B.          SAVE  ACTUAL  DATA  IN  A1
                  *                                       B  = STATUS
                  *                                       A1  = ACTUAL  DATA
                  *                                       A3  = EXPECTED   DATA
022B  8489        CPCR  = CNT4MS  - 1.
022C  E020        LIT  = @20@.     CHECK  FOR  ST  WD  =  ED  (0020)
022D  84BE        CPCR  = STRD0   - 1.          ERROR#  E87   ST  WD NOT  0020
022E  F04B        A3  = A3  - 1.
022F  F0B7        IF  NOT  AOV  SKIP.
0230  4220        MPCR  = CHISRD  - 1.
0231  8491        CPCR  = CNT15MS  - 1.         MOVE  INTO  GAP  FOR  RD  REV
0232  84D9        CPCR  = TCCLR   - 1.
0233  8499        CPCR  = CNT200MS  - 1.
0234  8463        CPCR  = TCBKSP  - 1.          TEST  ERASE  FUNCTION
0235  C002        LIT  = 2  SAR  = 0.      ALLOW  1  SEC  FOR  URQ  (GAP)
0236  8576        CPCR  = WFURQ.                ERROR#  E103   NO  BKSP  GAP
0237  F096        DR1  BEX.          RESET  EOD
0238  848F        CPCR  = CNT32MS  - 1.         MOVE  INTO  GAP
0239  84D9        CPCR  = TCCLR   - 1.
023A  848D        CPCR  = CNT70MS  - 1.
023B  8469        CPCR  = TCERASE  - 1.         ERASE  00  RECORD
023C  846D        CPCR  = TCEDI   - 1.
023D  84ED        CPCR  = DWRTA3  - 1.          ERROR#  E81    NO  ERASE  DINT
023E  844B        CPCR  = CNT25US  - 1
023F  8469        CPCR  = TCERASE  - 1.         DISABLE   DATA  INT
0240  849F        CPCR  = CNT2SEC  - 1.
0241  E020        LIT  = @20@.     CHECK  FOR  EOD  (0020)
0242  84BE        CPCR  = STRD0   - 1.          ERROR#  E96   ERASE  EOD  ERR
0243  84D9        CPCR  = TCCLR   - 1.
0244  848D        CPCR  = CNT70MS  - 1.
0245  846B        CPCR  = TCRDREV  - 1.
0246  848D        CPCR  = CNT70MS  - 1.         WAIT  FOR  KNOWN  SECTION   OF
                  *                             TAPE  TO  REACH  READ  HEAD
                  *                             1ST  RECORD  SHLD  NOW  BE  01
0247  846D        CPCR  = TCEDI   - 1.
0248  84F3        CPCR  = WFSRQD  - 1.          ERROR#  E52    NO  DINT
0249  E080        LIT  = @80@.                  01  IN  REVERSE
024A  8454        CPCR  = TEXT  - 2.  IF  EXT  SWITCH  ON,  NO  DATA  CHECK
024B  84CF        CPCR  = DATRD  - 2.
024C  F01E        IF  LC3  SKIP.
024D  8416        CPCR  = DATERR  - 1.          ERROR#  E65    DATA  NOT  80
                  *                             STATUS  IN  B   DATA  IN  A1
024E  8573        CPCR  = WFURQD  - 1.          ERROR#  E52   NO  STINT
024F  E020        LIT  = @20@.     CHECK  FOR  ST  WD  =  EOD  (0020)
0250  84BE        CPCR  = STRD0   - 1.          ERROR#  E59   ST  WD NOT  0020
0251  8573        CPCR  = WFURQD  - 1.          ERROR#  E52   NO  STINT
0252  F096        DR1  BEX.          BACK  OVER  A  RECORD  BUT
0253  8485        CPCR  = CNT1MS  - 1.   DO  NOT  DO  DATA  READ
0254  84F3        CPCR  = WFSRQD  - 1.          ERROR#  E52    NO  DINT
                  *                             READ  NEXT  RECORD
0255  E0C0        LIT  = @C0@.                  03  IN  REVERSE
0256  84CF        CPCR  = DATRD  - 2.
0257  F01E        IF  LC3  SKIP.
0258  8416        CPCR  = DATERR  - 1.          ERROR#  E106   NO  EOD  BUF  RST
0259  8575        CPCR  = WFURQ  - 1.   WAIT  FOR  GAP  STINT  (ERROR#   E52(B
025A  F096        DR1  BEX.          RESET  EOD
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025B  846B          CPCR  = TCRDREV  - 1.      RESTORE  CONTROL  WORD
025C  846D          CPCR  = TCEDI  - 1.    TEST  FOR  NO RDEN  DURING  EN5MS
025D  8470          CPCR  = TCE5MS  - 1.      IN  READ  & WRITE
025E  84A1          CPCR  = CNT3SEC  - 1.
025F  84D9          CPCR  = TCCLR  - 1.
0260  E080          LIT  = @80@.
0261  84BE          CPCR  = STRD0  - 1.          ERROR#  E107   RDEN-RD  EN5MS
0262  848D          CPCR  = CNT70MS  - 1.
0263  8461          CPCR  = TCREAD  - 1.    TEST  THAT  WRITE  LEVEL
0264  C002          LIT  = 2  SAR  = 0.      ALLOW  200   MS FOR  URQ (GAP)
0265  8576          CPCR  = WFURQ.               ERROR#  E112   TWL NOT  RESET
0266  F096          DR1  BEX.          RESET  EOD
0267  F054          A3  = 0.
0268  845F          CPCR  = TCWRT  - 1.
0269  8493          CPCR  = CNT84MS  - 1.         WRITE  DELAY
026A  846D          CPCR  = TCEDI  - 1.
              RDENT.
026B  84ED          CPCR  = DWRTA3  - 1.
026C  8583          CPCR  = INCA364  - 1.
026D  426A          MPCR  = RDENT  - 1.
026E  845F          CPCR  = TCWRT  - 1.
026F  8470          CPCR  = TCE5MS  - 1.
0270  8493          CPCR  = CNT84MS  - 1.
0271  E080          LIT  = @80@.          CHECK    FOR  5MS  BIT  ONLY
0272  84BE          CPCR  = STRD0  - 1.          ERROR#  E108   RDEN (WRITE)
0273  8469          CPCR  = TCERASE  - 1.        ERASE  TO  BEYOND  EOT  HOLE
0274  8473          CPCR  = TCHISPD  - 1.
0275  411F          MPCR  = HISPDLP  - 4.        MOVE  TO  END  OF  TAPE
              *                                  IF  EOT  OK  GO  TO  NEXT  INST
              FSTEST.
0276  F0AD          IF  LC3.
0277  8499          CPCR  = CNT200MS  - 1.
0278  8469          CPCR  = TCERASE  - 1.        LOW  SPEED
0279  8499          CPCR  = CNT200MS  - 1.
027A  84D9          CPCR  = TCCLR  - 1.
027B  848D          CPCR  = CNT70MS  - 1.
027C  8463          CPCR  = TCBKSP  - 1.
027D  C400          LIT  = 0  SAR  = 4.   CHECK  FOR  BOT  = 0
027E  854F          CPCR  = STBITCK  - 1.        ERROR#  E113   BOT  AFTER  EOT
027F  849F          CPCR  = CNT2SEC  - 1.        BACK  OVER  EOT  HOLE
0280  84D9          CPCR  = TCCLR  - 1.
0281  E008          LIT  = @08@.     CHECK  FOR  ST  WD = EOT  (0008)
0282  84BE          CPCR  = STRD0  - 1.          ERROR#  E53   ST  WD NOT  0008
0283  848D          CPCR  = CNT70MS  - 1.
0284  845F          CPCR  = TCWRT  - 1.
0285  8493          CPCR  = CNT84MS  - 1.        WRITE  DELAY
0286  F054          A3  = 0.
              *                        WRITE  256   CHAR  RECORD-DATA   IS  01
              *                        WILL  BE  1  CLOCK  RECORDS  WHEN  TAPE  IS
              *                        TURNED  OVER
0287  846D          CPCR  = TCEDI  - 1.
              WFSTD.
0288  84F6          CPCR  = WFSRQ  - 1.          ERROR#  E88   2  MS W/0  DINT
0289  E001          LIT  = 1.               WRITE  ALL  CHAR  = 01
028A  84D6          CPCR  = DATWRT  + 2.
028B  8581          CPCR  = INCA3256  - 1.
028C  4287          MPCR  = WFSTD  - 1.
028D  845F          CPCR  = TCWRT  - 1.       DISABLE   DINT
028E  8493          CPCR  = CNT84MS  - 1.
028F  E028          LIT  = @28@.     CHECK  FOR  EOD  &  EOT  (0028)
0290  84BE          CPCR  = STRD0  - 1.          ERROR#  E97(A)ST      WD NOT  0028
0291  846D          CPCR  = TCEDI  - 1.
0292  84F6          CPCR  = WFSRQ  - 1.          ERROR#  E88(A)2      MS W/0  DINT
0293  E003          LIT  = @03@.     WRITE  03  CHAR  TO  BECOME  2  CLOCK
              *                        RECORD  WHEN  TAPE  IS  TURNED  OVER
0294  84D6          CPCR  = DATWRT  + 2.
0295  844B          CPCR  = CNT25US  - 1.
0296  845F          CPCR  = TCWRT  - 1.
0297  848F          CPCR  = CNT32MS  - 1.
0298  E028          LIT  = @28@.
0299  84BE          CPCR  = STRD0  - 1.          ERROR#  E97(B)
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              *                        WRITE  64   CHAR  RECORD-DATA   IS  FF
              *                        WILL  BE  SAME  RECORD  WHEN  TAPE  IS
              *                        TURNED  OVER
029A  F054          A3  = 0.
029B  846D          CPCR  = TCEDI  - 1.
              WRTFS.
029C  84F6          CPCR  = WFSRQ  - 1.          ERROR#  E89   2  MSW/0  DINT
029D  E0FF          LIT  = @FF@.
029E  84D6          CPCR  = DATWRT  + 2.
029F  8583          CPCR  = INCA364  - 1.
02A0  429B          MPCR  = WRTFS  - 1.
02A1  845F          CPCR  = TCWRT  - 1.
02A2  8575          CPCR  = WFURQ  - 1.  WAIT  FOR  GAP  STINT   (ERROR#   E52(D
02A3  E028          LIT  = @28@.          CHECK  FOR  ST  WD = EOD&EOT(0028)
02A4  84BE          CPCR  = STRD0  - 1.          ERROR#  E52    ST  WD NOT  0028
02A5  84D9          CPCR  = TCCLR  - 1.
02A6  8596          CPCR  = OPERATOR-ALERT  - 1.   PROG  STEP  6                  B
*****                 SET  FILE  PROTECT  TAB  FOR  WRITE  INHIBIT              B
*                     THEN  FORCE  STEP                                         B
02A7  850B          CPCR  = RWDWFBOT  - 1.
02A8  E014          LIT  = @14@.     CHECK  FOR  EOT=0    BOT&FP=1
02A9  84BE          CPCR  = STRD0  - 1.          ERROR#  E84   ST  WD NOT  0014
02AA  8469          CPCR  = TCERASE  - 1.        TRY  TO  ERASE  1ST  RECORD
02AB  8504          CPCR  = WFBOT0  - 1.
02AC  84A1          CPCR  = CNT3SEC  - 1.
02AD  84D9          CPCR  = TCCLR  - 1.
02AE  848D          CPCR  = CNT70MS  - 1.
02AF  850B          CPCR  = RWDWFBOT  - 1.
02B0  8499          CPCR  = CNT200MS  - 1.
02B1  8461          CPCR  = TCREAD  - 1.
02B2  8504          CPCR  = WFBOT0  - 1.
02B3  846D          CPCR  = TCEDI  - 1.
02B4  F007          A1  = AMPCR.
02B5  0880          AMPCR  = @0880@.
02B6  F05F          B.


              CFPTST.
02B7  C000          LIT  = 0  SAR  = 0.    ALLOW  524   MS FOR  SRQ
02B8  84F7          CPCR  = WFSRQ.               ERROR#  E85   NO  DINT
02B9  8565          CPCR  = SETDAT  - 1.
02BA  84E3          CPCR  = DRDCMPA3  - 1.       ERROR#  E63   DATA  ERR  AFTER
              *                                              INHIBITED   ERASE
              *                                  B=  STATUS*A1=ACT*     A3=EXPTD
02BB  848F          CPCR  = CNT32MS  - 1.
02BC  E024          LIT  = @24@.          CHECK  FOR  ST  WD = EOD  &  FP  (0024)
02BD  84BE          CPCR  = STRD0  - 1.          ERROR#  E66    ST  WD NOT  0024
02BE  856A          CPCR  = SHFTDAT  - 1.        IF  END  OF  DATA  PATERN-RETN
              *                                  IF  NOT  JUMP
02BF  42B6          MPCR  = CFPTST  - 1.
02C0  F0A9          IF  LC2.
02C1  41AF          MPCR  = TCTST4.
              FSTART.
02C2  84D9          CPCR  = TCCLR  - 1.
02C3  8596          CPCR  = OPERATOR-ALERT  - 1.   PROG  STEP  7                  B
*****                 TURN  TAPE  CARTRIDGE   OVER,SET   FILE   PROTECT         B
*                     TAB  FOR  WRITE  INHIBIT   THEN  FORCE  STEP              B
*                                      THEN  FORCE  STEP
02C4  F0BC          IF  NOT  GC2  SKIP.        XFER  ERROR  OVER-RIDE   TO  LC2
02C5  F019          SET  LC2.
02C6  F01F          RESET  GC2.
02C7  850B          CPCR  = RWDWFBOT  - 1.
02C8  C200          LIT  = 0  SAR  = 2.
02C9  854E          CPCR  = STBITCK  - 2.
02CA  8596          CPCR  = OPERATOR-ALERT  - 1.   OPERATOR  ERROR                B
*****                 SET  FILE  PROTECT  TAB  FOR  WRITE  INHIBIT              B
*                     THEN  FORCE  STEP                                         B
02CB  8499          CPCR  = CNT200MS  - 1.
02CC  8461          CPCR  = TCREAD  - 1.
02CD  8504          CPCR  = WFBOT0  - 1.
02CE  846D          CPCR  = TCEDI  - 1.
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02CF  C020          LIT  = 32  SAR  = 0.  ALLOW 8 SEC  FOR SRQ
02D0  84F7          CPCR = WFSRQ.              ERROR#  E99  DO DINT
02D1  856F          CPCR = EROVER  - 1.
02D2  F054          A3 = 0.
                  READFS.
02D3  84F6          CPCR = WFSRQ - 1.          ERROR#  E99(A)   2 MS W/0  DINT
02D4  E0FF          LIT  = @FF@.          DATA IS  FF
02D5  84D0          CPCR = DATRD - 1.          ERROR#  E94    DATA ERROR
                  *                             B =ACT   A2=EXPTD  DATA
02D6  856F          CPCR = EROVER  - 1.
02D7  8583          CPCR = INCA364   - 1.
02D8  42D2          MPCR = READFS  - 1.
02D9  8489          CPCR = CNT4MS  - 1.
02DA  E024          LIT  = @24@.
02DB  84BE          CPCR = STRD0   - 1.        ERROR#  E98  ST  WD NOT  0024
02DC  856F          CPCR = EROVER  - 1.
02DD  845F          CPCR = TCWRT   - 1.     DO WRITE OF FF CHAR ON
02DE  846D          CPCR = TCEDI   - 1.     PROTECTED  TAPE  CONTAINING
02DF  84D5          CPCR = DATWRT  + 1.     ONLY 2 CLK BITS  TO TEST
02E0  844B          CPCR = CNT25US   - 1.   EOD RAW BOR GIVES  TE
02E1  845F          CPCR = TCWRT   - 1.
02E2  8575          CPCR = WFURQ   - 1.  WAIT FOR GAP STINT  (ERROR#  E52(E
02E3  E026          LIT  = @26@.          CHECK FOR EOD,FP,&   TE
02E4  84BE          CPCR = STRD0   - 1.  ERROR#  E126  NO GAP/BOR  TE
02E5  856F          CPCR = EROVER  - 1.
02E6  8461          CPCR = TCREAD  - 1.
02E7  846D          CPCR = TCEDI   - 1.
02E8  84A1          CPCR = CNT3SEC   - 1.
02E9  E004          LIT  = @04@.       CHECK FOR NO DATA REQ OR EOD
02EA  84BE          CPCR = STRD0   - 1.        ERROR#  E95  FALSE  START  ERR
02EB  856F          CPCR = EROVER  - 1.
02EC  F0C0          IF  NOT LC2  SKIP.
02ED  F0F6          SET  GC2.
02EE  4523          MPCR = CLRTSEL  - 1.   ***  END OF TEST  4  ***          B
                  /
                  TCTST11.     TEST  11     DO TEST  6  WITH  DATA  = FF
02EF  F006          SET  GC1.
02F0  42F1          MPCR = TCTST6  - 1.
                  TCTST5.      TEST  5   DO TEST  6  WITH  2.9   INCH  GAP
02F1  F019          SET  LC2.
                  TCTST6.          WRITE  FROM LOAD POINT  TO EOT  (DATA  = 55)
                  *                DISPLAY  INCORRECT  STATUS  WORDS IN  IND  4
                  *                DISPLAY  NO OF TAPE  ERRORS  IN  IND  5
02F2  850B          CPCR = RWDWFBOT - 1.
02F3  8499          CPCR = CNT200MS  - 1.
02F4  845F          CPCR = TCWRT   - 1.
02F5  8504          CPCR = WFBOT0  - 1.
02F6  848D          CPCR = CNT70MS  - 1.
02F7  8650          CPCR = ALARM   - 1.
02F8  845F          CPCR = TCWRT   - 1.
02F9  F10F          A1 = 0.
                  NRECRD.
02FA  855D          CPCR = RSTBUF  - 1.
02FB  848D          CPCR = CNT70MS  - 1.
02FC  F0AB          IF  LC2  SET  LC2  ELSE  SKIP.
02FD  8499          CPCR = CNT200MS  - 1.
02FE  846D          CPCR = TCEDI   - 1.
02FF  F058          A3 = LIT.
0300  E03F          LIT  = 63.       64  CHAR PER  RECORD
                  CTST6.
0301  84F5          CPCR = WFSRQ - 2.
0302  F01E          IF  LC3  SKIP.
0303  835B          CPCR = SPO-CON-ERRIND    - 1.                          B
0304  84D3          CPCR = DATWRT  - 1.
0305  F04B          A3 = A3  - 1.
0306  F0B7          IF  NOT AOV  SKIP.
0307  4300          MPCR = CTST6   - 1.
0308  845F          CPCR = TCWRT   - 1.  DISABLE   DATA INT.
0309  8493          CPCR = CNT84MS  - 1.  WAIT FOR LAST  CHAR TO BE WRTN
030A  E020          LIT  = @20@.
030B  84BD          CPCR = STRD0   - 2.
030C  4320          MPCR = T6EOD   - 1.
030D  E028          LIT  = @28@.
030E  84C5          CPCR = SWCMP0  - 2.       CHECK FOR EOD & EOT
030F  4342          MPCR = SPO-CON-END    - 1.
0310  F0F6          SET  GC2.          SET  ERROR FLAG                      B
0311  F051          A3 = B.            SAVE  STATUS  WORD                   B
                  *                          TEST  FOR  C0NS0LE/SP0         B
0312  85AD          CPCR = TESTSPO-CON    - 1.   IF  SPO  + 1  IF  CON  + 2
0313  4316          MPCR = GOTOSPOSTATUS   - 1.                             B
0314  F071          B = A3.                                                 B
0315  8328          CPCR = STATUS  - 1.                                     B
0316  4320          MPCR = T6EOD   - 1.                                     B
                  GOTOSPOSTATUS.
0317  8339          CPCR = SPOSTATUS  - 1.                                  B
0318  8331          CPCR = TEST-EOT-BOT     - 1.                            B
0319  4320          MPCR = T6EOD   - 1.                                     B
                  SETBRJMP.                                               B
031A  F05D          ASE.                                                    B
031B  F080          B = BMAR.                                               B
031C  F07A          B = B1TT.                                               B
031D  F0D5          MAR1 = B.                                               B
031E  F0CE          LMAR.                                                   B
031F  E000          LIT  = 0.                                               B
0320  F0C9          JUMP.                                                   B
                  T6EOD.
0321  845F          CPCR = TCWRT   - 1.          RE-ESTABLISH    CONT  WORD
0322  8563          CPCR = RDYBUTTON  - 1.  END TEST  IF  RDY 0R  INPUT  REQ  B
0323  F008          IF  GC1  SKIP.
0324  42F9          MPCR = NRECRD  - 1.
0325  84D9          CPCR = TCCLR   - 1.    STOP  TAPE  IF  INCR  MODE
0326  848D          CPCR = CNT70MS  - 1.         WRITE  DELAY  IF  TEST  11
0327  845F          CPCR = TCWRT   - 1.
0328  42F9          MPCR = NRECRD  - 1.
                  STATUS.
0329  F023          A2 = AMPCR .
032A  F051          A3 = B.                 SAVE  STATUS  WORD
032B  8530          CPCR = DISPLAYB   - 1.
032C  F14B          B = A3  C.              TEST  FOR  TAPE  ERROR
032D  D100          SAR  = 1.
032E  F0E1          MIR  = B.
032F  F0C3          IF  NOT LST  SKIP.
0330  8526          CPCR = DISPLYERRCNT    - 1.
0331  F102          AMPCR = A2.                                             B
                  TEST-EOT-BOT.
0332  F14B          B = A3  C.
0333  D400          SAR  = 4.         TEST  FOR  EOT  THEN  FOR  BOT
0334  F05F          B.
0335  F0C4          IF  NOT MST  SKIP.
0336  4523          MPCR = CLRTSEL   - 1.       END OF TEST  6
0337  F05F          B.
0338  F0C2          IF  NOT LST  JUMP.
0339  8418          CPCR = CLRERR  - 1.    DRIVE  ERROR
                  *          EOT  NOT DETECTED  OR BOT  SET  INSTEAD  OF EOT
                  *          CHECK  BOT  PHOTO  CELL  & LAMP
                  SPOSTATUS.
033A  F023          A2 = AMPCR.
033B  F0DE          MIR  = A3.
033C  8763          CPCR = WRSREG1  - 1.  PUT STATUS  IN  S  REG  1          B
033D  F14B          B = A3  C.
033E  D100          SAR  = 1.
033F  F0E1          MIR  = B.
0340  F0C3          IF  NOT LST  SKIP.     TEST  FOR  TAPE  ERROR  BIT
0341  F012          A1 = A1  + 1.          INC  ERROR  CNT  IF  SET
0342  4355          MPCR = JUMPTOA2  - 1.                                   B
                  SPO-CON-END.                                            B
0343  84D9          CPCR = TCCLR   - 1.  STOP  TAPE                         B
0344  C000          LIT  = 0  SAR  = 0.          TEST  FOR  CONSOLE/SPO     B
0345  874F          CPCR = TESTFLAGW1   - 1.  +1  IF  C0NS0LE    +2  IF  SP0  B
0346  4523          MPCR = CLRTSEL   - 1.                                   B
0347  F0A2          IF  GC2  SKIP.          GC2  = ERROR                    B
0348  4909          MPCR = MICRO-TOOL.    RESET  ALL  FLAGS  EXCEPT  GC2    B
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0349  F0DB          MIR = A1.                                                    B
034A  F000          WAIT.  MIR = ERROR COUNT-FORCE  STEP TO SEE STATUS           B
034B  8771          CPCR = RDSREG1 - 1.  GET STATUS WORD TO B                    B
034C  F01F          RESET GC2.                                                   B
034D  F0E1          MIR = B.                                                     B
034E  F000          WAIT.  MIR = STATUS-FORCE  STEP TO GO TO TEST SELECT         B
034F  4909          MPCR = MICRO-TOOL.  RESET ALL FLAGS EXCEPT GC2               B
                SPO-CON-ERRCNT.
0350  F023          A2 = AMPCR.                                                  B
0351  F05F          B.                                                           B
                *                                  TEST FOR CONSOLE/SPO         B
0352  85AD          CPCR = TESTSPO-CON - 1.  IF SPO + 1 IF CON + 2
0353  4358          MPCR = SP0ERRCNT - 1.                                        B
0354  8526          CPCR = DISPLYERRCNT - 1.  ERR CNT & STATUS TO IND            B
                STRDJMPTOA2.      DO STATUS READ THEN JUMP TO A2                 B
0355  F096          DR1 BEX.        SELECT TC                                    B
                JUMPTOA2.
0356  F102          AMPCR = A2.                                                  B
0357  F05F          B.                                                           B
0358  F0C9          JUMP.                                                        B
                SP0ERRCNT.                                                       B
0359  F012          A1 = A1 + 1.          INC ERROR CNT                          B
                SETGC2JMPTOA2.                                                   B
035A  F0F6          SET GC2.                                                     B
035B  4355          MPCR = JUMPTOA2 - 1.
                SPO-CON-ERRIND.
035C  F023          A2 = AMPCR.                                                  B
035D  F05F          B.                                                           B
                *                                  TEST FOR SP0/CONSOLE         B
035E  85AD          CPCR = TESTSPO-CON - 1.  IF SPO + 1 IF CON + 2
035F  4359          MPCR = SETGC2JMPTOA2 - 1.  SET ERROR FLAG & EXIT             B
0360  F0A2          IF GC2 SKIP.                                                 B
0361  86AF          CPCR = LITEINDA - 1.  CLR TEST NO FROM A IND                 B
0362  E000          LIT = 0.                ON FIRST PASS THRU                   B
0363  853F          CPCR = ERRIND - 1.                                           B
0364  4354          MPCR = STRDJMPTOA2 - 1.                                      B
                SPO-CON-DISPLYB.                                                 B
0365  F023          A2 = AMPCR.                                                  B
0366  F051          A3 = B.          SAVE STATUS IN A3                           B
0367  F0F6          SET GC2.         SET ERROR FLAG                              B
0368  85AD          CPCR = TESTSPO-CON - 1.  IF SPO + 1 IF CON + 2
0369  436C          MPCR = SP0-DISPLYB - 1.                                      B
036A  F071          B = A3.          REST0RE STATUS T0 B                         B
036B  8530          CPCR = DISPLAYB - 1.                                         B
036C  4355          MPCR = JUMPTOA2 - 1.                                         B
                SP0-DISPLYB.                                                     B
036D  F0DE            MIR = A3.                                                  B
036E  8763          CPCR = WRSREG1 - 1.  PUT STATUS IN S REG 1                   B
036F  4354          MPCR = STRDJMPTOA2 - 1.                                      B
                TCTST12.    TEST 12    DO TEST 8 WITH DATA = FF
0370  F006          SET GC1.
0371  4372          MPCR = TCTST8 - 1.
                TCTST7.   TEST 7 * DO TEST 8 IN HI-SPD  INCREMENTAL MODE
0372  F019          SET LC2.
                TCTST8.    READ TO EOT-DISPLAY   INCORRECT STATUS
                *                  IN IND4 & DATA ERROR CNT IN IND5
                *                  LITE ERROR IND FOR ANY ERROR
                *                  GO TO TEST SELECT AT END.
                *                                  TERMINATE BY READY BUTTON
0373  850B          CPCR = RWDWFBOT - 1.      REWIND & WAIT FOR BOT
0374  8499          CPCR = CNT200MS - 1.
0375  F10F          A1 = 0.                 CLEAR ERROR COUNT
0376  8461          CPCR = TCREAD - 1.
0377  8504          CPCR = WFBOT0 - 1.
0378  8650          CPCR = ALARM - 1.
                CRDINC.
0379  8461          CPCR = TCREAD - 1.        READ
037A  8563          CPCR = RDYBUTTON - 1.
037B  F0AB          IF LC2 SET LC2 ELSE SKIP.
037C  8473          CPCR = TCHISPD - 1.
037D  846D          CPCR = TCEDI - 1.         ENABLE DATA INT
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037E  F058          A3 = LIT.                                                    B
037F  C03F          LIT = 63 SAR = 0.                                            B
0380  F05F          B.                                                           B
0381  C100          LIT = 0 SAR = 1.     WAIT FOR FIRST DINT OF RECORD           B
0382  F0AB          IF LC2 SET LC2 ELSE SKIP.     IF TEST 8 ALLOW 260MS          B
0383  E004          LIT = 4.                      IF TEST 7 ALLOW 780MS          B
0384  F01A          SET LC3.                                                     B
0385  84F7          CPCR = WFSRQ.                                                B
                RNCHAR.                READ NEXT CHAR                            B
0386  84F5          CPCR = WFSRQ - 2.  IF 2 M.S.  W/0 SRQ                        B
0387  F01E          IF LC3 SKIP.           DO READ BUT LITE ERROR IND            B
0388  835B          CPCR = SPO-CON-ERRIND - 1.                                   B
0389  E055          LIT = @55@.                                                  B
038A  F0BB          IF NOT GC1 SKIP.                                             B
038B  E0FF          LIT = @FF@.       IF TEST 12 TEST DATA FOR FF                B
038C  84CF          CPCR = DATRD - 2.   IF TEST 8 TEST FOR 55                    B
038D  F01E          IF LC3 SKIP.                IF NO INC & DISPLAY              B
038E  834F          CPCR = SPO-CON-ERRCNT - 1.                                   B
038F  F04B          A3 = A3 - 1.                                                 B
0390  F0B7          IF NOT AOV SKIP.                                             B
0391  4385          MPCR = RNCHAR - 1.                                           B
0392  8489          CPCR = CNT4MS - 1.                                           B
0393  E020          LIT = @20@.         CHECK FOR ST WD = GAP (0020)             B
0394  84BD          CPCR = STRD0 - 2.                                            B
0395  4399          MPCR = TSTLC2 - 1.          YES                              B
0396  C301          LIT = 1 SAR = 3.            NO- TEST EOT BIT = 1             B
0397  854E          CPCR = STBITCK - 2.                                          B
0398  4342          MPCR = SPO-CON-END - 1.  YES- END TEST                       B
0399  8364          CPCR = SPO-CON-DISPLYB - 1.                                  B
                TSTLC2.
039A  F0AC          IF LC2 SET LC2 SKIP.                                         B
039B  4378          MPCR = CRDINC - 1.                                           B
039C  84D9          CPCR = TCCLR - 1.           STOP TAPE                        B
039D  8499          CPCR = CNT200MS - 1.                                         B
039E  4378          MPCR = CRDINC - 1.          CONTINUE INCR READ               B
                TCTST13.                                                         B
039F  F006          SET GC1.                                                     B
                TCTST10.                        TEST 9 OR 10                     B
03A0  850B          CPCR = RWDWFBOT - 1.                                         B
03A1  8461          CPCR = TCREAD - 1.          BEGIN TEST 10                    B
03A2  8504          CPCR = WFBOT0 - 1.                                           B
03A3  F0C0          IF NOT LC2 SKIP.                                             B
03A4  43B7          MPCR = TCTST9 - 1.          GO TO TEST 9                     B
03A5  8473          CPCR = TCHISPD - 1.         MOVE TO CENTER (TEST10)  OR      B
                *                               3/4 POINT (TEST13)  OF TAPE      B
                *                               HI-SPD,  THEN ALTERNATELY        B
                *                               READ LOW SPD FWD,15 SEC          B
                *                               READ LOW SPD REV,15 SEC          B
                *                               TERMINATE BY READY BUTTON        B
03A6  F002          IF GC1 STEP ELSE SKIP.
03A7  84B2          CPCR = CNTPERAM - 1.    WAIT 15MS TIMES AMPCR
03A8  1800          AMPCR = 6144.           92 SEC (TEST 13)
03A9  F008          IF GC1 SKIP.
03AA  84B2          CPCR = CNTPERAM - 1.
03AB  0ED8          AMPCR = 3800.
                RDCENT.
03AC  8461          CPCR = TCREAD - 1.
03AD  8650          CPCR = ALARM - 1.  1 BELL MEANS FORWARD
03AE  84A5          CPCR = CNT15SEC - 1.
03AF  84D9          CPCR = TCCLR - 1.
03B0  8650          CPCR = ALARM - 1.  2 BELLS MEANS REVERSE
03B1  8499          CPCR = CNT200MS - 1.
03B2  846B          CPCR = TCRDREV - 1.
03B3  8650          CPCR = ALARM - 1.
03B4  84A5          CPCR = CNT15SEC - 1.
03B5  84D9          CPCR = TCCLR - 1.
03B6  848D          CPCR = CNT70MS - 1.
03B7  43AB          MPCR = RDCENT - 1.
                TCTST9.                         READ 1ST 5 FT OF TAPE
03B8  8461          CPCR = TCREAD - 1.          FORWARD THEN REVERSE
03B9  8650          CPCR = ALARM - 1.  1 BELL MEANS FORWARD
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03BA  84A5        CPCR  = CNT15SEC   - 1.
03BB  84D9        CPCR  = TCCLR  - 1.
03BC  8650        CPCR  = ALARM - 1.  2 BELLS  MEANS  REVERSE
03BD  8499        CPCR  = CNT200MS   - 1.
03BE  846B        CPCR  = TCRDREV  - 1.
03BF  8650        CPCR  = ALARM - 1.
03C0  84A5        CPCR  = CNT15SEC   - 1.
03C1  84D9        CPCR  = TCCLR  - 1.
03C2  848D        CPCR  = CNT70MS  - 1.
03C3  43B7        MPCR  = TCTST9   - 1.
                  TCTST14.          REWIND  THEN  GO  TO  TEST  SELECT
03C4  850B        CPCR  = RWDWFBOT - 1.
03C5  8650        CPCR  = ALARM - 1.          BELL  INDICATES
03C6  4523        MPCR  = CLRTSEL  - 1.       REWIND  COMPLETE
                  PARERR.
03C7  F0F9        WHEN RDC  BEX.
03C8  F0FF        0  EQV  B.
03C9  F09C        IF  ABT  JUMP.
03CA  F007        A1  = AMPCR.
03CB  F033        A2  = B.
03CC  F07B        B = 0.     IF  AMPCR  IS  0  THIS  IS  EXT  BUSS  ERROR
03CD  F003        A1  EQV  B.
03CE  F0B5        IF  NOT  ABT  SKIP.
03CF  841F        CPCR  = TCERR  - 1.         ERROR#  E2  EXT  BUSS  BIT  = 1
                  *                                          A2  = EXT  BUSS
03D0  841F        CPCR  = TCERR  - 1.         PARITY  OR  ADDRESS  ERROR
                  *                                       GO  TO  FEMT  MTR
                  *                                     A2  = ERROR  CODE
                  *                                     A1  = ERROR  ADDRS
                  ERRIRQ.
03D1  F007        A1  = AMPCR.
03D2  F018        SET  LC1.
03D3  F108        ASR  BEX.        GET  PORT  ADDR  OF  TC  &  STATUS          D
03D4  F0E1        MIR  = B.                                                    D
03D5  F000        WAIT.            ERROR  #E127    UNEXPECTED  IRQ             D
03D6  F07A        B  = BITT.                                                   D
03D7  F0D5        MAR1  = B.                                                   D
03D8  F08D        BMI.                                                         D
03D9  84D9        CPCR  = TCCLR  - 1.         SELECT  TC
03DA  F1AE        IF  NOT  URQ SKIP.
03DB  83DE        CPCR  = DRTCLRERR  - 1.   ERROR  #E5    STINT  = 1           D
03DC  F1AD        IF  NOT  SRQ  SKIP.
03DD  83DE        CPCR  = DRTCLRERR  - 1.   ERROR  #E6     DINT  = 1           D
03DE  83DE        CPCR  = DRTCLRERR  - 1.   ERROR  #E7      IRQ  = 1           D
                  DRTCLRERR.                                                   D
03DF  F096        DR1  BEX.                                                    D
03E0  F0E7        MIR  = B001.             RESET  BUFFER                       D
03E1  F099        DW1.                                                         D
03E2  F0E6        MIR  = 0.                                                    D
03E3  F099        DW1.                     CLEAR  TC                           D
03E4  443A        MPCR  = DIRECTERR  - 1.                                      D
                  E5MSDIA.
03E5  F096        DR1  BEX.
03E6  F007        A1  = AMPCR.
03E7  F018        SET  LC1.
03E8  F1B5        IF  URQ SKIP.
03E9  841F        CPCR  = TCERR  - 1.         ERROR#  E24  5MS  EARLY
03EA  841F        CPCR  = TCERR  - 1.         ERROR#  E31    5M  = 1
                  BOTDIA.          BOT  DIAGNOSTIC
03EB  F007        A1  = AMPCR.
03EC  F018        SET  LC1.    A1  IS  NOW  ERROR  OVER-RIDE   ADDRESS
03ED  849F        CPCR  = CNT2SEC  - 1.
03EE  C400        LIT  = 0  SAR  = 4.     CHECK  FOR  BOT  BIT  = 0
03EF  854E        CPCR  = STBITCK  - 2.
03F0  841A        CPCR  = CLRERR  + 1.        ERROR#  E34    SLOW  FWD  DRIVE
03F1  84D9        CPCR  = TCCLR  - 1.  STOP  TAPE
03F2  848D        CPCR  = CNT70MS  - 1.
03F3  8467        CPCR  = TCRWND  - 1.        REWIND
03F4  84A1        CPCR  = CNT3SEC  - 1.
03F5  8499        CPCR  = CNT200MS  - 1.
03F6  8461        CPCR  = TCREAD  - 1.        MOVE  TAPE  WITH  READ
03F7  84A3        CPCR  = CNT7SEC  - 1.    40  INCH  LEADER  BOT  TIME
03F8  C400        LIT  = 0  SAR  = 4.
03F9  854F        CPCR  = STBITCK  - 1.       ERROR#  E36  NO  FWD/NO  BOT
03FA  8418        CPCR  = CLRERR  - 1.        ERROR#  E33  NO  WRT  DRIVE
                  RWDDIA.
03FB  F007        A1  = AMPCR.
03FC  F018        SET  LC1.    A1  IS  NOW  ERROR  OVER-RIDE   ADDRESS
03FD  C400        LIT  = 0  SAR  = 4.     CHECK  FOR  BOT  = 0
03FE  8550        CPCR  = STBITCK.            ERROR#  E40  NO  REVBOT  STINT
03FF  84A1        CPCR  = CNT3SEC  - 1.
0400  C400        LIT  = 0  SAR  = 4.     CHECK  FOR  BOT  = 0
0401  854F        CPCR  = STBITCK  - 1.       ERROR#  E100  FAST  FWD  DRIVE
0402  8418        CPCR  = CLRERR  - 1.        ERROR#  E101  NO  REV  BOT
                  HI-SPDDIA.
0403  F007        A1  = AMPCR.
0404  F018        SET  LC1.    A1  IS  NOW  ERROR  OVER-RIDE   ADDRESS
0405  849F        CPCR  = CNT2SEC  - 1.
0406  C400        LIT  = 0  SAR  = 4.
0407  854F        CPCR  = STBITCK  - 1.       ERROR#  E50  NO  HISPD  MOTION
0408  8418        CPCR  = CLRERR  - 1.        ERROR#  E51  SLOW  HI-SPD
                  EODDIA.
0409  F007        A1  = AMPCR.
040A  F018        SET  LC1.    A1  IS  NOW  ERROR  OVER-RIDE   ADDRESS
040B  C500        LIT  = 0  SAR  = 5.     CHECK  FOR  EOD  = 0
040C  8550        CPCR  = STBITCK.            ERROR#  E102  NO  EOD  STINT
040D  8491        CPCR  = CNT15MS  - 1.
040E  E020        LIT  = @20@.          CHECK  FOR  EOD  = 1
040F  854F        CPCR  = STBITCK  - 1.       ERROR#  E57  EOD  STATUS  ERR
0410  8418        CPCR  = CLRERR  - 1.        ERROR#  E55   EOD  LATE
                  *                                          SLOW  FWD  DRIVE
                  BKSPDIA.
0411  F007        A1  = AMPCR.
0412  F018        SET  LC1.    A1  IS  NOW  ERROR  OVER-RIDE   ADDRESS
0413  849D        CPCR  = CNT1SEC  - 1.
0414  C401        LIT  = 1  SAR  = 4.     CHECK  FOR  BOT  = 1
0415  854F        CPCR  = STBITCK  - 1.       ERROR#  E44  NO  BKSP  BOT
0416  8418        CPCR  = CLRERR  - 1.        ERROR#  E73  SLOW  REV  DRIVE
                  DATERR.
0417  F017        A1  = B.          SAVE  INCORRECT  DATA
0418  F096        DR1  BEX.      STATUS  READ
                  CLRERR.
0419  F0C1        IF  NOT  LC3  SKIP.
041A  F1E7        RETN.
041B  F0AD        IF  LC3.                RESET  LC3  ON  E  34
041C  F0E7        MIR  = B001.
041D  F099        DW1.                RESET  BUFFER
041E  F0E6        MIR  = 0.
041F  F099        DW1.                CLEAR  DDP  THEN  GO  TO  E
                  TCERR.         COMMON  ERROR  ROUTINE
0420  F0DA        MIR  = AMPCR .
0421  F008        IF  GC1  SKIP.   NO  LOOP  OPTION  DURING  TAPE  MOTION
0422  8455        CPCR  = TEXT  - 1.    CHECK  STATUS  OF  EXT  SWITCH
0423  F0CF        MAR1  = AMPCR.                                             B
0424  0782        AMPCR  = SIMREG2.                                          B
0425  F0F3        MW1.                SAVE  AMPCR  IN  S  REG  2             B
0426  F0E1        MIR  = B.                                                  B
0427  876D        CPCR  = WRSREG3  - 1.  SAVE  B  IN  S  REG  3              B
0428  8650        CPCR  = ALARM - 1.                                         B
0429  C000        LIT  = 0  SAR  = 0.       TEST  FOR  SPO  OR  CONSOLE      B
042A  874F        CPCR  = TESTFLAGW1  - 1.  + IF  CON  +2  IF  SPO           B
042B  853F        CPCR  = ERRIND  - 1.  IF  CON  TURN  ERR  IND  ON          B
042C  F05F        B.   FILLER                                                B
042D  F0CF        MAR1  = AMPCR.                                             B
042E  0782        AMPCR  = SIMREG2.                                          B
042F  F0F1        MR1.                READ  AMPCR  VALUE  FROM  S  REG  2    B
0430  F0D7        MAR1  = BMAR + 1.   ADDRESS  S  REG  3                     B
0431  F0F9        WHEN RDC  BEX.                                             B
0432  F05B        AMPCR  = B.         RESTORE  AMPCR                         B
0433  F05D        ASE.                                                       B
0434  F080        B  = BMAR.          GET  DEVICE  ADDRESS                   B
0435  F07A        B  = BITT.          SET  INST  BIT                         B
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0436  F0F1          MR1.                    READ B VALUE FROM S REG 3          B
0437  F0D5          MAR1 = B.       RESTORE BR1 (OS NOW = BR1)                 B
0438  F0F9          WHEN RDC BEX.                                              B
0439  F0CE          LMAR.           CLEAR MAR                                  B
043A  E000          LIT = 0.                                                   B
              DIRECTERR.                                                       D
043B  F0DA          MIR = AMPCR.                                               B
043C  F000          WAIT.           ERROR-SEE MIR FOR ADDRESS OF ERROR NO      B
              *********                                                        B
043D  F0E1          MIR = B.                                                   B
043E  F000          WAIT.           DISPLAY B                                  B
043F  F0DB          MIR = A1.
0440  F000          WAIT.
0441  F0DD          MIR = A2.
0442  F000          WAIT.
0443  F0DE          MIR = A3.
0444  F000          WAIT.
0445  F0EF          MIR = Z.
0446  F000          WAIT.
              *  FORCE STEP FOR ERROR-RIDE
              *  SUBSEQUENT ERRORS MAY BE RESULT OF ORIGINAL ERROR
0447  F0F6          SET GC2.        LIGHT ERROR IND
0448  F0BE          IF NOT LC1 JUMP.
0449  F05C          AMPCR = A1.
044A  F01A          SET LC3.    MAKE OVER-RIDE LOOK LIKE TEST WAS GOOD
044B  F0C9          JUMP.           ERROR OVER-RIDE
              CNT25US.                        WAIT 20 MICRO-SECONDS
044C  DD00          SAR = 13.
044D  F076          B = B111.
044E  F07C          B = B L.
              TCTIMER.
044F  F023          A2 = AMPCR.
0450  F0F5          SAVE.
0451  F07E          B = B + 1.
0452  F0B4          IF NOT ABT JUMP.
0453  F102          AMPCR = A2.
0454  F0C9          JUMP.
0455  F01A          SET LC3.  IF ERROR DO RETN IN STEAD OF JUMP
              TEXT.           IF EXT SWITCH IS SET LOOP FAILING TEST
              *               IF GC1 = 1 & EXT SWITCH IS SET DO DATA
              *               READ & EXIT WITH RETN
0456  F0BA          IF NOT EXT SKIP.
0457  F0A0          IF EXT SKIP.
0458  F0C9          JUMP.
0459  F0BB          IF NOT GC1 SKIP.  GC1 = 0 FOR TEST 1, = 1 IN 2,3,4
045A  F097          DR2 BEX.  READ DATA BUT DO NOT TEST IT
045B  F18A          IF GC1 RETN.
045C  855C          CPCR = RSTBUF - 2.      RESET BUFFER & CLEAR
045D  F0BC          IF NOT GC2 SKIP.
045E  4085          MPCR = T5MS - 1.
045F  4008          MPCR = BUFTST - 1.
              TCWRT.
0460  C084          LIT = @84@ SAR = 0.     WRITE HIGH THRESHOLD
0461  4481          MPCR = DEVWRT1 - 1.
              TCREAD.
0462  C002          LIT = @02@ SAR = 0.     READ
0463  4481          MPCR = DEVWRT1 - 1.
              TCBKSP.
0464  C001          LIT = @01@ SAR = 0.     BACKSPACE
0465  4481          MPCR = DEVWRT1 - 1.
              TCSFP.
0466  C008          LIT = @08@ SAR = 0.     SET FILE PROTECT
0467  4481          MPCR = DEVWRT1 - 1.
              TCRWND.
0468  C801          LIT = @01@ SAR = 8.     REWIND
0469  4481          MPCR = DEVWRT1 - 1.
              TCERASE.
046A  C802          LIT = @02@ SAR = 8.     ERASE
046B  4481          MPCR = DEVWRT1 - 1.
              TCRDREV.
046C  C003          LIT = @03@ SAR = 0.     READ REVERSE
046D  4481          MPCR = DEVWRT1 - 1.
              TCEDI.          IF LC1 IS SET BIT WILL BE SET ELSE RESET
046E  F018          SET LC1.                ENABLE DATA INTER
046F  D400          SAR = 4.
0470  4478          MPCR = DEVWRT2 - 1.
              TCE5MS.
0471  F018          SET LC1.
0472  D500          SAR = 5.
0473  4478          MPCR = DEVWRT2 - 1.
              TCHISPD.
0474  F018          SET LC1.                SET HI-SPEED BIT
0475  D600          SAR = 6.
0476  4478          MPCR = DEVWRT2 - 1.
              TCHITHR.
0477  F018          SET LC1.
0478  D700          SAR = 7.
              DEVWRT2.            ADJUST 1 CW BIT TO 1 IF LC1 ELSE 0
0479  F08D          BMI.
047A  F07D          B = B C.
047B  F158          B = BTT1.
047C  F014          IF LC1 SKIP.
047D  F075          B = BTT0.
047E  F092          CSAR.
047F  F07D          B = B C.
0480  F0E1          MIR = B.
0481  4483          MPCR = DEVWRT1 + 1.
              DEVWRT1.
0482  F089          B = LIT.
0483  F0E2          MIR = B C.
0484  F099          DW1.
0485  F0C9          JUMP.
              CNT1MS.                         WAIT FOR 1 M.S.
0486  CF69          LIT = 105 SAR = 15.
0487  44A6          MPCR = CNT - 1.
              CNT3MS.                         WAIT FOR 3 M.S.
0488  CED5          LIT = 213 SAR = 14.
0489  44A6          MPCR = CNT - 1.
              CNT4MS.                         WAIT FOR 4 M.S.
048A  CDBF          LIT = 191 SAR = 13.             4.2 MS
048B  44A6          MPCR = CNT - 1.
              CNT5MS.                         WAIT FOR 5 M.S.
048C  C705          LIT = 5 SAR = 7.
048D  44A6          MPCR = CNT - 1.
              CNT70MS.
048E  C743          LIT = 67 SAR = 7.       70 M.S.
048F  44A6          MPCR = CNT - 1.
              CNT32MS.                        WAIT FOR 32 M.S.
0490  C71F          LIT = 31 SAR = 7.
0491  44A6          MPCR = CNT - 1.
              CNT15MS.                        WAIT FOR 15 M.S.
0492  C70F          LIT = 15 SAR = 7.
0493  44A6          MPCR = CNT - 1.
              CNT84MS.                        WAIT FOR 84 M.S.
0494  C753          LIT = 83 SAR = 7.       86.5 M.S.
0495  44A6          MPCR = CNT - 1.
              CNT100MS.                       WAIT FOR 100 M.S.
0496  C763          LIT = 99 SAR = 7.
0497  44A6          MPCR = CNT - 1.
              CNT140MS.                       WAIT FOR 140 M.S.
0498  C789          LIT = 137 SAR = 7.
0499  44A6          MPCR = CNT - 1.
              CNT200MS.                       WAIT FOR 200 M.S.
049A  C7C4          LIT = 196 SAR = 7.
049B  44A6          MPCR = CNT - 1.
              CNT318MS.                       WAIT 318 M.S.
049C  C69A          LIT = 154 SAR = 6.
049D  44A6          MPCR = CNT - 1.
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                CNT1SEC.                                WAIT  FOR  1  SEC.
049E    C4D1        LIT  = 209   SAR  = 4.          1.71    SEC
049F    44A6        MPCR = CNT - 1.
                CNT2SEC.                                WAIT  FOR  2  SEC.
04A0    C4FF        LIT  = 255   SAR  = 4.                      2.1     SEC
04A1    44A6        MPCR = CNT - 1.
                CNT3SEC.                        WAIT  FOR  3  SECONDS
04A2    C267        LIT  = 103   SAR  = 2.        3.4    SEC
04A3    44A6        MPCR = CNT - 1.
                CNT7SEC.                        WAIT  FOR  7  SEC
04A4    C2C4        LIT  = 196   SAR  = 2.        6.45    SEC
04A5    44A6        MPCR = CNT - 1.
                CNT15SEC.
04A6    C072        LIT  = 114   SAR  = 0.        15   SEC
                CNT.     SAR  = COUNT  CYCLE  TIME,   LIT  = NO OF CYCLES
04A7    F023        A2  = AMPCR.
04A8    F0CA        LCTR.                   SET  NO OF CYCLES
04A9    F076        B  = B111.
04AA    F07C        B  = B  L.
04AB    F0F5        SAVE.
04AC    F07E        B  = B  + 1.
04AD    F0B6        IF  NOT  AOV  JUMP.
04AE    F030        INC.
04AF    F02E        IF  COV  SKIP.
04B0    44A8        MPCR = CNT + 1.
04B1    F102        AMPCR = A2.             RESTORE  CALLER  ADDRS
04B2    F0C9        JUMP.
                CNTPERAM.                       WAIT  PER  CONTENTS  OF  AMPCR
04B3    F007        A1  = AMPCR.
04B4    F09A        EXEC.               GET  TIME  VALUE
04B5    F041        A3  = AMPCR.
04B6    F05F        B.
                CCNTLP.
04B7    8491        CPCR  = CNT15MS  -  1.
04B8    F04B        A3  = A3  -  1.
04B9    F0B7        IF  NOT  AOV  SKIP.
04BA    44B6        MPCR = CCNTLP  -  1.
04BB    F05C        AMPCR = A1.
04BC    F05F        B.
04BD    F0C9        JUMP.
04BE    F01A        SET  LC3.
                STRD0.          STATUS  READ  &  CMP  W/  LIT-DATA    REQ  =  0
04BF    F096        DR1  BEX.
04C0    F033        A2  = B.          STORE  STATUS  WORD  IN  A2
04C1    44C7        MPCR = SWCMP0.
                STRD1.          STATUS  READ  P  CMP  W/  LIT-DATA    REQ  =  1
04C2    F096        DR1  BEX.
                SWCMP1.  COMPARE  STATUS  WD TO LIT  WITH  MSB  =  1
04C3    F033        A2  = B.          STORE  STATUS  WORD  IN  A2
04C4    F079        B  = B100.
04C5    44C8        MPCR = SWCMP0  + 1.
04C6    F01A        SET  LC3.
                SWCMP0.  COMPARE  STATUS  WD TO LIT  WITH  MSB  =  0
04C7    F033        A2  = B.
04C8    F07B        B  = 0.
04C9    F087        B  = LIT  OR  B.
04CA    F116        A2  EQV  B.
04CB    F09C        IF  ABT  JUMP.
04CC    F0DD        MIR = A2.         PUT  STATUS  WORD  BACK  INTO  B
04CD    F033        A2  = B.          PUT  EXPECTED  STATUS  INTO  A2
04CE    F08D        BMI.
04CF    4418        MPCR = CLRERR  -  1.
04D0    F01A        SET  LC3.
                DATRD.
04D1    F097        DR2  BEX.
04D2    F033        A2  = B.
04D3    44C7        MPCR = SWCMP0.
                DATWRT.
04D4    E055        LIT  = @55@.
04D5    F0BB        IF  NOT  GC1  SKIP.
04D6    E0FF        LIT  = @FF@.        IF  TEST  12  WRITE  FF-TEST    6  WRT 55
04D7    F0EA        MIR  = LIT.
04D8    F098        DW2.
04D9    F0C9        JUMP.
                TCCLR.
04DA    C000        LIT  = 0  SAR  = 0.
04DB    4481        MPCR = DEVWRT1  -  1.
                RDREVCMPA3.
04DC    F023        A2  = AMPCR.
04DD    F097        DR2  BEX.
04DE    F05F        B.
04DF    8512        CPCR  = DATREV  -  1.
04E0    F102        AMPCR = A2.
04E1    F03C        A3  EQV  B.
04E2    F09C        IF  ABT  JUMP.
04E3    4416        MPCR = DATERR  -  1.
                DRDCMPA3.       DATA  READ  &  COMPARE  WITH  A3
04E4    F023        A2  = AMPCR.
04E5    F05F        B.
04E6    84F6        CPCR  = WFSRQ  -  1.  ERROR    NOTE  THE  OCCURRENCE  OF
                *                                   THIS  ERROR  (E122)
                *                                   FORCE  STEP  3  TIMES
                *                                   SEE  M1R  FOR  MICRO  ADDRS
                *                                   OF  NEXT  ERROR  #
04E7    F102        AMPCR = A2.
04E8    F097        DR2  BEX.
04E9    F03C        A3  EQV  B.
04EA    F09C        IF  ABT  JUMP.
04EB    F008        IF  GC1  SKIP.
04EC    441F        MPCR = TCERR  -  1.
04ED    4416        MPCR = DATERR  -  1.
                DWRTA3.         DATA  WRITE  FROM  A3
04EE    F023        A2  = AMPCR.
04EF    F0DE        MIR  = A3.
04F0    84F6        CPCR  = WFSRQ  -  1.  ERROR  NOTE  THE  OCCURRENCE  OF
                *                                   THIS  ERROR  (E122)
                *                                   FORE  STEP  3  TIMES
                *                                   SEE  MIR  FOR  MICRO  ADDRS
                *                                   OF  NEXT  ERROR  #
04F1    F102        AMPCR = A2.
04F2    F098        DW2.                DATA  WRITE
04F3    F0C9        JUMP.
                WFSRQD.
04F4    C00E        LIT  = 14  SAR  = 0.     ALLOW  4  SEC  FOR  DINT
04F5    44F7        MPCR = WFSRQ.
04F6    F01A        SET  LC3.
                WFSRQ.          WAIT  2  MILLI-SECONDS     FOR  SRQ  ELSE  ERROR
04F7    C800        LIT  = 0  SAR  = 8.     LIT  = NO OF ITERATIONS    - 2
04F8    F0CA        LCTR.                   SAR  = PER1OD*0=262MS     1=131MS    ETC
04F9    F076        B  = B111.
04FA    F07C        B  = B  L.
04FB    F1AD        IF  NOT  SRQ  SKIP.
04FC    F0C9        JUMP.
04FD    F07E        B  = B  + 1.
04FE    F09E        IF  AOV  SKIP.
04FF    44FA        MPCR = WFSRQ  + 3.
0500    F0C8        INC  IF  COV  SKIP.
0501    44F8        MPCR = WFSRQ  + 1.
0502    4418        MPCR = CLRERR  -  1.
                WFBOT1.         WAIT  FOR  BOT  =  1
0503    C401        LIT  = 1  SAR  = 4.
0504    F0F7        SKIP.
                WFBOT0.         WAIT  FOR  BOT  =  0
0505    C400        LIT  = 0  SAR  = 4.
0506    F096        DR1  BEX.
0507    F07F        B  = B R.  CLEAR  ALL  BITS   EXCEPT  BOT
0508    F157        B  = BT0T.
0509    F0CB        LIT  EQV  B.
050A    F09C        IF  ABT  JUMP.
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050B  4505          MPCR = WFBOT0.
                RWDWFBOT.          REWIND AND WAIT FOR BOT
050C  F023          A2 = AMPCR.
050D  F05F          B.
050E  8467          CPCR = TCRWND - 1.
050F  8502          CPCR = WFBOT1 - 1.
0510  F102          AMPCR = A2.
0511  F05F          B.
0512  F0C9          JUMP.
                DATREV.
0513  F01B          A1 = B L.
0514  C908          LIT = 8 SAR = 9.
0515  F0CA          LCTR.
0516  F07B          B = 0.
                CDATREV.
0517  CF00          LIT = 0 SAR = 15.
0518  F00B          A1 = A1 L.
0519  F011          A1 = A1 + LIT.(LIT      = 0)
051A  F0C4          IF NOT MST SKIP.
051B  F07A          B = BITT.
051C  F092          CSAR.
051D  F07F          B = B R.
051E  F030          INC.
051F  F02E          IF COV SKIP.
0520  4516          MPCR = CDATREV - 1.
0521  F07F          B = B R.
0522  D600          SAR = 6.
0523  F0C9          JUMP.
                CLRTSEL.
0524  84D9          CPCR = TCCLR - 1.          STOP TAPE-GO TO TEST SEL
0525  F05F          B.          FILLER                                    B
0526  4909          MPCR = MICRO-TOOL.    RESET ALL FLAGS EXCEPT GC2      B
                DISPLYERRCNT.
0527  F0F6          SET GC2.          SET ERROR FLAG                    B
0528  F012          A1 = A1 + 1.
0529  F066          B = A1.
052A  F07D          B = B C.
052B  D800          SAR = 8.
052C  F018          SET LC1.
052D  F07D          B = B C.
052E  F0C3          IF NOT LST SKIP.     RESET ERROR AT 256
052F  F07B          B = 0.
0530  F017          A1 = B.
                DISPLAYB.
0531  C890          LIT = @90@ SAR = 8.  A1 IS DISPLAYED IN IND 5
0532  F014          IF LC1 SKIP.
0533  E088          LIT = @88@.                B IS DISPLAYED IN IND 4
0534  F07D          B = B C.
0535  F087          B = LIT OR B.
0536  F0E2          MIR = B C.
0537  F060          B = AMPCR.                                           B
0538  F0CF          MAR1 = AMPCR.                                        B
0539  06DE          AMPCR = CONTPORTADDRESS.
053A  F05B          AMPCR = B.                                           B
053B  F0F1          MR1.
053C  F0F9          WHEN RDC BEX.                                        B
053D  F078          B = B0TT.                                            B
053E  F0D5          MAR1 = B.                                            B
053F  F099          DW1.
                ERRIND.                    TURN ON ERROR IND
0540  F0F6          SET GC2.          REMEMBER ERROR IND IS ON
0541  F0CA          LCTR.
0542  E07E          LIT = @7E@.
0543  F0EF          MIR = Z.
0544  E004          LIT = 4.
0545  F060          B = AMPCR.                                           B
0546  F0CF          MAR1 = AMPCR.                                        B
0547  06DE          AMPCR = CONTPORTADDRESS.                             B
0548  F05B          AMPCR = B.                                           B
0549  F0F1          MR1.                                                 B
054A  F0F9          WHEN RDC BEX.                                        B
```

```
054B  F078          B = B0TT.                                            B
054C  F0D5          MAR1 = B.                                            B
054D  F099          DW1.
054E  4319          MPCR = SETBRJMP - 1.                                 B
054F  F01A          SET LC3.
                STBITCK.
0550  F096          DR1 BEX.
0551  F0E1          MIR = B.              SAVE STATUS WORD
0552  F07F          B = B R.
0553  F157          B = BT0T.
0554  F078          B = B0TT.        CLR MSB IN CASE OF SAR = 0
0555  F05F          B.
0556  F0CB          LIT EQV B.
0557  F09D          IF ABT SKIP.
0558  455A          MPCR = STBITERR - 1.
0559  F08D          BMI.                RESTORE STATUS WORD
055A  F0C9          JUMP.
                STBITERR.
055B  F08D          BMI.                RESTORE STATUS WORD
055C  4418          MPCR = CLRERR - 1.
055D  F0E6          MIR = 0.
                RSTBUF.                 SEND BKSPACE TO RESET BUFFER
055E  F08D          BMI.                THEN SEND CURRENT CONT WORD
055F  F0E7          MIR = B001.
0560  F099          DW1.
0561  F0E1          MIR = B.
0562  F099          DW1.
0563  F0C9          JUMP.
                RDYBUTTON.
0564  F1AC          IF NOT IRQ JUMP.
0565  4342          MPCR = SPO-CON-END - 1.                              B
                SETDAT.                 MOVE A1 TO A3 BLANKING UPPER 8 BITS
0566  F042          A3 = A1.
0567  F045          A3 = A3 L.
0568  D800          SAR = 8.
0569  F046          A3 = A3 R.
056A  F0C9          JUMP.
                SHFTDAT.                SHIFT DATA PATERN 1 RIGHT
056B  F00D          A1 = A1 R.          IF SHFTD DATA IS 80 DO RETN
056C  C108          LIT = 8 SAR = 1.
056D  F111          A1 EQV LIT.
056E  F0B4          IF NOT ABT JUMP.
056F  F1E7          RETN.
                EROVER.
0570  F19F          IF NOT GC2 JUMP.
0571  84D9          CPCR = TCCLR - 1.
0572  848D          CPCR = CNT70MS - 1.
0573  42C3          MPCR = FSTART + 1.
                WFURQD.
0574  C004          LIT = 4 SAR = 0.
0575  4576          MPCR = WFURQ.
```

```
                INCA3256.
0582  D800          SAR  = 8.
0583  F0F7          SKIP.
                INCA364.                INC  A3  THEN  JUMP  UNTIL  COUNT  IS
0584  D600          SAR  = 6.           REACHED  THEN  RETN
0585  F04C          A3   = A3  + 1.
0586  F072          B    = A3  R.
0587  F05F          B.
0588  F0C2          IF  NOT  LST  JUMP.
0589  F1E7          RETN.
                DECA364.
058A  D600          SAR  = 6.           DEC  A3  THEN  JUMP  UNTIL  COUNT  IS
058B  F04B          A3   = A3  -  1.    REACHED  THEN  RETN
058C  F072          B    = A3  R.
058D  F05F          B.
058E  F0B1          IF  LST  JUMP.
058F  F1E7          RETN.
                *
                DESELECT.                       WRITE  TO  PORT  16
0590  F05D          ASE.
0591  F080          B    = BMAR.
0592  F08F          BR2  = LIT  L.
0593  C80F          LIT  = 15  SAR  = 8.
0594  F098          DW2.
0595  F16E          BR2  = B.
0596  F0C9          JUMP.
                OPERATOR-ALERT.                 SOUND  ALARM  THEN  WAIT  WITH          B
0597  F0DA          MIR  = AMPCR.               ADDRESS  OF  OPERATOR  INSTRUCTION      B
0598  F05F          B.                          IN  MIR                                 B
0599  86DE          CPCR  = STACK  -  1.                                                B
059A  8650          CPCR  = ALARM  -  1.                                                B
059B  8724          CPCR  = RDSTACKAMPCRTOB  -  1.  GET  AMPCR  FROM  STACK             B
059C  F0E1          MIR  = B.                                                           B
059D  F000          WAIT.  *****    OPERATOR  ACTION  REQUIRED                          B
                *                   SEE  MIR  FOR  ADDRESS  OF  INSTRUCTION         B
059E  46FB          MPCR  = UNSTACKRESTOREA  -  1.                                      B
                TESTTABLE.
059F  F019          SET  LC2.       TEST  0  -  D0  TESTS  1  THRU  4  SEQUENTIALLY
05A0  4007          MPCR  = TCTST1   -  1.
05A1  40D2          MPCR  = TCTST2   -  1.
05A2  413C          MPCR  = TCTST3   -  1.
05A3  41AE          MPCR  = TCTST4   -  1.
05A4  42F0          MPCR  = TCTST5   -  1.
05A5  42F1          MPCR  = TCTST6   -  1.
05A6  4371          MPCR  = TCTST7   -  1.
05A7  4372          MPCR  = TCTST8   -  1.
05A8  F019          SET  LC2.
05A9  439F          MPCR  = TCTST10   -  1.
05AA  42EE          MPCR  = TCTST11   -  1.
05AB  436F          MPCR  = TCTST12   -  1.
05AC  439E          MPCR  = TCTST13   -  1.
05AD  43C3          MPCR  = TCTST14   -  1.




                TESTSPO-CON.
05AE  C001          LIT  = 1  SAR  = 0.
05AF  474F          MPCR  = TESTFLAGW1   -  1.
                STARTCONTROLLER.                START  FROM  SYSTEM  CLEAR
05B0  F17D          DLD.                        READ  CONFIGURATION  CARD
05B1  F0F9          WHEN RDC  BEX.
05B2  F0E1          MIR  = B.           SYSTEM  CONFIGURATION  IN  MIR
05B3  F017          A1   = B.
05B4  F0F9          WHEN RDC  BEX.
05B5  F0FF          0  EQV  B.
05B6  F09D          IF  ABT  SKIP.
05B7  F000          WAIT.               CONFIG  FF  NOT  RESET  BY  BEX-
                **********              FAILURE  IS  CON1  CHIP  D7
```

```
05B8  F0F8          WHEN IRQ.                   PROG  STEP  0                       B
                *  VERIFY  CORRECT  SYSTEM  CONFIGURATION  DISPLAYED  IN  MIR
                *  IF  YES,-  PUSH  READY  BUTTON  ON  CONSOLE  OR
                *  INPUT  REQUEST  ON  SPO
                *  IF  NO FORCE  STEP  THEN  METER  CON1  CARD  PIN  2K
                *   IF  0%  REPLACE  CHIPS  D5,D3,C7,D7      ON  CON1  CARD
                *   IF  NOT  0%  REPLACE  CHIPS  D5,A5,A7,F5,F7      ON  CON1  CARD
05B9  F18E          IF  IRQ  SKIP.
05BA  461E          MPCR  = CON1LOOP  -  1.
                *
05BB  F108          ASR  BEX.
05BC  F051          A3  = B.            SAVE  CONTROLLER  ADDRESS
05BD  F07A          B  = BITT.          SET  STATUS  WORD DATA  REQUEST  BIT
05BE  C820          SAR  = 8  LIT  = @20@.
05BF  F07F          B  = B  R.
05C0  F036          A2  = B  L.         CLEAR  BITS  9-16
05C1  F066          B  = A1.  SYSTEM  CONFIGURATION  FOR  SPO-CONSOLE  CHECK
05C2  F0C3          IF  NOT  LST  SKIP.     SPO-CONSOLE  CHECK
05C3  E000          LIT  = 0.               SPO  ON  SYSTEM
05C4  F1CC          MIR  = A2  OR  LIT.
                *  FOR  SPO  CONTPORTADDRESS        = 1000XXXX00000000
                *  FOR  CONSOLE  CONTPORTADDRESS    = 1000XXXX00100000
05C5  F0CF          MAR1  = AMPCR.
05C6  06DE          AMPCR  = CONTPORTADDRESS.
05C7  F0F3          MW1.                STORE  CONTROLLER  PORT  ADDRESS
05C8  8693          CPCR  = CLEARFLAGS  -  1.       CLEAR  ALL  FLAGS
05C9  86A2          CPCR  = SETCONTADDRS  -  1.
05CA  871D          CPCR  = INITMAINSTACK  -  1.    SET  MAIN  STACK  ADDRESS
05CB  05D1          AMPCR  = CONSPORTSELECT  -  1.
                **
05CC  F0DE          MIR  = A3.
05CD  F066          B  = A1.  SYSTEM  CONFIGURATION  FOR  SPO-CONSOLE  CHECK
                *  REMOVE  WHEN  SYS  CONF.  CARD  INSTALLED
                **
05CE  F0C2          IF  NOT  LST  JUMP.
05CF  C001          SAR  = 0  LIT  = 1.
                *  SET  FLAG  0  IN  FLAG  WORD  1  TO  1  FOR  SPO,  0  FOR  CONSOLE
05D0  8735          CPCR  = SETFLAGW1  -  1.
05D1  4621          MPCR  = SPOPORTSELECTP  -  1.
                *
                 CONSPORTSELECT.
                *  CONSOLE  ON  SYSTEM
                *  PORT  SELECT,  OPERATOR  ENTERS  PK  1-12  TO  INDICATE-
                *  THE  PORT  NUMBER  OF  THE  DEVICE  TO  BE  TESTED
                *
05D2  86A2          CPCR  = SETCONTADDRS  -  1.
05D3  F1D5          MIR  = B001  + 1.       ENABLE  KEYBOARD
05D4  F099          DW1.
05D5  86AF          CPCR  = LITEINDA  -  1.
05D6  E0FF          LIT  = @FF@.                LIGHT  PK  1-8
05D7  86B5          CPCR  = LITEINDB  -  1.
05D8  E00F          LIT  = @0F@.            LIGHT  PK  9-12
                *  GET  PORT  NUMBER  (PK  KEY  1-12)
05D9  86C3          CPCR  = SELECTPORT  -  1.
05DA  F017          A1  = B.            SAVE  PORT  ADDRESS
05DB  86AF          CPCR  = LITEINDA  -  1.
05DC  E000          LIT  = 0.                   TURN  OFF  PK  1-8
05DD  86B5          CPCR  = LITEINDB  -  1.
05DE  E000          LIT  = 0.                   TURN  OFF  PK  9-11
05DF  F066          B  = A1.        PORT  ADDRESS  TO  B  FOR  SAVEPORT
                 STOREPORT.         FROM  SPO  PORT  SELECT
05E0  86CA          CPCR  = CSAVEPORT  -  1.    SAVE  PORT  ADDRESS
05E1  CF01          SAR  = 15  LIT  = 1.        SET  FLAG  15  TO  INDICATE-
05E2  8735          CPCR  = SETFLAGW1  -  1.    PORT  HAS  BEEN  SELECTED
                *  PRINT  TEST  SELECT  MESSAGE  FOR  FIRST  ENTRY  TO  SPO-
                *  TEST  SELECT
05E3  85AD          CPCR  = TESTSPO-CON  -  1.      +1  IF  SPO  +2  IF  CON
05E4  463C          MPCR  = SPOTESTSELECTP  -  1.   TRUE  RETURN  SPO
```

```
                *
                 TESTSELECTCLEAR.              PROGRAM JUMPS HERE TO CLEAR-
                * MEMORY FLAG WORDS 2,3,AND  4 BEFORE ALLOWING THE-
                * OPERATOR TO SELECT A TEST.    MEMORY FLAG WORD 1 AND-
                * THE PORT ADDRESS ARE NOT CHANGED.
05E5  869C          CPCR = CLEARFW2-3-4    - 1.
                 TESTSELECT.                   PROGRAM JUMPS HERE TO ALLOW THE-
                *                 OPERATOR TO SELECT A TEST.    THE MEMORY-
                *                 FLAG WORDS ARE NOT CHANGED.
05E6  86A2          CPCR = SETCONTADDRS  - 1.
05E7  F096          DR1 BEX.          RESET STATUS INTERRUPT
05E8  85AD          CPCR = TESTSPO-CON   - 1.     +1 IF SPO  +2 IF CON
05E9  463E          MPCR = SPOTESTSELECT   - 1.   SPO ON SYSTEM
                *
                * CONSOLE ON SYSTEM
05EA  F1D5          MIR = B001   + 1.     ENABLE KEYBOARD
05EB  F099          DW1.
                *
05EC  86B7          CPCR = LITEINDS   - 1.
05ED  E008          LIT  = 8.             LIGHT NUMERIC INDICATOR
05EE  F0BC          IF NOT GC2 SKIP.
05EF  86B7          CPCR = LITEINDS   - 1.
05F0  E00C          LIT  = @0C@.    KEEP ERROR IND ON IF GC2 = 1
                * GET FIRST DIGIT OF TEST NUMBER (10  S DIGIT)
05F1  86C5          CPCR = SELECTTEST   - 1.
05F2  F051          A3 = B.           SAVE (10  S DIGIT)
                *
                * GET SECOND DIGIT OF TEST NUMBER (1  S DIGIT)
05F3  86C5          CPCR = SELECTTEST   - 1.
                *
05F4  86B7          CPCR = LITEINDS   - 1.
05F5  E000          LIT  = 0.             TURN OFF NUMERIC INDICATOR
                *
                 TENSLOOPCHECK.
                * IF STATUS INT.  GO TO MEMORY-MODIFY (FOR ANY TEST #)
05F6  F1B5          IF URQ SKIP.
05F7  45FB          MPCR = CTESTL  - 1.
                *
05F8  F096          DR1 BEX.          RESET STATUS INTERRUPT
05F9  85AD          CPCR = TESTSPO-CON   - 1.     +1 IF SPO  +2 IF CON
05FA  4798          MPCR = SPO-MEM-MOD   - 1.   SPO MEMORY MODIFY
05FB  4817          MPCR = MEMORY-MODIFY  - 1.  CONSOLE MEMORY MODIFY
                *
                 CTESTL.
                * TEST TENS DIGIT FOR 0 THRU 9
05FC  E00A          LIT  = 10.
05FD  F032          A2 = A3.
05FE  F11B          A2 - LIT.
05FF  F0B7          IF NOT AOV SKIP.
0600  464E          MPCR = INVALIDTEST   - 1.
                * TEST ONES DIGIT FOR 0 THRU 9
0601  F033          A2 = B.
0602  F11B          A2 - LIT.
0603  F0B7          IF NOT AOV SKIP.
0604  464E          MPCR = INVALIDTEST   - 1.
                *
                 TENSLOOP.
0605  F04B          A3 = A3 - 1.
0606  E00A          LIT  = 10.
0607  F09E          IF AOV SKIP.
0608  460A          MPCR = ENDTENSLOOP   - 1.
0609  F083          B = LIT  + B.
060A  4604          MPCR = TENSLOOP   - 1.
                *
                 ENDTENSLOOP.
060B  F017          A1 = B.                   SAVE TEST NUMBER
                * INSURE THAT TEST NUMBER IS NOT GREATER THAN THE UPPER
                * LIMIT FOR THIS MTR (SEE DEFINE TESTNUMBERLIMIT)
060C  E00E          LIT  = TESTNUMBERLIMIT.
060D  F109          A1 - LIT  - 1.
060E  F0B7          IF NOT AOV SKIP.
060F  464E          MPCR = INVALIDTEST   - 1.     ILLEGAL TEST NUMBER
                *
0610  F082          B = LIT  L.
0611  C890          LIT  = @90@  SAR = 8.  DISPLAY TEST# IN IND A          B
0612  F0DC          MIR = A1 + B.
0613  F098          DW2.
                * DISABLE SYSTEM CONTROLLER (SPO OR CONSOLE)
0614  F0E6          MIR = 0.
0615  F099          DW1.
                * INSURE THAT BOTH STATUS AND DATA INTERRUPTS FROM SPO-
                * OR CONSOLE ARE CLEARED BEFORE JUMPING TO MTR
0616  F096          DR1 BEX.          RESET STATUS INTERRUPT
0617  F097          DR2 BEX.          RESET DATA INTERRUPT
0618  86B5          CPCR = LITEINDB   - 1.
0619  E000          LIT  = 0.                 CLEAR B IND
061A  86B9          CPCR = SETPORTADDR  - 1.  BR1 = INST.  BR2 = DATA
061B  059E          AMPCR = TESTTABLE   - 1.
061C  F100          AMPCR = A1 + AMPCR.
061D  F01F          RESET GC2.            CLEAR ERROR FLAG
061E  F0C9          JUMP.
                / SUBROUTINES
                * LOOP USED TO METER PIN 2K (TP 92) ON CON1 CARD
                 CON1LOOP.
061F  F17D          DLD.
0620  F0F9          WHEN RDC BEX.
0621  461E          MPCR = CON1LOOP   - 1.
                *
                *
                 SPOPORTSELECTP.
                * ENTER HERE TO PRINT SELECT PORT MESSAGE
0622  866D          CPCR = SPOPRINT   - 1.
0623  072E          AMPCR = PORTPRINT.
                 SPOPORTSELECT.
                * ENTER HERE TO AVOID PRINTING
0624  86A2          CPCR = SETCONTADDRS  - 1.
0625  F0E7          MIR = B001.
0626  F099          DW1.              ENABLE SPO INPUT
                * SELECT PORT # PER NUMERIC KEYS (01  THRU 12)
0627  86C3          CPCR = SELECTPORT   - 1.      FOR TENS DIGIT
0628  F017          A1 = B.                       SAVE TENS DIGIT
0629  86C3          CPCR = SELECTPORT   - 1.      FOR ONES DIGIT
                *       ONES DIGIT IS IN B
                * OPERATOR ENTERS PORT NUMBER (1 THROUGH 12)
062A  F0E6          MIR = 0.
062B  F099          DW1.              DISABLE SPO INPUT
                * TEST TENS DIGIT FOR 0 OR 1
062C  E001          LIT  = 1.
062D  F109          A1 - LIT  - 1.
062E  F0B7          IF NOT AOV SKIP.
062F  46D8          MPCR = INVALIDPORT   - 1.     TENS DIGIT  > 1
                * TEST ONES DIGIT FOR 0 THRU 9
0630  E00A          LIT  = 10.
0631  F033          A2 = B.                       ONES DIGIT IN A2
0632  F11B          A2 - LIT.
0633  F0B7          IF NOT AOV SKIP.
0634  46D8          MPCR = INVALIDPORT   - 1.     ONES DIGIT  > 9
                *
0635  E00A          LIT  = 10.
0636  F066          B = A1.
0637  F0C3          IF NOT LST SKIP.
0638  F029          A2 = A2 + LIT.
0639  F068          B = A2.                   PORT ADDRESS IN B
063A  F162          B = 0 - B.            SUBTRACT 1 FROM PORT NO
063B  F163          B = 0 - B - 1.        TO GET PORT ADDRESS
063C  85DF          CPCR = STOREPORT   - 1.
                *
```

```
                SPOTESTSELECTP.
063D  866D          CPCR = SPOPRINT - 1.      PRINT SELECT TEST MESSAGE
063E  0732          AMPCR = TESTPRINT.        ADDRESS OF MESSAGE
                *
                SPOTESTSELECT.
                * ENTRY POINT FOR NO PRINTING
063F  86A2          CPCR = SETCONTADDRS - 1.
0640  F0E7          MIR = B001.
0641  F099          DW1.              ENABLE SPO INPUT
                * SELECT TEST # PER NUMERIC KEYS (00 THRU 99)
0642  86C5          CPCR = SELECTTEST - 1.        FOR TENS DIGIT
0643  F051          A3 = B.                       SAVE TENS DIGIT
0644  86C5          CPCR = SELECTTEST - 1.        FOR ONES DIGIT
                *       ONES DIGIT IN B
0645  F0E6          MIR = 0.
0646  F099          DW1.              DISABLE SPO INPUT
0647  F033          A2 = B.
0648  F1B5          IF URQ SKIP.    NO PRINT IF MEM-MOD SELECTED
0649  866D          CPCR = SPOPRINT - 1.      SPACE AFTER TEST NO
064A  064E          AMPCR = SPACEPRINT.
064B  86A2          CPCR = SETCONTADDRS - 1.
064C  F068          B = A2.
064D  45F5          MPCR = TENSLOOPCHECK - 1.
                *
                SPACEPRINT.
064E  2080          CNST = @2080@.
                INVALIDTEST.
064F  8650          CPCR = ALARM - 1.         SOUND BELL
0650  45E5          MPCR = TESTSELECT - 1.
                *
                *
                ALARM.
                *
0651  F0DA          MIR = AMPCR.
0652  F05F          B.
0653  86DE          CPCR = STACK - 1.
0654  86A2          CPCR = SETCONTADDRS - 1.
0655  85AD          CPCR = TESTSPO-CON - 1.       +1 IF SPO  +2 IF CON
0656  4661          MPCR = SPOALARM - 1.      SPO ON SYSTEM
                * CONSOLE ON SYSTEM
0657  E008          LIT = @08@.
0658  F0EA          MIR = LIT.
0659  F099          DW1.
065A  C207          SAR = 2 LIT = 7.
065B  F089          B = LIT.
065C  F0E2          MIR = B C.    ALARM DATA WORD
065D  F0FC          WHEN SRQ STEP.
065E  F098          DW2.
065F  F05F          B.
0660  F0FC          WHEN SRQ STEP.
0661  4669          MPCR = CALARM - 1.
                *
                SPOALARM.     SPO ON SYSTEM
0662  F1D5          MIR = B001 + 1.     ENABLE OUTPUT
0663  F099          DW1.
0664  F0EA          MIR = LIT.
0665  E007          LIT = @07@.     RING BELL
0666  F0FC          WHEN SRQ STEP.
0667  F098          DW2.
0668  F05F          B.
0669  F0FC          WHEN SRQ STEP.
                *
                CALARM.
066A  F0E6          MIR = 0.        DISABLE SPO OR CONSOLE
066B  F099          DW1.
066C  86B9          CPCR = SETPORTADDR - 1.  BR1 = INST.  BR2 = DATA
066D  46FB          MPCR = UNSTACKRESTOREA - 1.  RETURN
                *
                *
                *
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                SPOPRINT.
                * SPO PRINT FROM MEMORY
                *
066E  F0DA          MIR = AMPCR.
066F  F05F          B.
0670  86DE          CPCR = STACK - 1.         STACK AMPCR AND A REGISTERS
0671  86A2          CPCR = SETCONTADDRS - 1.      SELECT SPO
0672  8724          CPCR = RDSTACKAMPCRTOB - 1.
0673  F05B          AMPCR = B.      RETURN AMPCR FOR EXEC
0674  F05F          B.
0675  F09A          EXEC.     ADDRESS OF MESSAGE TO AMPCR
0676  F0EA          MIR = LIT.
0677  C802          SAR = 8 LIT = @02@.
0678  F099          DW1.                      ENABLE SPO PRINTER
                SPOREADY.
0679  F096          DR1 BEX.              READ SPO STATUS
067A  F05F          B.
067B  F0C3          IF NOT LST SKIP.    CHECK FOR READY
067C  4678          MPCR = SPOREADY - 1.
                *
067D  F0CF          MAR1 = AMPCR.         BR1 = ADDRESS OF MESSAGE
                SPOFETCH.
067E  F0F1          MR1.
067F  F0FA          WHEN RDC BEX MAR1 = BMAR + 1.
0680  F07D          B = B C.
0681  F0C4          IF NOT MST SKIP.          MST = STOP CODE
0682  468C          MPCR = SPOSTOP - 1.       END PRINT
0683  F0FC          WHEN SRQ STEP.        WAIT FOR PRINTER INTERRUPT
0684  F0E1          MIR = B.
0685  F098          DW2.                  WRITE FIRST CHARACTER
0686  F07D          B = B C.
0687  F0C4          IF NOT MST SKIP.          MST = STOP CODE
0688  468C          MPCR = SPOSTOP - 1.       END PRINT
0689  F0E1          MIR = B.
068A  F0FC          WHEN SRQ STEP.        WAIT FOR PRINTER INTERRUPT
068B  F098          DW2.                  WRITE SECOND CHARACTER
068C  467D          MPCR = SPOFETCH - 1.
                *
                SPOSTOP.
068D  F0FC          WHEN SRQ STEP.        WAIT FOR LAST CHARACTER TO PRINT
068E  8741          CPCR = RSTBR1 - 1.        RESTORE BR1
068F  F096          DR1 BEX.                  RESET STINT
0690  F0E6          MIR = B000.
0691  F099          DW1.                      DISABLE SPO OUTPUT
0692  86B9          CPCR = SETPORTADDR - 1.  RESTORE DEVICE PORT ADDRS
0693  46FB          MPCR = UNSTACKRESTOREA - 1.  RETURN
                *
                CLEARFLAGS.
0694  F023          A2 = AMPCR.               SAVE RETURN
0695  F0E6          MIR = 0.
0696  F0CF          MAR1 = AMPCR.
0697  06DD          AMPCR = PORTADDRESS.
0698  F0F3          MW1.                      CLEAR PORT ADDRESS
0699  F0CF          MAR1 = AMPCR.
069A  0762          AMPCR = MEMFLAGW1.
069B  F0F3          MW1.                      CLEAR MEMORY FLAG WORD 1
069C  F102          AMPCR = A2.               RESTORE RETURN
                CLEARFW2-3-4.
069D  F023          A2 = AMPCR.               SAVE RETURN
069E  F0E6          MIR = 0.
069F  F0CF          MAR1 = AMPCR.
06A0  0763          AMPCR = MEMFLAGW2.
06A1  F0F3          MW1.                      CLEAR MEMORY FLAG WORD 2
06A2  4355          MPCR = JUMPTOA2 - 1.
                *
                SETCONTADDRS.
06A3  F060          B = AMPCR.            SAVE RETURN
06A4  F0CF          MAR1 = AMPCR.
06A5  06DE          AMPCR = CONTPORTADDRESS.
06A6  F05B          AMPCR = B.            RESTORE RETURN
06A7  D800          SAR = 8.
```

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06A8  F0F1          MR1.
06A9  F0F9          WHEN RDC BEX.          CONTROLLER ADDRESS TO B
06AA  F07F          B = B R.
06AB  F07C          B = B L.          CLEAR ALL BITS EXCEPT 5,6,7,8
06AC  F0D5          MAR1 = B.
06AD  F078          B = BOTT.
06AE  F16E          BR2 = B.                BR2 = 0000XXXX DATA
06AF  F0C9          JUMP.
                *
              LITEINDA.                     LIGHT A INDICATORS
06B0  E06F          LIT = @6F@.
06B1  F0CA          LCTR.
06B2  F09A          EXEC.                   LOAD VARIABLE LIT
06B3  F0EF          MIR = Z.
06B4  F098          DW2.
06B5  F0C9          JUMP.
              LITEINDB.                     LIGHT B INDICATORS
06B6  E077          LIT = @77@.
06B7  46B0          MPCR = LITEINDA.
                *
              LITEINDS.                           LIGHT S INDICATORS
06B8  E07E          LIT = @7E@.
06B9  46B0          MPCR = LITEINDA.
                *
              SETPORTADDR.
06BA  F060          B = AMPCR.              SAVE RETURN
06BB  F0CF          MAR1 = AMPCR.
06BC  06DD          AMPCR = PORTADDRESS.
06BD  F05B          AMPCR = B.              RESTORE RETURN
06BE  F0F1          MR1.
06BF  F0F9          WHEN RDC BEX.          PORT ADDRESS TO B
06C0  F16E          BR2 = B.          BR2 FOR DATA
06C1  F07A          B = BITT.
06C2  F0D5          MAR1 = B.          BR1 FOR INSTRUCTION
06C3  F0C9          JUMP.
                *
                * VERIFY CORRECT CONTROLLER ADDRESS DISPLAYED IN MIR
              SELECTPORT.
06C4  F0DE          MIR = A3.          CONTROLLER ADDRESS (ASR AFTER IRQ)
06C5  F0FC          WHEN SRQ.          VERIFY MIR DIGIT B = SPO/CONSOLE PORT
                *                      NUMBER MINUS ONE
                *                      IF YES ENTER PORT NO OF CASSETTE
                *                      IF NO GO TO SPO OR CONSOLE MTR
              SELECTTEST.
06C6  F0FC          WHEN SRQ STEP.          ENTER TEST NUMBER
06C7  F097          DR2 BEX.
06C8  F086          B = LIT AND B.          STRIP UPPER DIGIT
06C9  E00F          LIT = @0F@.
06CA  F0C9          JUMP.
                *
                *
                *
              CSAVEPORT.                    SAVE PORT ADDRESS (DATA IN B)
                * TEST PORT ADDRESS FOR PORT 12 OR LESS
06CB  E00B          LIT = 11.
06CC  F017          A1 = B.
06CD  F109          A1 - LIT - 1.
06CE  F0B7          IF NOT AOV SKIP.
06CF  46D8          MPCR = INVALIDPORT - 1.          PORT ADDRESS > 12
                * CLEAR ALL BITS EXCEPT 5,6,7,8
06D0  F07C          B = B L.
06D1  D400          SAR = 4.
06D2  F0E5          MIR = B R.
06D3  F060          B = AMPCR.          SAVE RETURN
06D4  F0CF          MAR1 = AMPCR.
06D5  06DD          AMPCR = PORTADDRESS.
06D6  F05B          AMPCR = B.          RESTORE RETURN
06D7  F0F3          MW1.
06D8  F0C9          JUMP.
                *
              INVALIDPORT.
                *
06D9  8650          CPCR = ALARM - 1.          SOUND BELL
06DA  85AD          CPCR = TESTSPO-CON - 1.  +1 IF SPO  +2 IF CON
06DB  4623          MPCR = SPOPORTSELECT - 1.
06DC  45D1          MPCR = CONSPORTSELECT - 1.
              PORTADDRESS.
06DD  0000          CNST = @0000@.
              CONTPORTADDRESS.
06DE  0000          CNST = @0000@.
                /
              STACK.
                *UNCONDITIONAL SAVE A1, A2, A3, AMPCR IN MEMORY STACK
                *DISTROYS - B, SAR, LIT, MIR
                *ASSUMES BR1, BR2 DIFFER BY INST BIT ONLY
06DF  F082          B = LIT L.                                          C
06E0  C810          LIT = @10@ SAR = 8.                                 C
06E1  F0D5          MAR1 = B.                STACK POINTER = 4096       C
              STACKW3.
06E2  F0F1          MR1.
06E3  F0F9          WHEN RDC BEX.          FETCH POINTER
06E4  F083          B = LIT + B.                INCRAMENT POINTER
06E5  E004          LIT = 4.
06E6  F08C          BMI MIR = B.
06E7  F0F3          MW1.                        RESTORE NEW POINTER
06E8  F08C          BMI MIR = B.
06E9  F0D5          MAR1 = B.                   NEW STACK ADDRESS
06EA  F0F3          MW1.                        STORE AMPCR TOP OF STACK
06EB  F0DB          MIR = A1.
06EC  F089          B = LIT.
06ED  E003          LIT = 3.
06EE  F01C          A1 = BMAR.
06EF  F064          B = A1 - B.
06F0  F0D5          MAR1 = B.          OLD TOP OF STACK ADDRESS + 1.
06F1  F0F3          MW1.                        SAVE A1
06F2  F0D7          MAR1 = BMAR + 1.
06F3  F0DD          MIR = A2.
06F4  F0F3          MW1.                        SAVE A2
06F5  F0D7          MAR1 = BMAR + 1.
06F6  F0DE          MIR = A3.
06F7  F0F3          MW1.                        SAVE A3
06F8  4741          MPCR = RSTBR1 - 1.          RESTORE BR1 EXIT
              UNSTACK.
                *RESTORE AMPCR FROM TOP OF MEMORY STACK
                *A REGISTERS REMAIN UNCHANGED
06F9  870B          CPCR = STACKR - 1.
06FA  F05B          AMPCR = B.                  RESTORE AMPCR
06FB  4741          MPCR = RSTBR1 - 1.          RESTORE BR1 EXIT
              UNSTACKRESTOREA.
                *RESTORE AMPCR AND A REGISTERS FROM TOP OF STACK
06FC  870B          CPCR = STACKR - 1.
06FD  F05B          AMPCR = B.                  RESTORE AMPCR
06FE  F08D          BMI. (ADDRESS - 1) OF STORED A1
06FF  F0D6          MAR1 = B + 1.
0700  F0F1          MR1.                        FETCH A1
0701  F0F9          WHEN RDC BEX.
0702  F0D7          MAR1 = BMAR + 1.
0703  F017          A1 = B.                     RESTORE A1
0704  F0F1          MR1.                        FETCH A2
0705  F0F9          WHEN RDC BEX.
0706  F0D7          MAR1 = BMAR + 1.
0707  F033          A2 = B.                     RESTORE A2
0708  F0F1          MR1.                        FETCH A3
0709  F0F9          WHEN RDC BEX.
070A  F051          A3 = B.                     RESTORE A3
070B  4741          MPCR = RSTBR1 - 1.          RESTORE BR1 AND EXIT
              STACKR.
070C  F082          B = LIT L.                                          C
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070D  C810          LIT  = @10@  SAR  = 8.                              C
070E  F0D5          MAR1 = B.                                          C
                  STACKR1.
070F  F0F1          MR1.
0710  F0F9          WHEN RDC BEX.              FETCH  POINTER
0711  F0DD          MIR  = A2.       SAVE  A2
0712  F033          A2   = B.
0713  E004          LIT  = 4.
0714  F146          B = A2 - LIT.        DECRAMENT  STACK  POINTER
0715  F08C          BMI,  MIR = B.       EXCHANGE  MIR  &  B
0716  F033          A2 = B.              RESTORE  A2
0717  F08D          BMI.      POINTER  ADDRESS  TO  B
0718  F0F3          MW1.                       RESTORE  POINTER
0719  F083          B = LIT + B.  ADDRESS  OF  SAVED  AMPCR  TO  B
                  STACKR2.
071A  F0D5          MAR1 = B.
071B  F0F1          MR1.                       FETCH  AMPCR  FROM  STACK
071C  F0F9          WHEN RDC BEX.
071D  F0C9          JUMP.
                  INITMAINSTACK.             INITIALIZE     STACK  POINTER
071E  F079          B = B100.
071F  D300          SAR = 3.
0720  F07F          B = B R.
0721  F0D5          MAR1 = B.
0722  F0E1          MIR = B.
0723  F0F3          MW1.                       POINTER  = 4096
0724  4741          MPCR = RSTBR1  - 1.        RESTORE  BR1  EXIT
                  RDSTACKAMPCRTOB.
                  *READ  TOP  AMPCR  IN  STACK  TO  B  REG  -  USE  FOR
                  *NESTED  EXEC.
0725  F082          B = LIT  L.                                        C
0726  C810          LIT  = @10@  SAR  = 8.                             C
0727  F0D5          MAR1 = B.                  POINTER  ADDRESS  = 4096  C
0728  F0F1          MR1.                 FETCH  POINTER
0729  F0F9          WHEN RDC BEX.
072A  F0D5          MAR1 = B.            TOP  OF  STACK  ADDRESS
072B  F0F1          MR1.
072C  F0F9          WHEN RDC BEX.              B = AMPCR  FROM  STACK
072D  4741          MPCR = RSTBR1  - 1.        RESTORE  BR1  EXIT
                  /
                  PORTPRINT.
072E  0D0A          CNST = @0D0A@.             CR  LF
072F  504F          CNST = @504F@.
0730  5254          CNST = @5254@.
0731  2080          CNST = @2080@.       PORT   SPACE  &  STOP  CODE
                  TESTPRINT.
0732  0D0A          CNST = @0D0A@.             CRLF
0733  5445          CNST = @5445@.
0734  5354          CNST = @5354@.
0735  2080          CNST = @2080@.       TEST   SPACE  &  STOP  CODE
                  /
                  *  TEST  FLAG  AND  SET  FLAG  ROUTINES
                  *
                  SETFLAGW1.           FLAG  NO.  IN  SAR,  STATE  IN  LIT
0736  F060          B = AMPCR.     SAVE  RETURN
0737  F0CF          MAR1 = AMPCR.        ADDRESS  OF  FLAG  WORD  1  TO  MAR1
0738  0762          AMPCR = MEMFLAGW1.
                  *
                  SETFLAGS.            COMMON POINT  TO  SETFLAGW1-2-3-4
0739  F0F1          MR1.
073A  F05B          AMPCR = B.     RESTORE  RETURN
073B  F0F9          WHEN RDC BEX.        FLAG  WORD TO B
073C  F092          CSAR.          CHANGE  VALUE  TO  SHIFT   FLAG  TO  LSB
073D  F172          CSAR  B = B C.       MOVE  FLAG  IN  B  TO  LSB
073E  F075          B = BTT0.      RESET  FLAG  BIT
073F  F087          B = LIT  OR  B.      SET  FLAG  PER  LIT
0740  F0E2          MIR = B C.   SHIFT  FLAG  WORD  BACK  &  TO  MIR
0741  F0F3          MW1.           FLAG  WORD  TO  MEMORY
                  *
                  RESTORE-BR1.
                  RSTBR1.              COMMON POINT  FROM  ABOVE  AND  -
                  *                    AND  TESTFLAGW1-2-3-4
0742  F0E1          MIR = B.                 SAVE  B
0743  F05D          ASE.           SELECT  BR2
0744  F080          B = BMAR.
                  *  GENERATE  NEW  BR1   (MSB  INST-DATA   SET  OPPOSITE   BR2)
0745  F159          B = BFTF.
0746  D800          SAR = 8.
0747  F07F          B = B R.
0748  F07C          B = B L.       CLEAR  MAR  (DO  NOT  USE  LIT  HERE)
0749  F0D5          MAR1 = B.
074A  F08D          BMI.                 RESTORE  B
074B  F0C9          JUMP.          RETURN
                  *
                  SETFLAGW2.           FLAG  NO.  IN  SAR,  STATE  IN  LIT
074C  F060          B = AMPCR.     SAVE  RETURN
074D  F0CF          MAR1 = AMPCR.        ADDRESS  OF  FLAG  WORD  2  TO  MAR1
074E  0763          AMPCR = MEMFLAGW2.
074F  4738          MPCR = SETFLAGS  - 1.
                  *
                  TESTFLAGW1.          FLAG  NO.  IN  SAR,  STATE  IN  LIT
0750  F060          B = AMPCR.     SAVE  RETURN
0751  F0CF          MAR1 = AMPCR.        ADDRESS  OF  FLAG  WORD  1  TO  MAR1
0752  0762          AMPCR = MEMFLAGW1.
                  *
                  TESTFLAGS.           COMMON POINT  TO  TESTFLAGW1-2-3-4
0753  F0F1          MR1.
0754  F05B          AMPCR = B.     RESTORE  RETURN
0755  F0F9          WHEN RDC BEX.        FLAG  WORD  TO  B
0756  F092          CSAR.
0757  F07F          B = B R.       SHIFT   FLAG  TO  LSB
0758  F157          B = BT0T.
0759  F078          B = B0TT.
075A  F0CB          LIT  EQV  B.
075B  F09D          IF  ABT  SKIP.
075C  F105          AMPCR = AMPCR + 1.       SET  AMPCR  FOR  FALSE  RETURN
075D  4741          MPCR = RSTBR1  - 1.
                  *
                  TESTFLAGW2.          FLAG  NO.  IN  SAR,  STATE  IN  LIT
075E  F060          B = AMPCR.     SAVE  RETURN
075F  F0CF          MAR1 = AMPCR.        ADDRESS  OF  FLAG  WORD  2  TO  MAR1
0760  0763          AMPCR = MEMFLAGW2.
0761  4752          MPCR = TESTFLAGS  - 1.
                  *  MEMORY WORDS  FOR  PROGRAM  FLAGS
                  MEMFLAGW1.
0762  0000          CNST = @0000@.       FLAGS  1  THRU  16  OF  WORD  1
                  MEMFLAGW2.
0763  0000          CNST = @0000@.       FLAGS  1  THRU  16  OF  WORD  2
                  *
                  WRSREG1.
0764  F060          B = AMPCR.
0765  F0CF          MAR1 = AMPCR.
0766  0781          AMPCR = SIMREG1.
                  ZROSREG1A.
0767  F05B          AMPCR = B.
0768  F0F3          MW1.
0769  4741          MPCR = RESTORE-BR1   - 1.
                  WRSREG2.
076A  F060          B = AMPCR.
076B  F0CF          MAR1 = AMPCR.
076C  0782          AMPCR = SIMREG2.
076D  4766          MPCR = ZROSREG1A  - 1.
                  WRSREG3.
076E  F060          B = AMPCR.
076F  F0CF          MAR1 = AMPCR.
0770  0783          AMPCR = SIMREG3.
0771  4766          MPCR = ZROSREG1A  - 1.
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                RDSREG1.
0772    F060            B = AMPCR.
0773    F0CF            MAR1 = AMPCR.
0774    0781            AMPCR = SIMREG1.
                RDSREG1A.
0775    F05B            AMPCR = B.
0776    F0F1            MR1.
0777    F0F9            WHEN RDC BEX.
0778    4741            MPCR = RESTORE-BR1 - 1.
                RDSREG2.
0779    F060            B = AMPCR.
077A    F0CF            MAR1 = AMPCR.
077B    0782            AMPCR = SIMREG2.
077C    4774            MPCR = RDSREG1A - 1.
                RDSREG3.
077D    F060            B = AMPCR.
077E    F0CF            MAR1 = AMPCR.
077F    0783            AMPCR = SIMREG3.
0780    4774            MPCR = RDSREG1A - 1.
                SIMREG1.
0781    0000            CNST = @0000@.
                SIMREG2.
0782    0000            CNST = @0000@.
                SIMREG3.
0783    0000            CNST = @0000@.
                SET-CONT-DINT.
                * SET CONTROLLER DATA INTERRUPT, RESTORE PORT ADDRESS
                * IN BR1 AND BR2 THEN JUMP
0784    F0DA            MIR = AMPCR.
0785    F05F            B.
0786    86DE            CPCR = STACK - 1. SAVE AMPCR, A1,A2,A3 IN STACK
0787    86A2            CPCR = SETCONTADDRS - 1.
0788    85AD            CPCR = TESTSPO-CON - 1.
0789    478C            MPCR = SCDINT - 1. SPO ON SYSTEM
                *
078A    F0EA            MIR = LIT. CONSOLE ON SYSTEM
078B    E004            LIT = 4. ENABLE CON PRINTER DINT
078C    F0F7            SKIP.
                SCDINT.
078D    F1D5            MIR = B001 + 1. ENABLE OUTPUT
078E    F099            DW1.
078F    F0FC            WHEN SRQ STEP.
                ********    STOP HERE IF CONTROLLER ENABLE DOES NOT CAUSE
                *             SRQ (NOTE- SPO SRQ HAS BEEN USED PRIOR TO
                *                 THIS STOP
                *           RUN SPO OR CONSOLE MTR
                *
                RSCDINT.
0790    86B9            CPCR = SETPORTADDR - 1. RESTORE BR1 AND BR2
0791    46FB            MPCR = UNSTACKRESTOREA - 1. RETURN
                *
                *
                RESET-CONT-DINT.
                * DISABLE CONTROLLER, RESTORE PORT ADDRESS IN BR1 AND
                * BR2, THEN JUMP
0792    F0DA            MIR = AMPCR.
0793    F05F            B.
0794    86DE            CPCR = STACK - 1. SAVE AMPCR,A1,A2,A3 IN STACK
0795    86A2            CPCR = SETCONTADDRS - 1.
0796    F0E6            MIR = 0.
0797    F099            DW1.
0798    478F            MPCR = RSCDINT - 1.
                *
                /
                SPO-MEM-MOD.
0799    F0A9            IF LC2 STEP. RESET WRITE-BEFORE-READ FLAG
079A    86A2            CPCR = SETCONTADDRS - 1.
                * RETURNS WITH BR1 = INSTRUCTION, BR2 = DATA
079B    F0A5            IF LC1.
                SMM-NEW-ADDRESS.
079C    87C6            CPCR = SMM-ENABLE-OUT - 1.
079D    E00D            LIT = @0D@.
079E    8801            CPCR = SMM-DEV-WT-LIT - 1.
079F    E00A            LIT = @0A@.
07A0    8801            CPCR = SMM-DEV-WT-LIT - 1.
07A1    87CD            CPCR = SMM-SPACE-4 - 1.
07A2    87C3            CPCR = SMM-ENABLE-IN - 1.
07A3    F0A8            IF LC1 SET LC1 SKIP.
07A4    87D5            CPCR = SMM-ACCEPT-4 - 1.
07A5    87C6            CPCR = SMM-ENABLE-OUT - 1.
07A6    F0BF            IF NOT LC1 SKIP.
07A7    87E6            CPCR = SMM-PRINT-4 - 1.
07A8    87CD            CPCR = SMM-SPACE-4 - 1.
07A9    F0D1            MAR1 = A2.
07AA    F0E7            MIR' = B001.
07AB    F0AB            IF LC2 SET LC2 ELSE SKIP.
07AC    F0F3            MW1. WRITE BEFORE READ PREVENT PE
07AD    F0F1            MR1.
07AE    F0F9            WHEN RDC BEX.
07AF    F033            A2 = B.
07B0    87E6            CPCR = SMM-PRINT-4 - 1.
07B1    87C3            CPCR = SMM-ENABLE-IN - 1.
                SMM-WHAT-TO-DO.
07B2    87FA            CPCR = SMM-DEV-RD - 1.
07B3    F0CB            LIT EQV B.
07B4    E020            LIT = @20@.
07B5    07BA            AMPCR = SMM-NEW-CONTENT - 1.
07B6    F09B            IF ABT LUOP JUMP.
07B7    E01B            LIT = @1B@.
07B8    F09D            IF ABT SKIP.
07B9    47B1            MPCR = SMM-WHAT-TO-DO - 1.
07BA    F018            SET LC1.
                SMM-NEW-CONTENT.
07BB    87C6            CPCR = SMM-ENABLE-OUT - 1.
07BC    87CD            CPCR = SMM-SPACE-4 - 1.
07BD    87C3            CPCR = SMM-ENABLE-IN - 1.
07BE    87D5            CPCR = SMM-ACCEPT-4 - 1.
07BF    F0DD            MIR = A2.
07C0    F0F3            MW1.
07C1    F0FB            WHEN RMI MAR1 = BMAR + 1.
07C2    F035            A2 = BMAR.
07C3    479B            MPCR = SMM-NEW-ADDRESS - 1.
                SMM-ENABLE-IN.
07C4    F0FC            WHEN SRQ STEP.
07C5    F0E7            MIR = B001.
07C6    47C7            MPCR = SMM-SEND-CW - 1.
                SMM-ENABLE-OUT.
07C7    F1D5            MIR = B001 + 1.
                SMM-SEND-CW.
07C8    F05D            ASE.
07C9    F080            B = BMAR.
07CA    F16F            BR2 = BITT.
07CB    F098            DW2.
07CC    F16E            BR2 = B.
07CD    F0C9            JUMP.
                SMM-SPACE-4.
07CE    F007            A1 = AMPCR.
07CF    F05F            B.
07D0    E020            LIT = @20@.
07D1    8801            CPCR = SMM-DEV-WT-LIT - 1.
07D2    8802            CPCR = SMM-DEV-WT - 1.
07D3    8802            CPCR = SMM-DEV-WT - 1.
07D4    8802            CPCR = SMM-DEV-WT - 1.
07D5    47F7            MPCR = SMM-JUMP-A1 - 1.
                SMM-ACCEPT-4.
07D6    F007            A1 = AMPCR.
07D7    F0CA            LCTR.
07D8    CC02            SAR = 12, LIT = 2.
07D9    F034            A2 = B000.
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                    SMM-ACCEPT-LOOP.
07DA  F026              A2  = A2  L.
07DB  87FA              CPCR  = SMM-DEV-RD  - 1.
07DC  F0CC              LIT  - B.
07DD  E040              LIT  = @40@.
07DE  F09E              IF  AOV  SKIP.
07DF  F083              B = LIT  + B.
07E0  E009              LIT  = 9.
07E1  F086              B = LIT  AND B.
07E2  E00F              LIT  = @0F@.
07E3  F031              A2  = A2  + B.
07E4  F0C8              INC  IF  COV  SKIP.
07E5  47D9              MPCR  = SMM-ACCEPT-LOOP  - 1.
07E6  47F7              MPCR  = SMM-JUMP-A1  - 1.
                    SMM-PRINT-4.
07E7  F007              A1  = AMPCR.
07E8  F0CA              LCTR.
07E9  CC02              SAR  = 12,  LIT  = 2.
                    SMM-PRINT-LOOP.
07EA  F025              A2  = A2  C.
07EB  F06D              B = A2  AND  LIT.
07EC  E00F              LIT  = @0F@.
07ED  F0CC              LIT  - B.
07EE  E009              LIT  = 9.
07EF  F09E              IF  AOV  SKIP.
07F0  F083              B = LIT  + B.
07F1  E007              LIT  = @07@.
07F2  F0ED              MIR  = LIT  + B.
07F3  E030              LIT  = @30@.
07F4  8802              CPCR  = SMM-DEV-WT  - 1.
07F5  F0C8              INC  IF  COV  SKIP.
07F6  47E9              MPCR  = SMM-PRINT-LOOP  - 1.
07F7  47F7              MPCR  = SMM-JUMP-A1  - 1.
                    SMM-JUMP-A1.
07F8  F05C              AMPCR  = A1.
07F9  F05F              B.
07FA  F0C9              JUMP.
                    SMM-DEV-RD.
07FB  F1AE              IF  NOT  URQ  SKIP.
07FC  4807              MPCR  = SMM-STINTS  - 1.
07FD  F0C5              IF  SRQ  DR2  BEX  SKIP.
07FE  47FA              MPCR  = SMM-DEV-RD  - 1.
07FF  F086              B = LIT  AND B.
0800  E07F              LIT  = @7F@.
0801  F0C9              JUMP.
                    SMM-DEV-WT-LIT.
0802  F0EA              MIR  = LIT.
                    SMM-DEV-WT.
0803  F1AE              IF  NOT  URQ  SKIP.
0804  4807              MPCR  = SMM-STINTS  - 1.
0805  F0C6              IF  SRQ  DW2  SKIP.
0806  4802              MPCR  = SMM-DEV-WT  - 1.
0807  F0C9              JUMP.
                    SMM-STINTS.
0808  F05D              ASE.
0809  F035              A2  = BMAR.
080A  F08E              BR2  = A2  OR  B100.
080B  F097              DR2  BEX.
080C  F07D              B = B  C.
080D  D300              SAR  = 3.       ERROR  STATUS  TO  LSB,  E-O-M  TO  MSB
080E  F090              BR2  = A2.
080F  F05F              B.
                    *
                    *  PUSH  INPUT-REQUEST  TO  RESET  LC2  (NORMAL  OPERATION
                    *                  BEFORE  ERROR  WAS  PUSHED)
                    *  PUSH  ERROR  TO  SET  LC2  (WRITE  BEFORE  READ  FLAG)
                    *  PUSH  END-OF-MESSAGE  TO  EXIT  SPO-MEMORY-MODIFY
0810  F0C4              IF  NOT  MST  SKIP.
0811  4908              MPCR  = MICRO-TOOL  - 1.  EXIT  IF  E-O-M  BIT  SET
0812  F05F              B.                  SET  WRITE  BEFORE  READ
0813  F198              IF  LST  SET  LC2  SKIP.  FLAG  IF  ERROR  STATUS  BIT  SE
0814  4798              MPCR  = SPO-MEM-MOD  - 1.  INPUT-REQUEST  STATUS
0815  4799              MPCR  = SPO-MEM-MOD.  ERROR  STATUS  (LEAVE  LC2  SET)
                    /
                    MEM-MOD-SETLC3.  SET  WRITE-BEFORE-READ  FLAG
                    *  JUMP  TO  ABOVE  LABEL  FROM  UPPER  CASE  RESET  KEY  CODE
                    *  ALLOWS  WRITE-BEFORE-READ  OF  FIRST  ADDRESS
0816  F01A              SET  LC3.
0817  F0F7              SKIP.
                    MEMORY-MODIFY.
0818  F0AD              IF  LC3  STEP.
0819  F01F              RESET  GC2.
081A  F0A9              IF  LC2  STEP.
081B  86A2              CPCR  = SETCONTADDRS  - 1.
                    *  RETURNS  WITH  BR1  = INSTRUCTION,  BR2  = DATA
081C  F0EA              MIR  = LIT.
081D  C881              SAR  = 8  LIT  = @81@.
081E  F082              B = LIT  L.
081F  F0EC              MIR  = LIT  OR B.
0820  E009              LIT  = 9.
0821  F098              DW2.
0822  E010              LIT  = @10@.
0823  F099              DW1.
0824  F082              B = LIT  L.
0825  C803              SAR  = 8,  LIT  = @03@.
0826  F0E1              MIR  = B.
0827  F0FC              WHEN  SRQ  STEP.
0828  F098              DW2.                              READY  THE  R
0829  F0EA              MIR  = LIT.
082A  E008              LIT  = @08@.
082B  F0FC              WHEN  SRQ  STEP.
082C  F099              DW1.
082D  F082              B = LIT  L.
082E  E0C0              LIT  = @C0@.
082F  F0ED              MIR  = LIT  + B.
0830  E004              LIT  = @04@.
0831  F0FC              WHEN  SRQ  STEP.
0832  F098              DW2.
0833  F01D              A1  = LIT.
0834  E00A              LIT  = @0A@.
0835  88C7              CPCR  = MM-POSITION  - 1.  POS  RIGHT
                    MM-LIST-NEXT.
0836  88B6              CPCR  = MM-ADVANCE  - 1.  ADV  1  LINE
0837  F018              SET  LC1.
0838  F019              SET  LC2.
0839  F0CA              LCTR.
083A  E003              LIT  = @03@.
083B  8866              CPCR  = MM-KYBD  - 1.
083C  F0D1              MAR1  = A2.
083D  F0E7              MIR  = B001.
083E  F0AF              IF  LC3  SET  LC3  ELSE  SKIP.
083F  F0F3              MW1.  WRITE  BEFORE  TO  PREVENT  PE.
0840  F0F1              MR1.
0841  F0F9              WHEN  RDC  BEX.                   GET  THE  CONT  T
0842  F033              A2  = B.
0843  E003              LIT  = @03@.
0844  084A              AMPCR  = MM-CONTENTS  - 1.
0845  F041              A3  = AMPCR.
0846  F0CA              LCTR.
0847  F01D              A1  = LIT.
0848  E003              LIT  = @03@.
0849  88C7              CPCR  = MM-POSITION  - 1.
084A  48D9              MPCR  = MM-PRINT  - 1.
                    MM-CONTENTS.
084B  F0CA              LCTR.
084C  E000              LIT  = @00@.
084D  F00C              RESET  GC1.
084E  F0AD              IF  LC3  STEP.  RESET  WRITE-BEFORE-READ  FLAG
084F  0854              AMPCR  = RESET-GC1LC3  - 1.  FOR  RETURN  FROM  MM-KYBD
0850  4866              MPCR  = MM-KYBD  - 1.
                    *
                    *  MM-KYBD  JUMPS  HERE  FOR  OCK  I,II,III  KEYS
```

```
                SET-LC3GC1.
0851    F01A            SET   LC3.
                SET-GC1.
0852    F006            SET   GC1.
0853    F0F7            SKIP.
                SET-LC3.
0854    F01A            SET   LC3.
                RESET-GC1LC3.
0855    F0CA            LCTR.
0856    E003            LIT    =   @03@.
0857    F01D             A1    =  LIT.
0858    88C7            CPCR   =  MM-POSITION    -  1.
0859    F018            SET    LC1.
085A    8866            CPCR   =  MM-KYBD  -  1.
085B    F0DD            MIR    =  A2.   •
085C    F0F3            MW1.
085D    0818            AMPCR  =  MEMORY-MODIFY   .
085E    F19C            IF  NOT  GC1    JUMP.
085F    F019            SET    LC2.                                  POS  TO  LEFT.
0860    F01D            A1  =  LIT.
0861    E012            LIT     =    @12@.
0862    F0D7            MAR1    =  BMAR   +  1.
0863    F035            A2      =  BMAR.
0864    88C7            CPCR    =  MM-POSITION    -  1.
0865    F0F6            SET    GC2.
0866    4835            MPCR    =  MM-LIST-NEXT    -  1.
                MM-KYBD.
0867    F041            A3      =    AMPCR.                                    SAVE  RETURN      D
0868    F081            B       =    NOT  CTR    R.
0869    D800            SAR     =    8.
086A    F0A2            IF   GC2  SKIP.
086B    486D            MPCR    =      MM-NANO-SAVE    -  1.
086C    F01F            RESET   GC2.
086D    48D9            MPCR    =  MM-PRINT   -  1.
                MM-NANO-SAVE.
086E    F017            A1      =    B.
086F    F05D            ASE.          SELECT   BR2
0870    F080            B  =  BMAR.
0871    F16F            BR2     =  B1TT.              BR2   =  CONTROL   PORT
0872    F1DB            MIR     =    0    +    Z.
0873    E002            LIT     =      @02@.
0874    F098            DW2.                                           ENABLE   KBD  D     A
0875    F034            A2      =  B000.
0876    F05D            ASE.          SELECT   BR2
0877    F080            B  =  BMAR.
0878    F078            B  =  B0TT.
0879    F16E            BR2     =  B.                 BR2   =  DATA   PORT
                MM-KYBD-LOOP.
087A    F0C5            IF  SRQ  DR2  BEX  SKIP.
087B    4879            MPCR    =  MM-KYBD-LOOP    -  1.
087C    0818            AMPCR   =  MEMORY-MODIFY   .
087D    F0CB            LIT     EQV    B.
087E    E01F            LIT     =  @1F@.     RESET   KEY  LOWER  SHIFT   MECHANICAL
087F    F09B            IF   ABT  LUOP  JUMP.   RESET   KEY   START   OVER
0880    E0AB            LIT     =  @AB@.     RESET   KEY  LOWER  SHIFT   ELECTRONIC
0881    F09B            IF   ABT  LUOP  JUMP.   RESET   KEY   START   OVER
0882    0815            AMPCR   =  MEM-MOD-SETLC3     -  1.
0883    E09F            LIT     =  @9F@.     RESET   KEY  UPPER  SHIFT   MECHANICAL
0884    F09B            IF   ABT  LUOP  JUMP.
0885    E08B            LIT     =  @8B@.     RESET   KEY  UPPER  SHIFT   ELECTRONIC
0886    F09B            IF   ABT  LUOP  JUMP.
0887    0908            AMPCR   =  MICRO-TOOL    -  1.
0888    E04C            LIT     =  @4C@.           OCK  IIII    KEY  MECHANICAL
0889    F09B            IF   ABT  LUOP  JUMP.   OCK  IIII    KEY   GO  TO  END
088A    E0A0            LIT     =  @A0@.           OCK  IIII    KEY  ELECTRONIC
088B    F09B            IF   ABT  LUOP  JUMP.   OCK  IIII    KEY   GO  TO  END
088C    0850            AMPCR   =  SET-LC3GC1      -  1.
088D    E0CE            LIT     =  @CE@.           OCK  II   UPPER  SHIFT   MECHANICAL
088E    F09B            IF   ABT  LUOP  JUMP.
088F    E083            LIT     =  @83@.           OCK  II   UPPER  SHIFT   ELECTRONIC
0890    F09B            IF   ABT  LUOP  JUMP.
0891    0851            AMPCR   =  SET-GC1    -  1.
0892    E04E            LIT     =  @4E@.           OCK  II   LOWER  SHIFT   MECHANICAL
0893    F09B            IF   ABT  LUOP  JUMP.
0894    E0A3            LIT     =  @A3@.           OCK  II   LOWER  SHIFT   ELECTRONIC
0895    F09B            IF   ABT  LUOP  JUMP.
0896    0853            AMPCR   =  SET-LC3    -  1.
0897    E0CD            LIT     =  @CD@.           OCK  I    UPPER  SHIFT   MECHANICAL
0898    F09B            IF   ABT  LUOP  JUMP.
0899    E081            LIT     =  @81@.           OCK  I    UPPER  SHIFT   ELECTRONIC
089A    F09B            IF   ABT  LUOP  JUMP.
089B    F0E1            MIR     =  B.
089C    F07F            B  =  B  R.
089D    C400            SAR     =  4  LIT  =  0.
089E    08A5            AMPCR   =  ABCDEF-KEY    -  1.
089F    E004            LIT     =  @04@.      UPPER  DIGIT   FOR  ALPHA  ELECTRONIC
08A0    F0CB            LIT  EQV  B.
08A1    F09B            IF   ABT  LUOP  JUMP.
08A2    E005            LIT     =  @05@.      UPPER  DIGIT   FOR  ALPHA  MECHANICAL
08A3    F09B            IF   ABT  LUOP  JUMP.
08A4    E000            LIT     =  0.
08A5    F0F7            SKIP.                 NUMERIC  KEY  ENTERED
              ABCDEF-KEY.                     ALPHA  KEY  ENTERED
08A6    E009            LIT     =  @09@.
08A7    F08D            BM1.            RESTORE  B  (CHARACTER   ENTERED)
08A8    F083            B  =  LIT  +  B.  ADD  9  IF   ALPHA  KEY
08A9    F086            B    =  LIT    AND    B.
08AA    CC0F            SAR     =  12,     LIT     =  @0F@.
08AB    F025            A2      =    A2    C.
08AC    F031            A2      =    A2    +    B.                                CONCATENATE
08AD    0879            AMPCR   =    MM-KYBD-LOOP     -  1.
08AE    F030            INC.
08AF    F0B9             IF  NOT  COV     JUMP.                                    TEST  FOR  A
08B0    F066            B    =    A1.
08B1    F095            CTR     =    B.                                           RESTORE  COUN     R
08B2    08D9            AMPCR   =      MM-PRINT     -  1.
08B3    F0A6            IF    LC1      JUMP.                                      PRINT  FLAG.
08B4    F101            AMPCR   =    A3.
08B5    F05F            B.
08B6    F0C9            JUMP.
              MM-ADVANCE.
08B7    F05D            ASE.          SELECT   BR2
08B8    F080            B  =  BMAR.
08B9    F16F            BR2     =  B1TT.              BR2   =  CONTROL   PORT
08BA    F0EA            MIR     =    LIT.
08BB    E008            LIT     =    @08@.
08BC    F098            DW2.                                           ENABLE    FORM     I
08BD    F082            B  =  LIT  L.
08BE    E0C0            LIT     =    @C0@.
08BF    F0ED             MIR    =    LIT   +  B.
08C0    E050            LIT     =    @50@.
08C1    F05D            ASE.          SELECT   BR2
08C2    F080            B  =  BMAR.
08C3    F078            B  =  B0TT.
08C4    F16E            BR2     =  B.                 BR2   =  DATA   PORT
08C5    F0FC            WHEN  SRQ  STEP.
08C6    F098            DW2.
08C7    F0C9            JUMP.
              MM-POSITION.
08C8    F05D            ASE.          SELECT   BR2
08C9    F080            B  =  BMAR.
08CA    F16F            BR2     =  B1TT.              BR2   =  CONTROL   PORT
08CB    F0EA             MIR    =    LIT.
08CC    C810            SAR     =  8,   LIT   =  @10@.
08CD    F098            DW2.                                           ENABLE   CARRI
08CE    E001            LIT     =  @01@.                               LEFT  POSITIO     P
08CF    F015            IF   LC2  SKIP.
08D0    E000            LIT     =  @00@.                               RIGHT  POSITI
08D1    F082            B  =  LIT  L.
08D2    F0DC            MIR     =    A1    +  B.
```

```
08D3   F05D        ASE.        SELECT   BR2
08D4   F080        B  =  BMAR.
08D5   F078        B  =  B0TT.
08D6   F16E        BR2  =  B.              BR2  =  DATA  PORT
08D7   F0FC         WHEN  SRQ  STEP.
08D8   F098        DW2.
08D9   F0C9         JUMP.
               MM-PRINT.
08DA   F0A5         IF   LC1    STEP.
08DB   F1DB        MIR    =    0    +    Z.
08DC   E004        LIT     =    @04@.
08DD   F05D        ASE.        SELECT   BR2
08DE   F080        B  =  BMAR.
08DF   F16F        BR2  =  BITT.           BR2  =  CONTROL  PORT
08E0   F098        DW2.                                              ENABLE  PRINT
08E1   C84B        SAR  =  8,   LIT    =  @4B@.
08E2   F015        IF   LC2  SKIP.                                   LC2  MEANS  RE     R
08E3   C849        SAR  =  8,   LIT    =  @49@.
08E4   F089        B    =    LIT.
08E5   F01B        A1   =  B  L.
08E6   F081         B    =    NOT    CTR    R.
08E7   F07C        B    =  B    L.
08E8   DE00        SAR    =  14.
08E9   F05F        B.
08EA   F0F4        SAR    =  B.
08EB   F025        A2  =  A2   C.
08EC   F05D        ASE.        SELECT   BR2
08ED   F080        B  =  BMAR.
08EE   F078        B  =  B0TT.
08EF   F16E        BR2  =  B.              BR2  =  DATA  PORT
               MM-PRINT-LOOP.
08F0   F147        B    =    A2     C.
08F1   D400        SAR    =    4.
08F2   F07F        B    =    B    R.
08F3   DC00        SAR  =  12.                                       ISOLATE   NEXT     I
08F4   F0CC         LIT    -    B.
08F5   E009         LIT     =    @09@.
08F6   F09E        IF  AOV  SKIP.
08F7   F018        SET    LC1.                                       UNDIGIT
08F8   E037        LIT     =    @37@.
08F9   F014        IF     LC1     SKIP.
08FA   E030        LIT     =    @30@.
08FB   F083        B  =  LIT   +  B.                                 PUT  ZONE  ON.
08FC   F0DC        MIR   =  A1   +  B.
08FD   F0FC        WHEN  SRQ  STEP.
08FE   F098         DW2.
08FF   F030         INC.
0900   F0C5        IF  SRQ  DR2  BEX  SKIP.
0901   F101        AMPCR     =     A3.
               MM-NANO-DUMB.
0902   F0C5        IF  SRQ  DR2  BEX  SKIP.
0903   4901        MPCR  =  MM-NANO-DUMB   -   1.
0904   F09F        IF    COV  JUMP.                                  END  OF  PRINT
0905   F025        A2      =    A2      C.
0906   DC00        SAR  =  12.                                       LINE   UP  NEXT     I
0907   08EF        AMPCR    =     MM-PRINT-LOOP      -    1.
0908   F0C9        JUMP.


              ********************************************************     *
              MICRO-TOOL.                              PRESS   OCK   IIII
             *  MEMORY-MODIFY   USES   LC1,LC2,LC3,GC1,GC2
0909   F01F          RESET   GC2.
090A   F0A5        IF   LC1   STEP.
090B   F0A9        IF   LC2   STEP.
090C   F0AD        IF   LC3   STEP.
090D   F00C        RESET   GC1.
090E   45E5        MPCR  =  TESTSELECT    -   1.
```

MANUAL PROCEDURES

NOTE 1
TESTS MAY BE STARTED AFTER AN ERROR BY

1 PRESS CLEAR

2 PRESS CONSOLE READY OR SPO INPUT REQ — B B B B

3 SELECT PORT NO THEN SELECT TEST NO — B
FOR TESTS 5-8 WAIT FOR BOT(ALARM)
BEFORE METER OR SCOPE READINGS
IF TEST COMPLETES (NUM OR RDY ON) DURING — B
METERING,RESTART THEN CONTINUE METERING

NOTE 2 ALL CASSETTE DDP SIGNAL NAMES ARE PREFIXED BY 'TC' IN CIRCUITS LIST

NOTE 3 FOLLOWING NOTATION IS USED FOR SCOPE WAVEFORMS EXPECTED
2US/160MS PER: 2 MICRO-SEC POS PULSE WIDTH WITH A 160 MILLI-SEC PERIOD
SEE WAVEFORMS: REF TO SECT 4 BY SIGNAL NAME

	OPERATOR ACTION	RESPONSE	YES	NO	
E1					
	(FEMT MTR INDICATES CASSETTE EXT BUSS ERROR)				
1		EXT BIT # = 1	F118		
		EXT BIT # = 9-12	F190		
		EXT BIT # = 13-16	F191		
E2	OPERATOR ACTION	RESPONSE	YES	NO	
.1	METER TC1-1V (PSENST/)	100%	2	F10	
2	METER TC1-2T (PSREAD/)	100%	O	F9	
3	PRESS FST 3 TIMES OBSERVE MIR	MIR = 0010	F134	4	
4	OBSERVE MIR	D = 0	5	F135	
5	OBSERVE MIR	C = 0	F118	F136	
E3	GO TO E9-13				
E4	GO TO E9-13				
E5	OPERATOR ACTION	RESPONSE	YES	NO	D D
1	HAS ANY TAPE ACTIVITY OCCURRED (RESTART & OBSERVE TAPE IF NECESSARY)		2	3	D D D D
2	METER TC4-1Y (PSWRITE/)	100%	F128	F9	D D D
3	PRESS FST 3 TIMES-SEE MIR A8 ON		F51	4	D

	4 OBSERVE M1R	C8 ON	F52	5	
	5 OBSERVE M1R	C4 ON	F54	6	
	6 OBSERVE M1R	C2 ON	F131	F132	
E6			F124		
E7			F2		
E8	OPERATOR ACTION	RESPONSE	YES	NO	
	1 METER TC4-1S (PSINST/)	100%	2	F4	
	2 PRESS FST & OBSERVE M1R	M1R = 0	4	3	
	3 OBSERVE M1R	D4 ON	5	8	
	4 PRESS CLEAR,SET EXT SWITCH TO EXT,START TEST 1 AFTER PROG STEP 3 SCOPE TC1-2T (PSREAD/)	1US PULSES	F122	F6	
	5 METER TC4-2Y (TREL/)	100%	7	6	
	6 DRIVE ERROR-TREL/ = 0 0R TC3-F7				
	7 METER TC4-1Q (DNR)	100%	F69	F123	
	8 IS CASSETTE CLOSED		9	10	
	9 RESTART MTR				
	10 METER TC4-1B (CDSCLKPX)	3-5%	11	F186	
	11 IS ANOTHER DEVICE IN THE SAME PORT GROUP (1-4 OR 5-8) AS CASETTE KNOWN TO OPERATE ERROR FREE		F69	F69&179	
E9	OPERATOR ACTION	RESPONSE	YES	NO	
	1 METER TC4-1S (PSINST)	100%	2	F4	
	2 PRESS FST & OBSERVE M1R	A8 ON	3	11	
	3 METER TC3-2K (FDL/)	100%	5	4	
	4 METER TC4-2F (WOP)	0%	F55	F111	
	5 METER TC3-1T (BRESET)	0%	6	F125	
	6 CLOSE CASSETTE	R 1ND OFF	7	F112	
	7 PRESS CLEAR,SET EXT SWITCH TO EXT,RUN TEST 1-AFTER PROG STEP 3 METER TC4-1N (PSENST/)	100%	8	F8	
	8 SCOPE TC4-F4 (RDSTAT)	SEE WAVEFORMS	9	14	
	9 METER TC4-2I (STINT/)	50-70%	13	10	
	10 STINT/ READING WAS 100%		F115	F114	
	11 OBSERVE M1R	C4 ON	F15	12	

	12 PRESS CLEAR, SET EXT SWITCH TO EXT, RUN TEST 1 - AFTER PROG STEP 3 METER TC4-1Y (PSWRITE/)	SWITCHING (NOT 0%, NOT 100%)	16	F9	D D D D D
	13 METER PADP7R (PSIRQ/)	100%	F7	F3	
	14 SCOPE TC4-1R (PSREAD/)	SEE WAVEFORMS	F113	15	
	15 METER PADP7R (PSIRQ/)	100%	F179	F184	D D D
	16 METER TC4-2Q (CG#CD!CLEARN)	0%	F116	F195	D
E10	OPERATOR ACTION	RESPONSE	YES	NO	
	1 PRESS FST & OBSERVE M1R	C4 ON	F117	2	
	2 HOLDING CLEAR PUSHBUTTON METER TC3-1T (BRESET)	100%	3	F81	
	3 RELEASE CLEAR,SET EXT SWITCH TO EXT,RUN TEST 1 AFTER PROG STEP 3 METER TC4-2L (DINT/)	60-70%	F118	4	
	4 METER TC2-2T (BIR)	100%	5	7	
	5 SCOPE TC4-F4 (RDSTAT)	SEE WAVEFORMS	F82	6	
	6 SCOPE TC4-1R (PSREAD/)	SEE WAVEFORMS	F119	F6	
	7 METER TC2-2T (BIR)	5-10%	F120	F121	
E12	OPERATOR ACTION	RESPONSE	YES	NO	
	1 PRESS FST & OBSERVE MIR	MIR = 0	2	F137	
	2 METER TC4-1S (PSINST)	100%	3	F4	
	3 PRESS CLEAR,SET EXT SWITCH TO EXT,START TEST 1 AFTER PROG STEP 3 METER TC4-2L (D1NT/)	100%	F138	E9-13	
E13	OPERATOR ACTION	RESPONSE	YES	NO	
	1 PRESS CLEAR,SET EXT SWITCH TO EXT,START TEST 1 AFTER PROG STEP 3 SCOPE TC1-1V (PSENST/)	1US NEG PULSES	F142	2	
	2 SET EXT SWITCH TO CENTER PRESS FST & OBSERVE MIR	MIR = 0	3	E123	
	3 IS CASSETTE IN PORT 1		F139&140	F139	
E14	OPERATOR ACTION	RESPONSE	YES	NO	
	1 SCOPE TC1-2E (SHIFT)	0 LEVEL	2	6	
	2 PRESS CLEAR,SET EXT SWITCH TO EXT,START TEST 1, AFTER PROG STEP 3 SCOPE TC3-2B (WSTR)	0 LEVEL	3	F105	

	3 SCOPE TC3-1T (BRESET)	2US PULSES	5	4
	4 SCOPE TC3-1T (BRESET)	0 LEVEL	F106	F107
	5 SCOPE TC2-2T (B1R)	HIGH LEVEL	F108	F126
	6 SCOPE TC3-2B (WSTR)	0 LEVEL	F104	F171
E15	1 PRESS CLEAR,SET EXT SWITCH TO EXT,START TEST 1 AFTER PROG STEP 3 SCOPE PADP7R (PSIRQ/)	PULSES	F10	2
	2 SCOPE PADP7Q (PSURQ/)	HIGH LEVEL	F2	F193
E16			F143	
E17			F141	
E18	OPERATOR ACTION	RESPONSE	YES	NO
	1 PRESS FST & OBSERVE M1R	BIT C2 = 0N	F79	2
	2 METER TC1-2W (PE)	0%	4	3
	3 METER TC3-2S (1STPE/)	100%	F80	F81
	4 PRESS CLEAR, SET EXT SWITCH TO EXT-START TEST 2 AFTER PROG STEP 3 SCOPE TC2-2P (BOR)	NEG 85US/1.1MS PER	F82	F83
E19			F169	
E20	OPERATOR ACTION	RESPONSE	YES	NO
	DID ERROR E122 OCCUR		F184	1
	1 PRESS FST-NOTE M1R (ACTUAL DATA) 2 PRESS FST 3 TIMES			
	NOTE M1R (EXPECTED DATA)	DIFFENCE IN D1 ONLY	3	6
	3 PRESS FST 3 TIMES	M1R = 0	F84	4
	4 PRESS CLEAR, SET EXT SWITCH TO EXT-START TEST 2 AFTER PROG STEP 3 SCOPE TC3-2B (WSTR)	0 LEVEL	F85	5
	5 SCOPE TC1-2L (LDBUF)	LOW LEVEL	9	F87
	6 EXPECTED DATA IS 0		7	8
	7 ACTUAL DATA IS	0005	F69	
		000F	F89	
		0015	F88	
		00F0	F90	
		8000	F91	
		OTHER	8	
	8 DIFFERENCE IS IN DIGIT D		9	10
	9 ACTUAL DATA HAS DROPPED BIT		F86&92	F86
	10 ACTUAL DATA HAS DROPPED BIT		F93&94	F94

E21	OPERATOR ACTION	RESPONSE	YES	NO	
	1 RUN TEST 2	NO ERRORS	2	3	
	2 PRESS CLEAR,SET EXT SWITCH TO EXT,START TEST 1 AFTER PROG STEP 3 SCOPE TC3-1T (BRESET)	2US PULSES	F109	F170	
E22	OPERATOR ACTION	RESPONSE	YES	NO	
					B
					B
	1 METER TC2-2P (BOR)	100%	F78&F179	F34	B
E23			F2		
E24	OPERATOR ACTION	RESPONSE	YES	NO	
	PRESS FST & OBSERVE M1R	C2 ON	F49	1	
	1 START TEST 6 (SEE NOTE 1) SCOPE TC3-2B (WSTR)	SEE WAVEFORMS	2	F75	
	2 PRESS CLEAR, SET EXT SWITCH TO EXT,START TEST 1 AFTER PROG STEP 3 SCOPE TC3-T3 (5M)	100%	F76	F77	
E25			F89&F90		
E26	OPERATOR ACTION	RESPONSE	YES	NO	
	1 PRESS FST & OBSERVE M1R	C8 ON	F60	2	
	2 START TEST 6 (SEE NOTE 6) SCOPE TC3-2B (WSTR)	SEE WAVEFORMS	3	F61	
	3 SET EXT SWITCH START TEST 1, AFTER PROG STEP 3 METER TC4-Y3 (EN5MS)	100%	4	F62	
	4 SCOPE TC3-T3 (5M)	1US/5MS PERIOD	F63	F64	
E27			F53		
E28			F73		
E29	SEE E70				
E30			F145		
E31	OPERATOR ACTION	RESPONSE	YES	NO	
	1 PRESS FST OBSERVE M1R	C2 ON	F49	F50	
E32			F146		
E33			F46		
E34	OPERATOR ACTION	RESPONSE	YES	NO	
	1 METER TC4-2S (BOT)	0%	2	F17	

	2	DID CASSETTE 'R' IND BLINK RAPIDLY DURING TAPE MOTION (REPEAT TEST 2 IF NECESSARY)		E36.2	3
	3	DRIVE ERROR-SLOW FORWARD SPEED			
E35		OPERATOR ACTION	RESPONSE	YES	NO
	1	PRESS FST & OBSERVE MIR	MIR = 0000	F59&F73	
			M1R = 0011	2	
			M1R = 0012	F67	
			M1R = 0014	6	
			M1R = 0018	8	
			M1R = 0030	F73	
			M1R = 0050	9	
			M1R = 0080	F73	
			M1R = 0090	F68	
			M1R = 00A0	F73	
	2	METER TC3-2Y (TREL/)	0%	4	3
	3	DRIVE ERROR-TREL/ = 1 OR TC3 F7 OR TC3-F7			
	4	METER TC4-1Q (DNR)	0%	F69	5
	5	METER TC3-C3 (TREL)	100%	F70	F71
	6	METER TC2-2R (TWRL/)	0%	F72	7
		NOTE-FILE PROT TAB SET CAN CAUSE THIS ERROR			
	7	DRIVE ERROR-TWRL/ = 1			
	8	METER TC4-2W (EOT)	0%	F69	F17
	9	METER TC4-2N (STL)	0%	F73	F74
E36		OPERATOR ACTION	RESPONSE	YES	NO
	1	REPEAT TEST 2 OBSERVING CASSETTE 'R' INDICATOR	BLINKING RAPIDLY	2	5
	2	METER TC3-2J (TRWP/)	100%	3	F45
	3	METER TC3-1J (BDL/)	100%	4	F46
	4	DRIVE ERROR-CONSTANT TRWP OR BDL			
	5	TAPE MOTION OCCURRED		8	6
	6	START TEST 6 (SEE NOTE 1 BUT DO NOT WAIT FOR BOT) METER TC3-2K (FDL/)	0%	7	F46
	7	DRIVE ERROR-NO FORWARD DRIVE			
	8	START TEST 6 (SEE NOTE 1 & WAIT FOR 2 SEC OF TAPE MOTION) METER TC3-1R (CLPL/)	100%	10	9
	9	DRIVE ERROR-CLPL/ = 0 OR TC3-F7			
	10	METER TC3-2T (TPRL/)	100%	12	11
	11	DRIVE ERROR-TPRL/ = 0 OR TC3-F7			
	12	OBSERVE CASSETTE 'R' IND	IND ON	F47	F48

E37		OPERATOR ACTION	RESPONSE	YES	NO
	1	PRESS CLEAR,SET EXT SWITCH TO EXT,START TEST 1 AFTER PROG STEP 3 SCOPE TC4-2N	POS PULSES	F73	F133
E38				F11	
E39				F12	
E40		OPERATOR ACTION	RESPONSE	YES	NO
	1	REPEAT TEST 2 OBSERVING CASSETTE 'R' IND	BLINKING RADIDLY	E36.2	F13
E41		OPERATOR ACTION	RESPONSE	YES	NO
	1	PRESS FST & OBSERVE M1R	A8 ON	F14	F15
E42				F16	
E43				F17	
E44				F18	
E45				F19	
E46		OPERATOR ACTION	RESPONSE	YES	NO
	1	CHECK REV DRIVE SPEED	CORRECT	F20	
E47				F21	
E48				F22	
E49				F23	
E50		OPERATOR ACTION	RESPONSE	YES	NO
		DRIVE ERROR-NO BOT AT HI-SPEED SLOW SPEED OR LOW PHOTO CELL			
E51		OPERATOR ACTION	RESPONSE	YES	NO
	1	START TEST 10 AFTER REWIND BUT BEFORE ALARM METER TC1-2Q (HSL/)	0%	2	F24
	2	DRIVE ERROR-HSL/ = 1			
E52		OPERATOR ACTION	RESPONSE	YES	NO
	1	REPEAT TEST 4	ERROR RECURS	2	3
	2	PERFORM TAPE DRIVE ADJUSTMENTS (COULD BE CAUSED BY DEFECTIVE TAPE)			
	3	RANDOM DATA READ ERROR-DISREGARD			
E53		SEE E52			

E54		OPERATOR ACTION	RESPONSE		YES	NO
	1	PRESS FST & OBSERVE MIR	MIR = 0040	2		
			MIR = 0041	3		
			MIR = 005X	F25		
	2	START TEST 6 (SEE NOTE 1)				
		SCOPE TC3-2B (WSTR)	1US PULSES		F31	F26
	3	START TEST 6 (SEE NOTE 1)				
		SCOPE TC3-2B (WSTR)	1US PULSES		4	F27
	4	SCOPE TC1-V3 (TE)	0 LEVEL		F29	F28
E55	SEE E70					
E56		OPERATOR ACTION	RESPONSE		YES	NO
	1	PRESS FST & OBSERVE MIR	MIR = 0	F33&F73		
			M1R = 8020	F34		
			M1R = 0024	F35		
			M1R = 0060	2		
			MIR = 0062	F189		
			MIR = OTHER	3		
	2	START TEST 6 (SEE NOTE 1)				
		SCOPE TC3-2B (WSTR)	SEE WAVEFORMS		F36	F37
	3	REPEAT TEST 3, IF ERROR DOES NOT RECUR COMPLETE MIR BY RUNNING TEST 4 IF ERROR RECURS GO TO STEP 4				
	4	START TEST 6 (SEE NOTE 1)				
		SCOPE TC3-2B (WSTR)	SEE WAVEFORMS		5	F38
	5	SCOPE TC1 1L (TWIL/)	SEE WAVEFORMS		12	6
	6	SCOPE TC1-2E (SHIFT)	SEE WAVEFORMS		F40	F80
	7	SCOPE TC1-2U (DREF)	SEE WAVEFORMS		8	F41
	8	SCOPE TC1-1K (CNT4)	SEE WAVEFORMS		9	F42
	9	SCOPE TC3-1L (RCL/)	2US/160 MS PER		10	F44
	10	SCOPE TC1-IS (TRIP/)	SEE WAVEFORMS		F43	11
	11	DRIVE ERROR-TRIP,TWIL, OR RCL OR TC1-E1 NOTE IF RCL IS NOT WORKING IN THE DRIVE, SIGNAL TRIP/ MAY BE INTERMITTANTLY WRONG AND DIFFICULT TO DETECT ON SCOPE				
	12	SCOPE TC3-1U (TWL/)	2US/160MS PER		7	13
	13	SCOPE TC3-L4 (TWL)	NEG 2US/160MS PER		F118	F172
E57		OPERATOR ACTION	RESPONSE		YES	NO
	1	PRESS FST & OBSERVE MIR	MIR = 0040		14	2
	2	START TEST 6 (SEE NOTE 1)				
		SCOPE TC3-2B (WSTR)	SEE WAVEFORMS		6	3
	3	SCOPE TC3-2B (WSTR)	0 LEVEL		F173	4
	4	SCOPE TC1-V3 (PE)	0 LEVEL		F174	5
	5	SCOPE TC3-2S (1STPE/)	NEG 1US,160MS PER		F108	F171
	6	SCOPE TC3-2S (1STPE/)	NEG 1US,160MS PER		7	F79
	7	SCOPE TC1-1P (TWCP/)	NEG 1US,125US PER		9	8
	8	SCOPE TC1-1D (BNWRITE)	2US,160MS PER		F175	F150
	9	SCOPE TC3-1U (TWL/)	2US/160MS PER		11	10
	10	SCOPE TC4-L4 (TWL)	NEG 2US/160MS PER		F118	F172
	11	SCOPE TC1-24 (RDSTRB)	SEE WAVEFORMS		F176	12
	12	SCOPE TC1-2V (TRCL/)	SEE WAVEFORMS		F177	13
	13	DRIVE ERROR- TWCP,TRCL,OR OR TC1 E1	TWL			
	14	START TEST 6 (SEE NOTE 1)				
		SCOPE TC3-2B (WSTR)	SEE WAVE FORMS		15	F33
	15	SCOPE TC1-2L (LDBUF)	0 LEVEL		F32	F117
E58					F80	
E59	SEE E52					
E60		OPERATOR ACTION	RESPONSE		YES	NO
	1	START TEST 6 (SEE NOTE 1)				
		SCOPE TC1-IL (TWIL/)	SEE WAVEFORMS		2	F80
	2	ALLOW TEST 6 TO RUN FOR 1 MINUTE PRESS READY OR INPUT REQ				
		START TEST 8 (SEE NOTE 1) NOTE TEST 8 READS DATA WRITTEN IN TEST 6-SCOPING MUST BE DONE BEFORE REACHING END OF 1 MINUTE-RESTART AS REQ'D				
		SCOPE TC3-1U (TWL/)	100%		3	F147
	3	SCOPE TC1-IL (SHIFT)	1US PULSES		F148	F30
E61					F149	
E62		OPERATOR ACTION	RESPONSE		YES	NO
	1	PRESS FST & OBSERVE M1R	M1R = 8002		F150	
			M1R = 8040		F151	
			M1R = 8060		2	
	2	START TEST 6 (SEE NOTE 1)				
		SCOPE TC3-2S (1STPE/)	SEE WAVEFORMS		3	F152
	3	SYNC ON TC3-2S (1STPE/)				
		SCOPE TC1-2W (PE)	FIRST PE PULSE IS AT 1STPE/ TIME		4	F80
	4	SYNC ON TC3-2S (1STPE/)	FIRST TWCP/ PULSE			
		SCOPE TC1-1P (TWCP/)	125 US AFTER 1STPE/		5	F81
	5	SCOPE TC1-1T (BRESET)	SEE WAVEFORMS		F153	F49

E63	OPERATOR ACTION	RESPONSE	YES	NO
1	REPEAT TEST 4	ERROR RECURS	2	E52-3
2	DRIVE ERROR-NO FILE PROT OR DEFECTIVE TAPE			

E64	OPERATOR ACTION	RESPONSE	YES	NO
1	METER TC3-1U (TWL/)	100%	2	F127
2	PRESS FST TWICE & NOTE MIR (ACTUAL DATA)			
3	PRESS FST TWICE & NOTE MIR (EXPECTED DATA)			
4	DIFFERENCE IS IN 1 DIGIT ONLY		5	F39
5	DIFFERENCE IS IN DIGIT D		6	F58
6	DIFFERENCE IS IN BIT 1 ONLY		7	F57
7	START TEST 6 (SEE NOTE 1) SCOPE TC1-1L (TWIL)	SEE WAVEFORMS	F56	8
8	SCOPE TC3-2S (1STPE/)	SEE WAVEFORMS	9	F65
9	SYNC ON TC3-2S (1STPE/) SCOPE TC1-2W (PE)	FIRST PE PULSE IS AT 1STPE/ TIME	10	F80
10	SYNC ON TC3-2S (1STPE/) SCOPE TC1-1P (TWCP/)	FIRST TWCP/PULSE 125 US AFTER 1STPE/	F66	F81

E65 SEE E52

E66 SEE E52

E67 E68 SEE E70

E69	OPERATOR ACTION	RESPONSE	YES	NO
1	METER TC4-1Y (PSWRITE/)	100%	F128	F9

E70	OPERATOR ACTION	RESPONSE	YES	NO
1	REPEAT TEST 3 SEVERAL TIMES	ERROR RECURS	3	2
2	RANDOM DATA READ ERROR PROCEED TO TEST 4			
3	START TEST 6 (SEE NOTE 1) SCOPE TC3-2B (WSTR)	SEE WAVEFORMS	4	F38
4	PERFORM TAPE DRIVE ADJUSTMENTS INCORRECT REVERSE SPEED IS INDICATED (COULD BE CAUSED BY DEFECTIVE TAPE) IF ERROR# E70 RECURS AFTER DRIVE ADJUSTMENTS ARE VERIFIED TO BE CORRECT PROCEED TO STEP 5			
5	SET EXT SWITCH TO EXT (INHIBIT READ REV DATA CHECK) START TEST 3 (SEE NOTE 1)	TEST COMPLETES WITHOUT ERROR	6	7
6	SET EXT SWITCH TO CENTER (DRIVE DOES NOT READ DATA IN REVERSE BUT THIS DOES NOT CONSTITUTE A FAILURE) PROCEED WITH TEST 4 (NOTE 1)			
7	FOLLOW INSTRUCTION PER ERROR#			

E71 E72 SEE E70

E73 PERFORM TAPE DRIVE SPEED ADJUSTMENTS

E74 SEE E70 D D

E75 SEE E52 D D D

E76 F194 (ALSO SEE E52) D D D

E77 THRU E81 SEE E52 D

E82					
1	PRESS FST TWICE & OBSERVE MIR (ACTUAL DATA)				
2	PRESS FST TWICE & OBSERVE MIR (EXPECTED DATA)	ACT = 0080 EXP = 0040		F182	E52

E83 SEE E52

E84	OPERATOR ACTION	RESPONSE	YES	NO
1	PRESS FST & OBSERVE MIR	D8 ON	F59	2
2	METER TC2-2R (TWRL/)	0%	F154	3
3	DRIVE ERROR-TWRL WITH WRITE INHIBITED			

E85 SEE E63

E86	OPERATOR ACTION	RESPONSE	YES	NO
1	PRESS FST TWICE & OBSERVE MIR (ACTUAL DATA)			
2	PRESS FST TWICE & OBSERVE MIR (EXPECTED DATA)	ACT = 0000 EXP = 003F	3	4
3	DATA HAS BEEN READ FROM 'BLANK' SECTION OF TAPE REPEAT TEST 4 DRIVE ERROR IF ERROR RECURS			

4	EXPECTED DATA IS 64 SEQUENTIAL SINGLE CHARATER RECORDS (IF E86 1ST CHAR IS 3F LAST IS 00 IF E110 1ST CHAR IS 00 LAST IS 3F) VALUE OF EXPECTED DATA INDICATES NO OF RECORDS READ CORRECTLY (IF E86 EXP DATA IS 3E ONLY 1 RECORD (3F) WAS CORRECT IF E110 EXP DATA IS 3E THEN 62 RECORDS (00-3D) WERE CORRECT) PRESS FST TWICE TO RESUME MTR IF ERROR RECURS GO TO STEP 5 IF NOT DISREGUARD (SEE STEP 6 COMMENT)			
5	SET EXT SWITCH TO EXT (INHIBIT HI-SPD READ DATA CHECKS) PRESS FST 6 TIMES (ONLY 2 REQ'D IF STEP 1 & 2 USED) TO RESUME MTR	TEST COMPLETES WITHOUT FURTHER ERRORS	6	7
6	SET EXT SWITCH TO CENTER (DRIVE DOES NOT READ DATA AT HIGH SPEED BUT THIS DOES NOT CONSTITUE A FAILURE) END OF MTR			
7	FOLLOW INSTRUCTIONS PER ERROR#			

E87	DRIVE ERROR HI-SPD SEARCH SEE E70-4			
E88 E89	SEE E52			
E90			F155	
E91			F156	
E92			F157	
E93			F158	
E94	OPERATOR ACTION	RESPONSE	YES	NO
1	PRESS FST 6 TIMES TO RETRY DATA READ	ERROR RECURS	3	2
2	RANDOM DATA ERROR-DISREGARD.			
3	DRIVE ERROR USING TEST 11 WRITE F'S TO EOT			
4	TURN TAPE CARTRIDGE OVER USING TEST 12 OBSERVE CLOCK & DATA SIGNALS IN DRIVE TO ISOLATE			

E95	OPERATOR ACTION	RESPONSE	YES	NO
1	CHECK DRIVE ANALOG CLOCK SIGNAL FOR DISTORTION	SIGNAL CORRECT	F159	
E96			F160	
E97	SEE E52			
E98 E99	SEE E94			
E100	OPERATOR ACTION	RESPONSE	YES	NO
1	START TEST 9,			
2	REV MOTION OCCURS WHEN DOUBLE ALARM SOUNDS		E104-4	3
3	METER TC3-1J (BDL/) NOTE METERING MUST BE DONE AFTER DOUBLE ALARM AND BEFORE SINGLE ALARM	0% (DURING REV)	4	F95
4	DRIVE ERROR-NO REV MOTION (BDL/)			

E101	OPERATOR ACTION	RESPONSE	YES	NO
1	START TEST 6	TAPE REWINDS	6	2
2	OBSERVE TAPE	FWD MOTION OCCURS	3	4
3	PRESS READY OR INPUT REQ RETN TO STEP 1			
4	PRESS CLEAR,START TEST 6 SCOPE TC3-2J (TRWP/) NOTE TRWP/ PULSE OCCURS ONLY ONCE AS TEST 6 IS STARTED REPEAT STEP 4 AS REQUIRED	2US NEG PULSE	5	F96
5	DRIVE ERROR-TRWP/			
6	PRESS CLEAR OPEN & CLOSE CASSETTE WHEN REWIND COMPLETE METER TC3-1R (CLPL/)	0%	6	5
7	DRIVE ERROR-CLPL/ = 1 OR TC3 F7			
8	METER TC4-2S (BOT)	100%	F97	F98
E102			F161	

E103 DRIVE ERROR-INCORRECT CENTER OF TAPE SPEED OR TC3-E3

E104		OPERATOR ACTION	RESPONSE	YES	NO
	1	PRESS FST & OBSERVE M1R	M1R = 0000	2	
			M1R = 0008	F59	
			M1R = 0018	F99	
			M1R = 0050	F15	
			M1R = 0015	E36	
	2	OPEN & CLOSE CASSETTE WHILE TAPE IS AT CLEAR LEADER METER TC1-2T (TPRL/)	100%	4	3
	3	DRIVE ERROR-TPRL/ OR TC3 F7			
	4	START TEST 6 WHEN FORWARD MOTION STARTS METER TC1-2Q (HSL/)	100%	5	F100
	5	METER TC3-2J (TRWP/)	100%	6	F45
	6	OBSERVE CASSETTE 'R' IND & REPEAT TEST 2	BLINKING RAPIDLY	E36-2	7
	7	CHECK DRIVE SPEEDS	CORRECT	F101	

E105 F146

E106 F162

E107 F163

E108 F164

E109 F165

E110 SEE E86

E111 F166

E112 (OR SLOW TAPE ACCELERATION) F167

E114 F99

E115 F150

E116 F168

E117 F146

E118 F127

E119 F117

E120 DRIVE ERROR HI-SPD REV SEARCH SEE E70-4

E121		OPERATOR ACTION	RESPONSE	YES	NO
	1	METER TC3-1Y (BSY/)	0%	2	F118
	2	DRIVE ERROR-BSL/			

E123		OPERATOR ACTION	RESPONSE	YES	NO	
						B
						B
	1	IS TC ON SAME PS CARD AS CONSOLE OR SPO		F140	F192	B

E124 E125 SEE E123

E126		OPERATOR ACTION	RESPONSE	YES	NO	
	1	PRESS FST & OBSERVE MIR	C2 ON	F181	2	
	2	PRESS FST 5 TIMES	ERROR RECURS	E94-3	E94-2	
						D
						D

E127		OPERATOR ACTION	RESPONSE	YES	NO	D
						D
	1	HOLDING CLEAR METER TC4-2Q (CG#CD!CLEARN)	100%	2	F195	D
						D
						D
	2	RE-RUN MTR, IF E127 RECURS SKIP STEP 1, GO TO STEP 3				D
						D
						D
	3	OBSERVE MIR DIGIT B FOR PORT ADDRESS OF TC (NOTE * PORT ADDRESS IS PORT NO. MINUS ONE)		4	5	D
						D
						D
	4	PRESS FST & FOLLOW NEXT E#				D
						D
	5	RUN MTR FOR DEVICE IN PORT INDICATED IN STEP 3				D

FAILURE DICTIONARY

NOTE
IF TC IS IN PORT 1-4 PS IS PS1-1 (LOWEST PRIORTY) B
IF TC IS INPORT 5-8 PS IS PS1-2 B
IF TC IS IN PORT 9-12 PS IS PS1-3 (IF USED) B

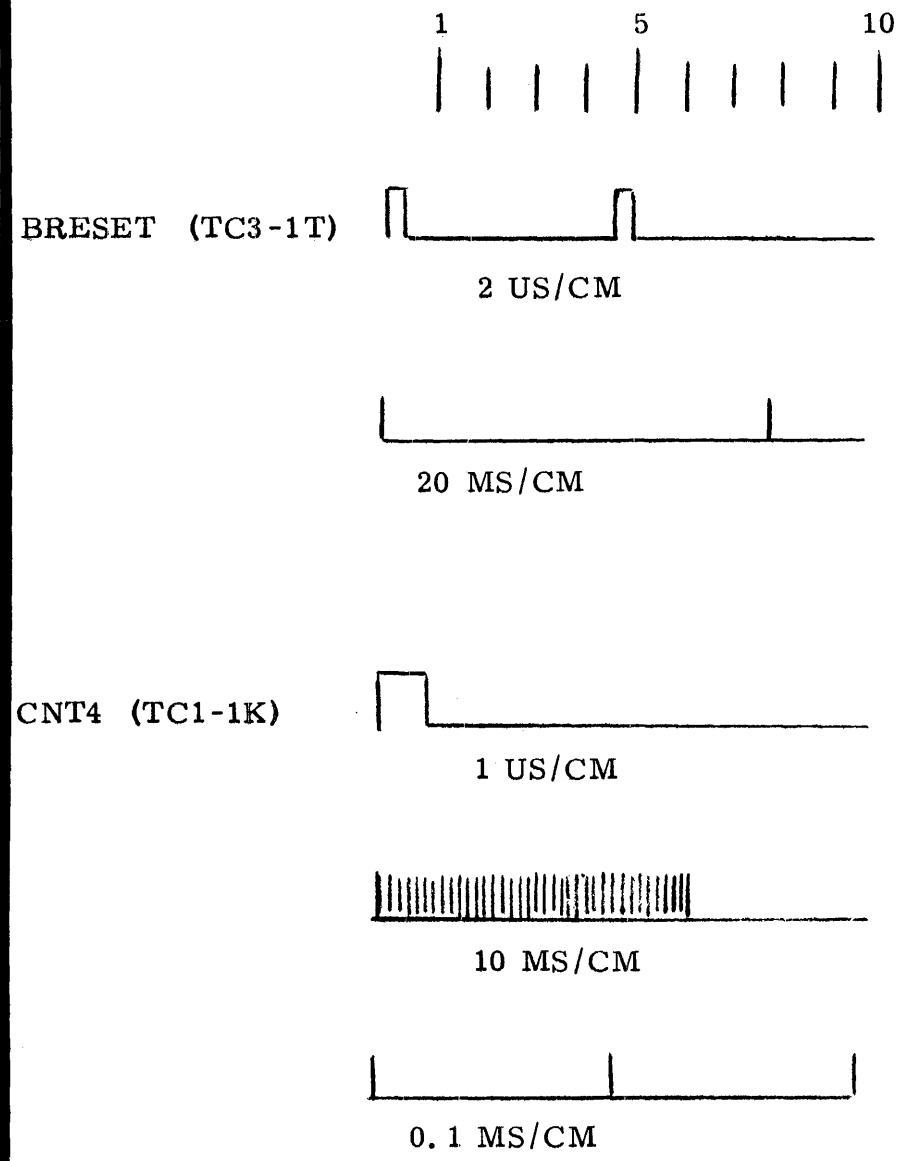
		SOURCE REF	
F1	PS A5 C3	PROG	
F2	PS C3 D3 D5 E3	15 23 7	
F3	PS A3 A5 A7 C1 E5 F7	9 12	D
F4	A7 D1 OF ALL PS1 CARDS		D D
F5	PS D7	6	D
F6	PS E7 F7 MU4 D5	5 8 9 10	D D D
F7	PS A3 C1 D1 D7 E5	9	
F8	PS A5 C7	20	
F9	PS E7 F7	2 69	
F10	PS A5 B3 B5 C7	2 15	
F11	TC4 D1 E3	38	
F12	TC4 D1 E1 F1	39	
F13	TC4 A1 B1 C1 D1	40	
F14	TC4 B7 C1	41	
F15	TC4 A3	41 104 9	
F16	TC2 C7 E3	42	
F17	TC4 B7 C7	34 35 43	
F18	TC4 B5 B7	44	
F19	TC4 A7	45	
F20	TC4 B5 C7 D5 D7 E1	46	
F21	TC4 E5	47 21	
F22	TC4 B7 D3 E5	48	
F23	TC1 B1 B5 D1 D7 F5 TC2 F3	49	
F24	TC1 C1 D5 TC2 A7 B7 D5 D7	51	
F25	TC3 D7 E3	54	
F26	TC3 C1 E5 E7 F5	54	
F27	TC3 A5 B1 D7 E7	54	
F28	TC1 A1 A3 A5 C1 D7	54	
F29	TC1 A3 A7 D1 E1 E7	54	
F30	TC1 D7 F7	54	
F31	TC1 F7 TC2 E5	54	
F32	TC1 A1	54 57	
F33	TC3 A5	56 57	
F34	TC3 E5	56 22	
F35	TC2 C7 D5	56	
F36	TC4 E1 E3 F1	56	
F37	TC3 C1 C5 E7	56	
F38	TC3 A3 B1 B3 D1 D7	56	D
F39	TC1 B3 C3 F7	64	D
F40	TC1 B3 C1 C3 D5 F7	56	D
F41	TC1 A7 B1 C3 C7 D3 D7 E3 E5 E7 F3 F5	56	D D D
F42	TC1 A3 E1 E5 F5	56	D
F43	TC1 B1 B5 C3 D1 D3 D7 F5	56	D D D
F44	TC3 C7 TC4 F3 F5	56	
F45	TC3 C7 TC4 C7 D7 E7	36 104	
F46	TC3 C7 TC4 E5	33 36	
F47	TC2 E3 TC3 F5 TC4 C5 D7	36	
F48	TC3 F5 TC4 F1 F7	36	
F49	TC3 D3	24 31 62	
F50	TC3 A5 TC4 D5	31	
F51	TC4 A5 B5	5	
F52	TC4 C5 D5 E7 F3	5	
F53	TC2 A3 B1 B3 B5 E3 E7	27	
F54	TC4 D1	5	
F55	TC4 D3	9	
F56	TC1 B3 F7 TC2 C3	64	
F57	TC1 C3 TC2 C3	64	
F58	TC1 B3 TC2 A3	64	
F59	TC4 C7	20 84 104	
F60	TC4 C5 E3	26	
F61	TC3 A3 A5 A7 B3 B5 C1 D1 D3 D7 E1	26	

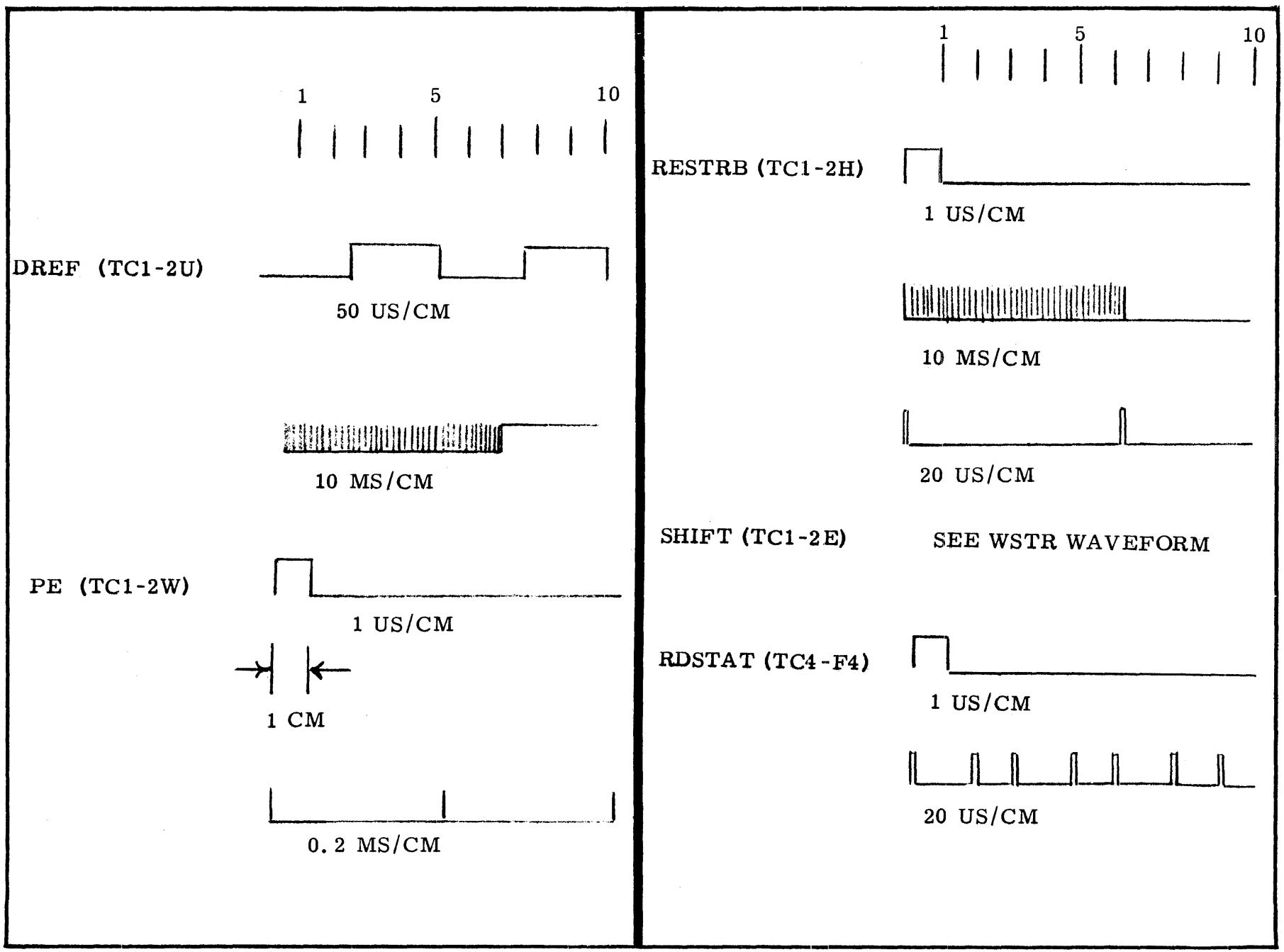
F62	TC4 F3 F5	26
F63	TC4 C5 D5	26
F64	TC3 A5 B3 B5 C1 C3 D1	26
F65	TC1 E7	64
F66	TC1 A5 C1 F7 TC3 E3	64
F67	TC1 B5 TC2 F3	35
F68	TC2 E3 TC4 F3 F5	35
F69	TC2 F3	35 20 8
F70	TC4 A5 E7 F7	35
F71	TC3 F5 F7	35
F72	TC2 B7 C7 D7 F3	35
F73	TC2 E3	28 35 56
F74	TC4 A3 D1 E1 E3	35
F75	TC3 A3 A5	24
F76	TC3 A5 C1 D1	24
F77	TC3 B3 B5 C3 D1 E1	24
F78	TC2 A5 A7 B3 D3 D5 TC1 B7 F7 (B3 & D3 MUST BOTH FAIL & ARE LEAST SUSPECT)	22
F79	TC3 A1	18 57
F80	TC1 F7	18 56 58 60
F81	TC3 E7	10 18 62
F82	TC3 D5 E5	10 18
F83	TC2 B3 D3 D5 E1 E5	18
F84	TC2 C1 D5 E1 E5	20
F85	TC3 E5 F5	20
F86	TC2 C3 C5 D1 D3 F3	20
F87	TC1 A1 A3 D1 D7 F7	20
F88	TC2 E1	20
F89	TC2 D3	20
F90	TC2 B3	20
F91	TC4 E1	20
F92	TC2 F7	20
F93	TC2 E7	20
F94	TC2 A3 B1 B3 B5 E3	20
F95	TC3 C7	100
F96	TC3 C7 TC4 C3 C5 D7 E7 F3	101
F97	TC4 C5 D5 D7 F1	101
F98	TC3 F5 TC4 A5 C7 D5 F1	101
F99	TC4 B7	104 114
F100	TC1 D5 TC2 B7	104
F101	TC3 C5 F5 F7	104
F102	TC4 F1	13
F103	TC1 E7 TC2 C5 E1	13
F104	TC1 A1 D7 E7 F7	14
F105	TC3 A1 C1 D3 E5	14
F106	TC3 D5 TC4 B5 D3	14
F107	TC3 C1 C5 D5 E7	14
F108	TC1 E7 TC2 A5 B3 C1 D3 D5 D7 E5 (B3 & D3 MUST BOTH FAIL & ARE LEAST SUSPECT)	14
F109	TC2 B3 D3 D5 D7	21
F110	TC4 B3 B5	21
F111	TC4 B3 D3 D7 E1	9
F112	TC4 A5 D5	9
F113	TC4 B1 E1	9
F114	TC4 A3 C1 D1 D3 E3 F5	9
F115	TC3 E3 TC4 A1 A3 C1 F1	9
F116	TC4 A5 A7 B3 B5 C1 D3 E1 E5 E7	9
F117	TC1 D7	10 57 119
F118	TC3 F3	1 2 56 57 121
F119	TC4 B1 E1 F1	10
F120	TC2 B3 B5 D3 E5	10
F121	TC2 D5	10
F122	TC1 E7 TC2 C5 D5 E1	8
F123	TC3 F5 TC4 A5 A7 E7	8
F124	TC3 D5 E5 TC4 F5 PS F5	6
F125	TC4 B3 E5	9
F126	TC3 E5 TC4 B3	14
F127	TC4 C5	64 118
F128	TC4 E5 E7	5 69
F129	TC3 C7 TC4 B3 D3 D7 E1 E5	PROG
F130	PS C1 D7 E3	4

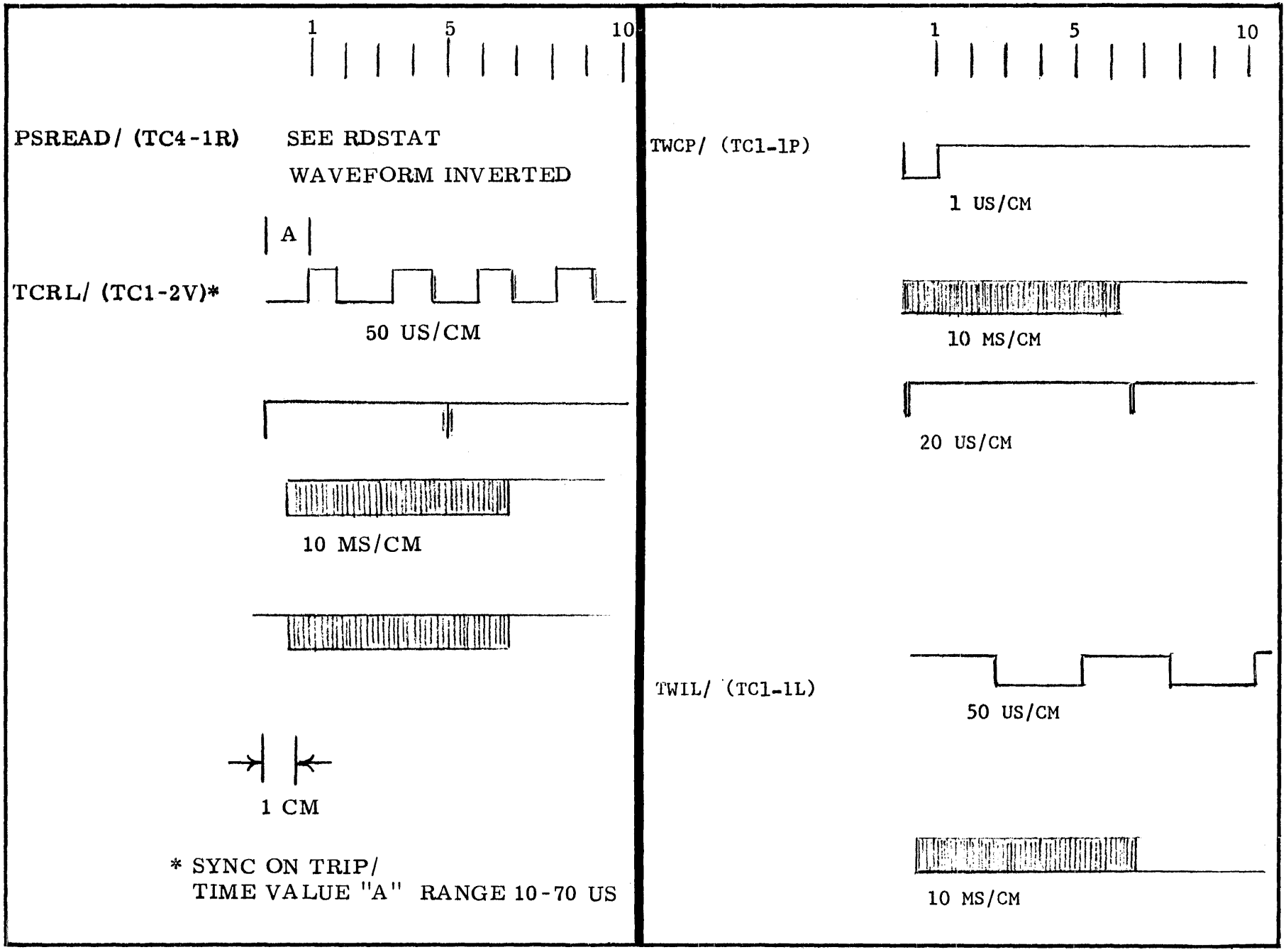
F131	TC3 A1 D3 D7 E1 E3 TC4 C1	5	
F132	TC4 A3 B1 C1 D1 F5 PS F5	5	
F133	TC3 D5 TC4 A3 D1 E1 F1	37	
F134	TC1 E7 TC2 C5 E1 E3	2	
F135	TC2 C5 F3 F7	2	
F136	TC2 E3 E7	2	
F137	TC2 E5	12	
F138	TC4 F5	12	B
F139	PS B3 B5 B7 D3 & B5 OF PS1-2 & PS1-3(IF USED)	13	B B
F140	PS A5 B5 C5 C7	13 123/5	
F141	PS C5 B7	17	
F142	TC1 E7 TC2 C5 E1 TC4 F1	13	
F143	TC3 E3 TC4 B3 B5 D1 F1	16	
F144	TC4 A1 A3 B1 C1 C7 D1	19	
F145	TC3 A5 D1	30	
F146	TC3 E1	32 105 117	
F147	TC3 F3 TC4 C5	60	
F148	TC2 B5 E5	60	
F149	TC4 B1	61	
F150	TC4 D5	57 62 115	
F151	TC3 C1 E5 TC4 E1 F1	62	
F152	TC3 A1 E7	62	
F153	TC3 C1 D1 D7	62	
F154	TC2 C7 D7	84	
F155	TC2 A7 B7 C7 D7 F3	90	
F156	TC2 C7 TC4 D7	91	
F157	TC2 B7 C7 D7	92	
F158	TC3 C5 F5	93	
F159	TC3 C1 C5 D3 D5 E7	95	
F160	TC3 E1 E3	96	
F161	TC3 A1 TC4 E3	102	
F162	TC3 D5 TC4 D3	106	
F163	TC3 D3 E3 TC4 F3	107	
F164	TC3 D7	57 108	
F165	TC3 E5 TC4 F3 F5	109	
F166	TC4 A1 D7	111	
F167	TC4 D7	112	
F168	TC4 A1	116	
E169	TC4 A1 A3 B1 C1 C7 D1 D3	19	
F170	TC3 D5	21	
F171	TC3 A1 C1 C5 F5	57	
F172	TC4 C5 D7	56 57	
F173	TC3 A1 F5	57	
F174	TC3 A3 A5 B1 B3 E7	57	
F175	TC1 D5	57	
F176	TC3 A1 B7 C5 D3 D7 E3	57	
F177	TC1 B7 C1 C5 E1	57	
F178	PS A5 A7 B5 C1	PROG	
F179	PS E7	8 22	
F180	PS A5 F7	PROG	
F181	TC1 B1 D3 E7	126	
F182	TC1 A1 D7	82	B

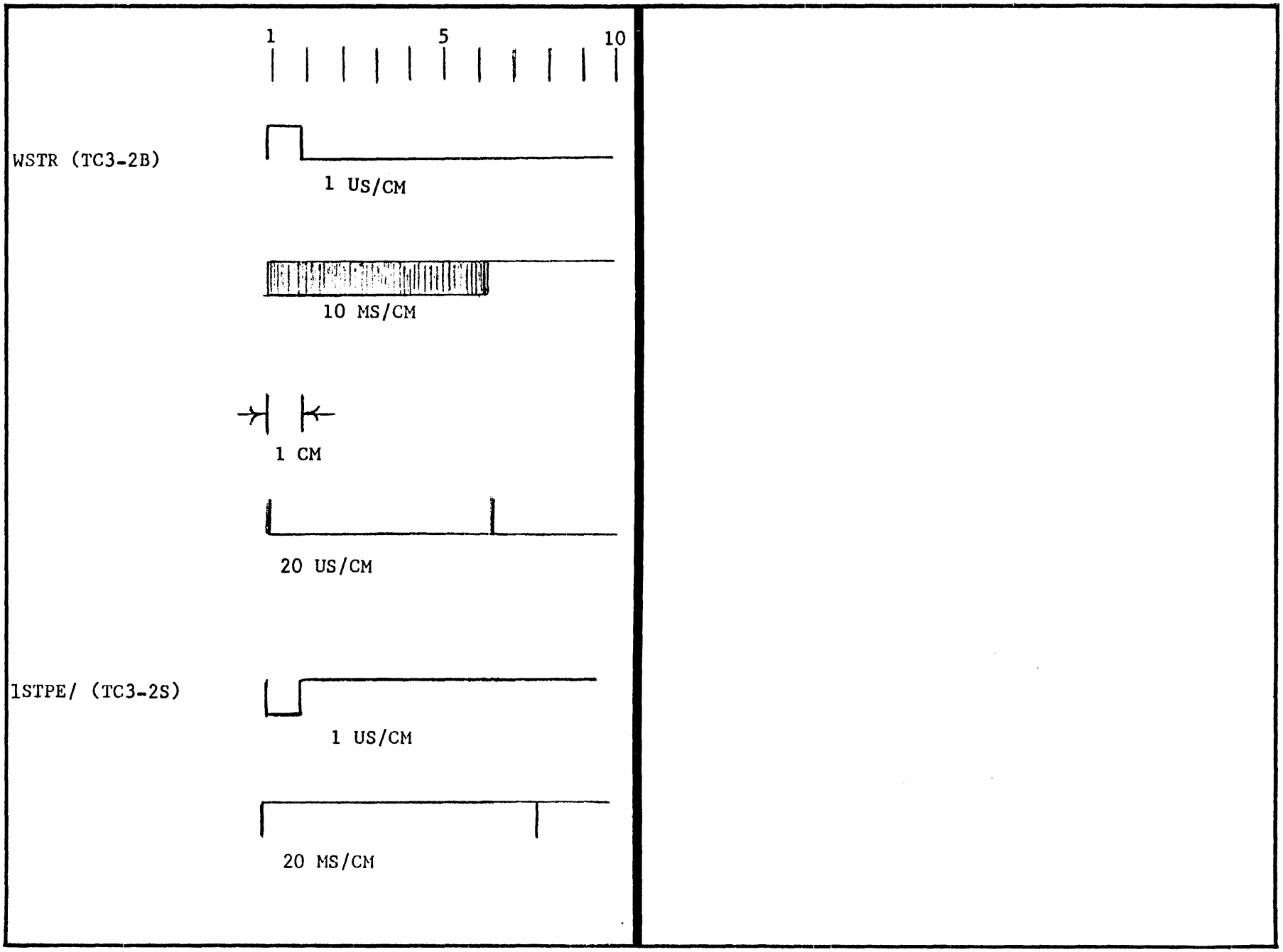
F183	PS B3 D3 & B3 D3 OF PS1-2 & PS1-3(IF USED)	PROG	B
F184	TC2 B3 D3 PS E7	20	
F185	PS A3 A5	9	B
F186	NO SCLOCKS TO THIS DDP. (CDSCLKPX) ON CD	8	B B
F189	TC1 D1	56	
F190	TC2 C5 D5 E1 E3 E7	1	
F191	TC2 C5 D5 E1 F3 F7	1	B
F192	PS B3 & B5 OF PS1-2 & PS1-3(IF USED)	13 123	B B
F193	PS A3 C1 E5	15	
F194	TC1 D3	76	D D D D D
F195	CG1 C1 (FOR B721 CG2 C3 & CD2 A5)		D

ILLUSTRATIONS




1
5
10
DREF (TC1-2U)
50 US/CM
10 MS/CM
PE (TC1-2W)
1 US/CM
1 CM
0.2 MS/CM
1
5
10
RESTRB (TC1-2H)
1 US/CM
10 MS/CM
20 US/CM
SHIFT (TC1-2E)
SEE WSTR WAVEFORM
RDSTAT (TC4-F4)
1 US/CM
20 US/CM


1
5
10
PSREAD/ (TC4-1R)
SEE RDSTAT
WAVEFORM INVERTED
A
TCRL/ (TC1-2V)*
50 US/CM
10 MS/CM
1 CM
* SYNC ON TRIP/
TIME VALUE "A" RANGE 10-70 US
1
5
10
TWCP/ (TC1-1P)
1 US/CM
10 MS/CM
20 US/CM
TWIL/ (TC1-1L)
50 US/CM
10 MS/CM


1
5
10
WSTR (TC3-2B)
1 US/CM
10 MS/CM
1 CM
20 US/CM
1STPE/ (TC3-2S)
1 US/CM
20 MS/CM

TMMTR MAGNETIC TAPE UNIT
9491-2 MAGNETIC TAPE DRIVE
B 391 I/O CONTROL

PROGRAM-ID TMMTR.

NOTE: THIS MTR APPLIES TO MAGNETIC TAPE DRIVE MODEL A9491-2 AND ALSO APPLIES TO DDP #B391.

TURN TAPE DRIVE POWER OFF
PLACE MTR/MEM SWITCH IN MTR POSITION
PLACE IRQ/EXT SWITCH IN CENTER POSITION
LOAD TMMTR TAPE 1449 0874
PLACE LOAD SWITCH IN NORMAL - PRESS CLEAR

NOTE

ANY DISAGREEMENT WITH INSTRUCTIONS - SEE INCREMENTER ADDRESS FOR FURTHER ACTIONS

OPERATOR INSTRUCTIONS

PROG STEP	INCR	OPERATOR ACTION
1	0015	VERIFY MIR = SYS CONFIG. IF YES PRESS CONSOLE READY OR SPO INPUT REQ. IF NO SEE INCR FOR INST.
2	0007	SELECT MAG TAPE PORT NUMBER - SELECT FROM PK 1 THRU PK 11 IF CONSOLE OR 01 THRU 11 IF SPO.
3	0008	SELECT TEST - PRESS 00 ON SPO OR CONSOLE TO RUN TESTS 1 THRU 5 SEQUENTIAL. (SEE TEST SELECT TABLE)
4	0534	PORT SELECT TEST (SEE 0534 FOR INSTRUCTIONS. FST TO CONTINUE MTR
5	054E	TURN TAPE TRANSPORT POWER ON BRING TEST TAPE TO LOAD POINT. PUT TRANSPORT ON LINE TAPE LOADS CORRECTLY - FST INCORRECT LOADING - ERROR #E48
6	08C1	START TEST 4 - EXHAUSTIVE SEQUENTIAL DATA WRITE AND READ TO EOT. NOTE: OPERATOR MUST USE #E 151C IF TAPE RUNS PAST EOT TAB FORCE STEP TO START TEST
7	092C	REMOVE WRITE RING FROM TAPE. RETURN TAPE TO LOAD POINT AND ON LINE - FORCE STEP
8	0008	TEST COMPLETE REPLACE WRITE RING

TEST SELECT TABLE

NUMERIC	TEST
00	RUN TESTS 1 THRU 5 SEQUENTIALLY
01	TEST DDP WITH TAPE POWER OFF
02	TEST TAPE MOTION, READ AND WRITE
03	TEST ERASE & EXHAUSTIVE TAPE MOTION
04	EXHAUSTIVE WRITE & READ TO EOT
05	TEST WRITE INHIBIT
06	WRITE ALL ONES TAPE - DEBUG USE
07	REWIND TAPE TO BOT - AID
08	BACKSPACE ONE RECORD - AID
09	4 CHAR WRITE LOOP - DEBUG USE
10	READ LOOP - DEBUG USE
11	ERASE - DEBUG USE TERMINATE WITH SPO INPUT REQUEST OR CONSOLE READY BUTTON.
12	ENABLE 5 MSEC TIME MARKS COUNTER
13	FORWARD RAMP GEN - ADJUSTMENT TERMINATE WITH SPO INPUT REQUEST OR CONSOLE READY BUTTON.
14	REVERSE RAMP GEN - ADJUSTMENT TERMINATE WITH SPO INPUT REQUEST OR CONSOLE READY BUTTON.

PROGRAM LISTING

```
                *
                 START.
                 STARTCONTROLLER.          START  FROM SYSTEM  CLEAR
0000    8155           CPCR  = BUSSTEST1   - 1.    TEST  EXTERNAL  BUSS
                *********ERROR      # E1
                       TESTNUMBERLIMIT    VALUE  IS  14.
                *
0001    F18E           IF  IRQ  SKIP.          TEST  FOR  ERROR  IRQ
0002    400C           MPCR  = IRQOFF   - 1.
0003    F108           ASR  BEX.
0004    F0E1           MIR  = B.
0005    F000           WAIT.      UNEXPECTED  IRQ,   ADDRESS  IN  MIR
                *
                ********ERROR      #E2                                    D
                *
                *
                 SELECTPORT.
                *
                *
0006    F0DE           MIR  = A3.       CONTROLLER  ADDRESS  (ASR  AFTER  IRQ)
0007    F0FC           WHEN SRQ  STEP.
                * CONTROLLER  ADDRESS  IS  DISPLAYED  IN  MIR
                * IF  CONTROLLER  ADDRESS  IS  NOT CORRECT,  RUN SPO  OR
                *                                          CONSOLE  MTR
                * IF  CONTROLLER  ADDRESS  IS  CORRECT,  ENTER PORT  NUMBER
                *       OF DEVICE  THAT  IS  BEING  TESTED
                *   FOR  CONSOLE  SYSTEMS
                *         PRESS  PK  UNDER  LIGHTED  A  AND  B  INDICATORS
                *         (LEFT  TO  RIGHT)  FOR  PORTS  1  THROUGH  12
                *   FOR  SPO  SYSTEMS
                *         PRESS  2  NUMERIC  KEYS  FOR  PORTS  01  THROUGH  12
                *         'PORT'  IS  PRINTED
                *
                * NOTE-IF  AN INVALID  PORT  NUMBER  IS  ENTERED,  THE MTR
                *       SOUNDS  THE  ALARM  AND  RETURNS  FOR  ANOTHER  PORT
                *       NUMBER.  (ONLY  THE  LOWER  4  BITS  OF  EACH
                *       CHARACTER  ARE  USED  IN  THIS  CHECK-PRESS  CORRECT
                *       KEYS)
                *
                *
                 SELECTTEST.
0008    F0FC           WHEN SRQ  STEP.
                * PRESS  2  NUMERIC  KEYS  TO  SELECT  TEST
                *   FOR  CONSOLE  SYSTEMS
                *         PRESS  KEYS  ON  NUMERIC  KEYBOARD
                *   FOR  SPO  SYSTEMS
                *         'TEST'  IS  PRINTED
                *         PRESS  NUMERIC  KEYS
                *
                *
                * NOTE-IF  AN INVALID  TEST  NUMBER  IS  ENTERED,  THE MTR
                *       SOUNDS  THE  ALARM  AND  RETURNS  FOR  ANOTHER  TEST
                *       NUMBER.  (ONLY  THE  LOWER  4  BITS  OF  EACH
                *       CHARACTER  ARE  USED  IN  THIS  CHECK-PRESS  CORRECT
                *       KEYS)
                *
                *
0009    F097           DR2  BEX.
000A    F086           B  = LIT  AND  B.       STRIP  UPPER  DIGIT
000B    E00F           LIT  = @0F@.
000C    F0C9           JUMP.
                *
                *
                 IRQOFF.
000D    F17D           DLD.                    READ  CONFIGURATION  CARD
000E    F0F9           WHEN RDC  BEX.
000F    F0E1           MIR  = B.        SYSTEM  CONFIGURATION  IN  MIR
0010    F017           A1  = B.
0011    F0F9           WHEN RDC  BEX.
0012    F0FF           0  EQV  B.
0013    F09D           IF  ABT  SKIP.
0014    F000           WAIT.            CONFIG  FF  NOT  RESET  BY  BEX-
                **********              FAILURE  IS  CON1  CHIP  D7
                *
0015    F0F8           WHEN IRQ  STEP.
                * VERIFY  CORRECT  SYSTEM  CONFIGURATION  DISPLAYED  IN  MIR
                * IF  YES,  PUSH  READY  BUTTON  ON  CONSOLE  OR
                *           INPUT  REQUEST  ON  SPO.    IF  PROGRAM  HANGS  HERE
                *           (NO  RESPONSE  TO  INPUT  REQUEST  OR  READY
                *           BUTTON)  RUN  SPO  OR  CONSOLE  MTR
                * IF  NO,  PRESS  FST
                *
                * METER  CON1  PIN  2K
                *  IF  0%  REPLACE  CHIPS  D5,D3,C7,D7       ON  CON1  CARD
                *  IF  NOT  0%  REPLACE  CHIPS  D5,A5,A7,F5,F7       ON  CON1  CARD
                *
0016    F18E           IF  IRQ  SKIP.
0017    4079           MPCR  = CON1LOOP  - 1.
                *
0018    814D           CPCR  = BUSSTEST  - 1.     FIRST  BUSS  TEST  WITH  IRQ  ON
                * IF  BUSS  TEST  FAILS  HERE,  FAILURE  IS  CONTROLLER  PORT
                *     SELECT  CARD  B7
                *
0019    F108           ASR  BEX.
001A    F051           A3  = B.         SAVE  CONTROLLER  ADDRESS
001B    F07A           B  = BITT.       SET  STATUS  WORD DATA  REQUEST  BIT
001C    C820           SAR  = 8  LIT  = @20@.
001D    F07F           B  = B  R.
001E    F036           A2  = B  L.      CLEAR  BITS  9-16
001F    F066           B  = A1.  SYSTEM  CONFIGURATION  FOR  SPO-CONSOLE  CHECK
0020    F0C3           IF  NOT  LST  SKIP.     SPO-CONSOLE  CHECK
0021    E000           LIT  = 0.               SPO  ON  SYSTEM
0022    F1CC           MIR  = A2  OR  LIT.
                * FOR  SPO  CONTPORTADDRESS          = 1000XXXX00000000
                * FOR  CONSOLE  CONTPORTADDRESS      = 1000XXXX00100000
0023    F0CF           MAR1  = AMPCR.
0024    014D           AMPCR  = CONTPORTADDRESS.
0025    F0F3           MW1.             STORE  CONTROLLER  PORT  ADDRESS
0026    8100           CPCR  = CLEARFLAGS  - 1.     CLEAR  ALL  FLAGS
0027    8117           CPCR  = SETCONTADDRS  - 1.
0028    81A2           CPCR  = INITMAINSTACK  - 1.     SET  MAIN  STACK  ADDRESS
0029    81AA           CPCR  = INITFLOSTACK  - 1.    SET  FLOW  STACK  ADDRESS
002A    0030           AMPCR  = CONSPORTSELECT  - 1.
                **
002B    F0DE           MIR  = A3.
002C    F066           B  = A1.  SYSTEM  CONFIGURATION  FOR  SPO-CONSOLE  CHECK
                **
002D    F0C2           IF  NOT  LST  JUMP.
002E    C001           SAR  = 0  LIT  = 1.
                * SET  FLAG  0  IN  FLAG  WORD  1  TO  1  FOR  SPO,  0  FOR  CONSOLE
002F    81D5           CPCR  = SETFLAGW1  - 1.
0030    407E           MPCR  = SPOPORTSELECTP  - 1.
                *
                 CONSPORTSELECT.
                * CONSOLE  ON  SYSTEM
                * PORT  SELECT,  OPERATOR  ENTERS  PK  1-12  TO  INDICATE-
                * THE  PORT  NUMBER  OF  THE  DEVICE  TO  BE  TESTED
                *
0031    8117           CPCR  = SETCONTADDRS  - 1.
0032    F1D5           MIR  = B001  + 1.       ENABLE  KEYBOARD.
0033    F099           DW1.
0034    8125           CPCR  = LITEINDA  - 1.
0035    E0FF           LIT  = @FF@.                  LIGHT  PK  1-8
0036    812B           CPCR  = LITEINDB  - 1.
0037    E00F           LIT  = @0F@.            LIGHT  PK  9-12
                * GET  PORT  NUMBER  (PK  KEY  1-12)
0038    8005           CPCR  = SELECTPORT  - 1.
0039    F017           A1  = B.         SAVE  PORT  ADDRESS
003A    8125           CPCR  = LITEINDA  - 1.
```

```
003B  E000          LIT  = 0.                    TURN OFF PK 1-8
003C  812B          CPCR = LITEINDB  - 1.
003D  E000          LIT  = 0.                    TURN OFF PK 9-11
003E  F066          B = A1.          PORT ADDRESS TO B FOR SAVEPORT
                STOREPORT.           FROM SPO PORT SELECT
003F  8139          CPCR = CSAVEPORT - 1.   SAVE PORT ADDRESS
0040  CF01          SAR = 15 LIT = 1.       SET FLAG 15 TO INDICATE-
0041  81D5          CPCR = SETFLAGW1 - 1.   PORT HAS BEEN SELECTED
                *  PRINT TEST SELECT MESSAGE FOR FIRST ENTRY TO SPO-
                *  TEST SELECT
0042  C001          SAR = 0 LIT = 1.
0043  81F8          CPCR = TESTFLAGW1 - 1.  TEST SPO-CONSOLE FLAG
0044  4099          MPCR = SPOTESTSELECTP - 1.  TRUE RETURN SPO
                *
                   TESTSELECTCLEAR.          PROGRAM JUMPS HERE TO CLEAR-
                *  MEMORY FLAG WORDS 2,3,AND 4 BEFORE ALLOWING THE-
                *  OPERATOR TO SELECT A TEST.  MEMORY FLAG WORD 1 AND-
                *  THE PORT ADDRESS ARE NOT CHANGED.
0045  8109          CPCR = CLEARFW2-3-4 - 1.
                   TSTSEL.
                   TESTSELECT.               PROGRAM JUMPS HERE TO ALLOW THE-
                *                 OPERATOR TO SELECT A TEST.  THE MEMORY-
                *                 FLAG WORDS 2,3,4  ARE NOT CHANGED
                *  CLEAR ERROR FLAG, IF ON IT REFERS TO LAST TEST
0046  C100          SAR = 1 LIT = 0.
0047  81D5          CPCR = SETFLAGW1 - 1.
0048  8117          CPCR = SETCONTADDRS - 1.
0049  F096          DR1 BEX.        RESET STATUS INTERRUPT
004A  807C          CPCR = TESTSPO-CONSOLE  - 1.
004B  409B          MPCR = SPOTESTSELECT - 1.  SPO ON SYSTEM
                *
                *  CONSOLE ON SYSTEM
                *
004C  812B          CPCR = LITEINDB - 1.
004D  E000          LIT  = 0.                    CLEAR B INDICATORS
004E  F1D5          MIR  = B001  + 1.       ENABLE KEYBOARD
004F  F099          DW1.
                *
0050  812D          CPCR = LITEINDS - 1.
0051  E008          LIT  = 8.               LIGHT NUMERIC INDICATOR
                *
                *
                *  GET FIRST DIGIT OF TEST NUMBER (10 S DIGIT)
0052  8007          CPCR = SELECTTEST - 1.
0053  F051          A3 = B.          SAVE (10 S DIGIT)
                *
                *  GET SECOND DIGIT OF TEST NUMBER (1 S DIGIT)
0054  8007          CPCR = SELECTTEST - 1.
                *
0055  812D          CPCR = LITEINDS - 1.
0056  E000          LIT  = 0.               TURN OFF NUMERIC INDICATOR
                *  IF STATUS INT. GO TO MEMORY-MODIFY FOR ANY TEST #
0057  F1AE          IF NOT URQ SKIP.        CONSOLE URQ TEST
0058  4292          MPCR = MEMORY-MODIFY - 1.
                *
                   TENSLOOPCHECK.
                *  TEST TENS DIGIT FOR 0 THRU 9
0059  E00A          LIT  = 10.
005A  F032          A2 = A3.
005B  F11B          A2 - LIT.
005C  F0B7          IF NOT AOV SKIP.
005D  40AE          MPCR = INVALIDTEST - 1.
                *  TEST ONES DIGIT FOR 0 THRU 9
005E  F033          A2 = B.
005F  F11B          A2 - LIT.
0060  F0B7          IF NOT AOV SKIP.
0061  40AE          MPCR = INVALIDTEST - 1.
```

```
                *
                   TENSLOOP.
0062  F04B          A3 = A3 - 1.
0063  E00A          LIT  = 10.
0064  F09E          IF AOV SKIP.
0065  4067          MPCR = ENDTENSLOOP - 1.
0066  F083          B = LIT + B.
0067  4061          MPCR = TENSLOOP - 1.
                *
                   ENDTENSLOOP.
0068  F017          A1 = B.                  SAVE TEST NUMBER
                *  INSURE THAT TEST NUMBER IS NOT GREATER THAN THE UPPER
                *  LIMIT FOR THIS MTR (SEE DEFINE TESTNUMBERLIMIT)
0069  E00E          LIT  = TESTNUMBERLIMIT.
006A  F109          A1 - LIT - 1.
006B  F0B7          IF NOT AOV SKIP.
006C  40AE          MPCR = INVALIDTEST - 1.      ILLEGAL TEST NUMBER
                *
                *  DISPLAY TEST NUMBER IN A INDICATORS
006D  F082          B = LIT L.
006E  C890          SAR = 8 LIT = @90@.
006F  F0DC          MIR = A1 + B.
0070  F098          DW2.
                *  DISABLE SYSTEM CONTROLLER (SPO OR CONSOLE)
0071  F0E6          MIR = 0.
0072  F099          DW1.
                *  INSURE THAT BOTH STATUS AND DATA INTERRUPTS FROM SPO-
                *  OR CONSOLE ARE CLEARED BEFORE JUMPING TO MTR
0073  F096          DR1 BEX.        RESET STATUS INTERRUPT
0074  F097          DR2 BEX.        RESET DATA INTERRUPT
                *
0075  812F          CPCR = SETPORTADDR - 1.  BR1 = INST.  BR2 = DATA
0076  0416          AMPCR = TESTTABLE - 1.
0077  F100          AMPCR = A1 + AMPCR.
0078  F05F          B.
0079  F0C9          JUMP.
                /  SUBROUTINES
                *  LOOP USED TO METER PIN 2K (TP 92) ON CON1 CARD
                   CON1LOOP.
007A  F17D          DLD.
007B  F0F9          WHEN RDC BEX.
007C  4079          MPCR = CON1LOOP - 1.
                *
                   TESTSPO-CONSOLE.
007D  C001          SAR = 0 LIT = 1.  SPO-CONSOLE FLAG (1 = SPO)
007E  41F8          MPCR = TESTFLAGW1 - 1.
                *
                *
                   SPOPORTSELECTP.
                *  ENTER HERE TO PRINT SELECT PORT MESSAGE
007F  80DA          CPCR = SPOPRINT - 1.
0080  01CE          AMPCR = PORTPRINT.
                   SPOPORTSELECT.
                *  ENTER HERE TO AVOID PRINTING
0081  8117          CPCR = SETCONTADDRS - 1.
0082  F0E7          MIR = B001.
0083  F099          DW1.            ENABLE SPO INPUT
                *  SELECT PORT # PER NUMERIC KEYS (01 THRU 12)
0084  8005          CPCR = SELECTPORT - 1.       FOR TENS DIGIT
0085  F017          A1 = B.                      SAVE TENS DIGIT
0086  8005          CPCR = SELECTPORT - 1.       FOR ONES DIGIT
                *       ONES DIGIT IS IN B
                *  OPERATOR ENTERS PORT NUMBER (1 THROUGH 12)
0087  F0E6          MIR = 0.
0088  F099          DW1.            DISABLE SPO INPUT
                *  TEST TENS DIGIT FOR 0 OR 1
0089  E001          LIT  = 1.
008A  F109          A1 - LIT - 1.
008B  F0B7          IF NOT AOV SKIP.
008C  4147          MPCR = INVALIDPORT - 1.      TENS DIGIT > 1
```

```
                * TEST  ONES  DIGIT   FOR  0  THRU  9
008D  E00A          LIT   = 10.
008E  F033          A2  = B.                          ONES  DIGIT   IN  A2
008F  F11B          A2  -  LIT.
0090  F0B7          IF  NOT AOV  SKIP.
0091  4147          MPCR  = INVALIDPORT   -  1.       ONES  DIGIT   > 9
                *
0092  E00A          LIT   = 10.
0093  F066          B  = A1.
0094  F0C3          IF  NOT LST  SKIP.
0095  F029          A2  = A2  + LIT.
0096  F068          B  = A2.                    PORT  ADDRESS  IN  B
                * SUBSTRACT  1  FROM  PORT  NUMBER  TO  GET  PORT  ADDRESS
0097  F162          B  = 0  -  B.
0098  F163          B  = 0  -  B  -  1.
0099  803E          CPCR  = STOREPORT   -  1.
                *
                SPOTESTSELECTP.
009A  80DA          CPCR  = SPOPRINT   -  1.      PRINT  SELECT  TEST  MESSAGE
009B  01D2          AMPCR  = TESTPRINT.           ADDRESS  OF  MESSAGE
                *
                SPOTESTSELECT.
                * ENTRY  POINT   FOR  NO  PRINTING
009C  8117          CPCR  = SETCONTADDRS   -  1.
009D  F0E7          MIR  = B001.
009E  F099          DW1.                ENABLE  SPO  INPUT
                * SELECT  TEST  #  PER  NUMERIC  KEYS  (00   THRU  99)
009F  8007          CPCR  = SELECTTEST   -  1.        FOR  TENS  DIGIT
00A0  F051          A3  = B.                          SAVE  TENS  DIGIT
00A1  8007          CPCR  = SELECTTEST   -  1.        FOR  ONES  DIGIT
                *          ONES  DIGIT   IN  B
00A2  F0E6          MIR  = 0.
00A3  F099          DW1.                DISABLE  SPO  INPUT
00A4  F033          A2  = B.            SAVE  ONES  DIGIT
                *   IF  STINT   GO  TO  SPO  MEMORY  MODIFY
00A5  F1B5          IF  URQ  SKIP.
00A6  40A8          MPCR  = CSPACEP   -  1.
                *
00A7  F096          DR1  BEX.           RESET  STINT
00A8  4393          MPCR  = SPO-MEM-MOD   -  1.
                *
                CSPACEP.
00A9  80DA          CPCR  = SPOPRINT   -  1.      SPACE  AFTER  TESTNUMBER
00AA  00AE          AMPCR  = SPACEPRINT.          ADDRESS  OF  PRINT  MESSAGE
00AB  8117          CPCR  = SETCONTADDRS   -  1.
00AC  F068          B  = A2.            ONES  DIGIT   TO  B.
00AD  4058          MPCR  = TENSLOOPCHECK   -  1.
                *
                SPACEPRINT.
00AE  2080          CNST  = @2080@.         -  STOP
                *
                INVALIDTEST.
00AF  80B7          CPCR  = ALARM  -  1.          SOUND  BELL
00B0  4045          MPCR  = TESTSELECT   -  1.
                *
                /
                INDICATE-ERROR.
                * SPO  SYSTEMS-   SOUND  ALARM
                * CONSOLE  SYSTEMS-   SOUND  ALARM  AND  TURN  ERROR  LIGHT   ON
                *
00B1  F0DA          MIR  = AMPCR.
00B2  F05F          B.
00B3  815D          CPCR  = STACK  -  1.  SAVE  AMPCR,  A1,   A2,   A3
                * SET  FLAG  1  IN  FLAG  WORD  1  TO  1  TO  INDICATE   ERROR
00B4  C101          SAR  = 1  LIT   = 1.
00B5  81D5          CPCR  = SETFLAGW1   -  1.
00B6  80B7          CPCR  = ALARM  -  1.          SOUND  ALARM
00B7  417F          MPCR  = UNSTACKRESTOREA   -  1.  RETURN  TO  MTR
                *
```

```
                ALARM.
                *
00B8  F0DA          MIR  = AMPCR.
00B9  F05F          B.
00BA  815D          CPCR  = STACK  -  1.
00BB  8117          CPCR  = SETCONTADDRS   -  1.
00BC  807C          CPCR  = TESTSPO-CONSOLE    -  1.
00BD  40CE          MPCR  = SPOALARM  -  1.     SPO  ON  SYSTEM
                * CONSOLE  ON  SYSTEM
00BE  E008          LIT   = @08@.
00BF  F0EA          MIR  = LIT.
00C0  F099          DW1.
00C1  C207          SAR  = 2  LIT   = 7.
00C2  F089          B  = LIT.
00C3  F0E2          MIR  = B  C.      ALARM  DATA  WORD  FOR  CONSOLE
00C4  F0FC          WHEN  SRQ  STEP.
00C5  F098          DW2.
00C6  F05F          B.
00C7  F0FC          WHEN  SRQ  STEP.
                * TURN  ERROR  LIGHT   ON,  IF  ERROR  FLAG  IS  ON
00C8  C100          SAR  = 1  LIT   = 0.
00C9  81F8          CPCR  = TESTFLAGW1   -  1.
00CA  40D6          MPCR  = CALARM  -  1.         ERROR  FLAG  IS  OFF
                * ERROR  FLAG  IS  ON
00CB  812D          CPCR  = LITEINDS   -  1.
00CC  E004          LIT   = @04@.               ERROR  LIGHT
00CD  40D6          MPCR  = CALARM  -  1.
                *
00CE  40D6          MPCR  = CALARM  -  1.
                *
                SPOALARM.       SPO  ON  SYSTEM
00CF  F1D5          MIR  = B001   + 1.      ENABLE  OUTPUT
00D0  F099          DW1.
00D1  F0EA          MIR  = LIT.
00D2  E007          LIT   = @07@.     RING  BELL
00D3  F0FC          WHEN  SRQ  STEP.
00D4  F098          DW2.
00D5  F05F          B.
00D6  F0FC          WHEN  SRQ  STEP.
                *
                CALARM.
00D7  F0E6          MIR  = 0.         DISABLE   SPO  OR  CONSOLE
00D8  F099          DW1.
00D9  812F          CPCR  = SETPORTADDR   -  1.  BR1  = INST.   BR2  = DATA
00DA  417F          MPCR  = UNSTACKRESTOREA   -  1.  RETURN
                *
                *
                *
                SPOPRINT.
                * SPO  PRINT   FROM  MEMORY
                *
00DB  F0DA          MIR  = AMPCR.
00DC  F05F          B.
00DD  815D          CPCR  = STACK  -  1.          STACK  AMPCR  AND  A  REGISTERS
00DE  8117          CPCR  = SETCONTADDRS   -  1.      SELECT   SPO
00DF  81C2          CPCR  = RDSTACKAMPCRTOB   -  1.
00E0  F05B          AMPCR  = B.       RETURN  AMPCR  FOR  EXEC
00E1  F05F          B.
00E2  F09A          EXEC.     ADDRESS  OF  MESSAGE  TO  AMPCR
00E3  F0EA          MIR  = LIT.
00E4  C802          SAR  = 8  LIT   = @02@.
00E5  F099          DW1.                        ENABLE  SPO  PRINTER
                SPOREADY.
00E6  F096          DR1  BEX.               READ  SPO  STATUS
00E7  F05F          B.
00E8  F0C3          IF  NOT LST  SKIP.      CHECK  FOR  READY
00E9  40E5          MPCR  = SPOREADY   -  1.
                *
00EA  F0CF          MAR1  = AMPCR.          BR1  = ADDRESS  OF  MESSAGE
```

```
                SPOFETCH.
00EB  F0F1          MR1.
00EC  F0FA          WHEN RDC BEX MAR1 = BMAR + 1.
00ED  F07D          B = B C.
00EE  F0C4          IF NOT MST SKIP.            MST = STOP CODE
00EF  40F9          MPCR = SPOSTOP - 1.         END PRINT
00F0  F0FC          WHEN SRQ STEP.          WAIT FOR PRINTER INTERRUPT
00F1  F0E1          MIR = B.
00F2  F098          DW2.                    WRITE FIRST CHARACTER
00F3  F07D          B = B C.
00F4  F0C4          IF NOT MST SKIP.            MST = STOP CODE
00F5  40F9          MPCR = SPOSTOP - 1.         END PRINT
00F6  F0E1          MIR = B.
00F7  F0FC          WHEN SRQ STEP.          WAIT FOR PRINTER INTERRUPT
00F8  F098          DW2.                    WRITE SECOND CHARACTER
00F9  40EA          MPCR = SPOFETCH - 1.
                *
                SPOSTOP.
00FA  F0FC          WHEN SRQ STEP.          WAIT FOR LAST CHARACTER TO PRINT
00FB  81E2          CPCR = RSTBR1 - 1.          RESTORE BR1
00FC  F096          DR1 BEX.                    RESET STINT
00FD  F0E6          MIR = B000.
00FE  F099          DW1.                        DISABLE SPO OUTPUT
00FF  812F          CPCR = SETPORTADDR - 1.  RESTORE DEVICE PORT ADDRS
0100  417F          MPCR = UNSTACKRESTOREA - 1.  RETURN
                *
                CLEARFLAGS.
0101  F023          A2 = AMPCR.                 SAVE RETURN
0102  F0E6          MIR = 0.
0103  F0CF          MAR1 = AMPCR.
0104  014C          AMPCR = PORTADDRESS.
0105  F0F3          MW1.                        CLEAR PORT ADDRESS
0106  F0CF          MAR1 = AMPCR.
0107  0214          AMPCR = MEMFLAGW1.
0108  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 1
0109  F102          AMPCR = A2.                 RESTORE RETURN
                CLEARFW2-3-4.
010A  F023          A2 = AMPCR.                 SAVE RETURN
010B  F0E6          MIR = 0.
010C  F0CF          MAR1 = AMPCR.
010D  0215          AMPCR = MEMFLAGW2.
010E  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 2
010F  F0CF          MAR1 = AMPCR.
0110  0216          AMPCR = MEMFLAGW3.
0111  F0F3            MW1.                       CLEAR MEMORY FLAG WORD 3
0112  F0CF          MAR1 = AMPCR.
0113  0217          AMPCR = MEMFLAGW4.
0114  F0F3          MW1.                        CLEAR MEMORY FLAG WORD 4
0115  F102          AMPCR = A2.                 RESTORE RETURN
0116  F05F          B.
0117  F0C9          JUMP.
                *
                SETCONTADDRS.
0118  F060          B = AMPCR.              SAVE RETURN
0119  F0CF          MAR1 = AMPCR.
011A  014D          AMPCR = CONTPORTADDRESS.
011B  F05B          AMPCR = B.              RESTORE RETURN
011C  D800          SAR = 8.
011D  F0F1          MR1.
011E  F0F9          WHEN RDC BEX.           CONTROLLER ADDRESS TO B
011F  F07F          B = B R.
0120  F07C          B = B L.        CLEAR ALL BITS EXCEPT 5,6,7,8
0121  F078          B = B0TT.
0122  F16E          BR2 = B.                BR2 = 0000XXXX  DATA
0123  F07A          B = B1TT.
0124  F0D5          MAR1 = B.               BR1 = 1000XXXX  INSTRUCTION
0125  F0C9          JUMP.
```

```
                *
                LITEINDA.                   LIGHT A INDICATORS
0126  E06F          LIT = @6F@.
0127  F0CA          LCTR.
0128  F09A          EXEC.                   LOAD VARIABLE LIT
0129  F0EF          MIR = Z.
012A  F098          DW2.
012B  F0C9          JUMP.
                LITEINDB.                   LIGHT B INDICATORS
012C  E077          LIT = @77@.
012D  4126          MPCR = LITEINDA.
                *
                LITEINDS.                       LIGHT S INDICATORS
012E  E07E          LIT = @7E@.
012F  4126          MPCR = LITEINDA.
                *
                SETPORTADDR.
0130  F060          B = AMPCR.              SAVE RETURN
0131  F0CF          MAR1 = AMPCR.
0132  014C          AMPCR = PORTADDRESS.
0133  F05B          AMPCR = B.              RESTORE RETURN
0134  F0F1          MR1.
0135  F0F9          WHEN RDC BEX.           PORT ADDRESS TO B
0136  F16E          BR2 = B.        BR2 FOR DATA
0137  F07A          B = B1TT.
0138  F0D5          MAR1 = B.       BR1 FOR INSTRUCTION
0139  F0C9          JUMP.
                *
                *
                CSAVEPORT.                  SAVE PORT ADDRESS (DATA IN B)
                * TEST PORT ADDRESS FOR PORT 12 OR LESS
013A  E00B          LIT = 11.
013B  F017          A1 = B.
013C  F109          A1 - LIT - 1.
013D  F0B7          IF NOT AOV SKIP.
013E  4147          MPCR = INVALIDPORT - 1.     PORT ADDRESS > 12
                * CLEAR ALL BITS EXCEPT 5,6,7,8
013F  F07C          B = B L.
0140  D400          SAR = 4.
0141  F0E5          MIR = B R.
0142  F060          B = AMPCR.      SAVE RETURN
0143  F0CF          MAR1 = AMPCR.
0144  014C          AMPCR = PORTADDRESS.
0145  F05B          AMPCR = B.      RESTORE RETURN
0146  F0F3          MW1.
0147  F0C9          JUMP.
                *
                INVALIDPORT.
                *
0148  80B7          CPCR = ALARM - 1.       SOUND BELL
                *
0149  807C          CPCR = TESTSPO-CONSOLE - 1.
014A  4080          MPCR = SPOPORTSELECT - 1.
014B  4030          MPCR = CONSPORTSELECT - 1.
                PORTADDRESS.
014C  0000          CNST = @0000@.
                CONTPORTADDRESS.
014D  0000          CNST = @0000@.
                *
                BUSSTEST.               EXTERNAL BUSS TEST
014E  F0F9          WHEN RDC BEX.
014F  F0FF          0 EQV B.
0150  F09C          IF ABT JUMP.
0151  F0DA          MIR = AMPCR.
0152  F000          WAIT.
                *********OBSERVE       MIR
                *********GO      TO INCREMENTER ADDRESS DISPLAYED IN MIR
0153  F0E1          MIR = B.
0154  F000          WAIT.
0155  7FFF          MPCR = STARTCONTROLLER - 1.
```

```
                BUSSTEST1.                              EXTERNAL  BUSS  TEST
0156  F0F9            WHEN RDC BEX.
0157  F0FF            0 EQV B.
0158  F09C            IF ABT JUMP.
0159  F0E1            MIR = B.
015A  F000            WAIT.
                *********EXTERNAL       BUSS  FAILURE  OR PARITY  ERROR
                *********ERROR      #  E1
015B  F0DA            MIR = AMPCR.
015C  F000            WAIT.
015D  7FFF            MPCR = STARTCONTROLLER  - 1.
                /
                 STACKW.
                 STACK.
                *UNCONDITIONAL   SAVE A1,  A2,  A3,  AMPCR IN MEMORY STACK
                *DISTROYS  - B,  SAR,  LIT,  MIR
                *ASSUMES  BR1,  BR2 DIFFER  BY INST  BIT  ONLY
015E  F079            B = B100.
015F  D300            SAR = 3.
0160  F07F            B = B R.
0161  F0D5            MAR1 = B.             STACK  POINTER  = 4096
                 STACKW3.
0162  F0F1            MR1.
0163  F0F9            WHEN RDC BEX.         FETCH  POINTER
0164  F083            B = LIT + B.            INCRAMENT  POINTER
0165  E004            LIT = 4.
0166  F08C            BMI MIR = B.
0167  F0F3            MW1.                          RESTORE  NEW POINTER
0168  F08C            BMI MIR = B.
0169  F0D5            MAR1 = B.                     NEW STACK  ADDRESS
016A  F0F3            MW1.                          STORE  AMPCR TOP  OF  STACK
016B  F0DB            MIR = A1.
016C  F089            B = LIT.
016D  E003            LIT = 3.
016E  F01C            A1 = BMAR.
016F  F064            B = A1 - B.
0170  F0D5            MAR1 = B.       OLD TOP  OF  STACK  ADDRESS  + 1.
0171  F08D            BMI.
0172  F017            A1 = B.         RESTORE  A1
0173  F0F3            MW1.                          SAVE  A1
0174  F0D7            MAR1 = BMAR + 1.
0175  F0DD            MIR = A2.
0176  F0F3            MW1.                          SAVE  A2
0177  F0D7            MAR1 = BMAR + 1.
0178  F0DE            MIR = A3.
0179  F0F3            MW1.                          SAVE  A3
017A  F05F            B.
017B  41E2            MPCR = RSTBR1  - 1.           RESTORE  BR1  EXIT
                 STACKR.
                 UNSTACK.
                *RESTORE  AMPCR FROM TOP  OF  MEMORY STACK
                *A REGISTERS  REMAIN  UNCHANGED
017C  818F            CPCR = STACKRA  - 1.
017D  F05B            AMPCR = B.                    RESTORE  AMPCR
017E  F05F            B.
017F  41E2            MPCR = RSTBR1  - 1.           RESTORE  BR1  EXIT
                 UNSTACKRESTOREA.
                *RESTORE  AMPCR AND A REGISTERS  FROM TOP  OF  STACK
0180  818F            CPCR = STACKRA  - 1.
0181  F05B            AMPCR = B.                    RESTORE  AMPCR
0182  F08D            BMI.  (ADDRESS  - 1)  OF  STORED  A1
0183  F0D6            MAR1 = B + 1.
0184  F0F1            MR1.                          FETCH  A1
0185  F0F9            WHEN RDC BEX.
0186  F0D7            MAR1 = BMAR + 1.
0187  F017            A1 = B.                       RESTORE  A1
0188  F0F1            MR1.                          FETCH  A2
0189  F0F9            WHEN RDC BEX.
018A  F0D7            MAR1 = BMAR + 1.
018B  F033            A2 = B.                       RESTORE  A2
018C  F0F1            MR1.                          FETCH  A3
018D  F0F9            WHEN RDC BEX.
018E  F051            A3 = B.                       RESTORE  A3
018F  41E2            MPCR = RSTBR1  - 1.           RESTORE  BR1  AND EXIT
                 STACKRA.
0190  F079            B = B100.
0191  D300            SAR = 3.
0192  F07F            B = B R.
0193  F0D5            MAR1 = B.             STACK  POINTER  = 4096
                 STACKR1.
0194  F0F1            MR1.
0195  F0F9            WHEN RDC BEX.                 FETCH  POINTER
0196  F0DD            MIR = A2.       SAVE  A2
0197  F033            A2 = B.
0198  E004            LIT = 4.
0199  F146            B = A2 - LIT.           DECRAMENT  STACK  POINTER
019A  F08C            BMI,  MIR = B.          EXCHANGE  MIR  &  B
019B  F033            A2 = B.                 RESTORE  A2
019C  F08D            BMI.        POINTER  ADDRESS  TO  B
019D  F0F3            MW1.                    RESTORE  POINTER
019E  F083            B = LIT + B.  ADDRESS  OF  SAVED  AMPCR  TO  B
                 STACKR2.
019F  F0D5            MAR1 = B.
01A0  F0F1            MR1.                          FETCH  AMPCR FROM  STACK
01A1  F0F9            WHEN RDC BEX.
01A2  F0C9            JUMP.
                 INITMAINSTACK.                     INITIALIZE     STACK  POINTER
01A3  F079            B = B100.
01A4  D300            SAR = 3.
01A5  F07F            B = B R.
01A6  F0D5            MAR1 = B.
01A7  F0E1            MIR = B.
01A8  F0F3            MW1.                          POINTER  = 4096
01A9  F05F            B.
01AA  41E2            MPCR = RSTBR1  - 1.           RESTORE  BR1  EXIT
                 STKINIT.
                 INITFLOSTACK.                      INITIALIZE     FLO  POINTER
01AB  F082            B = LIT  L.
01AC  C70C            SAR = 7 LIT  = @0C@.
01AD  F0D5            MAR1 = B.
01AE  F0E1            MIR = B.
01AF  F0F3            MW1.                POINTER  = 6144
01B0  41E2            MPCR = RSTBR1  - 1.           RESTORE  BR1  EXIT
                 MFLOSTACK.
                 MARKFLOSTACK.
                *SAVE  AMPCR FROM MAIN PROGRAM FLOW-FOR  GLOBAL  RETURN
                *ASSUMES  B,  MIR,  SAR,  LIT  CAN BE  DISTROYED  AND THAT
                *BR1,  BR2 DIFFER  BY INST  BIT  ONLY
01B1  F0DA            MIR = AMPCR.
01B2  F082            B = LIT  L.
01B3  C70C            SAR = 7 LIT  = @0C@.
01B4  F0D5            MAR1 = B.                FLO  POINTER  = 6144
01B5  4161            MPCR = STACKW3  - 1.          WRITE  AMPCR TO  STACK
                 FLOSTACKRDDEC.
                *RESTORE  AMPCR FROM TOP  OF  FLOW STACK  AND DECRAMENT
                *STACK  POINTER
01B6  F082            B = LIT  L.
01B7  C70C            SAR = 7 LIT  = @0C@.
01B8  F0D5            MAR1 = B.                FLOW STACK  POINTER  = 6144
01B9  8193            CPCR = STACKR1  - 1.          READ  POINTER  AND AMPCR
01BA  417C            MPCR = UNSTACK.               OPTIONAL  NO A WD RESTORE
                 FLOSTACKR.
                 FLOSTACKRD.
                *RESTORE  AMPCR FROM TOP  OF  FLOW STACK  WITHOUT
                *DECRAMENTING  FLOW STACK  POINTER.
01BB  F082            B = LIT  L.
01BC  C70C            SAR = 7 LIT  = @0C@.
01BD  F0D5            MAR1 = B.                FLO  STACK  POINTER  = 6144
01BE  F0F1            MR1.
01BF  F0F9            WHEN RDC BEX.                 FETCH  POINTER
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01C0  F05F        B.
01C1  819E        CPCR = STACKR2 - 1.        READ TOP OF STACK
01C2  417C        MPCR = UNSTACK.            OPTIONAL NO A WD RESTORE
                RDSTACKAMPCRTOB.
               *READ TOP AMPCR IN STACK TO B REG - USE FOR
               *NESTED EXEC.
01C3  F079        B = B100.
01C4  D300        SAR = 3.
01C5  F07F        B = B R.
01C6  F0D5        MAR1 = B.              POINTER ADDRESS = 4096
01C7  F0F1        MR1.                   FETCH POINTER
01C8  F0F9        WHEN RDC BEX.
01C9  F0D5        MAR1 = B.              TOP OF STACK ADDRESS
01CA  F0F1        MR1.
01CB  F0F9        WHEN RDC BEX.                B = AMPCR FROM STACK
01CC  F05F        B.
01CD  41E2        MPCR = RSTBR1 - 1.         RESTORE BR1 EXIT
               /
                PORTPRINT.
01CE  0D0A        CNST = @0D0A@.             CR LF
01CF  504F        CNST = @504F@.         PO
01D0  5254        CNST = @5254@.         RT
01D1  2080        CNST = @2080@.         - STOP
                TESTPRINT.
01D2  0D0A        CNST = @0D0A@.             CRLF
01D3  5445        CNST = @5445@.         TE
01D4  5354        CNST = @5354@.         ST
01D5  2080        CNST = @2080@.         - STOP
               /
               *  TEST FLAG AND SET FLAG ROUTINES
               *
                SETFLAGW1.             FLAG NO. IN SAR, STATE IN LIT
01D6  F060        B = AMPCR.     SAVE RETURN
01D7  F0CF        MAR1 = AMPCR.          ADDRESS OF FLAG WORD 1 TO MAR1
01D8  0214        AMPCR = MEMFLAGW1.
               *
                SETFLAGS.              COMMON POINT TO SETFLAGW1-2-3-4
01D9  F0F1        MR1.
01DA  F05B        AMPCR = B.     RESTORE RETURN
01DB  F0F9        WHEN RDC BEX.        FLAG WORD TO B
01DC  F092        CSAR.          CHANGE VALUE TO SHIFT FLAG TO LSB
01DD  F172        CSAR B = B C.        MOVE FLAG IN B TO LSB
01DE  F075        B = BTT0.
01DF  F087        B = LIT OR B.        SET FLAG PER LIT
01E0  F07D        B = B C.       SHIFT FLAGS BACK TO POSITION
01E1  F0E1        MIR = B.       MODIFIED FLAG WORD TO MIR
01E2  F0F3        MW1.           FLAG WORD TO MEMORY
               *
                RESTORE-BR1.
                RSTBR1.                COMMON POINT FROM ABOVE AND -
               *                       AND TESTFLAGW1-2-3-4
01E3  F0E1        MIR = B.             SAVE B
01E4  F05D        ASE.           SELECT BR2
01E5  F080        B = BMAR.
               * GENERATE NEW BR1 (MSB INST-DATA SET OPPOSITE BR2)
01E6  F159        B = BFTF.
01E7  D800        SAR = 8.
01E8  F07F        B = B R.
01E9  F07C        B = B L.       CLEAR MAR (DO NOT USE LIT HERE)
01EA  F0D5        MAR1 = B.
01EB  F08D        BMI.                 RESTORE B
01EC  F0C9        JUMP.          RETURN
               *
                SETFLAGW2. -           FLAG NO. IN SAR, STATE IN LIT
01ED  F060        B = AMPCR.     SAVE RETURN
01EE  F0CF        MAR1 = AMPCR.          ADDRESS OF FLAG WORD 2 TO MAR1
01EF  0215        AMPCR = MEMFLAGW2.
01F0  41D8        MPCR = SETFLAGS - 1.
               *
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                SETFLAGW3.             FLAG NO. IN SAR, STATE IN LIT
01F1  F060        B = AMPCR.     SAVE RETURN
01F2  F0CF        MAR1 = AMPCR.          ADDRESS OF FLAG WORD 3 TO MAR1
01F3  0216        AMPCR = MEMFLAGW3.
01F4  41D8        MPCR = SETFLAGS - 1.
               *
                SETFLAGW4.             FLAG NO. IN SAR, STATE IN LIT
01F5  F060        B = AMPCR.     SAVE RETURN
01F6  F0CF        MAR1 = AMPCR.          ADDRESS OF FLAG WORD 4 TO MAR1
01F7  0217        AMPCR = MEMFLAGW4.
01F8  41D8        MPCR = SETFLAGS - 1.
               *
                TESTFLAGW1.            FLAG NO. IN SAR, STATE IN LIT
01F9  F060        B = AMPCR.     SAVE RETURN
01FA  F0CF        MAR1 = AMPCR.          ADDRESS OF FLAG WORD 1 TO MAR1
01FB  0214        AMPCR = MEMFLAGW1.
               *
                TESTFLAGS.             COMMON POINT TO TESTFLAGW1-2-3-4
01FC  F0F1        MR1.
01FD  F05B        AMPCR = B.     RESTORE RETURN
01FE  F0F9        WHEN RDC BEX.        FLAG WORD TO B
01FF  F092        CSAR.
0200  F07F        B = B R.       SHIFT FLAG TO LSB
0201  F157        B = BT0T.
0202  F078        B = B0TT.
0203  F05F        B.
0204  F0CB        LIT EQV B.
0205  F09D        IF ABT SKIP.
0206  F105        AMPCR = AMPCR + 1.       SET AMPCR FOR FALSE RETURN
0207  41E2        MPCR = RSTBR1 - 1.
               *
                TESTFLAGW2.            FLAG NO. IN SAR, STATE IN LIT
0208  F060        B = AMPCR.     SAVE RETURN
0209  F0CF        MAR1 = AMPCR.          ADDRESS OF FLAG WORD 2 TO MAR1
020A  0215        AMPCR = MEMFLAGW2.
020B  41FB        MPCR = TESTFLAGS - 1.
               *
                TESTFLAGW3.            FLAG NO. IN SAR, STATE IN LIT
020C  F060        B = AMPCR.     SAVE RETURN
020D  F0CF        MAR1 = AMPCR.          ADDRESS OF FLAG WORD 3 TO MAR1
020E  0216        AMPCR = MEMFLAGW3.
020F  41FB        MPCR = TESTFLAGS - 1.
               *
                TESTFLAGW4.            FLAG NO. IN SAR, STATE IN LIT
0210  F060        B = AMPCR.     SAVE RETURN
0211  F0CF        MAR1 = AMPCR.          ADDRESS OF FLAG WORD 4 TO MAR11
0212  0217        AMPCR = MEMFLAGW4.
0213  41FB        MPCR = TESTFLAGS - 1.
               *
               *  MEMORY WORDS FOR PROGRAM FLAGS
                MEMFLAGW1.
0214  0000        CNST = @0000@.         FLAGS 1 THRU 16 OF WORD 1
                MEMFLAGW2.
0215  0000        CNST = @0000@.         FLAGS 1 THRU 16 OF WORD 2
                MEMFLAGW3.
0216  0000        CNST = @0000@.         FLAGS 1 THRU 16 OF WORD 3
                MEMFLAGW4.
0217  0000        CNST = @0000@.         FLAGS 1 THRU 16 OF WORD 4
               *  END OF FLAG ROUTINES
               *
                READDATAKEYTOA1.
               *  SUB-ROUTINE TO READ 1 DATA CHARACTER FROM SPO OR -
               *   CONSOLE AND RETURN WITH CHARACTER IN A1
               *   A2 AND A3 ARE SAVED
               *   ALL OTHER REGISTERS ARE DESTROYED
               *
0218  F0DA        MIR = AMPCR.
0219  F05F        B.
021A  815D        CPCR = STACK - 1.  SAVE AMPCR FOR RETURN
021B  8117        CPCR = SETCONTADDRS - 1.
```

```
021C  807C          CPCR = TESTSPO-CONSOLE - 1.
021D  422D          MPCR = SPOKEY - 1.          SPO ON SYSTEM
                  *
                  * CONSOLE ON SYSTEM
021E  F1D5          MIR = B001 + 1.          ENABLE KEYBOARD
021F  F099          DW1.
0220  812D          CPCR = LITEINDS - 1.
0221  E008          LIT = 8.          LIGHT NUMERIC INDICATOR
0222  F0FC          WHEN SRQ STEP.
0223  F097          DR2 BEX.
0224  F017          A1 = B.          SAVE DATA CHARACTER IN A1.
0225  F009          A1 = A1 AND LIT.          USE ONLY LOWER DIGIT
0226  E00F          LIT = @0F@.
                  * DISPLAY LOWER DIGIT IN B INDICATORS
0227  F082          B = LIT L .
0228  C888.         SAR = 8 LIT = @88@.
0229  F0DC          MIR = A1 + B.
022A  F098          DW2.
022B  812D          CPCR = LITEINDS - 1.
022C  E000          LIT = 0.          TURN NUMERIC INDICATOR OFF
022D  4234          MPCR = EXITDKEY - 1.
                  *
                    SPOKEY.          SPO ON SYSTEM
022E  F0E7          MIR = B001.
022F  F099          DW1.          ENABLE SPO INPUT
0230  F0FC          WHEN SRQ STEP.
0231  F097          DR2 BEX.
0232  F017          A1 = B.          SAVE DATA CHARACTER IN A1
0233  F009          A1 = A1 AND LIT.          USE ONLY LOWER DIG
0234  E00F          LIT = @0F@.
                  *
                    EXITDKEY.
0235  F0E6          MIR = 0.
0236  F099          DW1.          DISABLE SPO OR CONSOLE
0237  812F          CPCR = SETPORTADDR - 1.          RESTORE BR1 AND BR2
0238  817B          CPCR = UNSTACK - 1.          RETURN (CHARACTER IN A1)
                  *
                  / SIMULATED REGISTERS          SIMREG1,          SIMREG2,          SIMREG3
                    ZROSREG1.
0239  F0E6          MIR = B000.
                    WRSREG1.
023A  F060          B = AMPCR.
023B  F0CF          MAR1 = AMPCR.
023C  0278          AMPCR = SIMREG1.
                    ZROSREG1A.
023D  F05B          AMPCR = B.
023E  F0F3          MW1.
023F  F05F          B.
0240  4263          MPCR = INCSREG1A - 1.
                    ZROSREG2.
0241  F0E6          MIR = B000.
                    WRSREG2.
0242  F060          B = AMPCR.
0243  F0CF          MAR1 = AMPCR.
0244  0279          AMPCR = SIMREG2.
0245  423C          MPCR = ZROSREG1A - 1.
                    ZROSREG3.
0246  F0E6          MIR = B000.
                    WRSREG3.
0247  F060          B = AMPCR.
0248  F0CF          MAR1 = AMPCR.
0249  027A          AMPCR = SIMREG3.
024A  423C          MPCR = ZROSREG1A - 1.
                    RDSREG1.
024B  F060          B = AMPCR.
024C  F0CF          MAR1 = AMPCR.
024D  0278          AMPCR = SIMREG1.
                    RDSREG1A.
024E  F05B          AMPCR = B.
024F  F0F1          MR1.
0250  F0F9          WHEN RDC BEX.
0251  F0E1          MIR = B.
0252  4263          MPCR = INCSREG1A - 1.
                    RDSREG2.
0253  F060          B = AMPCR.
0254  F0CF          MAR1 = AMPCR.
0255  0279          AMPCR = SIMREG2.
0256  424D          MPCR = RDSREG1A - 1.
                    RDSREG3.
0257  F060          B = AMPCR.
0258  F0CF          MAR1 = AMPCR.
0259  027A          AMPCR = SIMREG3.
025A  424D          MPCR = RDSREG1A - 1.
                    INCSREG1.
025B  F060          B = AMPCR.
025C  F0CF          MAR1 = AMPCR.
025D  0278          AMPCR = SIMREG1.
                    INCSREG1B.
025E  F05B          AMPCR = B.
025F  F0F1          MR1.
0260  F0F9          WHEN RDC BEX.
0261  F07E          B = B + 1.
0262  F0E1          MIR = B.
0263  F0F3          MW1.
                    INCSREG1A.
0264  41E2          MPCR = RESTORE-BR1 - 1.
                    INCSREG2.
0265  F060          B = AMPCR.
0266  F0CF          MAR1 = AMPCR.
0267  0279          AMPCR = SIMREG2.
0268  425D          MPCR = INCSREG1B - 1.
                    INCSREG3.
0269  F060          B = AMPCR.
026A  F0CF          MAR1 = AMPCR.
026B  027A          AMPCR = SIMREG3.
026C  425D          MPCR = INCSREG1B - 1.
                    DECSREG2.
026D  F060          B = AMPCR.
026E  F0CF          MAR1 = AMPCR.
026F  0279          AMPCR = SIMREG2.
0270  F05B          AMPCR = B.
0271  F0F1          MR1.
0272  F0F9          WHEN RDC BEX.
0273  F162          B = 0 - B.
0274  F163          B = 0 - B - 1.
0275  F0E1          MIR = B.
0276  F0F3          MW1.
0277  4263          MPCR = INCSREG1A - 1.
                    SIMREG1.
0278  0000          CNST = @0000@.
                    SIMREG2.
0279  0000          CNST = @0000@.
                    SIMREG3.
027A  0000          CNST = @0000@.
                    SET-CONT-DINT.
                  * SET CONTROLLER DATA INTERRUPT, RESTORE PORT ADDRESS
                  * IN BR1 AND BR2 THEN JUMP
027B  F0DA          MIR = AMPCR.
027C  F05F          B.
027D  815D          CPCR = STACK - 1. SAVE AMPCR, A1,A2,A3 IN STACK
027E  8117          CPCR = SETCONTADDRS - 1.
027F  807C          CPCR = TESTSPO-CONSOLE - 1.
0280  4282          MPCR = SCDINT - 1.          SPO ON SYSTEM
                  *
                  * CONSOLE ON SYSTEM
0281  E004          LIT = @04@.          ENABLE CONSOLE PRINTER DINT
0282  F0F7          SKIP.
                    SCDINT.
0283  E002          LIT = @02@.          ENABLE SPO OUTPUT
0284  F0EA          MIR = LIT.
0285  F099          DW1.
```

```
0286  F0FC          WHEN SRQ STEP.
              ********      STOP HERE IF CONTROLLER ENABLE DOES NOT CAUSE
              *               SRQ (NOTE- SPO SRQ HAS BEEN USED PRIOR TO
              *                 THIS STOP
              *             RUN SPO OR CONSOLE MTR
              *
              RSCDINT.
0287  812F          CPCR = SETPORTADDR - 1.        RESTORE BR1 AND BR2
0288  417F          MPCR = UNSTACKRESTOREA - 1. RETURN
              *
              *
              RESET-CONT-DINT.
              *  DISABLE CONTROLLER, RESTORE PORT ADDRESS IN BR1 AND
              *  BR2, THEN JUMP
0289  F0DA          MIR = AMPCR.
028A  F05F          B.
028B  815D          CPCR = STACK - 1. SAVE AMPCR,A1,A2,A3      IN STACK
028C  8117          CPCR = SETCONTADDRS - 1.
028D  F0E6          MIR = 0.
028E  F099          DW1.
028F  F05F          B.
0290  4286          MPCR = RSCDINT - 1.
              *
              /
              MEM-MOD-SETLC3.     SET WRITE-BEFORE-READ     FLAG
              *  JUMP TO ABOVE LABEL FROM UPPER CASE RESET KEY CODE
              *  ALLOWS WRITE-BEFORE-READ     OF FIRST ADDRESS
0291  F01A          SET LC3.
0292  F0F7          SKIP.
              MEMORY-MODIFY.
0293  F0AD          IF LC3 STEP.
0294  F01F          RESET GC2.
0295  F0A9          IF LC2 STEP.
0296  8117          CPCR = SETCONTADDRS - 1.
              *  RETURNS WITH BR1 = INSTRUCTION,    BR2 = DATA
0297  F0EA          MIR = LIT.
0298  C881          SAR = 8 LIT = @81@.
0299  F082          B = LIT L.
029A  F0EC          MIR = LIT OR B.
029B  E009          LIT = 9.
029C  F098          DW2.
029D  E010          LIT = @10@.
029E  F099          DW1.
029F  F082          B = LIT L.
02A0  C803          SAR = 8, LIT = @03@.
02A1  F0E1          MIR = B.
02A2  F0FC          WHEN SRQ STEP.
02A3  F098          DW2.                                   READY THE R
02A4  F0EA          MIR = LIT.
02A5  E008          LIT = @08@.
02A6  F0FC          WHEN SRQ STEP.
02A7  F099          DW1.
02A8  F082          B = LIT L.
02A9  E0C0          LIT = @C0@.
02AA  F0ED          MIR = LIT + B.
02AB  E004          LIT = @04@.
02AC  F0FC          WHEN SRQ STEP.
02AD  F098          DW2.
02AE  034C          AMPCR = MM-POSITION - 1.
02AF  F01D          A1 = LIT.
02B0  E00A          LIT = @0A@.
02B1  F091          CALL.                                  POSITION RIG
              MM-LIST-NEXT.
02B2  033B          AMPCR = MM-ADVANCE - 1.
02B3  F091          CALL.                                  ADVANCE 1 L E
02B4  F018          SET LC1.
02B5  F019          SET LC2.
02B6  F0CA          LCTR.
02B7  E003          LIT = @03@.
02B8  02EA          AMPCR = MM-KYBD - 1.
02B9  F091          CALL.                                  ACCEPT AND P N
02BA  F0D1          MAR1 = A2.
02BB  F0E7          MIR = B001.
02BC  F0AF          IF LC3 SET LC3 ELSE SKIP.
02BD  F0F3          MW1. WRITE BEFORE TO PREVENT PE.
              *  DELAY REQUIRED HERE FOR WRITE BEFORE READ ON 711
02BE  F0F1          MR1.
02BF  F0F9          WHEN RDC BEX.                          GET THE CONT T
02C0  F033          A2 = B.
02C1  E003          LIT = @03@.
02C2  02CA          AMPCR = MM-CONTENTS - 1.
02C3  F041          A3 = AMPCR.
02C4  F0CA          LCTR.
02C5  034C          AMPCR = MM-POSITION - 1.
02C6  F01D          A1 = LIT.
02C7  E003          LIT = @03@.
02C8  F091          CALL.
02C9  035E          AMPCR = MM-PRINT - 1.
02CA  F0C9          JUMP.                                  PRINT THE CO E
              MM-CONTENTS.
02CB  F0CA          LCTR.
02CC  E000          LIT = @00@.
02CD  F00C          RESET GC1.
02CE  F0AD          IF LC3 STEP.       RESET WRITE-BEFORE-READ FLAG
02CF  02D4          AMPCR = RESET-GC1LC3 - 1. FOR RETURN FROM MM-KYBD
02D0  42EA          MPCR = MM-KYBD - 1.
              *
              *  MM-KYBD JUMPS HERE FOR OCK I,II,III      KEYS
              SET-LC3GC1.
02D1  F01A          SET LC3.
              SET-GC1.
02D2  F006          SET GC1.
02D3  F0F7          SKIP.
              SET-LC3.
02D4  F01A          SET LC3.
              RESET-GC1LC3.
02D5  F0CA          LCTR.
02D6  E003          LIT = @03@.
02D7  034C          AMPCR = MM-POSITION - 1.
02D8  F01D          A1 = LIT.
02D9  F091          CALL.
02DA  F018          SET LC1.
02DB  02EA          AMPCR = MM-KYBD - 1.
02DC  F091          CALL.                                  ACCEPT AND P N
02DD  F0DD          MIR = A2.
02DE  F0F3          MW1.
02DF  0293          AMPCR = MEMORY-MODIFY.
02E0  F19C          IF NOT GC1 JUMP.
02E1  F019          SET LC2.                               POS TO LEFT.
02E2  F01D          A1 = LIT.
02E3  E012          LIT = @12@.
02E4  034C          AMPCR = MM-POSITION - 1.
02E5  F0D7          MAR1 = BMAR + 1.
02E6  F035          A2 = BMAR.
02E7  F091          CALL.
02E8  02B1          AMPCR = MM-LIST-NEXT - 1.
02E9  F0F6          SET GC2.
02EA  F0C9          JUMP.
              MM-KYBD.
02EB  F041          A3 = AMPCR.                            SAVE RETURN D
02EC  F081          B = NOT CTR R.
02ED  D800          SAR = 8.
02EE  035E          AMPCR = MM-PRINT - 1.
02EF  F0A2          IF GC2 SKIP.
02F0  42F2          MPCR = MM-NANO-SAVE - 1.
02F1  F01F          RESET GC2.
02F2  F0C9          JUMP.
              MM-NANO-SAVE.
02F3  F017          A1 = B.
02F4  F05D          ASE. SELECT BR2
02F5  F080          B = BMAR.
02F6  F16F          BR2 = BITT.        BR2 = CONTROL PORT
```

```
02F7  F1DB        MIR  =  0  +  Z.
02F8  E002        LIT  =  @02@.
02F9  F098        DW2.                                   ENABLE KBD D A
02FA  F034        A2  =  B000.
02FB  F05D        ASE.      SELECT  BR2
02FC  F080        B  =  BMAR.
02FD  F078        B  =  B0TT.
02FE  F16E        BR2  =  B.          BR2  =  DATA  PORT
                MM-KYBD-LOOP.
02FF  F0C5        IF  SRQ  DR2  BEX  SKIP.
0300  42FE        MPCR  =  MM-KYBD-LOOP  -  1.
0301  0293        AMPCR  =  MEMORY-MODIFY.
0302  F0CB        LIT  EQV  B.
0303  E01F        LIT  =  @1F@.   RESET  KEY  LOWER  SHIFT  MECHANICAL
0304  F09B        IF  ABT  LUOP  JUMP.  RESET  KEY  START  OVER
0305  E0AB        LIT  =  @AB@.   RESET  KEY  LOWER  SHIFT  ELECTRONIC
0306  F09B        IF  ABT  LUOP  JUMP.  RESET  KEY  START  OVER
0307  0290        AMPCR  =  MEM-MOD-SETLC3  -  1.
0308  E09F        LIT  =  @9F@.   RESET  KEY  UPPER  SHIFT  MECHANICAL
0309  F09B        IF  ABT  LUOP  JUMP.
030A  E08B        LIT  =  @8B@.   RESET  KEY  UPPER  SHIFT  ELECTRONIC
030B  F09B        IF  ABT  LUOP  JUMP.
030C  038D        AMPCR  =  MICRO-TOOL  -  1.
030D  E04C        LIT  =  @4C@.          OCK  IIII  KEY  MECHANICAL
030E  F09B        IF  ABT  LUOP  JUMP.  OCK  IIII  KEY  GO  TO  END
030F  E0A0        LIT  =  @A0@.          OCK  IIII  KEY  ELECTRONIC
0310  F09B        IF  ABT  LUOP  JUMP.  OCK  IIII  KEY  GO  TO  END
0311  02D0        AMPCR  =  SET-LC3GC1  -  1.
0312  E0CE        LIT  =  @CE@.          OCK  II  UPPER  SHIFT  MECHANICAL
0313  F09B        IF  ABT  LUOP  JUMP.
0314  E083        LIT  =  @83@.          OCK  II  UPPER  SHIFT  ELECTRONIC
0315  F09B        IF  ABT  LUOP  JUMP.
0316  02D1        AMPCR  =  SET-GC1  -  1.
0317  E04E        LIT  =  @4E@.          OCK  II  LOWER  SHIFT  MECHANICAL
0318  F09B        IF  ABT  LUOP  JUMP.
0319  E0A3        LIT  =  @A3@.          OCK  II  LOWER  SHIFT  ELECTRONIC
031A  F09B        IF  ABT  LUOP  JUMP.
031B  02D3        AMPCR  =  SET-LC3  -  1.
031C  E0CD        LIT  =  @CD@.          OCK  I  UPPER  SHIFT  MECHANICAL
031D  F09B        IF  ABT  LUOP  JUMP.
031E  E081        LIT  =  @81@.          OCK  I  UPPER  SHIFT  ELECTRONIC
031F  F09B        IF  ABT  LUOP  JUMP.
0320  F0E1        MIR  =  B.
0321  F07F        B  =  B  R.
0322  C400        SAR  =  4  LIT  =  0.
0323  032A        AMPCR  =  ABCDEF-KEY  -  1.
0324  E004        LIT  =  @04@.   UPPER  DIGIT  FOR  ALPHA  ELECTRONIC
0325  F0CB        LIT  EQV  B.
0326  F09B        IF  ABT  LUOP  JUMP.
0327  E005        LIT  =  @05@.   UPPER  DIGIT  FOR  ALPHA  MECHANICAL
0328  F09B        IF  ABT  LUOP  JUMP.
0329  E000        LIT  =  0.
032A  F0F7        SKIP.                  NUMERIC  KEY  ENTERED
              ABCDEF-KEY.                ALPHA  KEY  ENTERED
032B  E009        LIT  =  @09@.
032C  F08D        BMI.          RESTORE  B  (CHARACTER  ENTERED)
032D  F083        B  =  LIT  +  B.  ADD  9  IF  ALPHA  KEY
032E  F086        B  =  LIT  AND  B.
032F  CC0F        SAR  =  12,  LIT  =  @0F@.
0330  F025        A2  =  A2  C.
0331  F031        A2  =  A2  +  B.                       CONCATENATE
0332  02FE        AMPCR  =  MM-KYBD-LOOP  -  1.
0333  F030        INC.
0334  F0B9        IF  NOT  COV  JUMP.                    TEST  FOR  A
0335  F066        B  =  A1.
0336  F095        CTR  =  B.                             RESTORE  COUN  R
0337  035E        AMPCR  =  MM-PRINT  -  1.
0338  F0A6        IF  LC1  JUMP.                         PRINT  FLAG.
0339  F101        AMPCR  =  A3.
033A  F05F        B.
033B  F0C9        JUMP.

              MM-ADVANCE.
033C  F05D        ASE.      SELECT  BR2
033D  F080        B  =  BMAR.
033E  F16F        BR2  =  BITT.          BR2  =  CONTROL  PORT
033F  F0EA        MIR  =  LIT.
0340  E008        LIT  =  @08@.
0341  F098        DW2.                                   ENABLE  FORM  I
0342  F082        B  =  LIT  L.
0343  E0C0        LIT  =  @C0@.
0344  F0ED        MIR  =  LIT  +  B.
0345  E050        LIT  =  @50@.
0346  F05D        ASE.      SELECT  BR2
0347  F080        B  =  BMAR.
0348  F078        B  =  B0TT.
0349  F16E        BR2  =  B.          BR2  =  DATA  PORT
034A  F0FC        WHEN  SRQ  STEP.
034B  F098        DW2.
034C  F0C9        JUMP.
              MM-POSITION.
034D  F05D        ASE.      SELECT  BR2
034E  F080        B  =  BMAR.
034F  F16F        BR2  =  BITT.          BR2  =  CONTROL  PORT
0350  F0EA        MIR  =  LIT.
0351  C810        SAR  =  8,  LIT  =  @10@.
0352  F098        DW2.                                   ENABLE  CARRI
0353  E001        LIT  =  @01@.                          LEFT  POSITIO  P
0354  F015        IF  LC2  SKIP.
0355  E000        LIT  =  @00@.                          RIGHT  POSITI
0356  F082        B  =  LIT  L.
0357  F0DC        MIR  =  A1  +  B.
0358  F05D        ASE.      SELECT  BR2
0359  F080        B  =  BMAR.
035A  F078        B  =  B0TT.
035B  F16E        BR2  =  B.          BR2  =  DATA  PORT
035C  F0FC        WHEN  SRQ  STEP.
035D  F098        DW2.
035E  F0C9        JUMP.
              MM-PRINT.
035F  F0A5        IF  LC1  STEP.
0360  F1DB        MIR  =  0  +  Z.
0361  E004        LIT  =  @04@.
0362  F05D        ASE.      SELECT  BR2
0363  F080        B  =  BMAR.
0364  F16F        BR2  =  BITT.          BR2  =  CONTROL  PORT
0365  F098        DW2.                                   ENABLE  PRINT
0366  C84B        SAR  =  8,  LIT  =  @4B@.
0367  F015        IF  LC2  SKIP.                         LC2  MEANS  RE  R
0368  C849        SAR  =  8,  LIT  =  @49@.
0369  F089        B  =  LIT.
036A  F01B        A1  =  B  L.
036B  F081        B  =  NOT  CTR  R.
036C  F07C        B  =  B  L.
036D  DE00        SAR  =  14.
036E  F05F        B.
036F  F0F4        SAR  =  B.
0370  F025        A2  =  A2  C.
0371  F05D        ASE.      SELECT  BR2
0372  F080        B  =  BMAR.
0373  F078        B  =  B0TT.
0374  F16E        BR2  =  B.          BR2  =  DATA  PORT
              MM-PRINT-LOOP.
0375  F147        B  =  A2  C.
0376  D400        SAR  =  4.
0377  F07F        B  =  B  R.
0378  DC00        SAR  =  12.                            ISOLATE  NEXT  I
0379  F0CC        LIT  -  B.
037A  E009        LIT  =  @09@.
037B  F09E        IF  AOV  SKIP.
037C  F018        SET  LC1.                              UNDIGIT
037D  E037        LIT  =  @37@.
037E  F014        IF  LC1  SKIP.
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037F  E030        LIT    =   @30@.                                     PUT  ZONE  ON.
0380  F083        B  =  LIT   +  B.
0381  F0DC        MIR  =  A1   +  B.
0382  F0FC        WHEN SRQ  STEP.
0383  F098         DW2.
0384  F030         INC.
0385  F0C5        IF  SRQ  DR2  BEX  SKIP.
0386  F101        AMPCR    =    A3.
              MM-NANO-DUMB.
0387  F0C5        IF  SRQ  DR2  BEX  SKIP.
0388  4386        MPCR  =  MM-NANO-DUMB  -  1.
0389  F09F        IF    COV  JUMP.                                     END  OF  PRINT
038A  F025        A2     =    A2     C.
038B  DC00        SAR  =  12.                                          LINE  UP  NEXT     I
038C  0374        AMPCR   =    MM-PRINT-LOOP      -    1.
038D  F0C9        JUMP.
            ************************************************************                  *
              MICRO-TOOL.                               PRESS  OCK  IIII
            *  MEMORY-MODIFY   USES   LC1,LC2,LC3,GC1,GC2
038E  F0AD        IF   LC3   STEP.
038F  F0A5        IF   LC1   STEP.
0390  F0A9        IF   LC2   STEP.
0391  F00C        RESET   GC1.
0392  F01F        RESET   GC2.
0393  4045        MPCR  =  TESTSELECT    -  1.
            /
              SPO-MEM-MOD.
0394  F0A9        IF  LC2  STEP.    RESET  WRITE-BEFORE-READ      FLAG
0395  8117        CPCR  =  SETCONTADDRS   -  1.
            *   RETURN  WITH  BR1  =  INST,    BR2  =  DATA
0396  F0A5        IF   LC1.
              SMM-NEW-ADDRESS.
0397  83C1        CPCR  =  SMM-ENABLE-OUT    -  1.
0398  E00D        LIT   =  @0D@.
0399  83FE        CPCR  =  SMM-DEV-WT-LIT     -  1.
039A  E00A        LIT   =  @0A@.
039B  83FE        CPCR  =  SMM-DEV-WT-LIT     -  1.
039C  83C9        CPCR  =  SMM-SPACE-4    -  1.
039D  83BE        CPCR  =  SMM-ENABLE-IN    -  1.
039E  F0A8        IF  LC1  SET  LC1  SKIP.
039F  83D2        CPCR  =  SMM-ACCEPT-4    -  1.
03A0  83C1        CPCR  =  SMM-ENABLE-OUT    -  1.
03A1  F0BF        IF  NOT  LC1  SKIP.
03A2  83E3        CPCR  =  SMM-PRINT-4     -  1.
03A3  83C9        CPCR  =  SMM-SPACE-4     -  1.
03A4  F0D1        MAR1  =  A2.
03A5  F0E7        MIR  =  B001.
03A6  F0AB        IF  LC2  SET  LC2  ELSE  SKIP.
03A7  F0F3        MW1.       WRITE  BEFORE  READ   PREVENT  PE
            *   DELAY  REQUIRED  HERE  FOR  WRITE  BEFORE  READ  ON  711
03A8  F0F1        MR1.
03A9  F0F9        WHEN  RDC  BEX.
03AA  F033        A2  =  B.
03AB  83E3        CPCR   =  SMM-PRINT-4    -  1.
03AC  83BE        CPCR   =  SMM-ENABLE-IN    -  1.
              SMM-WHAT-TO-DO.
03AD  83F7        CPCR  =  SMM-DEV-RD   -  1.
03AE  F0CB        LIT  EQV  B.
03AF  E020        LIT   =  @20@.
03B0  03B5        AMPCR  =  SMM-NEW-CONTENT    -  1.
03B1  F09B        IF  ABT  LUOP  JUMP.
03B2  E01B        LIT   =  @1B@.
03B3  F09D        IF  ABT  SKIP.
03B4  43AC        MPCR  =  SMM-WHAT-TO-DO    -  1.
03B5  F018        SET  LC1.
              SMM-NEW-CONTENT.
03B6  83C1        CPCR  =  SMM-ENABLE-OUT    -  1.
03B7  83C9        CPCR  =  SMM-SPACE-4    -  1.
03B8  83BE        CPCR  =  SMM-ENABLE-IN    -  1.
03B9  83D2        CPCR  =  SMM-ACCEPT-4    -  1.
03BA  F0DD        MIR  =  A2.
03BB  F0F3        MW1.
03BC  F0FB        WHEN  RMI  MAR1  =  BMAR  +  1.
03BD  F035        A2  =  BMAR.
03BE  4396        MPCR  =  SMM-NEW-ADDRESS    -  1.
              SMM-ENABLE-IN.
03BF  F0FC        WHEN  SRQ  STEP.
03C0  F0E7        MIR  =  B001.
03C1  43C2        MPCR  =  SMM-SEND-CW    -  1.
              SMM-ENABLE-OUT.
03C2  F1D5        MIR  =  B001    +  1.
              SMM-SEND-CW.
03C3  F05D        ASE.
03C4  F080        B  =  BMAR.
03C5  F16F        BR2  =  BITT.
03C6  F098        DW2.
03C7  F05F        B.
03C8  F16E        BR2  =  B.
03C9  F0C9        JUMP.
              SMM-SPACE-4.
03CA  F007        A1  =  AMPCR.
03CB  F05F        B.
03CC  F05F        B.
03CD  E020        LIT  =  @20@.
03CE  83FE        CPCR  =  SMM-DEV-WT-LIT     -  1.
03CF  83FF        CPCR  =  SMM-DEV-WT   -  1.
03D0  83FF        CPCR  =  SMM-DEV-WT   -  1.
03D1  83FF        CPCR  =  SMM-DEV-WT   -  1.
03D2  43F4        MPCR  =  SMM-JUMP-A1    -  1.
              SMM-ACCEPT-4.
03D3  F007        A1  =  AMPCR.
03D4  F0CA        LCTR.
03D5  CC02        SAR  =  12,    LIT  =  2.
03D6  F034        A2  =  B000.
              SMM-ACCEPT-LOOP.
03D7  F026        A2  =  A2  L.
03D8  83F7        CPCR  =  SMM-DEV-RD   -  1.
03D9  F0CC        LIT  -  B.
03DA  E040        LIT  =  @40@.
03DB  F09E        IF  AOV  SKIP.
03DC  F083        B  =  LIT  +  B.
03DD  E009        LIT  =  9.
03DE  F086        B  =  LIT  AND  B.
03DF  E00F        LIT  =  @0F@.
03E0  F031        A2  =  A2  +  B.
03E1  F0C8        INC  IF  COV  SKIP.
03E2  43D6        MPCR  =  SMM-ACCEPT-LOOP    -  1.
03E3  43F4        MPCR  =  SMM-JUMP-A1    -  1.
              SMM-PRINT-4.
03E4  F007        A1  =  AMPCR.
03E5  F0CA        LCTR.
03E6  CC02        SAR  =  12,    LIT  =  2.
              SMM-PRINT-LOOP.
03E7  F025        A2  =  A2  C.
03E8  F06D        B  =  A2  AND  LIT.
03E9  E00F        LIT  =  @0F@.
03EA  F0CC        LIT  -  B.
03EB  E009        LIT  =  9.
03EC  F09E        IF  AOV  SKIP.
03ED  F083        B  =  LIT  +  B.
03EE  E007        LIT  =  @07@.
03EF  F0ED        MIR  =  LIT  +  B.
03F0  E030        LIT  =  @30@.
03F1  83FF        CPCR  =  SMM-DEV-WT   -  1.
03F2  F0C8        INC  IF  COV  SKIP.
03F3  43E6        MPCR  =  SMM-PRINT-LOOP    -  1.
03F4  43F4        MPCR  =  SMM-JUMP-A1    -  1.
              SMM-JUMP-A1.
03F5  F05C        AMPCR  =  A1.
03F6  F05F        B.
03F7  F0C9        JUMP.
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                    SMM-DEV-RD.
03F8  F1AE              IF  NOT  URQ  SKIP.
03F9  4404              MPCR = SMM-STINTS   - 1.
03FA  F0C5              IF  SRQ  DR2  BEX  SKIP.
03FB  43F7              MPCR = SMM-DEV-RD   - 1.
03FC  F086              B = LIT  AND B.
03FD  E07F              LIT  = @7F@.
03FE  F0C9              JUMP.
                    SMM-DEV-WT-LIT.
03FF  F0EA              MIR  = LIT.
                    SMM-DEV-WT.
0400  F1AE              IF  NOT  URQ  SKIP.
0401  4404              MPCR = SMM-STINTS   - 1.
0402  F0C6              IF  SRQ  DW2  SKIP.
0403  43FF              MPCR = SMM-DEV-WT   - 1.
0404  F0C9              JUMP.
                    SMM-STINTS.
0405  F05D              ASE.
0406  F035              A2  = BMAR.
0407  F08E              BR2 = A2  OR  B100.
0408  F097              DR2  BEX.
0409  F07D              B = B C.
040A  D300              SAR = 3.        ERROR  STATUS  TO  LSB,   E-O-M   TO  MSB
040B  F090              BR2 = A2.
040C  F05F              B.
                    *
                    *  PUSH  INPUT-REQUEST    TO  RESET  LC2  (NORMAL  OPERATION
                    *                  BEFORE  ERROR  WAS  PUSHED)
                    *  PUSH  ERROR  TO  SET  LC2  (WRITE   BEFORE  READ  FLAG)
                    *  PUSH  END-OF-MESSAGE    TO  EXIT  SPO-MEMORY-MODIFY
040D  F0C4              IF  NOT  MST  SKIP.
040E  4413              MPCR = SMM-EXIT   - 1.      E-O-M   STATUS
040F  F019              SET  LC2.          WRITE-BEFORE-READ      FLAG
0410  F05F              B.
0411  F0B2              IF  LST  SKIP.
0412  4393              MPCR = SPO-MEM-MOD   - 1.         INPUT-REQUEST     STATUS
0413  4394              MPCR = SPO-MEM-MOD.    ERROR  STATUS  (LEAVE   LC2  SET)
                    SMM-EXIT.
                    *  SPO-MEM-MOD   USES  LC1  AND  LC2
0414  F0A5              IF  LC1  STEP.
0415  F0A9              IF  LC2  STEP.
0416  4045              MPCR = TESTSELECT    - 1.
                    /
                    TESTTABLE.
0417  4426              MPCR = TEST-0       - 1.
0418  4427              MPCR = TEST-1       - 1.
0419  454B              MPCR = TEST-2       - 1.
041A  46EC              MPCR = TEST-3       - 1.
041B  48C0              MPCR = TEST-4       - 1.
041C  4923              MPCR = TEST-5       - 1.
041D  4948              MPCR = TEST-6       - 1.
041E  497D              MPCR = TEST-7       - 1.
041F  4982              MPCR = TEST-8       - 1.
0420  4989              MPCR = TEST-9       - 1.
0421  49C5              MPCR = TEST-10      - 1.
0422  49CE              MPCR = TEST-11      - 1.
0423  49DA              MPCR = TEST-12      - 1.
0424  49DE              MPCR = TEST-13      - 1.
0425  49EE              MPCR = TEST-14      - 1.
0426  F000              WAIT.
                    TEST-0.
0427  F01A              SET  LC3.                        SEQ  TESTS
                    TEST-1.
                    PEC01.
0428  81AA              CPCR = STKINIT    - 1.       INITIALIZE      STACK
0429  E001              LIT  = @01@.                 NOT  RDY
042A  8BBC              CPCR = STATCHK2   - 1.       FIRST   STAT   READ
042B  8B24              CPCR = PESTAT1A   - 1.
                    *********FIRST        STATUS   READ  FAILED
                    *********ERROR        # E 5
042C  0428              AMPCR = PEC01.                LOOP  ON  READ
042D  8AF1              CPCR = CWNULL  - 1.           CONT  WORD = 0000
042E  C808              SAR  = 8  LIT  = 8.
042F  8B8D              CPCR = MTIMESH  - 1.          DELAY  5  +  MSEC
0430  F1AE              IF  NOT  URQ  SKIP.
0431  8B23              CPCR = PESTAT1   - 1.
                    *********STINT        AFTER  NO  OP
                    *********ERROR        # E 6
0432  F1AD              IF  NOT  SRQ  SKIP.
0433  8B23              CPCR = PESTAT1   - 1.
                    *********DINT         SET  ON  NO  OP
                    *********ERROR        # E 7
0434  E001              LIT  = @01@.
0435  8BBC              CPCR = STATCHK2  - 1.         CHECK  STATUS
0436  8B24              CPCR = PESTAT1A  - 1.
                    *********STATUS       FAILURE   AFTER   NO  OP  CONT  WORD
                    *********ERROR        # E 8
                     PEC01A.
0437  E008              LIT  = @08@.                  ENABLE  DINT
0438  8B04              CPCR = CWGEN  - 1.            WRITE  CONT  WD
0439  F05F              B.
043A  E001              LIT  = @01@.
043B  8BB3              CPCR = STATGEN4  - 1.         CHECK  STATUS
043C  8B24              CPCR = PESTAT1A  - 1.         STATUS  FAILURE
                    *********ERROR        # E 9
043D  0436              AMPCR = PEC01A   - 1.         LOOP  ON  WRITE
043E  8AFD              CPCR = CWEDWR  - 1.           WRITE  CONT  WD
043F  F1AE              IF  NOT  URQ  SKIP.           TEST  STINT
0440  8B23              CPCR = PESTAT1   - 1.         ERROR  STINT   WITH  DINT   SET
                    *********ERROR        # E 10
0441  8B16              CPCR = BUSS  - 1.
                    *********ERROR        # E 3        BUSS  FAILURE
                     PEC01A1.
0442  E001              LIT  = @01@.
0443  8BB5              CPCR = STATGENC  - 1.         CHECK  STATUS
0444  8B24              CPCR = PESTAT1A  - 1.         STATUS  FAILURE
                    *********ERROR        # E 11
0445  F1AD              IF  NOT  SRQ  SKIP.           TEST  DINT
0446  444B              MPCR = PEC01B   - 1.
0447  F18E              IF  IRQ  SKIP.
0448  8B23              CPCR = PESTAT1   - 1.         SRQ  NOT  SET
                    *********ERROR        # E 12
0449  0441              AMPCR = PEC01A1  - 1.         LOOPING
044A  F108              ASR  BEX.                     GET  STATUS
044B  8B24              CPCR = PESTAT1A  - 1.         DDP  NOT  SELECTED
                    *********ERROR        # E 13
                     PEC01B.
044C  F097              DR2  BEX.                     FIRST   DATA  READ                B
044D  F05F              B.
044E  F1AD              IF  NOT  SRQ  SKIP.           TEST  DINT  RESET
044F  8B24              CPCR = PESTAT1A  - 1.         DINT  NOT  RESET
                    *********ERROR        # E 14
0450  044B              AMPCR = PEC01B   - 1.         LOOP  ON  DATA  READ
0451  8AF9              CPCR = CWWR  - 1.             DISABLE   DINT
0452  8AFD              CPCR = CWEDWR  - 1.           RE-ENABLE   DINT
0453  F05F              B.
0454  F05F              B.
0455  F1AD              IF  NOT  SRQ  SKIP.           TEST  DINT  SET
0456  F0F7              SKIP.
0457  8B23              CPCR = PESTAT1   - 1.         DINT  NOT  SET
                    *********ERROR        # E 15
0458  F096              DR1  BEX.                                                       B
0459  F05F              B.
045A  F1AD              IF  NOT  SRQ  SKIP.           TEST  DINT
045B  F0F7              SKIP.
045C  8B23              CPCR = PESTAT1   - 1.         DINT  RESET  BY  STATUS  READ
                    *********ERROR        # E 16
045D  F07B              B = B000.
045E  F108              ASR  BEX.
045F  F0FF              0  EQV  B.
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0460  F09D        IF  ABT  SKIP.
0461  8B24        CPCR = PESTAT1A  - 1.      ASR WITHOUT IRQ FAILED
            *********ERROR     # E 17
0462  F1AD        IF  NOT SRQ SKIP.          TEST STILL SELECTED
0463  F0F7        SKIP.
0464  F000        WAIT.                      DINT RESET - ASR
            *********ERROR     # E 18        DESELECTED OR INST/ RESET
0465  F080        B = BMAR.                  STORE BR1
0466  F16C        BR1 = LIT  L.
0467  C808        SAR = 8 LIT = @08@.
0468  F0F1        MR1.                       MEMORY READ
0469  F05F        B.
046A  F1AD        IF  NOT SRQ SKIP.          TEST STILL SELECTED
046B  F0F7        SKIP.
046C  F000        WAIT.                      MEMORY READ DESELECTED DDP
            *********ERROR     # E 19
046D  F0D5        MAR1 = B.                  RESTORE BR1
046E  8B07        CPCR = PEDSEL  - 1.        DESELECT
046F  F18E        IF  IRQ  SKIP.
0470  F000        WAIT.                      IRQ FAILED TO SET
            *********ERROR     # E 20
0471  F1AD        IF  NOT SRQ SKIP.
0472  F000        WAIT.                      SRQ NOT RESET
            *                                  AFTER DESELECT
            *********ERROR     # E 21
0473  F089        B = LIT.
0474  C207        SAR = 2 LIT = @07@.
0475  F07D        B = B C.                   GEN STAT
0476  F028        A2 = A2 OR B.              ADD STAT TO PORT ADDR
0477  8B16        CPCR = BUSS  - 1.          BUSS FAILURE                    B
            *********ERROR     # E 3                                        B
          PEC01B1.
0478  F108        ASR BEX.                   ENABLE STATUS
0479  F116        A2 EQV B.                  = CPO1
047A  F09D        IF  ABT SKIP.
047B  8B24        CPCR = PESTAT1A  - 1.      STATUS FAILURE ON ASR
            *********ERROR     # E 22
047C  0477        AMPCR = PEC01B1  - 1.      LOOP ON ASR
047D  F082        B = LIT  L.                                                B
047E  C80F        SAR = 8 LIT = @0F@.                                        B
047F  F143        B = A2 AND B.                                              B
0480  F033        A2 = B.                                                    B
0481  F076        B = B111.
0482  F0D5        MAR1 = B.                  START PORT
0483  F0F7        SKIP.
        MRDDSL.
0484  F096        DR1 BEX.                   DATA READ
0485  F080        B = BMAR.
0486  F18E        IF  IRQ  SKIP.             TEST DINT
0487  8B24        CPCR = PESTAT1A  - 1.      DINT RESET
            *********DINT      RESET BY READ TO ANOTHER PORT
            *********ERROR     # E 23
0488  F07D        B = B C.
0489  F07E        B = B + 1.
048A  F0CB        LIT EQV B.
048B  E010        LIT = @10@.
048C  F0B5        IF  NOT ABT SKIP.
048D  4493        MPCR = MRDDSLA  - 1.
048E  F07D        B = B C.
048F  F0D5        MAR1 = B.
0490  F116        A2 EQV B.                  PORT UNDER TEST
0491  F09D        IF  ABT SKIP.
0492  4483        MPCR = MRDDSL  - 1.
0493  4484        MPCR = MRDDSL.
        MRDDSLA.
0494  81E2        CPCR = RSTBR1  - 1.        RESTORE BR1                     B
0495  F096        DR1 BEX.                   RESELECT                        B
0496  F05F        B.
0497  F1AD        IF  NOT SRQ SKIP.          TEST DINT NOT RESET
0498  F0F7        SKIP.
0499  F000        WAIT.

            *********STATUS      READ FAILED TO SELECT
            *********ERROR     # E 24
049A  8AF1        CPCR = CWNULL  - 1.        DISABLE DINT
049B  F1AD        IF  NOT SRQ SKIP.
049C  F000        WAIT.                      DINT NOT RESET BY NULL CW
            *********ERROR     # E 24A
          PEC01D.
049D  8AF9        CPCR = CWWR  - 1.
049E  8AFD        CPCR = CWEDWR  - 1.
049F  F0E8        MIR = B111.
04A0  F098        DW2.                       FIRST DATA WRITE                B
            *                                  ALL BITS ON
04A1  F05F        B.
04A2  F1AD        IF  NOT SRQ SKIP.          TEST DINT RESET
04A3  8B23        CPCR = PESTAT1  - 1.
            *********ERROR     # E 25
04A4  8B16        CPCR = BUSS  - 1.
            *********ERROR     # E 4         BUSS FAILURE
04A5  F097        DR2 BEX.                   READ DATA                       B
04A6  F057        A3 = LIT  L.
04A7  C881        SAR = 8 LIT = @81@.
04A8  F04A        A3 = A3 OR LIT.            GEN EXPECTED DATA = 81FF
04A9  E0FF        LIT = @FF@.
04AA  F03C        A3 EQV B.
04AB  F09D        IF  ABT SKIP.              TEST DATA
04AC  8B84        CPCR = PBUFDAT  - 1.       FIRST DATA READ FAILURE
            *********ERROR     # E 26
04AD  049C        AMPCR = PEC01D  - 1.       LOOP ON BUFF
            *                                  WRITE AND READ
04AE  8AF9        CPCR = CWWR  - 1.                                          B
04AF  8AF1        CPCR = CWNULL  - 1.        DISABLE DINT                    B
          PEC01E.
04B0  F0E6        MIR = B000.
04B1  F098        DW2.                       WRITE ZEROS TO BUFF             B
04B2  F0E8        MIR = B111.
04B3  F05F        B.
04B4  F097        DR2 BEX.                   READ BUFF                       B
04B5  F054        A3 = B000.
04B6  F0FF        0 EQV B.                                                   B
04B7  F09D        IF  ABT SKIP.                                              B
04B8  8B84        CPCR = PBUFDAT  - 1.       DATA BUFFER FAILURE             B
            *********ERROR     # E 27
04B9  F055        A3 = B001.
          PEC01F.
04BA  F0DE        MIR = A3.
04BB  F098        DW2.                       WRITE DATA TO BUFF              B
04BC  F05F        B.
04BD  F097        DR2 BEX.                   READ DATA FROM BUFF             B
04BE  F03C        A3 EQV B.
04BF  F09D        IF  ABT SKIP.
04C0  8B84        CPCR = PBUFDAT  - 1.       DATA BUFFER FAILURE
            *********ERROR     # E 28
04C1  F04C        A3 = A3 + 1.
04C2  F03E        A3 EQV LIT.
04C3  E0FF        LIT = @FF@.                LAST CHAR TEST
04C4  F09D        IF  ABT SKIP.
04C5  44B9        MPCR = PEC01F  - 1.
04C6  8AFD        CPCR = CWEDWR  - 1.        ENABLE DINT WRITE MODE
04C7  F0FC        WHEN SRQ STEP.             T1
04C8  F098        DW2.                       RESET DINT                      B
04C9  F099        DW1.                       REWRITE ENABLE DINT             B
04CA  F05F        B.
04CB  E01D        LIT = @1D@.                TIMER SET UP
04CC  8B8F        CPCR = MTIMELI  - 1.       DELAY FOR CTR WRITE STROBE
04CD  F05F        B.
04CE  F1AD        IF  NOT SRQ SKIP.          TEST DINT NOT SET
04CF  8B23        CPCR = PESTAT1  - 1.       DINT SET EARLY
            *********ERROR     # E 29
04D0  F1AD        IF  NOT SRQ SKIP.          TEST DINT SET
04D1  F0F7        SKIP.
04D2  8B23        CPCR = PESTAT1  - 1.       DINT NOT SET AT 100 USEC
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                *********ERROR      # E 30
04D3  E001          LIT  = @01@.
04D4  8BB5          CPCR = STATGENC  - 1.      CHECK STATUS
04D5  8B24          CPCR = PESTAT1A  - 1.      STATUS FAILURE LATE
                *********ERROR      # E 31
04D6  E019          LIT  = @19@.               T14
04D7  8B8F          CPCR = MTIMELI   - 1.      DELAY FOR SERVICE LATE
04D8  F05F          B.
04D9  8B16          CPCR = BUSS  - 1.
                *********ERROR      # E 3       BUSS FAILURE
04DA  E041          LIT  = @41@.
04DB  8BB5          CPCR = STATGENC  - 1.      CHECK STATUS
04DC  8B24          CPCR = PESTAT1A  - 1.      SERVICE LATE NOT SET
                *********ERROR      # E 32
04DD  F1AE          IF NOT URQ SKIP.
04DE  8B23          CPCR = PESTAT1   - 1.      STINT SET
                *********ERROR      # E 33
04DF  8AF9          CPCR = CWWR - 1.           RESET DINT
04E0  8ADF          CPCR = PSRQTMOUT - 1.      DELAY FOR WARS STROBE
04E1  F05F          B.
04E2  8B01          CPCR = CWEDRD - 1.         SET READ MODE
04E3  F1B5          IF URQ SKIP.               TEST STINT SET
04E4  8B23          CPCR = PESTAT1   - 1.      STINT NOT SET
                *********ERROR      # E 34
04E5  F096          DR1 BEX.                   RESET SERVICE LATE          B
04E6  F1AD          IF NOT SRQ SKIP.
04E7  8B23          CPCR = PESTAT1   - 1.      DINT SET WITHOUT RDSTROBE
                *********ERROR      # E 35
04E8  E002          LIT  = @02@.
04E9  8B04          CPCR = CWGEN - 1.          SET READ ONLY
04EA  F1AE          IF NOT URQ SKIP.
04EB  8B23          CPCR = PESTAT1   - 1.      STINT STILL SET
                *********ERROR      # E 36
04EC  8AF5          CPCR = CW5MKS - 1.         ENABLE 5 MSEC MARKS
04ED  F039          A2 = LIT L.                T1
04EE  C804          SAR = 8 LIT = 4.
04EF  F02F          A2 = A2 OR LIT.
04F0  E0DE          LIT  = @DE@.               TOTAL CTR SET UP 4993 MSEC
04F1  8A74          CPCR = PURQTMOUT1 - 1.     DELAY FOR 5MSEC GEN
04F2  F0F7          SKIP.                      T4994
04F3  8B23          CPCR = PESTAT1   - 1.      5 MSEC TIMER SET EARLY
                *********ERROR      # E 37
04F4  F1B5          IF URQ SKIP.
04F5  8B23          CPCR = PESTAT1   - 1.      STINT FOR 5MKS NOT SET
                *********ERROR      # E 37A
04F6  8B16          CPCR = BUSS  - 1.
                *********ERROR      # E 3       BUSS FAILURE
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```
04F7  E081          LIT  = @81@.
04F8  8BBC          CPCR = STATCHK2  - 1.      CHECK STATUS = 0081
04F9  8B24          CPCR = PESTAT1A  - 1.      STATUS FAILURE
                *********ERROR      # E 38
04FA  F1AE          IF NOT URQ SKIP.           TEST STINT
04FB  8B23          CPCR = PESTAT1   - 1.      STINT NOT RESET
                *********ERROR      # E 39
04FC  E001          LIT  = @01@.
04FD  8BBC          CPCR = STATCHK2  - 1.      CHECK STATUS = 0001
04FE  8B24          CPCR = PESTAT1A  - 1.
                *********ERROR      # E 40
04FF  CDD2          SAR = 13 LIT = @D2@.
0500  8B8D          CPCR = MTIMESH   - 1.      DELAY 5MSEC
0501  F1B5          IF URQ SKIP.               TEST STINT SET
0502  8B23          CPCR = PESTAT1   - 1.      TIME MARKS CTR HELD RESET
                *********ERROR      # E 41
0503  8AF1          CPCR = CWNULL - 1.         DISABLE TIME MARKS
0504  8B07          CPCR = PEDSEL  - 1.        DESELECT
0505  F05D          ASE.                                                   B
0506  F035          A2 = BMAR.                                             B
0507  F02F          A2 = A2 OR LIT.
0508  E081          LIT  = @81@.               STAT SET UP
0509  F18E          IF IRQ SKIP.               TEST STINT
050A  8B24          CPCR = PESTAT1A  - 1.      NO IRQ FOR STINT


                *********ERROR      # E 42
050B  F108          ASR BEX.                   ENABLE STATUS
050C  F05F          B.
050D  F0BD          IF NOT IRQ SKIP.
050E  8B24          CPCR = PESTAT1A  - 1.      IRQ NOT RESET WITH ENST
                *********ERROR      # E 43
050F  F116          A2 EQV B.
0510  F09D          IF ABT SKIP.               TEST STATUS = OP81
0511  8B24          CPCR = PESTAT1A  - 1.      STATUS FAILURE
                *********ERROR      # E 44
0512  F096          DR1 BEX.                   RESELECT                    B
0513  CDD2          SAR = 13 LIT = @D2@.
0514  8B8D          CPCR = MTIMESH   - 1.      DELAY 5 MSEC
0515  F1AE          IF NOT URQ SKIP.           TEST STINT NOT SET
0516  8B23          CPCR = PESTAT1   - 1.      5 MARKS NOT DISABLED
                *********ERROR      # E 45
0517  8AF5          CPCR = CW5MKS - 1.         ENABLE TIME MARKS
0518  F0FD          WHEN URQ STEP.             WAIT FOR TIME MARK
0519  8AF1          CPCR = CWNULL - 1.         DISABLE COUNTER
051A  827A          CPCR = SET-CONT-DINT - 1.                              B
051B  014D          AMPCR = CONTPORTADDRESS.                               B
```

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051C  F0CF        MAR1 = AMPCR.                                          B
051D  F0F1        MR1.                                                   B
051E  F0F9        WHEN RDC BEX.              FETCH CONTROLLER ADDR       B
051F  F017        A1 = B.                                                B
0520  8B08        CPCR = PEDSEL.             DESELECT FROM CONS OR SPO   B
0521  F108        ASR BEX.                   READ PRIORITY STATUS        B
0522  F003        A1 EQV B.                                              B
0523  F09D        IF ABT SKIP.                                           B
0524  8B24        CPCR = PESTAT1A - 1.       PRIORITY ERROR OR CONT      B
            *********ERROR     # E 46        ASR WENT TO MAG TAPE        B
0525  8288        CPCR = RESET-CONT-DINT     - 1.                        B
0526  827A        CPCR = SET-CONT-DINT - 1.  SEL CONT                    B
0527  F05D        ASE.                                                   B
0528  F080        B = BMAR.                  GET TAPE ADDRESS            B
0529  F033        A2 = B.                                                B
052A  F02F        A2 = A2 OR LIT.                                        B
052B  E081        LIT = @81@.                                            B
052C  F108        ASR BEX.                   READ TAPE STATUS            B
052D  F116        A2 EQV B.                  TAPE STATUS = 0P81          B
052E  F09D        IF ABT SKIP.                                           B
052F  8B24        CPCR = PESTAT1A - 1.       STATUS FAILURE - ASR        B
            *********ERROR     # E 47        AFFECTING 2 DDPS            B
0530  8288        CPCR = RESET-CONT-DINT     - 1.                        B
0531  8AFD        CPCR = CWEDWR - 1.         ENABLE DINT                 B
0532  8B07        CPCR = PEDSEL - 1.         DESELECT                    B
0533  F05E        ASR.                                                   B
0534  F000        WAIT.                                                  B
            *********PORT      SELECT CARD ENABLE STATUS GATING TEST.
            *********TO        VERIFY ONLY THE DEVICE GENERATING AN
            *********INTERRUPT IS ADDRESSED BY ASR, METER THE
            *********FOLLOWING SIGNALS.
            *********ONLY      THE SIGNAL CORRESPONDING TO THE PORT NO.
            *********OF        MAG TAPE SHOULD BE 0% ALL OTHERS SHOULD BE
            *********100%
            *********IF        AGREE - FORCE STEP
            *********IF        DISAGREE - FAILURE IS PS A5, B5, C5, C7
            *
            **    PORT          PS1-3
            **
            **     12       2J(PSENST12/)
            **     11       1J(PSENST11/)
            **     10       1K(PSENST10/)
            **      9       2B(PSENST09/)
            **                                  PS1-2
            **
            **      8                          2J(PSENST8/)
            **      7                          1J(PSENST7/)
            **      6                          1K(PSENST6/)
            **      5                          2B(PSENST5/)
            **                                                 PS1-1
            **      4                                       2J(PSENST4/)
            **      3                                       1J(PSENST3/)
            **      2                                       1K(PSENST2/)
            **      1                                       2B(PSENST1/)
            **
            **    NOTE:  SYSTEM MAY HAVE 1, 2 OR 3 PS1 CARDS
            *
0535  8AF9        CPCR = CWWR - 1.           DISABLE DINT                B
0536  8AF1        CPCR = CWNULL - 1.         RESET                       B
0537  F096        DR1 BEX.                   RESET STATUS                B
0538  8AFD        CPCR = CWEDWR - 1.         ENABLE DINT                 B
0539  F0FC        WHEN SRQ STEP.                                         B
053A  8AFD        CPCR = CWEDWR - 1.         SECOND ENABLE               B
053B  F1AD        IF NOT SRQ SKIP.                                       B
053C  F0F7        SKIP.                                                  B
053D  8B23        CPCR = PESTAT1 - 1.        INST WRITE RESET DINT       B
            *********ERROR     # E 47A                                    B
053E  F097        DR2 BEX.                   RESET DINT                  B
053F  F05F        B.                                                     B
0540  8AF1        CPCR = CWNULL - 1.         NULL                        B
0541  8AFD        CPCR = CWEDWR - 1.         RE-ENABLE DINT              B
0542  F05F        B.                                                     B
0543  F05F        B.                                                     B
0544  F1AD        IF NOT SRQ SKIP.                                       B
0545  8B23        CPCR = PESTAT1 - 1.        FWDIS EDGE DETECTOR RESET   B
            *********ERROR     # E 47B       ON NULL CONTROL WORD        B
0546  8AF9        CPCR = CWWR - 1.                                       B
0547  8ADF        CPCR = PSRQTMOUT - 1.      DELAY FOR LRC               B
0548  F05F        B.                                                     B
0549  8AF1        CPCR = CWNULL - 1.                                     B
054A  F0AE        IF LC3 SET LC3 SKIP.       SEQ FLAG                    B
054B  4045        MPCR = TSTSEL - 1.         END TEST 1                  B
            TEST-2.
            PEC02.
054C  81AA        CPCR = STKINIT - 1.        INITIALIZE STACK
054D  F097        DR2 BEX.                   DATA READ SELECT            B
054E  F000        WAIT.
            *********TURN      TAPE TRANSPORT POWER ON, BRING TEST TAPE
            *********TO        LOAD POINT AND PUT TRANSPORT ON LINE. IF
            *********TAPE      LOADS CORRECTLY, FORCE STEP.
            *********IF        TAPE LOADING NOT CORRECT--ERROR # E 48
054F  F1AE        IF NOT URQ SKIP.           TEST STINT
0550  8B23        CPCR = PESTAT1 - 1.        ERROR STINT SET
            *********ERROR     # E 49
0551  E010        LIT = @10@.
0552  8BBC        CPCR = STATCHK2 - 1.       TEST STATUS
0553  8B24        CPCR = PESTAT1A - 1.       STATUS FAILURE
            *********ERROR     # E 50
0554  F0EA        MIR = LIT.
0555  E0FF        LIT = @FF@.
0556  F098        DW2.                       LOAD DATA BUFF              B
0557  8AF9        CPCR = CWWR - 1.           CONTROL WORD = WRITE
0558  C8FF        SAR = 8 LIT = @FF@.        DELAY SET UP 195MSEC
0559  8B8D        CPCR = MTIMESH - 1.        DELAY
055A  C400        SAR = 4 LIT = 0.
055B  8BD6        CPCR = PRSTATLST - 1.      TEST BOT RESET
055C  8B21        CPCR = PESTAT1B - 1.       BOT FAILED TO RESET
            *********ERROR     # E 51
055D  8AFB        CPCR = CW5MKWR - 1.        ENABLE TIME MARKS
055E  E0C7        LIT = @C7@.                200 TM
055F  8BA1        CPCR = CNT5MKS - 1.        COUNT TIME MARKS
0560  F0BF        IF NOT LC1 SKIP.           TEST STATUS
            *                                DURING TM COUNT
0561  8A95        CPCR = PESTAT2AN - 1.      STATUS FAILED DURING FIRST
            *********ERROR     # E 52        MOTION ATTEMPT
            PEC02A.
0562  8AF5        CPCR = CW5MKS - 1.         STOP TAPE
0563  E005        LIT = @05@.
0564  8BA1        CPCR = CNT5MKS - 1.        COUNT TIME FOR MOTION STOP
0565  F0A5        IF LC1 STEP.               RESET STATUS FLAG
0566  8AF7        CPCR = CW5MKBKSP - 1.      SYNCHRONOUS REWIND
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0567  E0B9          LIT  = @B9@.                6  + 180
0568  8BA1          CPCR = CNT5MKS  - 1.       DELAY  WITH  TIME  MARKS
0569  8AF3          CPCR = CWBKSP  - 1.        RESET  TIME  MARKS
056A  F0A5          IF  LC1  STEP.
056B  C400          SAR  = 4  LIT  = 0.
056C  8BD6          CPCR = PRSTATLST  - 1.     TEST  BOT
056D  8A94          CPCR = PESTAT2N  - 1.      BOT  SET  EARLY
                 *********ERROR      # E 53
056E  F039          A2  = LIT  L.
056F  C852          SAR  = 8  LIT  = @52@.
0570  F121          A2  = A2  XOR  B111.
                  PEC02B.
0571  F02A          A2  = A2  + 1.
0572  F0B7          IF  NOT  AOV  SKIP.
0573  8B23          CPCR = PESTAT1  - 1.       TIME  OUT  WAITING  FOR  BOT
                 *********ERROR      # E 54
0574  F1AE          IF  NOT  URQ  SKIP.
0575  8B23          CPCR = PESTAT1  - 1.       STINT  SET  DURING  BKSPACE
                 *********ERROR      # E 55
0576  C401          SAR  = 4  LIT  = 1.
0577  8BD6          CPCR = PRSTATLST  - 1.     TEST  BOT
0578  4570          MPCR = PEC02B  - 1.        BOT  NOT  SET
0579  C001          SAR  = 0  LIT  = 1.
057A  8BD6          CPCR = PRSTATLST  - 1.     TEST  NOT  RDY  SET
057B  8B23          CPCR = PESTAT1  - 1.       NOT  RDY  NOT  SET  AT  BOT
                 *********ERROR      # E 56
057C  E005          LIT  = 5.                  T  + .5  SEC
057D  8AE9          CPCR = STIME  - 1.         DELAY  FOR  NBOT  SS
057E  F1B5          IF  URQ  SKIP.             TEST  STINT
057F  8B23          CPCR = PESTAT1  - 1.       STINT  NOT  SET  AT  BOT
                 *********ERROR      # E 57
0580  E010          LIT  = @10@.
0581  8BBC          CPCR = STATCHK2  - 1.      TEST  STATUS
0582  8B24          CPCR = PESTAT1A  - 1.      STATUS  FAILURE
                 *********ERROR      # E 58
0583  8AF9          CPCR = CWWR - 1.           START  TAPE  WRITE  MODE
0584  E02F          LIT  = @2F@.               T6  SEC
0585  8AC5          CPCR = PEXTCTR  - 1.       DELAY
0586  8AF5          CPCR = CW5MKS  - 1.        STOP  TAPE
0587  E005          LIT  = @05@.               T  30  MSEC
0588  8BA1          CPCR = CNT5MKS  - 1.       COUNT  TIME  MARKS
0589  F0BF          IF  NOT  LC1  SKIP.
058A  8A94          CPCR = PESTAT2N  - 1.      STATUS  FAILURE
                 *********ERROR      # E 59
058B  8B03          CPCR = CWREWND - 1.        HIGH  SPEED  REWIND
058C  F05F          B.
058D  F05F          B.
058E  F1AE          IF  NOT  URQ  SKIP.        TEST  STINT
058F  8B23          CPCR = PESTAT1  - 1.       STINT  SET  START  OF  REWIND
                 *********ERROR      # E 60
0590  C001          SAR  = 0  LIT  = 1.
0591  8BD6          CPCR = PRSTATLST  - 1.     TEST  NOT  RDY  SET
0592  8B23          CPCR = PESTAT1  - 1.       NOT  RDY  NOT  SET  -  REREAD
                 *********ERROR      # E 61
0593  E011          LIT  = @11@.
0594  8AE9          CPCR = STIME  - 1.         DELAY
0595  F1B5          IF  URQ  SKIP.             TEST  STINT
0596  8B23          CPCR = PESTAT1  - 1.       STINT  NOT  SET  AFTER  REWIND
                 *********ERROR      # E 62
0597  E010          LIT  = @10@.
0598  8BBC          CPCR = STATCHK2  - 1.      TEST  STAT
0599  8B24          CPCR = PESTAT1A  - 1.      STATUS  FAILURE  AFTER  REWIND
                 *********ERROR      # E 63
059A  8AFF          CPCR = CW5MKRD - 1.        FIRST  READ  FORWARD
059B  E019          LIT  = @19@.               T  30  MSEC
059C  8B96          CPCR = CNT5MKBOT  - 1.     DELAY  30  + 100  MSEC
059D  F0BF          IF  NOT  LC1  SKIP.
059E  8A94          CPCR = PESTAT2N  - 1.      STATUS  FAILURE
                 *********ERROR      # E 64
059F  8B01          CPCR = CWEDRD - 1.         ENABLE  DINT
05A0  E018          LIT  = @18@.               T  3  SEC
05A1  8AC5          CPCR = PEXTCTR  - 1.       DELAY
05A2  F1AD          IF  NOT  SRQ  SKIP.        TEST  DINT  NOT  SET
05A3  8A94          CPCR = PESTAT2N  - 1.      STOP  TAPE  READ  STATUS
                 *********ERROR      # E 65
05A4  8AF5          CPCR = CW5MKS  - 1.        STOP  TAPE
05A5  E005          LIT  = @05@.               T  30  M
05A6  8BA1          CPCR = CNT5MKS  - 1.       DELAY
05A7  F0BF          IF  NOT  LC1  SKIP.        BAD  STATUS  FLAG
05A8  8A94          CPCR = PESTAT2N  - 1.
                 *********ERROR      # E 66
05A9  8B03          CPCR = CWREWND - 1.        SECOND  HIGH  SPEED  REWIND
05AA  C001          SAR  = 0  LIT  = 1.
05AB  8BD6          CPCR = PRSTATLST  - 1.     TEST  NOT  RDY  SET
05AC  8A94          CPCR = PESTAT2N  - 1.      NOT  RDY  NOT  SET
                 *********ERROR      # E 66A
05AD  E01F          LIT  = @1F@.               T  4  SEC
05AE  8ACD          CPCR = PTMTSTRDY  - 1.     WAIT  FOR  NOT  RDY  RESET
05AF  8B23          CPCR = PESTAT1  - 1.       TIME  OUT  WITH  DEV  NOT  RDY
                 *********ERROR      # E 67
                  PEC02F.
05B0  8AFB          CPCR = CW5MKWR - 1.        START  WRITE
05B1  E023          LIT  = @23@.
05B2  8B96          CPCR = CNT5MKBOT  - 1.     DELAY  180  + 100  MSEC
05B3  F0BF          IF  NOT  LC1  SKIP.        TEST  STATUS  FLAG
05B4  8A94          CPCR = PESTAT2N  - 1.      STATUS  FAILURE
                 *********ERROR      # E 68
05B5  F01D          A1  = LIT.                 CHAR  COUNT
05B6  E06E          LIT  = @6E@.               T  11  MSEC
05B7  F05F          B.
05B8  8AFD          CPCR = CWEDWR - 1.         ENABLE  DINT
05B9  F0EA          MIR  = LIT.
05BA  E0FF          LIT  = @FF@.               BUFFER  DATA
05BB  F05F          B.
                  PEC02D.
05BC  8ADF          CPCR = PSRQTMOUT  - 1.     TIMEOUT  FOR  DINT
05BD  8A94          CPCR = PESTAT2N  - 1.      DINT  NOT  SET  IN  100  MSEC
                 *********ERROR      # E 68A
05BE  F098          DW2.                       DATA  WRITE                    B
05BF  F00F          A1  = A1  - 1.
05C0  F0B7          IF  NOT  AOV  SKIP.        TEST  LAST  CHAR
05C1  45BB          MPCR = PEC02D  - 1.
05C2  F01D          A1  = LIT.                 CHAR  COUNT
05C3  E032          LIT  = @32@.               T  5  MSEC
05C4  F0EA          MIR  = LIT.
05C5  E055          LIT  = @55@.               BUFFER  DATA
05C6  F058          A3  = LIT.
05C7  F05F          B.
                  PEC02E.
05C8  8AE1          CPCR = PSRQTMOUT2  - 1.    PRE  DINT  TIMEOUT
05C9  F0F7          SKIP.
05CA  8A94          CPCR = PESTAT2N  - 1.      DINT  SET  EARLY
                 *                             SET  EARLY  BY  RDSTROB
                 *********ERROR      # E 69
05CB  8ADF          CPCR = PSRQTMOUT  - 1.     DINT  TIME  OUT
05CC  8A94          CPCR = PESTAT2N  - 1.      CTR  RESET  BY  RDSTROB
                 *********ERROR      # E 69A
05CD  F098          DW2.                       DATA  WRITE                    B
05CE  F00F          A1  = A1  - 1.
05CF  F0B7          IF  NOT  AOV  SKIP.        TEST  LAST  CHAR
05D0  45C7          MPCR = PEC02E  - 1.
05D1  E01E          LIT  = @1E@.               T  96  USEC
05D2  8B8F          CPCR = MTIMELI  - 1.       DELAY  FOR  RDSTROBE
05D3  8AD9          CPCR = PDATRDCMP  - 1.     TEST  DATA  BUFF  NOT  CHANGED
05D4  8A95          CPCR = PESTAT2AN  - 1.     DATA  BUFF  CHANGED  BY  RDSTRB
                 *********ERROR      # E 70
05D5  F1AE          IF  NOT  URQ  SKIP.
05D6  8A94          CPCR = PESTAT2N  - 1.      STINT  DURING  RECORD
                 *********ERROR      # E 70A
05D7  8BC1          CPCR = NULLDWD - 1.        WRITE  NULL  CHARS
05D8  F079          B  = B100.
05D9  F0E1          MIR  = B.
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05DA  8ADF        CPCR = PSRQTMOUT - 1.     DINT TIME OUT
05DB  F019        SET LC2.                  TIMEOUT FLAG
05DC  F098        DW2.                      WRITE ZERO CRC                B
05DD  F05F        B.
05DE  8BC1        CPCR = NULLDWD - 1.       WRITE 3 NULL CHARACTERS
05DF  8ADF        CPCR = PSRQTMOUT - 1.     WAIT FOR LAST NULL WRITTEN
05E0  F019        SET LC2.                  TIMEOUT FLAG
05E1  8AF9        CPCR = CWWR - 1.          DISABLE DINT
05E2  F0C0        IF NOT LC2 SKIP.
05E3  8A94        CPCR = PESTAT2N - 1.      DINT FAILED DURING NULL WDS
                  *********ERROR     # E 71
05E4  CB94        SAR = 11 LIT = @94@.      T 14.2 MSEC
05E5  8B8D        CPCR = MTIMESH - 1.       DELAY
05E6  F1B5        IF URQ SKIP.              TEST STINT
05E7  8A94        CPCR = PESTAT2N - 1.      NO STINT FOR GAP
                  *********ERROR     # E 72
05E8  C501        SAR = 5 LIT = 1.
05E9  8BD6        CPCR = PRSTATLST - 1.     TEST GAP STATUS BIT
05EA  8A92        CPCR = PESTAT2CN - 1.     GAP BIT NOT SET
                  *********ERROR     # E 73
05EB  F172        CSAR B = B C.             RESTORE STATUS
05EC  F05F        B.
05ED  C101        SAR = 1 LIT = 1.
05EE  8BD7        CPCR = PRSTATLST.         TEST TAPE ERROR
05EF  45F6        MPCR = PEC02H - 1.        NOT SET
05F0  F0BC        IF NOT GC2 SKIP.          TEST IF A RETRY FAILURE
05F1  45F5        MPCR = PEC02G - 1.
05F2  F0F6        SET GC2.                  RETRY FLAG
05F3  E01F        LIT = @1F@.               T 4 SEC
05F4  8AC5        CPCR = PEXTCTR - 1.       DELAY - RUN OUT TAPE
05F5  45AF        MPCR = PEC02F - 1.        RETRY
                  PEC02G.
05F6  8A92        CPCR = PESTAT2CN - 1.     ABLE TO DROP INTO READ
                  *********READ      AFTER WRITE GAVE PARITY ERROR RETRY
                  *********AT        NEW LOCATION ON TAPE ALSO FAILED.
                  *********ERROR     # E 74
                  PEC02H.
05F7  F0BC        IF NOT GC2 SKIP.
05F8  8A92        CPCR = PESTAT2CN - 1.
                  *********TEST      2 FIRST RECORD WRITTEN GAVE READ AFTER
                  *********WRITE     FAILURE, A REATTEMPT AT NEW LOCATION
                  *********ON        TAPE PASSED.  ERROR # E 74A
05F9  8AFB        CPCR = CW5MKWR - 1.       ENABLE TIME MARKS
05FA  E000        LIT = 0.
05FB  8BA1        CPCR = CNT5MKS - 1.       COUNT 1 TIME MARK
05FC  F0BF        IF NOT LC1 SKIP.
05FD  8A94        CPCR = PESTAT2N - 1.      STATUS ERROR
                  *********ERROR     # E 75
05FE  81B0        CPCR = MFLOSTACK - 1.     ****  RETRY ENTRY ****
05FF  8B03        CPCR = CWREWND - 1.       REWIND WITHOUT STOP
0600  E02F        LIT = @2F@.               T 10 SEC
0601  8ACD        CPCR = PTMTSTRDY - 1.     TIME NOT RDY
0602  8A94        CPCR = PESTAT2N - 1.      NOT RDY NOT RESET AFTER
                  *********ERROR     # E 76   REWIND FROM FORWARD MOTION
0603  8AFF        CPCR = CW5MKRD - 1.       START TAPE
0604  E000        LIT = 0.                  T 5 + 100 MSEC
0605  8B96        CPCR = CNT5MKBOT - 1.     COUNT TIME MARKS
0606  F0BF        IF NOT LC1 SKIP.
0607  8A94        CPCR = PESTAT2N - 1.      STATUS ERROR
                  *********ERROR     # E 77
0608  8B01        CPCR = CWEDRD - 1.        ENABLE DINT
0609  C81A        SAR = 8 LIT = @1A@.       T 19.9 MSEC
060A  8B8D        CPCR = MTIMESH - 1.       DELAY
060B  F1AD        IF NOT SRQ SKIP.
060C  8A94        CPCR = PESTAT2N - 1.      DINT SET EARLY
                  *********ERROR     # E 78
060D  C8DD        SAR = 8 LIT = @DD@.       T 226.3 MSEC
060E  8ADD        CPCR = PSRQTMOUT3 - 1.    TIME OUT SRQ
060F  F0F7        SKIP.                     TIME OUT
0610  4613        MPCR = PEC02I - 1.        DINT SET
0611  F1B5        IF URQ SKIP.
0612  8A94        CPCR = PESTAT2N - 1.      RDSTB RESET STINT - NO DINT
                  *********ERROR     # E 79
0613  8A94        CPCR = PESTAT2N - 1.      NO RDSTROBE IN READ MODE
                  *********ERROR     # E 80
                  PEC02I.
0614  F1AE        IF NOT URQ SKIP.          TEST STINT RESET
0615  8A94        CPCR = PESTAT2N - 1.      STINT NOT RESET BY RDSTROBE
                  *********ERROR     # E 81
0616  E020        LIT = @20@.               T 100 USEC
0617  8B8F        CPCR = MTIMELI - 1.       DELAY FOR SECOND DINT
0618  E040        LIT = @40@.               STAT = C040
0619  8BB5        CPCR = STATGENC - 1.      CHECK STATUS
061A  8A95        CPCR = PESTAT2AN - 1.     STATUS WITH SERV LATE
                  *********ERROR     # E 82   FAILED.  16 BIT STATUS CHECK
061B  F10F        A1 = B000.                ZERO MISSING RDSTB REG
061C  F0CA        LCTR.
061D  E06D        LIT = @6D@.               CHAR AMOUNT 11 MSEC
061E  F058        A3 = LIT.                 EXPECTED DATA
061F  E0FF        LIT = @FF@.
0620  8A7F        CPCR = PARGEN - 1.        GENERATE PARITY BIT
                  PEC02J.
0621  8ADF        CPCR = PSRQTMOUT - 1.     TIME OUT ON SRQ
0622  8A7A        CPCR = MISSTBFLG - 1.     NO DINT FLAG RETURN + 3
0623  8AD9        CPCR = PDATRDCMP - 1.     READ AND COMPARE DATA
0624  8A26        CPCR = RDRETRY - 1.       READ ERROR
                  *********ERROR     # E 82A
0625  F030        INC.
0626  F02E        IF COV SKIP.              LAST CHAR TEST
0627  4620        MPCR = PEC02J - 1.
0628  F0CA        LCTR.
0629  E033        LIT = @33@.               CHARACTER AMOUNT
062A  F058        A3 = LIT.                 EXPECTED DATA
062B  E055        LIT = @55@.
062C  8A7F        CPCR = PARGEN - 1.        GEN PARITY BIT
                  PEC02K.
062D  8ADF        CPCR = PSRQTMOUT - 1.     TIME OUT SRQ
062E  8A7A        CPCR = MISSTBFLG - 1.     NO DINT FLAG RETURN + 3
062F  8AD9        CPCR = PDATRDCMP - 1.     READ DATA
0630  8A26        CPCR = RDRETRY - 1.       READ ERROR
                  *********ERROR     # 82B
0631  F030        INC.
0632  F02E        IF COV SKIP.              LAST CHAR TEST
0633  462C        MPCR = PEC02K - 1.
0634  F0C0        IF NOT LC2 SKIP.          TEST MISSED RDSTB
0635  8A26        CPCR = RDRETRY - 1.       DROPPING READ STROBES IN
                  *********ERROR     # E 83   FIRST READ MODE
0636  E0AE        LIT = @AE@.               T 530 USEC
0637  8B8F        CPCR = MTIMELI - 1.       DELAY
0638  F1AD        IF NOT SRQ SKIP.          TEST DINT NOT SET
0639  8A94        CPCR = PESTAT2N - 1.      DINT SET IN NULL CHAR AREA
                  *********ERROR     # E 84
063A  E005        LIT = 5.                  T 26 USEC
063B  8AE2        CPCR = PSRQTMOUT2.        DELAY FOR DINT
063C  8A94        CPCR = PESTAT2N - 1.      DINT FOR ZERO CRC NOT SET
                  *********ERROR     # E 85
063D  F054        A3 = B000.
063E  8AD9        CPCR = PDATRDCMP - 1.     READ ZERO DATA
063F  8A95        CPCR = PESTAT2AN - 1.     DATA FAILED
                  *********ERROR     # E 86
0640  C042        SAR = 0 LIT = @42@.       T 270 USEC
0641  8AE2        CPCR = PSRQTMOUT2.        TEST DINT NOT SET
0642  F0F7        SKIP.
0643  8A94        CPCR = PESTAT2N - 1.      DINT SET BY LRC RDSTROBE
                  *********ERROR     # E 87
0644  C098        SAR = 0 LIT = @98@.       T 600 USEC
0645  8AE2        CPCR = PSRQTMOUT2.        TEST DINT NOT SET
0646  F0F7        SKIP.
0647  8A94        CPCR = PESTAT2N - 1.      DINT SET BY COUNTER
                  *********ERROR     # E 88
0648  CF70        SAR = 15 LIT = @70@.
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0649  8A72        CPCR = PURQTMOUT - 1.    TIME STINT
064A  F0F7        SKIP.
064B  8A94        CPCR = PESTAT2N - 1.     STINT FOR GAP SET EARLY
          *********ERROR      # E 88A
064C  CF60        SAR = 15 LIT = @60@.
064D  8A72        CPCR = PURQTMOUT - 1.    DELAY FOR GAP
064E  8A94        CPCR = PESTAT2N - 1.     STINT NOT SET FOR GAP
          *********ERROR      # E 89
064F  E020        LIT = @20@.
0650  8BB3        CPCR = STATGEN4 - 1.     TEST STATUS
0651  8A95        CPCR = PESTAT2AN - 1.    STATUS ERROR
          *********ERROR      # E 90
0652  8AFB        CPCR = CW5MKWR - 1.      ENABLE TIME MARKS
0653  E000        LIT = 0.
0654  8BA1        CPCR = CNT5MKS - 1.      COUNT 1 TIME MARK
0655  8AF5        CPCR = CW5MKS - 1.       STOP READ
0656  E005        LIT = 5.
0657  8BA1        CPCR = CNT5MKS - 1.      COUNT 6 TIME MARKS
0658  F0BF        IF NOT LC1 SKIP.
0659  8A94        CPCR = PESTAT2N - 1.     STATUS FAILED DURING
          *********ERROR      # E 91       TIME MARK COUNT
065A  E009        LIT = 9.
065B  8B04        CPCR = CWGEN - 1.        BACKSPACE WITH DINT ENABLED
065C  C838        SAR = 8 LIT = @38@.      T 57.3 MSEC
065D  8A72        CPCR = PURQTMOUT - 1.    DELAY FOR GAP
065E  8A94        CPCR = PESTAT2N - 1.     NO GAP ON BACKSPACE
          *********ERROR      # E 92
065F  E020        LIT = @20@.
0660  8BB3        CPCR = STATGEN4 - 1.     TEST STATUS
0661  8A95        CPCR = PESTAT2AN - 1.    STATUS FAILURE
          *********ERROR      # E 93
0662  8AF7        CPCR = CW5MKBKSP - 1.    ENABLE TIME MARKS
0663  E000        LIT = 0.
0664  8BA1        CPCR = CNT5MKS - 1.      COUNT 1 TIME MARK
0665  8AF5        CPCR = CW5MKS - 1.       STOP TAPE
0666  E005        LIT = 5.
0667  8BA1        CPCR = CNT5MKS - 1.      DELAY FOR STOP.
0668  F0BF        IF NOT LC1 SKIP.
0669  8A95        CPCR = PESTAT2AN - 1.    STATUS ERROR
          *********ERROR      # E 94
066A  8AFF        CPCR = CW5MKRD - 1.      START READ
066B  E005        LIT = 5.
066C  8BA1        CPCR = CNT5MKS - 1.      COUNT 6 TIME MARKS
066D  F0A5        IF LC1 STEP.
066E  8B01        CPCR = CWEDRD - 1.       ENABLE DINT
066F  F05F        B.
0670  F1B5        IF URQ SKIP.
0671  8A94        CPCR = PESTAT2N - 1.     NO STINT START OF SECOND
          *********ERROR      # E 94A      READ
0672  CC40        SAR = 12 LIT = @40@.           T4MSEC
0673  8ADD        CPCR = PSRQTMOUT3 - 1.   TIME SRQ
0674  F0F7        SKIP.
0675  8A94        CPCR = PESTAT2N - 1.     DINT SET EARLY
          *********ERROR      # E 95
0676  CC47        SAR = 12 LIT = @47@.           T4.5MSEC
0677  8ADD        CPCR = PSRQTMOUT3 - 1.   TIME OUT DINT
0678  8A94        CPCR = PESTAT2N - 1.     DINT NOT SET
          *********ERROR      # E 96
0679  F058        A3 = LIT.
067A  E0FF        LIT = @FF@.              EXPECTED DATA
067B  8A7F        CPCR = PARGEN - 1.       GEN PARITY BIT
067C  8AD9        CPCR = PDATRDCMP - 1.    READ DATA
067D  8A94        CPCR = PESTAT2N - 1.     DATA AFTER BKSPACE FAILED
          *********ERROR      # E 97
067E  C820        SAR = 8 LIT = @20@.      T 32.7 MSEC
067F  8A72        CPCR = PURQTMOUT - 1.    DELAY FOR GAP.
0680  8A94        CPCR = PESTAT2N - 1.     NO STINT FOR GAP
          *********ERROR      # E 98
0681  C501        SAR = 5 LIT = 1.
0682  8BD6        CPCR = PRSTATLST - 1.    TEST GAP STATUS
0683  8A92        CPCR = PESTAT2CN - 1.    GAP NOT SET
          *********ERROR      # E 99
0684  8AFF        CPCR = CW5MKRD - 1.      SET TIME MARKS
0685  E000        LIT = 0.
0686  8BA1        CPCR = CNT5MKS - 1.
0687  8AF5        CPCR = CW5MKS - 1.       STOP TAPE
0688  E005        LIT = 5.
0689  8BA1        CPCR = CNT5MKS - 1.      DELAY FOR STOP
068A  F0BF        IF NOT LC1 SKIP.
068B  8A94        CPCR = PESTAT2N - 1.     STATUS FAILURE
          *********ERROR      # E 100
 PEC02N.
068C  F054        A3 = B000.               FIRST DATA CHAR
068D  89FF        CPCR = PSEQDAWR - 1.     WRITE SEQ RECORD
068E  CCE0        SAR = 12 LIT = @E0@.     T 14.3 MSEC
068F  8A72        CPCR = PURQTMOUT - 1.    DELAY FOR GAP
0690  8A94        CPCR = PESTAT2N - 1.     NO STINT FOR GAP
          *********ERROR      # E 101
0691  C501        SAR = 5 LIT = 1.
0692  8BD6        CPCR = PRSTATLST - 1.    TEST GAP STATUS
0693  8A92        CPCR = PESTAT2CN - 1.    GAP NOT SET
          *********ERROR      # E 102
0694  F07D        B = B C.                 RESTORE STATUS
0695  F05F        B.
0696  C101        SAR = 1 LIT = 1.
0697  8BD7        CPCR = PRSTATLST.        TEST TAPE ERROR
0698  469F        MPCR = PEC02M - 1.
0699  F0BC        IF NOT GC2 SKIP.         TEST IF A RETRY FAILURE
069A  469E        MPCR = PEC02L - 1.
069B  F0F6        SET GC2.                 RETRY FLAG
069C  E01F        LIT = @1F@.              T 4 SEC
069D  8AC5        CPCR = PEXTCTR - 1.      DELAY RUN OUT TAPE
069E  468B        MPCR = PEC02N - 1.       RETRY
 PEC02L.
069F  8A92        CPCR = PESTAT2CN - 1.
          *********READ      AFTER WRITE ON SEQ DATA RECORD GAVE
          *********PARITY      ERROR, RETRY AT NEW LOCATION ON TAPE
          *********ALSO      FAILED.---      ERROR # E 103
 PEC02M.
06A0  F0BC        IF NOT GC2 SKIP.
06A1  8A92        CPCR = PESTAT2CN - 1.
          *********FIRST      SEQ DATA RECORD WRITTEN GAVE READ AFTER
          *********WRITE      ERROR, A REATTEMPT AT NEW LOCATION ON
          *********TAPE      PASSED. SEE NOTE 1 - MANUAL PROCEDURE
06A2  F0BF        IF NOT LC1 SKIP.
06A3  8A94        CPCR = PESTAT2N - 1.     STATUS FAILURE DURING TMKS
          *********ERROR      # E 104
06A4  F0C0        IF NOT LC2 SKIP.
06A5  8A94        CPCR = PESTAT2N - 1.     MISSED DINT DURING RECORD
          *********ERROR      # E 104A
06A6  8AFB        CPCR = CW5MKWR - 1.      ENABLE TIME MARKS
06A7  E000        LIT = 0.
06A8  8BA1        CPCR = CNT5MKS - 1.      COUNT 1 TIME MARK
06A9  8AF5        CPCR = CW5MKS - 1.       STOP TAPE
06AA  E005        LIT = 5.
06AB  8BA1        CPCR = CNT5MKS - 1.      DELAY FOR TAPE STOP
06AC  F0BF        IF NOT LC1 SKIP.
06AD  8A94        CPCR = PESTAT2N - 1.     STATUS ERROR
          *********ERROR      # E 105
06AE  8AF3        CPCR = CWBKSP - 1.       BACKSPACE
06AF  C862        SAR = 8 LIT = @62@.      T 100 MSEC
06B0  8A72        CPCR = PURQTMOUT - 1.    TIME OUT GAP
06B1  8A94        CPCR = PESTAT2N - 1.     GAP FAILED TO SET
          *********ERROR      # E 106
06B2  C501        SAR = 5 LIT = 1.
06B3  8BD6        CPCR = PRSTATLST - 1.    TEST GAP STATUS
06B4  8A92        CPCR = PESTAT2CN - 1.    STATUS FAILURE
          *********ERROR      # E 107
06B5  8AF7        CPCR = CW5MKBKSP - 1.
06B6  E000        LIT = 0.
06B7  8BA1        CPCR = CNT5MKS - 1.      COUNT 1 TIME MARK
06B8  8AF5        CPCR = CW5MKS - 1.       STOP TAPE
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06B9  E005        LIT  = 5.
06BA  8BA1        CPCR = CNT5MKS - 1.        DELAY FOR TAPE STOP
06BB  81B0        CPCR = MFLOSTACK - 1.      **** RETRY ENTRY ****
06BC  F10F        A1 = B000.
06BD  8AFF        CPCR = CW5MKRD - 1.        START READ
06BE  E004        LIT  = 4.                  T 25 MSEC
06BF  8BA1        CPCR = CNT5MKS - 1.        DELAY TO START OF RECORD
06C0  F0BF        IF NOT LC1 SKIP.
06C1  8A94        CPCR = PESTAT2N - 1.       STATUS FAILURE
                  *********ERROR # E 108
06C2  8B01        CPCR = CWEDRD - 1.         ENABLE DINT
06C3  C815        SAR = 8 LIT = @15@.        T 21.5 MSEC
06C4  8ADD        CPCR = PSRQTMOUT3 - 1.     TIME OUT FIRST DINT
06C5  8A94        CPCR = PESTAT2N - 1.       DINT NOT SET
                  *                            START OF RECORD
                  *********ERROR # E 109
06C6  F0CA        LCTR.
06C7  E0FF        LIT = @FF@.                CHAR AMT 256
06C8  F054        A3 = B000.                 FIRST CHAR
                  PEC02P.
06C9  8A7F        CPCR = PARGEN - 1.         GEN PARITY BIT
06CA  8ADF        CPCR = PSRQTMOUT - 1.      TIMEOUT ON DINT
06CB  8A7A        CPCR = MISSTBFLG - 1.      NO DINT FLAG RETURN + 3
06CC  8AD9        CPCR = PDATRDCMP - 1.      READ AND COMPARE DATA
06CD  8A26        CPCR = RDRETRY - 1.        READ ERROR
                  *********ERROR # E 109A
06CE  F030        INC.
06CF  F04C        A3 = A3 + 1.               INC DATA
06D0  F02E        IF COV SKIP.               LAST CHAR TEST
06D1  46C8        MPCR = PEC02P - 1.
06D2  E058        LIT = @58@.                T 352 USEC
06D3  8AE2        CPCR = PSRQTMOUT2.         TIME OUT NULL
06D4  F0F7        SKIP.
06D5  8A94        CPCR = PESTAT2N - 1.       DINT SET IN NULL AREA
                  *********ERROR # E 110
06D6  8ADF        CPCR = PSRQTMOUT - 1.      TIME CRC
06D7  8A94        CPCR = PESTAT2N - 1.       DINT NOT SET FOR CRC
                  *********ERROR # E 111
06D8  F097        DR2 BEX.                   RESET DINT                    B
06D9  F051        A3 = B.                    SAVE CRC
06DA  E040        LIT = @40@.                T 198 USEC
06DB  8B8F        CPCR = MTIMELI - 1.
06DC  8AD9        CPCR = PDATRDCMP - 1.      READ DATA BUFF
06DD  8B30        CPCR = PEDATERR - 1.       DATA BUFF STROBED IN
                  *********ERROR # E 111A    NULL AREA
06DE  CC28        SAR = 12 LIT = @28@.       T 2.5 MSEC
06DF  8A72        CPCR = PURQTMOUT - 1.
06E0  8A94        CPCR = PESTAT2N - 1.       STINT FOR GAP NOT SET
                  *********ERROR # E 112
06E1  E020        LIT = @20@.
06E2  8BB3        CPCR = STATGEN4 - 1.       TEST STATUS
06E3  8A95        CPCR = PESTAT2AN - 1.      STATUS FAILURE
                  *********ERROR # E 113
06E4  8B03        CPCR = CWREWND - 1.        REWIND
06E5  E018        LIT = @18@.                T 3 SEC
06E6  8ACD        CPCR = PTMTSTRDY - 1.      TIME OUT NOT RDY
06E7  8A94        CPCR = PESTAT2N - 1.       NOT RDY NOT RESET
                  *********ERROR # E 114
06E8  E010        LIT = @10@.
06E9  8BBC        CPCR = STATCHK2 - 1.       TEST STATUS = 0010
06EA  8A9B        CPCR = PESTAT2BN - 1.      STATUS FAILURE
                  *********ERROR # E 115
06EB  F0AE        IF LC3 SET LC3 SKIP.       SEQ FLAG
06EC  4045        MPCR = TSTSEL - 1.         END TEST 2
                  TEST-3.
                  PEC03.          START TEST 3 EXHAUSTIVE TEST READS AND
                  *                 WRITES. TAPE AT BOT TO START.
06ED  E010        LIT = @10@.
06EE  8BBC        CPCR = STATCHK2 - 1.       TEST STATUS BOT ONLY
06EF  8B24        CPCR = PESTAT1A - 1.       STATUS FAILURE
                  *********ERROR # E 116
06F0  8AFB        CPCR = CW5MKWR - 1.        START WRITE
06F1  E023        LIT = @23@.                100 + 180 MSEC
06F2  8B96        CPCR = CNT5MKBOT - 1.      COUNT TIME MARKS
06F3  F0BF        IF NOT LC1 SKIP.           STATUS FLAG
06F4  8A94        CPCR = PESTAT2N - 1.
                  *********ERROR # E 117
06F5  8AFD        CPCR = CWEDWR - 1.         ENABLE DINT
06F6  F0EA        MIR = LIT.
06F7  E0FF        LIT = @FF@.
06F8  F098        DW2.                       LOAD DATA BUFF                B
06F9  F05F        B.
06FA  C8F0        SAR = 8 LIT = @F0@.        T 184.3 MSEC
06FB  8B8D        CPCR = MTIMESH - 1.        DELAY DURING DATA WRITE
06FC  8AF9        CPCR = CWWR - 1.           DISABLE DINT
06FD  CCE0        SAR = 12 LIT = @E0@.       T14.3 MSEC
06FE  8A72        CPCR = PURQTMOUT - 1.      DELAY FOR GAP
06FF  F05F        B.
0700  F096        DR1 BEX.                   RESET STATUS                  B
0701  8B03        CPCR = CWREWND - 1.        HIGH SPEED REWIND
0702  E028        LIT = @28@.                T 5 SEC
0703  8ACD        CPCR = PTMTSTRDY - 1.      TIME OUT READY
0704  8A94        CPCR = PESTAT2N - 1.       BOT NOT SET
                  *********ERROR # E 118
0705  8AFB        CPCR = CW5MKWR - 1.        START ERASE
0706  E048        LIT = @48@.                T 100 + 365 MSEC
0707  8B96        CPCR = CNT5MKBOT - 1.
0708  F0BF        IF NOT LC1 SKIP.
0709  8A94        CPCR = PESTAT2N - 1.       STATUS FAILED DURING ERASE
                  *********ERROR # E 119
070A  E024        LIT = @24@.
070B  8B04        CPCR = CWGEN - 1.          REWIND WITH WRITE CW
070C  CF01        SAR = 15 LIT = 1.
070D  8A72        CPCR = PURQTMOUT - 1.
070E  8A94        CPCR = PESTAT2N - 1.       NO STINT FOR NOT RDY AND
                  *********ERROR # E 119A    FORWARD
070F  E028        LIT = @28@.                T 5 SEC
0710  8ACD        CPCR = PTMTSTRDY - 1.
0711  8A94        CPCR = PESTAT2N - 1.       BOT NOT SET
                  *********ERROR # E 120
0712  8AFF        CPCR = CW5MKRD - 1.        START READ
0713  E003        LIT = 3.                   T 100 + 20 MSEC
0714  8B96        CPCR = CNT5MKBOT - 1.      COUNT TIME MARKS
0715  F0A5        IF LC1 STEP.               RESET FLAG
0716  8B01        CPCR = CWEDRD - 1.         ENABLE DINT
0717  C8F0        SAR = 8 LIT = @F0@.        T 250.8MSEC
0718  8ADD        CPCR = PSRQTMOUT3 - 1.     TIME OUT DINT
0719  F0F7        SKIP.
071A  8A94        CPCR = PESTAT2N - 1.       DINT SET IN ERASED AREA
                  *********ERROR # E 121
071B  8B03        CPCR = CWREWND - 1.        REWIND
071C  F0FD        WHEN URQ STEP.             STINT FOR TAPE RDY AT BOT
071D  C000        SAR = 0 LIT = 0.
071E  8BD6        CPCR = PRSTATLST - 1.      TEST NOT RDY RESET
071F  8A92        CPCR = PESTAT2CN - 1.      STINT SET FIRST PASS
                  *********ERROR # E122      OVER BOT
0720  8238        CPCR = ZROSREG1 - 1.       SIMREG 1 = TOTAL RECORD CNT
0721  8240        CPCR = ZROSREG2 - 1.       SIMREG 2 = INC OR FLY CNT
0722  8AFB        CPCR = CW5MKWR - 1.        START TAPE
0723  E01C        LIT = @1C@.                T 145 + 100 MSEC
0724  8B96        CPCR = CNT5MKBOT - 1.      COUNT TIME MARKS
0725  F0BF        IF NOT LC1 SKIP.
0726  8A94        CPCR = PESTAT2N - 1.       STATUS ERROR
                  *********ERROR # E 123
0727  81B0        CPCR = MFLOSTACK - 1.      **RETRY ENTRY INC RECORD WR
                  PEC03A.                    WRITE SEQ DATA INCRAMENTAL
0728  8252        CPCR = RDSREG2 - 1.        GET START RECORD COUNT
0729  8BCE        CPCR = SPPARSET - 1.
072A  8864        CPCR = WRMIDSUB - 1.       WRITE RECORD
072B  8AF5        CPCR = CW5MKS - 1.         STOP TAPE
072C  E005        LIT = 5.                   T 30 MSEC
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072D  8BA1        CPCR = CNT5MKS - 1.          COUNT TIME MARKS FOR STOP
072E  8264        CPCR = INCSREG2 - 1.         INCRAMENT RECORD COUNT
072F  F0CB        LIT EQV B.                   LAST RECORD
0730  E014        LIT = @14@.                  20 RECORDS
0731  F09D        IF ABT SKIP.
0732  4728        MPCR = PEC03A.
0733  8240        CPCR = ZROSREG2 - 1.         SIM REG2 RECORD COUNT
0734  81B0        CPCR = MFLOSTACK - 1.        **RETRY ENTRY FLY RECORD WR
              PEC03B.                          WRITE SEQ DATA ON FLY
0735  8252        CPCR = RDSREG2 - 1.          GET START RECORD COUNT
0736  F051        A3 = B.
0737  8864        CPCR = WRMIDSUB - 1.         WRITE RECORD
0738  8264        CPCR = INCSREG2 - 1.         INCRAMENT RECORD COUNT
0739  F051        A3 = B.
073A  F0CB        LIT EQV B.                   LAST RECORD
073B  E014        LIT = @14@.                  20 RECORDS
073C  F09D        IF ABT SKIP.
073D  4736        MPCR = PEC03B + 1.
073E  8240        CPCR = ZROSREG2 - 1.         ZERO CHAR COUNT
073F  81B0        CPCR = MFLOSTACK - 1.        **ENTRY FOR COMPLETE RETRY
              PEC03C.
0740  8AFB        CPCR = CW5MKWR - 1.          START TAPE
0741  8264        CPCR = INCSREG2 - 1.         INCRAMENT DATA COUNT
0742  F051        A3 = B.
0743  E006        LIT = 6.                     T 35 MSEC
0744  8BA1        CPCR = CNT5MKS - 1.          COUNT TIME MARKS
0745  F0BF        IF NOT LC1 SKIP.
0746  8A94        CPCR = PESTAT2N - 1.         STATUS ERROR
          *********ERROR # E 124
0747  8A7F        CPCR = PARGEN - 1.           GENERATE PARITY BIT
0748  8A6D        CPCR = FOREVNPAR - 1.        COMP PARITY, ADD BIT 1
0749  8AFD        CPCR = CWEDWR - 1.           ENABLE DINT
074A  8ADF        CPCR = PSRQTMOUT - 1.        TIME OUT DINT
074B  F019        SET LC2.                     FLAG DINT NOT SET
074C  F0DE        MIR = A3.
074D  F098        DW2.                         WRITE BAD PARITY DATA      B
074E  F05F        B.
074F  825A        CPCR = INCSREG1 - 1.         INC TOTAL RECORD COUNT
0750  8BC1        CPCR = NULLDWD - 1.          WRITE 3 NULL CHARS
0751  8ADF        CPCR = PSRQTMOUT - 1.        TIME OUT DINT
0752  F019        SET LC2.
0753  F0EE        MIR = LIT L.
0754  C881        SAR = 8 LIT = @81@.          FORCE ODD PARITY
0755  F098        DW2.                         WRITE CRC                  B
0756  F05F        B.
0757  8BC1        CPCR = NULLDWD - 1.          WRITE 3 NULL CHARS
0758  8ADF        CPCR = PSRQTMOUT - 1.        WAIT 1 DINT
0759  F019        SET LC2.
075A  8AF9        CPCR = CWWR - 1.             DISABLE DINT
075B  CCE0        SAR = 12 LIT = @E0@.         T 14.3 MSEC
075C  8A72        CPCR = PURQTMOUT - 1.        TIME OUT GAP
075D  8A94        CPCR = PESTAT2N - 1.
          *********ERROR # E 125
075E  C501        SAR = 5 LIT = 1.
075F  8BD6        CPCR = PRSTATLST - 1.        TEST GAP STATUS
0760  8A92        CPCR = PESTAT2CN - 1.        GAP NOT SET
          *********ERROR # E 126
0761  F07D        B = B C.                     RESTORE STATUS
0762  F05F        B.
0763  C101        SAR = 1 LIT = 1.
0764  8BD7        CPCR = PRSTATLST.            TEST TAPE ERROR
0765  8A92        CPCR = PESTAT2CN - 1.        PARITY ERROR NOT SET
          *********ERROR # E 127
0766  F0C0        IF NOT LC2 SKIP.             MISSING DINT FLAG
0767  8A94        CPCR = PESTAT2N - 1.         DROPPING WRITE STROBES
          *********ERROR # E 128
0768  8AFB        CPCR = CW5MKWR - 1.
0769  E000        LIT = 0.
076A  8BA1        CPCR = CNT5MKS - 1.          COUNT 1 TIME MARK
076B  8AF5        CPCR = CW5MKS - 1.           STOP TAPE
076C  E005        LIT = 5.                     T 30 MSEC
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076D  8BA1        CPCR = CNT5MKS - 1.
076E  F0BF        IF NOT LC1 SKIP.
076F  8A94        CPCR = PESTAT2N - 1.         STATUS ERROR
          *********ERROR # E 129
0770  8AF1        CPCR = CWNULL - 1.           STOP TIME MARKS
0771  8252        CPCR = RDSREG2 - 1.          GET RECORD COUNT
0772  F0CB        LIT EQV B.                   LAST RECORD TEST
0773  E0FF        LIT = @FF@.
0774  F09D        IF ABT SKIP.
0775  473F        MPCR = PEC03C - 1.
0776  F055        A3 = B001.
0777  F0F7        SKIP.
              PEC03M.
0778  F045        A3 = A3 L.
0779  DF00        SAR = 15.
077A  8AFB        CPCR = CW5MKWR - 1.          START WRITE
077B  E005        LIT = 5.                     T 30 MSEC
077C  8BA1        CPCR = CNT5MKS - 1.          COUNT TIME MARKS
077D  F0A5        IF LC1 STEP.
077E  8AFD        CPCR = CWEDWR - 1.           ENABLE DINT
077F  8ADF        CPCR = PSRQTMOUT - 1.        TIME OUT DINT
0780  F019        SET LC2.
0781  F0DE        MIR = A3.
0782  F098        DW2.                         WRITE 1 CHAR               B
0783  F079        B = B100.
0784  F0E1        MIR = B.
0785  8ADF        CPCR = PSRQTMOUT - 1.
0786  F019        SET LC2.
0787  F098        DW2.                         LOAD BUFF WITH NULL CHAR   B
0788  F05F        B.
0789  CC54        SAR = 12 LIT = @54@.         T4.038 MSEC
078A  8B8D        CPCR = MTIMESH - 1.          DELAY FOR NULL WRITES
078B  8AF9        CPCR = CWWR - 1.             DISABLE DINT - LRC STROBED
078C  CCB0        SAR = 12 LIT = @B0@.         T 11.2 MSEC
078D  8A72        CPCR = PURQTMOUT - 1.        DELAY FOR GAP - FIRST GAP
078E  8A94        CPCR = PESTAT2N - 1.         GAP STINT NOT SET
          *********ERROR # E 129A
078F  C101        SAR = 1 LIT = 1.
0790  8BD6        CPCR = PRSTATLST - 1.        TEST TAPE ERROR
0791  8A92        CPCR = PESTAT2CN - 1.        LRC TAPE ERROR NOT SET
          *********ERROR # E 129B
0792  CC48        SAR = 12 LIT = @48@.         T4.6 MSEC
0793  8A72        CPCR = PURQTMOUT - 1.        DELAY FOR GAP - SECOND GAP
0794  8A94        CPCR = PESTAT2N - 1.         GAP STINT NOT SET
          *********ERROR # E 129C
0795  C101        SAR = 1 LIT = 1.
0796  8BD6        CPCR = PRSTATLST - 1.        TEST TAPE ERROR
0797  8A92        CPCR = PESTAT2CN - 1.        LRC TAPE ERROR NOT SET
          *********ERROR # E 129D
0798  F071        B = A3.
0799  C801        SAR = 8 LIT = 1.
079A  8BD7        CPCR = PRSTATLST.            TEST LAST CHAR
079B  4777        MPCR = PEC03M - 1.           NEXT CHAR
079C  8B67        CPCR = PEBKSPACE - 1.        BACKSPACE - RESET LRC LOGIC
079D  F0A5        IF LC1 STEP.
079E  8B03        CPCR = CWREWND - 1.          REWIND
079F  E050        LIT = @50@.                  T 10 SEC
07A0  8ACD        CPCR = PTMTSTRDY - 1.        TIME OUT NOT RDY
07A1  8A94        CPCR = PESTAT2N - 1.         TAPE FAILED TO GO RDY
          *********ERROR # E 130               FOR BOT
              PEC03D.                          EXHAUSTIVE READ SECTION
07A2  8238        CPCR = ZROSREG1 - 1.         S1 = TOTAL RECORDS COUNT
07A3  8240        CPCR = ZROSREG2 - 1.         S2 = INC OR FLY COUNT
07A4  81B0        CPCR = MFLOSTACK - 1.        **RETRY FOR FIRST RECORD
07A5  F0BC        IF NOT GC2 SKIP.             RETRY FLAG
07A6  47AA        MPCR = PEC03E - 1.
07A7  8252        CPCR = RDSREG2 - 1.
07A8  F051        A3 = B.                      START DATA CHAR
07A9  8880        CPCR = PSEQDARDBOT - 1.READ FIRST RECORD
07AA  47AD        MPCR = PEC03EA - 1.
```

```
                PEC03E.                                 START  INC  READ
07AB  8252          CPCR  =  RDSREG2  -  1.
07AC  F051          A3  =  B.                           START  DATA  CHAR
07AD  888E          CPCR  =  PSEQDARD  -  1.            READ  RECORD
                PEC03EA.
07AE  8AF5          CPCR  =  CW5MKS  -  1.              STOP  TAPE
07AF  E005          LIT  =  5.                          T  30  MSEC
07B0  8BA1          CPCR  =  CNT5MKS  -  1.             DELAY  FOR  TAPE  STOP
07B1  F0A5          IF  LC1  STEP.
07B2  8AF1          CPCR  =  CWNULL  -  1.              STOP  TIME  MARKS
07B3  8264          CPCR  =  INCSREG2  -  1.            INC  RECORD  COUNT
07B4  F0CB          LIT  EQV  B.
07B5  E014          LIT  =  @14@.
07B6  F09D          IF  ABT  SKIP.                      LAST  RECORD  TEST
07B7  47AA          MPCR  =  PEC03E  -  1.
07B8  824A          CPCR  =  RDSREG1  -  1.             GET  TOTAL  RECORD  COUNT
07B9  F0CB          LIT  EQV  B.
07BA  E014          LIT  =  @14@.
07BB  F09D          IF  ABT  SKIP.                      SECOND  RECORD  GROUP  TEST
07BC  47BE          MPCR  =  PEC03EB  -  1.
07BD  8240          CPCR  =  ZROSREG2  -  1.            START  NEXT  20  RECORDS
07BE  47AA          MPCR  =  PEC03E  -  1.
                PEC03EB.
07BF  826C          CPCR  =  DECSREG2  -  1.
                PEC03G.
07C0  8B67          CPCR  =  PEBKSPACE  -  1.           BACKSPACE  1  RECORD
07C1  F0BF          IF  NOT  LC1  SKIP.
07C2  8A94          CPCR  =  PESTAT2N  -  1.            STATUS  ERROR  DURING  BKSPACE
              *********ERROR      # E 131
07C3  8AF5          CPCR  =  CW5MKS  -  1.              STOP  TAPE
07C4  E005          LIT  =  5.
07C5  8BA1          CPCR  =  CNT5MKS  -  1.             DELAY  FOR  TAPE  STOP
07C6  F0BF          IF  NOT  LC1  SKIP.
07C7  8A94          CPCR  =  PESTAT2N  -  1.            STATUS  ERROR
              *********ERROR      # E 132
07C8  81B0          CPCR  =  MFLOSTACK  -  1.           **ENTRY  FOR  RETRY**
07C9  8252          CPCR  =  RDSREG2  -  1.
07CA  F051          A3  =  B.                           START  DATA  CHAR
07CB  888E          CPCR  =  PSEQDARD  -  1.            READ  RECORD
07CC  824A          CPCR  =  RDSREG1  -  1.             GET  RECORD  COUNT
07CD  F0CB          LIT  EQV  B.
07CE  E032          LIT  =  @32@.                       50  RECORDS
07CF  F09D          IF  ABT  SKIP.                      LAST  BKSPACE  TEST
07D0  47BF          MPCR  =  PEC03G  -  1.
07D1  8B03          CPCR  =  CWREWND  -  1.             REWIND  HIGH  SPEED
07D2  E050          LIT  =  @50@.                       T  10  SEC
07D3  8ACD          CPCR  =  PTMTSTRDY  -  1.           TIME  OUT  NOT  RDY
07D4  8A94          CPCR  =  PESTAT2N  -  1.            TAPE  FAILED  TO  GO  RDY
              *********ERROR      # E 133                FOR  BOT
                PEC03H.                                 READ  RECORDS  ON  FLY
07D5  8240          CPCR  =  ZROSREG2  -  1.            RECORD  COUNT
07D6  81B0          CPCR  =  MFLOSTACK  -  1.           **ENTRY  FOR  RETRY**
07D7  F0BC          IF  NOT  GC2  SKIP.
07D8  47DC          MPCR  =  PEC03I  -  1.
07D9  8252          CPCR  =  RDSREG2  -  1.
07DA  F051          A3  =  B.                           START  DATA  CHAR
07DB  8880          CPCR  =  PSEQDARDBOT  -  1.READ  FIRST  RECORD
07DC  47DF          MPCR  =  PEC03IA  -  1.
                PEC03I.                                 START  FLY  READ
07DD  8252          CPCR  =  RDSREG2  -  1.
07DE  F051          A3  =  B.                           START  DATA  CHAR
07DF  888E          CPCR  =  PSEQDARD  -  1.            READ  RECORD
                PEC03IA.
07E0  8264          CPCR  =  INCSREG2  -  1.            INC  RECORD  COUNT
07E1  F0CB          LIT  EQV  B.
07E2  E014          LIT  =  @14@.
07E3  F09D          IF  ABT  SKIP.                      LAST  RECORD  TEST
07E4  47DC          MPCR  =  PEC03I  -  1.
07E5  8240          CPCR  =  ZROSREG2  -  1.            NEW  START  CHAR
07E6  81B0          CPCR  =  MFLOSTACK  -  1.           **ENTRY  FOR  RETRY**
```

```
                PEC03J.
07E7  8252          CPCR  =  RDSREG2  -  1.
07E8  F051          A3  =  B.                           START  DATA  CHAR
07E9  888E          CPCR  =  PSEQDARD  -  1.            READ  RECORD
07EA  8264          CPCR  =  INCSREG2  -  1.            INC  RECORD  COUNT
07EB  F0CB          LIT  EQV  B.                        LAST  RECORD  TEST
07EC  E014          LIT  =  @14@.
07ED  F09D          IF  ABT  SKIP.
07EE  47E6          MPCR  =  PEC03J  -  1.
07EF  F054          A3  =  B000.                        RECORD  COUNT
07F0  8240          CPCR  =  ZROSREG2  -  1.            START  CHAR
                PEC03K.
07F1  8B67          CPCR  =  PEBKSPACE  -  1.           BACK  SPACE
07F2  F0BF          IF  NOT  LC1  SKIP.
07F3  8A94          CPCR  =  PESTAT2N  -  1.            STATUS  ERROR  DURING  BKSPACE
              *********ERROR      # E 134
07F4  8AF5          CPCR  =  CW5MKS  -  1.              STOP  TAPE
07F5  F04C          A3  =  A3  +  1.                    INC  RECORD  COUNT
07F6  E005          LIT  =  5.                          T  30  MSEC
07F7  8BA1          CPCR  =  CNT5MKS  -  1.             COUNT  TIME  MARKS
07F8  F0BF          IF  NOT  LC1  SKIP.
07F9  8A94          CPCR  =  PESTAT2N  -  1.            STATUS  ERROR
              *********ERROR      # E 135
07FA  F03E          A3  EQV  LIT.
07FB  E014          LIT  =  @14@.
07FC  F09D          IF  ABT  SKIP.                      20TH  RECORD  TEST
07FD  47F0          MPCR  =  PEC03K  -  1.
07FE  81B0          CPCR  =  MFLOSTACK  -  1.           **ENTRY  FOR  RETRY**
07FF  8252          CPCR  =  RDSREG2  -  1.
0800  F051          A3  =  B.                           START  DATA  CHAR
0801  888E          CPCR  =  PSEQDARD  -  1.            READ  RECORD
0802  F054          A3  =  B000.                        RECORD  COUNT
                PEC03L.
0803  8B67          CPCR  =  PEBKSPACE  -  1.           START  BACKSPACE
0804  F0BF          IF  NOT  LC1  SKIP.
0805  8A94          CPCR  =  PESTAT2N  -  1.            STATUS  ERROR  DURING  BKSPACE
              *********ERROR      # E 136
0806  F04C          A3  =  A3  +  1.
0807  F03E          A3  EQV  LIT.
0808  E015          LIT  =  @15@.
0809  F09D          IF  ABT  SKIP.                      21  RECORD  TEST
080A  4802          MPCR  =  PEC03L  -  1.
080B  8AF5          CPCR  =  CW5MKS  -  1.              STOP  TAPE
080C  E005          LIT  =  5.
080D  8BA1          CPCR  =  CNT5MKS  -  1.             DELAY  FOR  TAPE  STOP
080E  F0BF          IF  NOT  LC1  SKIP.
080F  8A94          CPCR  =  PESTAT2N  -  1.            STATUS  ERROR
              *********ERROR      # E 137
0810  81B0          CPCR  =  MFLOSTACK  -  1.           **ENTRY  FOR  RETRY**
0811  8252          CPCR  =  RDSREG2  -  1.
0812  F051          A3  =  B.                           START  DATA  CHAR
0813  888E          CPCR  =  PSEQDARD  -  1.            READ  RECORD
0814  8AF5          CPCR  =  CW5MKS  -  1.              STOP  TAPE
0815  E005          LIT  =  5.
0816  8BA1          CPCR  =  CNT5MKS  -  1.             DELAY  FOR  STOP
0817  8AFB          CPCR  =  CW5MKWR  -  1.             START  WRITE
0818  E00A          LIT  =  @0A@.                       T  55  MSEC
0819  8BA1          CPCR  =  CNT5MKS  -  1.
081A  F0A5          IF  LC1  STEP.
081B  F054          A3  =  B000.
081C  8AFD          CPCR  =  CWEDWR  -  1.
                PEC03N.
081D  F04C          A3  =  A3  +  1.
081E  F0FC          WHEN SRQ  STEP.
081F  F0DE          MIR  =  A3.
0820  F098          DW2.                                WRITE  DATA                    B
0821  F03E          A3  EQV  LIT.
0822  E0FF          LIT  =  @FF@.
0823  F09D          IF  ABT  SKIP.                      TEST  LAST  CHAR
0824  481C          MPCR  =  PEC03N  -  1.
0825  F0FC          WHEN SRQ  STEP.
```

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0826  E01C        LIT  = @1C@.
0827  8B8F        CPCR = MTIMEL1 - 1.        DELAY 96 USEC FOR RDSTB
0828  C600        SAR = 6 LIT = 0.
0829  8BD6        CPCR = PRSTATLST - 1.      TEST SERV LATE NOT SET
082A  8A92        CPCR = PESTAT2CN - 1.      RDSTB SET SERV LATE
          *********ERROR     # E 137A
082B  8AF9        CPCR = CWWR - 1.           DISABLE DINT
082C  F0FD        WHEN URQ STEP.             WAIT FOR GAP
082D  F096        DR1 BEX.                   RESET STATUS                B
082E  F05F        B.
082F  8AF5        CPCR = CW5MKS - 1.         STOP TAPE
0830  E005        LIT = 5.
0831  8BA1        CPCR = CNT5MKS - 1.        DELAY FOR STOP
0832  8B67        CPCR = PEBKSPACE - 1.      BACKSPACE
0833  E002        LIT = 2.                   T 15 MSEC
0834  8BA1        CPCR = CNT5MKS - 1.        ALLOW ADDITIONAL GAP
0835  8AF5        CPCR = CW5MKS - 1.         STOP TAPE
0836  E005        LIT = 5.
0837  8BA1        CPCR = CNT5MKS - 1.        DELAY FOR STOP
0838  F0A5        IF LC1 STEP.
0839  8AF9        CPCR = CWWR - 1.           SET WRITE
083A  8AF1        CPCR = CWNULL - 1.         RESET MOTION
083B  8AFF        CPCR = CW5MKRD - 1.        SET READ
083C  E007        LIT = 7.                   T 40 MSEC
083D  8BA1        CPCR = CNT5MKS - 1.
083E  F0A5        IF LC1 STEP.
083F  8B01        CPCR = CWEDRD - 1.         ENABLE DINT
0840  C820        SAR = 8 LIT = @20@.        T32.7
0841  8ADD        CPCR = PSRQTMOUT3 - 1.     TIMEOUT FIRST DINT
0842  8A94        CPCR = PESTAT2N - 1.       WRITE STATUS NOT RESET
          *********ERROR     # E 137B

0843  F097        DR2 BEX.                   RESET DINT                  B
0844  F05F        B.
0845  E01A        LIT = @1A@.
0846  8B04        CPCR = CWGEN - 1.          SET 5MKS WITH READ AND
0847  8ADF        CPCR = PSRQTMOUT - 1.      DINT ENABLED
0848  F0F7        SKIP.
0849  8A94        CPCR = PESTAT2N - 1.       DINT SET WITH 5MKS ENABLED
          *********ERROR     # E 137C
084A  8B01        CPCR = CWEDRD - 1.         RESET 5MKS
084B  F0FD        WHEN URQ STEP.             WAIT FOR GAP
084C  F096        DR1 BEX.                   RESET STATUS                B
084D  F05F        B.
084E  8AF5        CPCR = CW5MKS - 1.         RESET 258
084F  8B67        CPCR = PEBKSPACE - 1.      BACKSPACE
0850  8AF5        CPCR = CW5MKS - 1.         STOP TAPE
0851  E005        LIT = 5.
0852  8BA1        CPCR = CNT5MKS - 1.        DELAY FOR STOP
0853  8AFF        CPCR = CW5MKRD - 1.        START READ
0854  E004        LIT = 4.
0855  8BA1        CPCR = CNT5MKS - 1.
0856  F0A5        IF LC1 STEP.
0857  8B01        CPCR = CWEDRD - 1.         ENABLE DINT - READ
0858  C820        SAR = 8 LIT = @20@.        T 32.7
0859  8ADD        CPCR = PSRQTMOUT3 - 1.     TIME OUT FIRST DINT
085A  8A94        CPCR = PESTAT2N - 1.       FIRST DINT NOT SET
          *********ERROR     # E 137D
085B  F055        A3 = B001.
085C  8AD9        CPCR = PDATRDCMP - 1.      READ FIRST CHAR
085D  8B30        CPCR = PEDATERR - 1.       FIRST DATA CHAR BLOCKED
          *********ERROR     # E 137E        BY LRC NOT RESET
085E  8B03        CPCR = CWREWND - 1.        REWIND
085F  E01A        LIT = @1A@.                T 3.1 SEC
0860  8ACD        CPCR = PTMTSTRDY - 1.      TIME OUT NOT RDY
0861  8A94        CPCR = PESTAT2N - 1.       TAPE FAILED TO GO RDY
          *********ERROR     # E 138        FOR BOT
0862  F0AE        IF LC3 SET LC3 SKIP.       SEQ FLAG
0863  4045        MPCR = TSTSEL - 1.         END TEST 3
0864  48C0        MPCR = PEC04 - 1.
```

```
          WRMIDSUB.
0865  F0DA        MIR = AMPCR.
0866  F05F        B.
0867  815D        CPCR = STACKW - 1.         STACK 20 USEC
0868  89FF        CPCR = PSEQDAWR - 1.       WRITE RECORD
0869  F0BF        IF NOT LC1 SKIP.           TEST STATUS FLAG
086A  8A94        CPCR = PESTAT2N - 1.       BAD STATUS IN PRE RECORD
          *********ERROR     # E 139        TIME COUNT.
086B  F0C0        IF NOT LC2 SKIP.           TEST WRITE STROBE FLAG
086C  8B52        CPCR = PEWRERR - 1.        DROPPING WRITE STROBES
          *********ERROR     # E 140        DURING RECORD.
086D  CCE0        SAR = 12 LIT = @E0@.       T 14.3 MSEC
086E  8A72        CPCR = PURQTMOUT - 1.
086F  8B52        CPCR = PEWRERR - 1.        GAP NOT SET
          *********ERROR     # E 141
0870  C501        SAR = 5 LIT = 1.
0871  8BD6        CPCR = PRSTATLST - 1.      TEST GAP STATUS
0872  8B53        CPCR = PEWRERR.            GAP NOT SET
          *********ERROR     # E 142
0873  F07D        B = B C.                   RESTORE STATUS
0874  F05F        B.
0875  C100        SAR = 1 LIT = 0.
0876  8BD7        CPCR = PRSTATLST.          TEST TAPE ERROR
0877  8A48        CPCR = WRRETRY - 1.        RETRY LAST RECORD
          *********READ      AFTER WRITE ERROR OCCURED WHILE WRITING
          *********MULTIPLE      RECORDS,  TEN RETRYS FAILED TO CORRECT
          *********ERROR.       ERROR # E 142A
0878  8AFB        CPCR = CW5MKWR - 1.        ENABLE TIME MARKS
0879  E000        LIT = 0.
087A  8BA1        CPCR = CNT5MKS - 1.        COUNT 1 TIME MARK
087B  F0BF        IF NOT LC1 SKIP.
087C  8B52        CPCR = PEWRERR - 1.        STATUS FAILURE
          *********ERROR     # E 143
087D  F0BC        IF NOT GC2 SKIP.
087E  8B52        CPCR = PEWRERR - 1.
          *********READ      AFTER WRITE ERROR OCCURED WHILE WRITING
          *********MULTIPLE      RECORDS.  RETRYS BY SHIFTING RECORD
          *********ON      TAPE PASSED.  SEE NOTE 1 - MANUAL PROCEDURE
087F  825A        CPCR = INCSREG1 - 1.       INC TOTAL RECORD COUNT
0880  417B        MPCR = STACKR - 1.         EXIT TO MAIN FLOW
          PSEQDARDBOT.                       RD SEQ DATA FROM BOT
0881  F0DA        MIR = AMPCR.
0882  F05F        B.
0883  815D        CPCR = STACKW - 1.         STACK
0884  8AFF        CPCR = CW5MKRD - 1.        START TAPE - READ MODE
0885  E003        LIT = 3.                   T 100 + 20 MSEC
0886  8B96        CPCR = CNT5MKBOT - 1.      COUNT TIME MARKS
0887  F0BF        IF NOT LC1 SKIP.
0888  8A94        CPCR = PESTAT2N - 1.       STATUS ERROR
          *********ERROR     # E 144
0889  F10F        A1 = B000.
088A  8B01        CPCR = CWEDRD - 1.         ENABLE DINT
088B  C8D0        SAR = 8 LIT = @D0@.        T 213 MSEC
088C  8ADD        CPCR = PSRQTMOUT3 - 1.     TIME OUT FIRST DINT
088D  8A94        CPCR = PESTAT2N - 1.       DINT NOT SET
          *********ERROR     # E 145
088E  489B        MPCR = PSEQDARD1.
          PSEQDARD.                          READ SEQ DATA
088F  F0DA        MIR = AMPCR.
0890  F05F        B.
0891  815D        CPCR = STACKW - 1.         STACK
0892  8AFF        CPCR = CW5MKRD - 1.
0893  E004        LIT = 4.                   T 25 MSEC
0894  8BA1        CPCR = CNT5MKS - 1.        COUNT TIME MARKS
0895  F10F        A1 = B000.
0896  8B01        CPCR = CWEDRD - 1.         ENABLE DINT
0897  C820        SAR = 8 LIT = @20@.        T 32.7
0898  8ADD        CPCR = PSRQTMOUT3 - 1.     TIME OUT FIRST DINT
0899  8A94        CPCR = PESTAT2N - 1.       DINT NOT SET
          *********ERROR     # E 147
089A  F0F7        SKIP.
```

```
                PSEQDARD1.
089B  F04C          A3 = A3 + 1.                INC EXPECTED DATA
089C  8A7F          CPCR = PARGEN - 1.          GENERATE PARITY BIT
089D  8ADF          CPCR = PSRQTMOUT - 1.       TIME OUT ON DINT
089E  8A7A          CPCR = MISSTBFLG - 1.       FLAG MISSED READ STROBE
089F  8AD9          CPCR = PDATRDCMP - 1.       READ AND COMPARE DATA
08A0  8A26          CPCR = RDRETRY - 1.         READ DATA ERROR
                *********ERROR # E 148          RETRYS FAILED
08A1  F074          B = A3 AND LIT.             AND OFF LAST DATA CHAR
08A2  E0FF          LIT = @FF@.
08A3  F0CB          LIT EQV B.                  LAST CHAR TEST
08A4  F09D          IF ABT SKIP.
08A5  489A          MPCR = PSEQDARD1 - 1.
08A6  CC14          SAR = 12 LIT = @14@.        T 900 USEC
08A7  8B8D          CPCR = MTIMESH - 1.         DELAY THRU NULL AREA
08A8  C601          SAR = 6 LIT = 1.
08A9  8BD6          CPCR = PRSTATLST - 1.       TEST SERV LATE
08AA  8A92          CPCR = PESTAT2CN - 1.       CRC DINT + LRC RDSTB =
                *********ERROR # E 149          SERVICE LATE - MISSING
08AB  F0C0          IF NOT LC2 SKIP.
08AC  8A26          CPCR = RDRETRY - 1.         MISSING RD STROBES - RETRY
                *********ERROR # E 149A
08AD  CC20          SAR = 12 LIT = @20@.        T 2 MSEC
08AE  8A72          CPCR = PURQTMOUT - 1.       TIME OUT GAP
08AF  8A94          CPCR = PESTAT2N - 1.        GAP FAILED TO SET
                *********ERROR # E 150
08B0  C501          SAR = 5 LIT = 1.
08B1  8BD6          CPCR = PRSTATLST - 1.       TEST GAP STATUS
08B2  8A92          CPCR = PESTAT2CN - 1.       STATUS ERROR
                *********ERROR # E 151
08B3  F07D          B = B C.                    RESTORE STATUS
08B4  F05F          B.
08B5  C100          SAR = 1 LIT = 0.
08B6  8BD7          CPCR = PRSTATLST.           TEST TAPE ERROR
08B7  8A26          CPCR = RDRETRY - 1.         TAPE ERROR ON READ - RETRY
                *********ERROR # E 151A         FAILED.
08B8  F097          DR2 BEX.                    RESET DINT                    B
08B9  F05F          B.
08BA  825A          CPCR = INCSREG1 - 1.        INC TOTAL RECORD COUNT
08BB  8AFF          CPCR = CW5MKRD - 1.         DISABLE DINT
08BC  E000          LIT = 0.
08BD  8BA1          CPCR = CNT5MKS - 1.         COUNT 1 TIME MARK
08BE  F0BC          IF NOT GC2 SKIP.
08BF  8B30          CPCR = PEDATERR - 1.        RETRY AFTER READ ERROR
                *********ERROR # E 151B         CORRECTED FAILURE
08C0  417B          MPCR = STACKR - 1.          EXIT STACK
                TEST-4.
                PEC04.
08C1  F000          WAIT.
                *********START TEST 4--EXHAUSTIVE SEQUENTIAL DATA
                *********WRITE AND READ TO EOT. IF TAPE RUNS PAST
                *********EOT TAB USE ERROR # E 151C
                *********FORCE STEP TO START TEST
08C2  81AA          CPCR = STKINIT - 1.         INITIALIZE STACK
08C3  8238          CPCR = ZROSREG1 - 1.        COMPLETE FAILURE COUNT
08C4  8240          CPCR = ZROSREG2 - 1.        PARTIAL FAILURE COUNT
08C5  F10F          A1 = B000.
08C6  F0F7          SKIP.
                PEC04A.
08C7  F000          WAIT.
                *********OPERATOR MAKE TAPE DECK RDY AND ON LINE.
                *********FORCE STEP.
08C8  C000          SAR = 0 LIT = 0.
08C9  8BD6          CPCR = PRSTATLST - 1.
08CA  48C6          MPCR = PEC04A - 1.
08CB  8AFB          CPCR = CW5MKWR - 1.         START TAPE
08CC  E01C          LIT = @1C@.
08CD  8B96          CPCR = CNT5MKBOT - 1.
08CE  81B0          CPCR = MFLOSTACK - 1.       **RETRY ENTRY
```

```
                PEC04B.
08CF  F054          A3 = B000.                  START CHAR
08D0  89FF          CPCR = PSEQDAWR - 1.        WRITE RECORD
08D1  CCE0          SAR = 12 LIT = @E0@.        T 14.3 MSEC
08D2  8A72          CPCR = PURQTMOUT - 1.       DELAY FOR GAP
08D3  8A94          CPCR = PESTAT2N - 1.        NO STINT FOR GAP
                *********ERROR # E 152
08D4  C501          SAR = 5 LIT = 1.
08D5  8BD6          CPCR = PRSTATLST - 1.       TEST GAP STATUS
08D6  8A92          CPCR = PESTAT2CN - 1.       GAP NOT SET
                *********ERROR # E 153
08D7  F07D          B = B C.
08D8  F05F          B.
08D9  C100          SAR = 1 LIT = 0.            TEST TAPE ERROR
08DA  8BD7          CPCR = PRSTATLST.
                PEC04B1.
08DB  891B          CPCR = WRERACCUM1 - 1.
08DC  F0BC          IF NOT GC2 SKIP.            TEST IF A RETRY FAILURE
                PEC04B2.
08DD  891F          CPCR = WRERACCUM2 - 1.
08DE  8AFB          CPCR = CW5MKWR - 1.         ENABLE TIME MARKS
08DF  E000          LIT = 0.
08E0  8BA1          CPCR = CNT5MKS - 1.         CNT 1 TMK
08E1  8AF5          CPCR = CW5MKS - 1.          STOP TAPE
08E2  E005          LIT = 5.
08E3  8BA1          CPCR = CNT5MKS - 1.         DELAY FOR TAPE STOP
08E4  8AF1          CPCR = CWNULL - 1.
08E5  F0A5          IF LC1 STEP.
08E6  C301          SAR = 3 LIT = 1.
08E7  8BD6          CPCR = PRSTATLST - 1.       TEST EOT
08E8  48CE          MPCR = PEC04B - 1.          WRITE NEXT RECORD
08E9  F0C0          IF NOT LC2 SKIP.
08EA  8A94          CPCR = PESTAT2N - 1.        MISSED DINT DURING RECORD
                *********ERROR # E 154
08EB  824A          CPCR = RDSREG1 - 1.
08EC  F0FF          0 EQV B.
08ED  F09D          IF ABT SKIP.                TEST TOTAL RECORDS FAILED
08EE  8B56          CPCR = PEWRERR1 - 1.
                *********OPERATOR USING ERROR OVERIDE
                *********FOR ACCUMULATED READ AFTER WRITE ERRORS
                *********SEE ERROR # E 166
08EF  8252          CPCR = RDSREG2 - 1.
08F0  F0FF          0 EQV B.
08F1  F09D          IF ABT SKIP.                TEST RETRYS PASSED
08F2  8B56          CPCR = PEWRERR1 - 1.
                *********OPERATOR USING ERROR OVERIDE
                *********FOR ACCUMULATED READ AFTER WRITE ERRORS
                *********SEE ERROR # E 166
                PEC04C.
08F3  8B03          CPCR = CWREWND - 1.         REWIND
08F4  8AF1          CPCR = CWNULL - 1.          RESET REWIND CONTROL WORD     A
08F5  E001          LIT = 1.
08F6  8BBC          CPCR = STATCHK2 - 1.        TEST EOT RESET
08F7  8A95          CPCR = PESTAT2AN - 1.       STATUS FAILURE
                *********ERROR # E 155
08F8  E0FF          LIT = @FF@.
08F9  8ACD          CPCR = PTMTSTRDY - 1.       TIME OUT NOT RDY ON REWIND
08FA  48F7          MPCR = PEC04C + 4.                                        A
08FB  8238          CPCR = ZROSREG1 - 1.        TOTAL RECORD COUNT
08FC  8240          CPCR = ZROSREG2 - 1.        TOTAL DATA ERRORS
08FD  81B0          CPCR = MFLOSTACK - 1.       **ENTRY FOR READ RETRYS
08FE  F0BC          IF NOT GC2 SKIP.
08FF  4902          MPCR = PEC04D - 1.
0900  F054          A3 = B000.
0901  8880          CPCR = PSEQDARDBOT - 1.READ FIRST RECORD
0902  4904          MPCR = PEC04E - 1.
                PEC04D.
0903  F054          A3 = B000.
0904  888E          CPCR = PSEQDARD - 1.        READ RECORD
```

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                    PEC04E.
0905  8AF5              CPCR = CW5MKS - 1.          STOP TAPE
0906  E005              LIT = 5.
0907  8BA1              CPCR = CNT5MKS - 1.         DELAY FOR TAPE STOP
0908  F0A5              IF LC1 STEP.
0909  8AF1              CPCR = CWNULL - 1.          STOP TIME MARKS
090A  F0A2              IF GC2 SKIP.
090B  490D              MPCR = PEC04F - 1.
090C  8264              CPCR = INCSREG2 - 1.        INC ERROR COUNT
090D  F01F              RESET GC2.
                    PEC04F.
090E  C301              SAR = 3 LIT = 1.
090F  8BD6              CPCR = PRSTATLST - 1.       TEST EOT
0910  4902              MPCR = PEC04D - 1.          READ NEXT RECORD
0911  8252              CPCR = RDSREG2 - 1.
0912  F0FF              0 EQV B.
0913  F09D              IF ABT SKIP.                TEST ERROR COUNT
0914  8B34              CPCR = PEDATERR1 - 1.       OVERIDE EXT
                    *********OPERATOR      USING ERROR OVERIDE
                    *********FOR      ACCUMULATED READ ERRORS
                    *********SEE      ERROR # E 167
                    PEC04G.
0915  8B03              CPCR = CWREWND - 1.         REWIND
0916  E0FF              LIT = @FF@.
0917  8ACD              CPCR = PTMTSTRDY - 1.       TIME OUT NOT RDY ON REWIND
0918  4915              MPCR = PEC04G.
0919  F0AE              IF LC3 SET LC3 SKIP.        SEQ FLAG
091A  4045              MPCR = TSTSEL - 1.
091B  4923              MPCR = PEC05 - 1.
                    WRERACCUM1.
091C  8A48              CPCR = WRRETRY - 1.         RETRY LAST RECORD
                    *********READ      AFTER WRITE ERROR OCCURED WHILE WRITING
                    *********MULTIPLE      RECORDS, TEN RETRYS FAILED TO CORRECT
                    *********ERROR.      SEE NOTE 3 - MANUAL PROCEDURE
091D  F01F              RESET GC2.
091E  825A              CPCR = INCSREG1 - 1.        INC FAILED RECORDS
091F  48DB              MPCR = PEC04B1.             FORCED OVER RIDE - EXT ON
                    WRERACCUM2.
0920  8B52              CPCR = PEWRERR - 1.
                    *********READ      AFTER WRITE ERROR OCCURED WHILE WRITING
                    *********MULTIPLE      RECORDS. RETRYS BY SHIFTING RECORD
                    *********ON      TAPE PASSED. SEE NOTE 1 - MANUAL PROCEDURE.
0921  F01F              RESET GC2.
0922  8264              CPCR = INCSREG2 - 1.        INC SUCC RETRYS
0923  48DD              MPCR = PEC04B2.             FORCED OVERIDE - EXT ON
                    TEST-5.
                    PEC05.
0924  8AFB              CPCR = CW5MKWR - 1.         START ERASE
0925  E0C0              LIT = @C0@.                 T100 + 965                C
0926  8B96              CPCR = CNT5MKBOT - 1.       DELAY FOR ERASE
0927  F0A5              IF LC1 STEP.
0928  8B03              CPCR = CWREWND - 1.         REWIND
0929  E028              LIT = @28@.                 T 5 SEC
092A  8ACD              CPCR = PTMTSTRDY - 1.
092B  8A94              CPCR = PESTAT2N - 1.        TAPE NOT RDY AFTER REWIND
                    *********ERROR      # E 156
092C  F000              WAIT.
                    *********OPERATOR      REMOVE WRITE RING FROM TAPE.
                    *********RETURN      TAPE TO READY STATE AND FORCE STEP.
092D  C201              SAR = 2 LIT = 1.
092E  8BD6              CPCR = PRSTATLST - 1.       TEST FILE PROTECT STATUS
092F  8A95              CPCR = PESTAT2AN - 1.       STATUS FAILURE
                    *********ERROR      # E 157
0930  8AFB              CPCR = CW5MKWR - 1.
0931  E023              LIT = @23@.                 T 100 + 180 MSEC
0932  8B96              CPCR = CNT5MKBOT - 1.
0933  F0A5              IF LC1 STEP.
0934  8AFD              CPCR = CWEDWR - 1.          ENABLE DINT
0935  F0EA              MIR = LIT.
0936  E0FF              LIT = @FF@.
0937  F098              DW2.                        LOAD DATA BUFF            B
0938  F05F              B.
0939  CCE0              SAR = 12 LIT = @E0@.        10.5 MSEC
093A  8B8D              CPCR = MTIMESH - 1.         DELAY FOR DATA WRITES
093B  8AF9              CPCR = CWWR - 1.            DISABLE DINT
093C  F098              DW2.                        RESET DINT                B
093D  F05F              B.
093E  F096              DR1 BEX.                    RESET STATUS              B
093F  F05F              B.
0940  C8F0              SAR = 8 LIT = @F0@.         T 15.3 MSEC
0941  8A72              CPCR = PURQTMOUT - 1.       DELAY FOR GAP
0942  F0F7              SKIP.
0943  8A94              CPCR = PESTAT2N - 1.        GAP SET - WRITE STROBES
                    *********ERROR      # E 158      NOT INHIBITED
0944  8B03              CPCR = CWREWND - 1.         REWIND
0945  E028              LIT = @28@.
0946  8ACD              CPCR = PTMTSTRDY - 1.
0947  8A94              CPCR = PESTAT2N - 1.        TAPE NOT RDY AFTER REWIND
                    *********ERROR      # E 159
0948  4045              MPCR = TSTSEL - 1.          EXIT TEST 5
                    TEST-6.
                    PEC06.
0949  8245              CPCR = ZROSREG3 - 1.
094A  8AFB              CPCR = CW5MKWR - 1.         START TAPE
094B  E023              LIT = @23@.                 T 100 + 180 MSEC
094C  8BA1              CPCR = CNT5MKS - 1.
094D  F0A5              IF LC1 STEP.
094E  F058              A3 = LIT.
094F  E0FF              LIT = @FF@.
0950  8A7F              CPCR = PARGEN - 1.
0951  8AFD              CPCR = CWEDWR - 1.
                    PEC06A.
0952  8ADF              CPCR = PSRQTMOUT - 1.
0953  F019              SET LC2.
0954  F0DE              MIR = A3.
0955  F098              DW2.                                                  B
0956  F05F              B.
0957  8256              CPCR = RDSREG3 - 1.
0958  8AB3              CPCR = PECRCGEN - 1.
0959  F1AE              IF NOT URQ SKIP.
095A  8A94              CPCR = PESTAT2N - 1.
                    *********STINT      SET WHILE WRITING ALL ONES TAPE
                    *********ERROR      # E 160
095B  C301              SAR = 3 LIT = 1.
095C  8BD6              CPCR = PRSTATLST - 1.
095D  4951              MPCR = PEC06A - 1.
095E  8BC1              CPCR = NULLDWD - 1.         WRITE 3 NULL CHARS
095F  8256              CPCR = RDSREG3 - 1.         FETCH CRC
0960  8ABE              CPCR = PECCRCFIN - 1.
0961  F0E1              MIR = B.
0962  8ADF              CPCR = PSRQTMOUT - 1.
0963  F019              SET LC2.
0964  F098              DW2.                                                  B
0965  F05F              B.
0966  8BC1              CPCR = NULLDWD - 1.         WRITE 3 NULL CHARS
0967  8ADF              CPCR = PSRQTMOUT - 1.
0968  F019              SET LC2.
0969  8AF9              CPCR = CWWR - 1.
096A  CCE0              SAR = 12 LIT = @E0@.
096B  8A72              CPCR = PURQTMOUT - 1.
096C  8A94              CPCR = PESTAT2N - 1.        STINT FOR GAP NOT SET
                    *********ERROR      # E 161
096D  C501              SAR = 5 LIT = 1.
096E  8BD6              CPCR = PRSTATLST - 1.
096F  8A92              CPCR = PESTAT2CN - 1.       GAP NOT SET IN STATUS
                    *********ERROR      # E 162
0970  F07D              B = B C.                    RESTORE STATUS
0971  F05F              B.
0972  C100              SAR = 1 LIT = 0.
0973  8BD7              CPCR = PRSTATLST.
0974  8A92              CPCR = PESTAT2CN - 1.       TAPE ERROR SET
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                *********ERROR      # E 163
0975  8AFB        CPCR  = CW5MKWR -  1.
0976  E000        LIT   = 0.
0977  8BA1        CPCR  = CNT5MKS -  1.
0978  8AF1        CPCR  = CWNULL -  1.        STOP  TAPE
0979  F0C0        IF  NOT LC2  SKIP.
097A  8A94        CPCR  = PESTAT2N  -  1.     MISSING  WRITE  STROBES
                *********ERROR      # E 164
097B  F0A5        IF  LC1  STEP.
097C  8B03        CPCR  = CWREWND -  1.       REWIND
097D  497E        MPCR  = PEC07.              WAIT  FOR  BOT
              TEST-7.
              PEC07.
097E  8B03        CPCR  = CWREWND -  1.       START  REWIND
097F  E0FF        LIT   = @FF@.               T 30  SEC
0980  8ACD        CPCR  = PTMTSTRDY  -  1.    TIME  OUT  NOT  RDY
0981  497E        MPCR  = PEC07.
0982  4045        MPCR  = TSTSEL  -  1.
              TEST-8.
              PEC08.
0983  8B67        CPCR  = PEBKSPACE  -  1.
0984  8AF5        CPCR  = CW5MKS -  1.        RESET  BKSP  CONTROL  WORD
0985  E005        LIT   = @05@.
0986  8BA1        CPCR  = CNT5MKS -  1.       COUNT  6  TIME  MARKS
0987  F0A5        IF  LC1  STEP.
0988  8AF1        CPCR  = CWNULL -  1.        RESET  TIME  MARKS
0989  4045        MPCR  = TSTSEL  -  1.
              TEST-9.
              PEC09.
098A  8238        CPCR  = ZROSREG1  -  1.
098B  8AFB        CPCR  = CW5MKWR -  1.       START  TAPE
098C  E023        LIT   = @23@.               T 280  MSEC
098D  8B96        CPCR  = CNT5MKBOT  -  1.
              PEC09A.
098E  8245        CPCR  = ZROSREG3  -  1.
098F  8AFB        CPCR  = CW5MKWR -  1.       ENABLE  TIME  MARKS
0990  E000        LIT   = 0.
0991  8BA1        CPCR  = CNT5MKS -  1.       COUNT  1  TIMEMARK
0992  F0A5        IF  LC1  STEP.
0993  8AFD        CPCR  = CWEDWR -  1.        ENABLE  DINT
0994  E055        LIT   = @55@.
0995  89B5        CPCR  = PEWRDAT -  1.
0996  E0AA        LIT   = @AA@.
0997  89B5        CPCR  = PEWRDAT -  1.
0998  E055        LIT   = @55@.
0999  89B5        CPCR  = PEWRDAT -  1.
099A  E0AA        LIT   = @AA@.
099B  89B5        CPCR  = PEWRDAT -  1.
099C  8BC1        CPCR  = NULLDWD -  1.
099D  8256        CPCR  = RDSREG3  -  1.
099E  8ABE        CPCR  = PECCRCFIN  -  1.
099F  F0E1        MIR   = B.
09A0  8ADF        CPCR  = PSRQTMOUT  -  1.
09A1  F019        SET  LC2.
09A2  F098        DW2.                                                    B
09A3  F05F        B.
09A4  8BC1        CPCR  = NULLDWD -  1.
09A5  8ADF        CPCR  = PSRQTMOUT  -  1.
09A6  F019        SET  LC2.
09A7  8AF9        CPCR  = CWWR -  1.
09A8  CCF0        SAR   = 12  LIT  = @F0@.    T 15.3  MSEC
09A9  8A72        CPCR  = PURQTMOUT  -  1.
09AA  F05F        B.
09AB  C100        SAR   = 1  LIT  = 0.
09AC  8BD6        CPCR  = PRSTATLST  -  1.    TEST  TAPE  ERROR
09AD  825A        CPCR  = INCSREG1  -  1.     TOTAL  PARITY  ERRORS
09AE  C301        SAR   = 3  LIT  = 1.
09AF  8BD6        CPCR  = PRSTATLST  -  1.    TEST  EOT
09B0  498D        MPCR  = PEC09A  -  1.
09B1  8AF1        CPCR  = CWNULL -  1.        STOP  TAPE
09B2  824A        CPCR  = RDSREG1  -  1.
09B3  F0E1        MIR   = B.
09B4  F000        WAIT.
              ******MIR    CONTAINS  BINARY  COUNT  OF  TOTAL  RECORDS  WITH
              ******BAD    PARITY.   FORCE  STEP  FOR  REWIND  AND  TEST
              ******SELECTOR.
09B5  897D        CPCR  = PEC07  -  1.        EXIT  AND  REWIND
              PEWRDAT.
09B6  F058        A3  = LIT.
09B7  F007        A1  = AMPCR.
09B8  F05F        B.
09B9  8ADF        CPCR  = PSRQTMOUT  -  1.
09BA  F019        SET  LC2.
09BB  F0DE        MIR   = A3.
09BC  F098        DW2.                                                    B
09BD  F05F        B.
09BE  8A7F        CPCR  = PARGEN  -  1.
09BF  8256        CPCR  = RDSREG3  -  1.
09C0  8AB3        CPCR  = PECRCGEN  -  1.
09C1  F0DD        MIR   = A2.
09C2  8246        CPCR  = WRSREG3  -  1.
09C3  F05C        AMPCR = A1.
09C4  F05F        B.
09C5  F0C9        JUMP.
              TEST-10.
              PEC10.
09C6  8B01        CPCR  = CWEDRD -  1.        START  TAPE
09C7  8ADF        CPCR  = PSRQTMOUT  -  1.    TIME  OUT  SRQ
09C8  F05F        B.
09C9  F097        DR2  BEX.                   READ  DATA                  B
09CA  F05F        B.
09CB  C301        SAR   = 3  LIT  = 1.
09CC  8BD6        CPCR  = PRSTATLST  -  1.    TEST  EOT
09CD  49C6        MPCR  = PEC10.
09CE  497D        MPCR  = PEC07  -  1.        REWIND
              TEST-11.
              PEC11.          ERASE  TO  BOT  OR  IRQ  TERMINATE
09CF  8AF9        CPCR  = CWWR -  1.          START  TAPE  -  ERASE
              PEC11A.
09D0  C880        SAR   = 8  LIT  = @80@.     T 98  MSEC
09D1  8B8D        CPCR  = MTIMESH  -  1.      DELAY
09D2  C300        SAR   = 3  LIT  = 0.
09D3  8BD6        CPCR  = PRSTATLST  -  1.    TEST  EOT
09D4  49D6        MPCR  = PEC11B  -  1.       EOT  SET
09D5  F18E        IF  IRQ  SKIP.              TEST  OPERATOR
09D6  49CF        MPCR  = PEC11A  -  1.       CONTINUE
              PEC11B.
09D7  8B03        CPCR  = CWREWND -  1.       REWIND
09D8  F108        ASR  BEX.
09D9  F05F        B.
09DA  497E        MPCR  = PEC07.              WAIT  FOR  RDY
              TEST-12.
              PEC12.
09DB  8AF5        CPCR  = CW5MKS -  1.        ENABLE  TIME  MARKS
09DC  F000        WAIT.                       FORCE  STEP  FOR  TEST  SELECT
09DD  8AF1        CPCR  = CWNULL -  1.        DISABLE  TIME  MARKS
09DE  4045        MPCR  = TSTSEL  -  1.
              TEST-13.
              PEC13.          FORWARD  RAMP  GEN  TO  EOT  OR  IRQ  TERMINATE
09DF  8AF9        CPCR  = CWWR -  1.          START  TAPE
09E0  C882        SAR   = 8  LIT  = @82@.     T 99.8  MSEC
09E1  8B8D        CPCR  = MTIMESH  -  1.      DELAY  IN  FORWARD  MOTION
09E2  8AF1        CPCR  = CWNULL -  1.        STOP
09E3  C882        SAR   = 8  LIT  = @82@.     T 99.8  MSEC
09E4  8B8D        CPCR  = MTIMESH  -  1.      DELAY  FOR  STOP
09E5  C300        SAR   = 3  LIT  = 0.
09E6  8BD6        CPCR  = PRSTATLST  -  1.    TEST  EOT
09E7  49E9        MPCR  = PEC13A  -  1.
09E8  F18E        IF  IRQ  SKIP.              TEST  OPERATOR
09E9  49DE        MPCR  = PEC13  -  1.        CONTINUE
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                    PEC13A.
09EA  F108              ASR  BEX.
09EB  F05F              B.
09EC  F096              DR1  BEX.                                          B
09ED  F05F              B.
09EE  4045              MPCR = TSTSEL  - 1.
                    TEST-14.
                    PEC14.          REVERSE  RAMP GEN TO BOT OR IRQ  TERMINATE
09EF  8AF3              CPCR = CWBKSP  - 1.       START  REVERSE
09F0  C882              SAR  = 8  LIT  = @82@.    T 99.8   MSCE
09F1  8B8D              CPCR = MTIMESH - 1.       DELAY  IN  REVERSE
09F2  8AF1              CPCR = CWNULL  - 1.       STOP  TAPE
09F3  C882              SAR  = 8  LIT  = @82@.    T 99.8   MSEC
09F4  8B8D              CPCR = MTIMESH - 1.       DELAY  FOR  STOP
09F5  C400              SAR  = 4  LIT  = 0.
09F6  8BD6              CPCR = PRSTATLST  - 1.    TEST  BOT
09F7  49F9              MPCR = PEC14A  - 1.
09F8  F18E              IF  IRQ  SKIP.            TEST  IRQ
09F9  49EE              MPCR = PEC14  - 1.        CONTINUE
                    PEC14A.
09FA  F108              ASR  BEX.
09FB  F05F              B.
09FC  F096              DR1  BEX.                                          B
09FD  F05F              B.
09FE  8B03              CPCR = CWREWND - 1.       REWIND  TO  RESET  EOT
09FF  497E              MPCR = PEC07.             WAIT  FOR  RDY
                    PSEQDAWR.                     WRITE  SEQ  DATA
0A00  F0DA              MIR  = AMPCR.
0A01  F05F              B.
0A02  815D              CPCR = STACKW  - 1.       STACK
0A03  8245              CPCR = ZROSREG3  - 1.     ZERO  CRC  REG
0A04  F10F              A1   = B000.
0A05  8AFB              CPCR = CW5MKWR - 1.       START  TAPE
0A06  E006              LIT  = 6.
0A07  8BA1              CPCR = CNT5MKS  - 1.      COUNT  7  TIME  MARKS
0A08  8AFD              CPCR = CWEDWR  - 1.       ENABLE  DINT
0A09  F0F7              SKIP.
                    PSEQDAWR1.
0A0A  F04C              A3   = A3  + 1.
0A0B  8ADF              CPCR = PSRQTMOUT  - 1.    DINT  TIME  OUT
0A0C  F019              SET  LC2.
0A0D  F0DE              MIR  = A3.
0A0E  F098              DW2.                      WRITE  DATA              B
0A0F  F05F              B.
0A10  8A7F              CPCR = PARGEN  - 1.       GENERATE  PARITY
0A11  8256              CPCR = RDSREG3  - 1.      FETCH  CRC
0A12  8AB3              CPCR = PECRCGEN  - 1.     CAL  CRC
0A13  F0DD              MIR  = A2.
0A14  8246              CPCR = WRSREG3  - 1.      RESTORE  CRC
0A15  F047              A3   = A3  AND  LIT.
0A16  E0FF              LIT  = @FF@.
0A17  F03E              A3  EQV  LIT.
0A18  F09D              IF  ABT  SKIP.            TEST  LAST  CHAR
0A19  4A09              MPCR = PSEQDAWR1  - 1.
0A1A  8BC1              CPCR = NULLDWD - 1.       WRITE  NULL  CHARS
0A1B  8256              CPCR = RDSREG3  - 1.      FETCH  CRC
0A1C  8ABE              CPCR = PECCRCFIN  - 1.    ASSEMBLE  FINAL  CRC
0A1D  F0E1              MIR  = B.
0A1E  8ADF              CPCR = PSRQTMOUT  - 1.    DINT  TIME  OUT
0A1F  F019              SET  LC2.
0A20  F098              DW2.                      WRITE  CRC               B
0A21  F05F              B.
0A22  8BC1              CPCR = NULLDWD - 1.       WRITE  NULL  CHARS
0A23  8ADF              CPCR = PSRQTMOUT  - 1.
0A24  F019              SET  LC2.
0A25  8AF9              CPCR = CWWR - 1.          DISABLE  DINT
0A26  417B              MPCR = STACKR  - 1.       EXIT
                    RDRETRY.
0A27  F033              A2   = B.                 SAVE  DATA
0A28  F060              B    = AMPCR.             SAVE  AMPCR
0A29  F05F              B.
0A2A  0A48              AMPCR = RDRTRYCNT.
0A2B  F0CF              MAR1 = AMPCR.
0A2C  F05B              AMPCR = B.
0A2D  F0F1              MR1.
0A2E  F0F9              WHEN RDC  BEX.            GET  COUNT
0A2F  F0BC              IF  NOT  GC2  SKIP.
0A30  4A33              MPCR = RDRETRY1  - 1.
0A31  F0F6              SET  GC2.
0A32  F07B              B    = B000.              ZERO  PREVIOUS  COUNT
0A33  F0F7              SKIP.
                    RDRETRY1.
0A34  F07E              B    = B  + 1.            INC  RETRY  COUNT
0A35  F0E1              MIR  = B.
0A36  F0F3              MW1.                      RESTORE  COUNT
0A37  F05F              B.
0A38  F0CB              LIT  EQV  B.              LAST  RETRY
0A39  E00B              LIT  = @0B@.
0A3A  F0B5              IF  NOT  ABT  SKIP.
0A3B  4B2B              MPCR = PEDATERRB1  - 1.   DATA  ERROR  ON  LAST  RETRY
0A3C  81E2              CPCR = RSTBR1  - 1.                                B
0A3D  C820              SAR  = 8  LIT  = @20@.    T 32.7
0A3E  8A72              CPCR = PURQTMOUT  - 1.    DELAY  FOR  GAP
0A3F  F05F              B.
0A40  F096              DR1  BEX.                 RESET  STATUS            B
0A41  8B67              CPCR = PEBKSPACE  - 1.    BACKSPACE
0A42  8AF5              CPCR = CW5MKS  - 1.       STOP  TAPE
0A43  E005              LIT  = 5.
0A44  8BA1              CPCR = CNT5MKS  - 1.      DELAY  FOR  TAPE  STOP
0A45  8AF1              CPCR = CWNULL  - 1.
0A46  F0A5              IF  LC1  STEP.
0A47  41BA              MPCR = FLOSTACKR  - 1.
                    RDRTRYCNT.
0A48  0000              CNST = @0000@.
                    WRRETRY.
0A49  F033              A2   = B.                 SAVE  DATA
0A4A  F060              B    = AMPCR.             SAVE  AMPCR
0A4B  F0CF              MAR1 = AMPCR.
0A4C  0A6D              AMPCR = WRRTRYCNT.
0A4D  F05B              AMPCR = B.
0A4E  F0F1              MR1.
0A4F  F0F9              WHEN RDC  BEX.            GET  COUNT
0A50  F0BC              IF  NOT  GC2  SKIP.
0A51  4A54              MPCR = WRRETRY1  - 1.
0A52  F0F6              SET  GC2.
0A53  F07B              B    = B000.              ZERO  PREVIOUS  COUNT
0A54  F0F7              SKIP.
                    WRRETRY1.
0A55  F07E              B    = B  + 1.            INC  RETRY  COUNT
0A56  F0E1              MIR  = B.
0A57  F0F3              MW1.                      RESTORE  COUNT
0A58  F05F              B.
0A59  F0CB              LIT  EQV  B.              LAST  RETRY
0A5A  E00B              LIT  = @0B@.
0A5B  F0B5              IF  NOT  ABT  SKIP.
0A5C  4B4D              MPCR = PEWRERRB1  - 1.    PARITY  ERROR  ON  LAST  RETRY   B
0A5D  81E2              CPCR = RSTBR1  - 1.
0A5E  8AF5              CPCR = CW5MKS  - 1.       STOP  TAPE
0A5F  E005              LIT  = 5.
0A60  8BA1              CPCR = CNT5MKS  - 1.      DELAY  FOR  TAPE  STOP
0A61  8AF3              CPCR = CWBKSP  - 1.       BACK  SPACE
0A62  F0FD              WHEN URQ  STEP.           WAIT  FOR  GAP
0A63  F096              DR1  BEX.                 RESET  STINT             B
0A64  8AF7              CPCR = CW5MKBKSP  - 1.    START  TIME  COUNT
0A65  E000              LIT  = 0.
0A66  8BA1              CPCR = CNT5MKS  - 1.      COUNT  1  TIME  MARK
0A67  8AF5              CPCR = CW5MKS  - 1.       STOP  TAPE
0A68  E005              LIT  = 5.
0A69  8BA1              CPCR = CNT5MKS  - 1.      DELAY  FOR  TAPE  STOP
0A6A  8AF1              CPCR = CWNULL  - 1.
0A6B  F0A5              IF  LC1  STEP.
0A6C  41BA              MPCR = FLOSTACKR  - 1.
```

```
                    WRRTRYCNT.
0A6D  0000              CNST  =  @0000@.
                    FOREVNPAR.
0A6E  F044              A3  =  A3  C.
0A6F  C881              SAR  =  8  LIT  =  @81@.
0A70  F136              A3  =  A3  XOR  LIT.
0A71  F044              A3  =  A3  C.
0A72  F0C9              JUMP.
                    PURQTMOUT.
0A73  F039              A2  =  LIT  L.
0A74  F05F              B.
                    PURQTMOUT1.
0A75  F121              A2  =  A2  XOR  B111.
0A76  F1AE              IF  NOT  URQ  SKIP.
0A77  F1E7              RETN.                       STINT  SET  SXIT
0A78  F02A              A2  =  A2  +  1.
0A79  F183              IF  AOV  JUMP.              TIME  OUT  EXIT
0A7A  4A75              MPCR  =  PURQTMOUT1.
                    MISSTBFLG.
0A7B  F019              SET  LC2.
0A7C  F012              A1  =  A1  +  1.            COUNT  MISSED  RDSTROBES
0A7D  F105              AMPCR  =  AMPCR  +  1.
0A7E  F05F              B.
0A7F  F1E7              RETN.                       BY  PASS  READ
                    PARGEN.                         GEN  ODD  PARITY
0A80  F1CD              MIR  =  A3  L.              STORE  DATA
0A81  D800              SAR  =  8.
0A82  F072              B  =  A3  R.
0A83  D400              SAR  =  4.
0A84  F049              A3  =  A3  XOR  B.          XOR  4  PAIRS
0A85  F072              B  =  A3  R.
0A86  D200              SAR  =  2.
0A87  F049              A3  =  A3  XOR  B.          XOR  2  PAIRS
0A88  F072              B  =  A3  R.
0A89  D100              SAR  =  1.
0A8A  F049              A3  =  A3  XOR  B.          XOR  1  PAIR
0A8B  F08D              BMI.
0A8C  F03B              A3.
0A8D  F0B2              IF  LST  SKIP.              1  =  ODD  PAIRS
0A8E  F158              B  =  BTT1.                 GEN  ODD  PARITY
0A8F  F07D              B  =  B  C.
0A90  D800              SAR  =  8.
0A91  F051              A3  =  B.
0A92  F0C9              JUMP.
                    PESTAT2CN.
0A93  F172              CSAR  B  =  B  C.           RESTORE  B
0A94  4A95              MPCR  =  PESTAT2AN  -  1.
                    PESTAT2N.
0A95  F096              DR1  BEX.                                                  B
                    PESTAT2AN.
0A96  F0BA              IF  NOT  EXT  SKIP.
0A97  F0A0              IF  EXT  SKIP.
0A98  F0F7              SKIP.
0A99  F0C9              JUMP.
0A9A  F0E6              MIR  =  B000.
0A9B  F099              DW1.                        NULL                           B
                    PESTAT2BN.
0A9C  F0BB              IF  NOT  GC1  SKIP.
0A9D  4B10              MPCR  =  PEXLOOP  -  1.
0A9E  F0DA              MIR  =  AMPCR.
0A9F  F000              WAIT.
                    *********GO      TO  INCREMENT  ADDRESS  DISPLAYED  IN  MIR
0AA0  F0E1              MIR  =  B.
0AA1  F000              WAIT.
0AA2  F0DE              MIR  =  A3.
0AA3  F000              WAIT.
0AA4  F0DB              MIR  =  A1.
0AA5  F000              WAIT.
0AA6  824A              CPCR  =  RDSREG1  -  1.
0AA7  F0E1              MIR  =  B.
0AA8  F000              WAIT.                       MIR  =  TOTAL  RECORD  COUNT
0AA9  8252              CPCR  =  RDSREG2  -  1.
0AAA  F0E1              MIR  =  B.
0AAB  F000              WAIT.                       START  CHAR  OF  RECORD
0AAC  F0BF              IF  NOT  LC1  SKIP.
0AAD  F000              WAIT.                       LC1  FLAG  SET
0AAE  F0C0              IF  NOT  LC2  SKIP.
0AAF  F000              WAIT.                       LC2  FLAG  SET
0AB0  F097              DR2  BEX.                   DATA  READ                     B
0AB1  F0E1              MIR  =  B.
0AB2  F000              WAIT.
0AB3  4B10              MPCR  =  PEXLOOP  -  1.
                    PECRCGEN.
0AB4  F032              A2  =  A3.
0AB5  F145              B  =  A2  XOR  B.
0AB6  DA00              SAR  =  10.
0AB7  F07C              B  =  B  L.
0AB8  F0C3              IF  NOT  LST  SKIP.
0AB9  F07A              B  =  B1TT.
0ABA  F037              A2  =  B  R.                A2  =  CRC
0ABB  C73C              SAR  =  7  LIT  =  @3C@.
0ABC  F1AB              IF  NOT  MST  JUMP.
0ABD  F120              A2  =  A2  XOR  LIT.        A2  =  CRC
0ABE  F0C9              JUMP.
                    PECCRCFIN.
0ABF  F033              A2  =  B.
0AC0  F082              B  =  LIT  L.
0AC1  CFEB              SAR  =  15  LIT  =  @EB@.
0AC2  F158              B  =  BTT1.
0AC3  F145              B  =  A2  XOR  B.           B  =  FINAL  CRC
0AC4  F07A              B  =  B1TT.
0AC5  F0C9              JUMP.
                    PEXTCTR.
0AC6  F0A0              IF  EXT  SKIP.              RESET  EXT
0AC7  F05F              B.
0AC8  F0CA              LCTR.
                    PEXTCTR1.
0AC9  F0A0              IF  EXT  SKIP.
0ACA  4AC8              MPCR  =  PEXTCTR1  -  1.
0ACB  F030              INC.
0ACC  F09F              IF  COV  JUMP.              EXIT
0ACD  4AC8              MPCR  =  PEXTCTR1  -  1.
                    PTMTSTRDY.
0ACE  F0A0              IF  EXT  SKIP.
0ACF  F05F              B.
0AD0  F0CA              LCTR.
                    PTMTSTRDYA.
0AD1  F096              DR1  BEX.                   READ  STAT                     B
0AD2  F05F              B.
0AD3  F0B2              IF  LST  SKIP.              NOT  RDY  RESET
0AD4  F1E7              RETN.
0AD5  F0A0              IF  EXT  SKIP.              125  MSEC  INCRAMENT
0AD6  4AD0              MPCR  =  PTMTSTRDYA  -  1.
0AD7  F030              INC.
0AD8  F09F              IF  COV  JUMP.              TEST  TIME  OUT
0AD9  4AD0              MPCR  =  PTMTSTRDYA  -  1.
                    PDATRDCMP.
0ADA  F097              DR2  BEX.                   READ  DATA                     B
0ADB  F03C              A3  EQV  B.
0ADC  F0B4              IF  NOT  ABT  JUMP.         FAILED  EXIT
0ADD  F1E7              RETN.                       GOOD  EXIT
                    PSRQTMOUT3.
0ADE  F039              A2  =  LIT  L.
0ADF  4AE3              MPCR  =  PSRQTMOUT1  -  1.
                    PSRQTMOUT.                      104  USEC  TIME  OUT
0AE0  E019              LIT  =  @19@.
0AE1  F0F7              SKIP.
                    PSRQTMOUT2.                     88  USEC  PRE  TIME  OUT
0AE2  E014              LIT  =  @14@.
0AE3  F038              A2  =  LIT.
```

```
                PSRQTMOUT1.
0AE4  F121          A2 = A2 XOR B111.
0AE5  F1AD          IF NOT SRQ SKIP.
0AE6  F1E7          RETN.                          DINT SET EXIT
0AE7  F02A          A2 = A2 + 1.
0AE8  F183          IF AOV JUMP.                   TIME OUT EXIT
0AE9  4AE4          MPCR = PSRQTMOUT1.
                STIME.
0AEA  F0CA          LCTR.
                STIME1.
0AEB  F034          A2 = B000.
0AEC  F02A          A2 = A2 + 1.
0AED  F09E          IF AOV SKIP.
0AEE  4AEB          MPCR = STIME1.
0AEF  F030          INC.
0AF0  F09F          IF COV JUMP.
0AF1  4AEA          MPCR = STIME1 - 1.
                CWNULL.
0AF2  E000          LIT = @00@.
0AF3  4B04          MPCR = CWGEN - 1.
                CWBKSP.
0AF4  E001          LIT = @01@.
0AF5  4B04          MPCR = CWGEN - 1.
                CW5MKS.
0AF6  E010          LIT = @10@.
0AF7  4B04          MPCR = CWGEN - 1.
                CW5MKBKSP.
0AF8  E011          LIT = @11@.
0AF9  4B04          MPCR = CWGEN - 1.
                CWWR.
0AFA  E004          LIT = @04@.
0AFB  4B04          MPCR = CWGEN - 1.
                CW5MKWR.
0AFC  E014          LIT = @14@.
0AFD  4B04          MPCR = CWGEN - 1.
                CWEDWR.
0AFE  E00C          LIT = @0C@.
0AFF  4B04          MPCR = CWGEN - 1.
                CW5MKRD.
0B00  E012          LIT = @12@.
0B01  4B04          MPCR = CWGEN - 1.
                CWEDRD.
0B02  E00A          LIT = @0A@.
0B03  4B04          MPCR = CWGEN - 1.
                CWREWND.
0B04  E020          LIT = @20@.
                CWGEN.
0B05  F0EA          MIR = LIT.
0B06  F099          DW1.                                B
0B07  F0C9          JUMP.
                PEDSEL.
0B08  F05E          ASR.
0B09  F0CE          LMAR.                               B
0B0A  E000          LIT = 0.                            B
0B0B  F035          A2 = BMAR.                     STORE BR1 A2 = PARTIAL STAT
0B0C  C80F          SAR = 8 LIT = @0F@.                 B
0B0D  F16C          BR1 = LIT L.
0B0E  F099          DW1.                           UNSELECT
0B0F  F0D1          MAR1 = A2.                     RESTORE BR1
0B10  F0C9          JUMP.
                PEXLOOP.
0B11  F0BA          IF NOT EXT SKIP.
0B12  F0A0          IF EXT SKIP.
0B13  F0C9          JUMP.
0B14  F09A          EXEC.
0B15  F006          SET GC1.                       SET LOOP FLAG
0B16  F0C9          JUMP.
                BUSS.
0B17  F0F9          WHEN RDC BEX.
0B18  F0FF          0 EQV B.
0B19  F09C          IF ABT JUMP.

0B1A  F0DA          MIR = AMPCR.
0B1B  F000          WAIT.
                *********GO TO INCREMENTER ADDRESS DISPLAYED IN MIR
0B1C  F0E1          MIR = B.
0B1D  F000          WAIT.
                *********ERROR BITS ON BUSS
0B1E  F0C9          JUMP.
                PESTAT1.
0B1F  F108          ASR BEX.
0B20  F05F          B.
0B21  4B24          MPCR = PESTAT1A - 1.
                PESTAT1B.
0B22  F172          CSAR B = B C.                  RESTORE B
0B23  4B24          MPCR = PESTAT1A - 1.
                PESTAT1.
0B24  F096          DR1 BEX.                                    B
                PESTAT1A.
0B25  F0BB          IF NOT GC1 SKIP.
0B26  4B10          MPCR = PEXLOOP - 1.
0B27  F0DA          MIR = AMPCR.
0B28  F000          WAIT.
                *********GO TO INCREMENT ADDRESS DISPLAYED IN MIR
0B29  F0E1          MIR = B.
0B2A  F000          WAIT.
                *********STATUS WORD
0B2B  4B10          MPCR = PEXLOOP - 1.
                PEDATERRB1.
0B2C  F05D          ASE.
0B2D  F080          B = BMAR.
0B2E  F07A          B = BITT.                                   B
0B2F  F0D5          MAR1 = B.                      RESTORE BR1.
0B30  F05F          B.
                PEDATERR.
0B31  F0BA          IF NOT EXT SKIP.
0B32  F0A0          IF EXT SKIP.
0B33  F0F7          SKIP.
0B34  F0C9          JUMP.
                PEDATERR1.
0B35  F0E6          MIR = B000.
0B36  F099          DW1.                           NULL                         B
0B37  F0DA          MIR = AMPCR.
0B38  F000          WAIT.
                *********GO TO INCRAMENT ADDRESS DISPLAYED IN MIR
0B39  F0E1          MIR = B.
0B3A  F000          WAIT.
0B3B  F0E6          MIR = B000.
0B3C  F0C0          IF NOT LC2 SKIP.
0B3D  F0DB          MIR = A1.                      DROPPED READ STROBE COUNT
0B3E  F000          WAIT.
0B3F  F0DE          MIR = A3.
0B40  F000          WAIT.
0B41  F0DD          MIR = A2.
0B42  F000          WAIT.
0B43  824A          CPCR = RDSREG1 - 1.
0B44  F0E1          MIR = B.
0B45  F000          WAIT.                          MIR = TOTAL RECORD COUNT
0B46  8252          CPCR = RDSREG2 - 1.
0B47  F0E1          MIR = B.
0B48  F000          WAIT.                          START CHAR OF RECORD
0B49  F096          DR1 BEX.                       READ STATUS                  B
0B4A  F0E1          MIR = B.
0B4B  F000          WAIT.
0B4C  F01F          RESET GC2.
0B4D  4045          MPCR = TESTSELECT - 1.
                PEWRERRB1.
0B4E  F05D          ASE.
0B4F  F080          B = BMAR.
0B50  F07A          B = BITT.
0B51  F0D5          MAR1 = B.
0B52  F05F          B.
```

```
                PEWRERR.
0B53  F0BA          IF  NOT  EXT  SKIP.
0B54  F0A0          IF  EXT  SKIP.
0B55  F0F7          SKIP.
0B56  F0C9          JUMP.
                PEWRERR1.
0B57  F096          DR1  BEX.                       READ  STATUS                B
0B58  F0E6          MIR  =  B000.
0B59  F099          DW1.                            NULL                        B
0B5A  F0DA          MIR  =  AMPCR.
0B5B  F000          WAIT.
              *******GO     TO  INCRAMENT  ADDRESS  DISPLAYED  IN  MIR
0B5C  F0E1          MIR  =  B.
0B5D  F000          WAIT.                           DEVICE  STATUS
0B5E  F0DB          MIR  =  A1.
0B5F  F000          WAIT.
0B60  824A          CPCR  =  RDSREG1  -  1.         GET  TOTAL  RECORD  COUNT
0B61  F0E1          MIR  =  B.
0B62  F000          WAIT.
0B63  8252          CPCR  =  RDSREG2  -  1.         INC  OR  FLY  COUNT
0B64  F0E1          MIR  =  B.
0B65  F000          WAIT.
0B66  F01F          RESET  GC2.
0B67  4045          MPCR  =  TSTSEL  -  1.          GO  TO  TEST  SELECTOR
                PEBKSPACE.                          STACK  ON  ENTRY
0B68  F0DA          MIR  =  AMPCR.
0B69  F05F          B.
0B6A  815D          CPCR  =  STACKW  -  1.
0B6B  8AF3          CPCR  =  CWBKSP  -  1.          WRITE  CONTROL  WORD
                PEBKSP1.
0B6C  F0FD          WHEN  URQ  STEP.                WAIT  FOR  GAP
0B6D  E020          LIT  =  @20@.
0B6E  8BBC          CPCR  =  STATCHK2  -  1.    READ  STATUS  CHECK
                PEBKSPSTAT.
0B6F  8B77          CPCR  =  PEBKSPSTD  -  1.   STATUS  DISAGREE
0B70  8AF7          CPCR  =  CW5MKBKSP  -  1.
0B71  E000          LIT  =  @00@.
0B72  8BA1          CPCR  =  CNT5MKS  -  1.         COUNT  1  TIME  MARK
0B73  417B          MPCR  =  STACKR  -  1.
                PEBKSPEX.
0B74  F018          SET  LC1.
0B75  F172          CSAR  B  =  B  C.
0B76  F017          A1  =  B.
0B77  417B          MPCR  =  STACKR  -  1.          RETURN
                PEBKSPSTD.
0B78  F0CB          LIT  EQV  B.
0B79  E022          LIT  =  @22@.                   GAP  WITH  TAPE  ERROR
0B7A  F0B5          IF  NOT  ABT  SKIP.
0B7B  4B6F          MPCR  =  PEBKSPSTAT.
0B7C  C400          SAR  =  4  LIT  =  0.
0B7D  8BD7          CPCR  =  PRSTATLST.             CHECK  BOT
0B7E  4B73          MPCR  =  PEBKSPEX  -  1.        EXIT
0B7F  F172          CSAR  B  =  B  C.
0B80  F05F          B.
0B81  C501          SAR  =  5  LIT  =  1.
0B82  8BD7          CPCR  =  PRSTATLST.             CHECK  GAP.
0B83  4B6B          MPCR  =  PEBKSP1  -  1.         GAP  NOT  SET
0B84  4B73          MPCR  =  PEBKSPEX  -  1.        GAP  WITH  OTHER  STATUS
                PBUFDAT.
0B85  F0BB          IF  NOT  GC1  SKIP.
0B86  4B10          MPCR  =  PEXLOOP  -  1.
0B87  F0DA          MIR  =  AMPCR.
0B88  F000          WAIT.
              *********GO     TO  INCREMENT  ADDRESS  DISPLAYED  IN  MIR
0B89  F0E1          MIR  =  B.
0B8A  F000          WAIT.
              *********MIR      =  FAILED  CHARACTER
0B8B  F0DE          MIR  =  A3.
0B8C  F000          WAIT.
              *********MIR      =  EXPECTED  CHARACTER
0B8D  4B10          MPCR  =  PEXLOOP  -  1.
                MTIMESH.
0B8E  F039          A2  =  LIT  L.
0B8F  4B91          MPCR  =  MTIME  -  1.
                MTIMELI.
0B90  F038          A2  =  LIT.
0B91  4B91          MPCR  =  MTIME  -  1.
                MTIME.
0B92  F05F          B.
0B93  F121          A2  =  A2  XOR  B111.           COMP  A2.
                MTIMEA.
0B94  F02A          A2  =  A2  +  1.
0B95  F183          IF  AOV  JUMP.                  TIMEOUT
0B96  4B93          MPCR  =  MTIMEA  -  1.
                CNT5MKBOT.                          DELAY  100  MSEC  IGNORE  STAT
0B97  F0EA          MIR  =  LIT.
0B98  F0CA          LCTR.
0B99  E013          LIT  =  @13@.
                CNT5MKB1.
0B9A  F0FD          WHEN  URQ  STEP.
0B9B  F096          DR1  BEX.                       RESET  STINT                B
0B9C  F030          INC.
0B9D  F02E          IF  COV  SKIP.
0B9E  4B99          MPCR  =  CNT5MKB1  -  1.
0B9F  F08D          BMI.
0BA0  F095          CTR  =  B.
0BA1  F0F7          SKIP.
                CNT5MKS.
0BA2  F0CA          LCTR.
                CNT5RTN.
0BA3  F0FD          WHEN  URQ  STEP.
0BA4  F096          DR1  BEX.                       RESET  STINT                B
0BA5  F0CB          LIT  EQV  B.
0BA6  E080          LIT  =  @80@.                   STATUS  =  5MKS  ONLY
0BA7  F0B5          IF  NOT  ABT  SKIP.
0BA8  4BAF          MPCR  =  CNT5MKS1  -  1.
0BA9  F018          SET  LC1.                       FLAG  BAD  STATUS
0BAA  F017          A1  =  B.                       STORE  BAD  STATUS
0BAB  F07D          B  =  B  C.
0BAC  D700          SAR  =  7.
0BAD  F05F          B.
0BAE  F0B2          IF  LST  SKIP.                  TEST  TM MARK IN  BAD  STAT
0BAF  4BA2          MPCR  =  CNT5RTN  -  1.
                CNT5MKS1.
0BB0  F030          INC.
0BB1  F02E          IF  COV  SKIP.                  TIME  MARKS  COUNTED
0BB2  4BA2          MPCR  =  CNT5RTN  -  1.
0BB3  F0C9          JUMP.
                STATGEN4.                           4000  TO  STATUS  WD
0BB4  F077          B  =  B001.
0BB5  4BB8          MPCR  =  STATGEN  -  1.
                STATGENC.                           C000  TO  STATUS  WD
0BB6  F077          B  =  B001.
0BB7  F07E          B  =  B  +  1.
0BB8  F07E          B  =  B  +  1.
                STATGEN.                            A  DIGIT  ENTRY
0BB9  F123          A2  =  B  C.
0BBA  D200          SAR  =  2.
                STATCHK1.
0BBB  F02F          A2  =  A2  OR  LIT.
0BBC  F0F7          SKIP.
                STATCHK2.
0BBD  F038          A2  =  LIT.
0BBE  F096          DR1  BEX.                       READ  STATUS                B
0BBF  F116          A2  EQV  B.
0BC0  F0B4          IF  NOT  ABT  JUMP.             FAILURE  EXIT.
0BC1  F1E7          RETN.                           GOOD  EXIT
                NULLDWD.                            WRITE  3  NULL  DATA  WORDS
0BC2  F0DA          MIR  =  AMPCR.
0BC3  F05F          B.
0BC4  815D          CPCR  =  STACKW  -  1.          STACK
0BC5  F094          CTR  =  B001  +  1.
```

```
                NULLDWDA.
0BC6  8ADF          CPCR = PSRQTMOUT - 1.     DINT TIME OUT
0BC7  F019          SET LC2.                  FLAG DINT NOT SET
0BC8  F030          INC.
0BC9  F079          B = B100.
0BCA  F0E1          MIR = B.
0BCB  F098          DW2.                      WRITE NULL DATA WORD          B
0BCC  F02E          IF COV SKIP.
0BCD  4BC5          MPCR = NULLDWDA - 1.      STAY IN LOOP
0BCE  417B          MPCR = STACKR - 1.        RETURN
                SPPARSET.
0BCF  F051          A3 = B.
0BD0  F0CB          LIT EQV B.
0BD1  C801          SAR = 8 LIT = 1.
0BD2  F09D          IF ABT SKIP.
0BD3  F0C9          JUMP.
0BD4  F082          B = LIT L.
0BD5  F048          A3 = A3 OR B.
0BD6  F0C9          JUMP.
                PRSTATLST.
0BD7  F096          DR1 BEX.                  READ STATUS                   B
0BD8  F172          CSAR B = B C.
0BD9  F1BA          LIT EQV 0.                LST = 0 OR 1
0BDA  F09D          IF ABT SKIP.
0BDB  4BDE          MPCR = PLSTT - 1.
0BDC  F05F          B.
0BDD  F0B1          IF LST JUMP.              TST BIT = 0 FAIL
0BDE  F1E7          RETN.                     TST BIT = 0 PASS
                PLSTT.
0BDF  F05F          B.
0BE0  F0C2          IF NOT LST JUMP.          TST BIT = 1 FAIL
0BE1  F1E7          RETN.                     TST BIT = 1 PASS
0BE2  4045          MPCR = TESTSELECT - 1.
```

MANUAL PROCEDURES

E1	OPERATOR ACTION	MACHINE ACTION	A	D
1	OPERATOR DIRECTED TO THIS ERROR FROM FE MEMORY TEST		2	F1
2	METER TM1 E3 (OUTMUXE/)	100%	3	F2
3	USE TABLE TO SELECT FAILURE BUSS BIT.			
	EXT BUSS BIT	MIR		
	1	8000	F3	
	2	4000	F8	
	8	0100	F3	
	9	0080	F4	
	10	0040	F4	
	11	0020	F5	
	12	0010	F5	
	13	0008	F6	
	14	0004	F6	
	15	0002	F7	
	16	0001	F7	

E2	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE MIR	MIR DIGIT B = MAG TAPE PORT # MINUS 1	2	F40
2	METER TM4 2Q (CGCLEAR)	METER READING 100% WITH SYS CLR BUTTON DEPRESSED.	3	F9
3	COMPARE MIR	MIR = NOTE: P = MAG TAPE PORT# -1		
		8P01	F10	
		OP21	F11	
		OP41	F12	
		CP41	F13	
		OP01	4	F0
4	METER TM4 2L (DINT/)	100%	5	F14
5	METER TM3 M3 (FORWARD)	0%	6	F15
6	METER TM4 U4 (TP)	100%	F16	F17

E3	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F18	

E5	OPERATOR ACTION	MACHINE ACTION	A	D
1	SEE STEP 10 FIRST. FORCE STEP, RECORD MIR VALUE. PUT EXT/IRQ SW TO EXT, FORCE STEP, THEN METER SIGNALS USING TABLE 5. ALL READINGS SHOULD BE 100% EXCEPT THE MAG TAPE PORT WHICH SHOULD READ 92-95%		2	F19

	-TABLE 5-	PORT#	PS1-	
	PADP5W (READ1/)	1	1	
	PADP4W (READ2/)	2	1	
	PADP5V (READ3/)	3	1	
	PADP4V (READ4/)	4	1	
	PADP8V (READ5/)	5	2	
	PADP7W (READ6/)	6	2	
	PADP8V (READ7/)	7	2	
	PADP7V (READ8/)	8	2	

2	METER ACCORDING TO MAG TAPE PORT	PORT LOC	PS1-	READING		
	PADP5I (PINST)	1 THRU 4	1	100%	3	F20
	PADP5I (PINST	5 THRU 8	2	100%	3	F20
3	METER TM1 1E (TMRDSTAT)	5-8%			4	F21
4	METER TM1 E3 (OUTMUXE/)	92-94%			5	F22
5	SELECT RECORDED MIR VALUE FROM FOLLOWING.	MIR =				
		0000			6	
		0003			F25	
		0005			8	
		0009			F28	
		0011			9	
		0021			F31	
		0041			F32	
		0081			F33	
		0081			F34	
		4001			F34	
		8001			F35	
		0101			F35	
		0010			F36	F37
6	METER TM2 1L (TMDNR)	100%			F7	7
7	METER TM4 2E (RDY/)	100%			F23	F24
8	METER TM2 1X (FPT/)	100%			F26	F27
9	METER TM4 1E (LDP/)	100%			F29	F30
10	SYS CLEAR MUST BE VERIFIED BEFORE PROCEEDING IN STEP 1. IF CLEAR GOOD ON FIRST PASS, THEN OPERATOR MUST RESTART MTR AND IF ERROR E5 FAILS SECOND PASS, PROCEED WITH STEP 1.					
	FIRST PASS METER TM1 X3 (CLR/)	0% WITH SYS CLR BUTTON DEPRESSED			11	12
11	RESTART MTR FOR SECOND PASS					
12	METER TM1 1H (CGCLR)	100% WITH SYS CLR BUTTON DEPRESSED			F209	F 9
E6	OPERATOR ACTION	MACHINE ACTION			A	D
1	FORCE STEP AND COMPARE MIR	MIR =				
		0081			F 3	
		0001			F39	F0
E7	OPERATOR ACTION	MACHINE ACTION			A	D
1	NONE	NONE			F39	
E8	OPERATOR ACTION	MACHINE ACTION			A	D
1	NONE	NONE			F39	
E9	OPERATOR ACTION	MACHINE ACTION			A	D
1	FORCE STEP, RECORD MIR VALUE. PUT EXT/IRQ SW TO EXT AND FORCE STEP, SELECT					
	RECORDED MIR VALUE.	RECORDED MIR =				
		0001			2	
		C001			6	
		C041			F65	F0
2	METER TM4 1B (CDSCLK)	3-5%			3	F42
3	METER TM4 1Y (PSWRIT/)	94-97%			4	F43
4	METER TM4 2S (TMENDI)	100%			F8	4A
4A	METER TM4 2Q (CGCLEAR)	0%			5	F9
5	METER TM4 P3 (WRINST)	3-5%			F44	F45
6	METER TM4 D3 (WRITE)	0%			F46	F47
E10	OPERATOR ACTION	MACHINE ACTION			A	D
1	NONE	NONE			F48	
E11	OPERATOR ACTION	MACHINE ACTION			A	D
1	FORCE STEP AND COMPARE MIR	MIR =				
		4001			2	
		C041			6	F0
2	METER TM4 P3 (WRINST)	0%			3	F49
3	METER TM4 D3 (WRITE)	100%			4	F50
5	METER TM4 S3 (BACKSP/)	100%			5	F51
5	METER TM3 IT (TMDATARQ)	100%			F52	F53
6	METER TM4 1H (TMSTL)	1%			F54	7
7	METER TM4 V4 (WDIS/)	98-99%			F95	8
8	METER TM4 V4 (WDIS/)	1%			F96	F55
E12	OPERATOR ACTION	MACHINE ACTION			A	D
1	FORCE STEP AND COMPARE MIR	MIR =				
		4001			F56	
		C001			2	F0
2	METER TM4 2L (DINT/)	0%			F57	F58
E13	OPERATOR ACTION	MACHINE ACTION			A	D
1	NONE	NONE			F 59	
E14	OPERATOR ACTION	MACHINE ACTION			A	D
1	METER TM4 1S (PINST)	0%			F60	F61

E15	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		4001	F62	
		C001	F63	F0
E16	USE E165			
E17	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F64	
E18	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TM4 1Y (PSWRIT/)	100%	2	F66
2	METER PS1-1 2Q (PSSRQ/)	98-99%	F67	F68
E19	USE E165			
E20	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F69	
E22	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND RECORD MIR VALUE. PUT EXT/IRQ SW TO EXT AND SGL/NORM SW TO SGL. PRESS AND HOLD FST BUTTON AND PRESS AND RELEASE SGL BUTTON THEN RELEASE FST. PRESS SGL BUTTON 9 TIMES. METER ALL SIGNALS IN TABLE 22, ONLY THE SIGNAL CORRESPONDING TO THE PORT NO. OF MAG TAPE SHOULD BE 0%, ALL OTHERS SHOULD BE 100%		2	F71

22--		PORT #	PS1-
PS1-1	2B	1	1
PS1-1	1K	2	1
PS1-1	1J	3	1
PS1-1	2J	4	1
PS1-2	2B	5	2
PS1-2	1K	6	2
PS1-2	1J	7	2
PS1-2	2J	8	2

2	RECORDED MIR VALUE = 0000		3	4
3	METER TM2 1S (EXT 16/)	0%	F72	F73
4	DIGIT B OF RECORDED MIR VALUE = MAG TAPE PORT # MINUS 1.		5	F74
5	RECORDED MIR VALUE = CP41	(P = PORT # - 1)	F75	F0
E23	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F76	
E24	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F77	
E24A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F78	
E25	OPERATOR ACTION	MICHINE ACTION	A	D
1	NONE	NONE	F79	
E26	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP, RECORD MIR VALUE AND COMPARE TO FOLLOWING.	MIR = (X=DON'T CARE)		
		CXXX	F80	
		4001	F81	2
2	PUT EXT/IRQ SW TO EXT AND FORCE STEP 2 TIMES. METER TM1 4W (INMUX)	2-3%	3	F82
3	METER TM1 E3 (OUTMUXE/)	95-98%	4	F83
4	RECORDED MIR VALUE = 0000		F84	5
5	EXPECTED DATA WAS 81FF, COMPARE TO RECORDED MIR VALUE AND SELECT MISSING BIT(S)	MISSING MIR BIT(S)		
		D1 OR D2	F85	
		D4 OR D8	F86	
		C1 OR C2	F87	
		C4 OR C8	F88	
		B1 OR A8	F89	F0
E27	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND OBSERVE MIR	MIR = 81FF	F91	2
2	SELECT MIR BIT(S) THAT ARE SET.	MIR BIT(S) SET		
		A8,B1,C8 OR C4	F92	
		C2,C1,D8 OR D4	F93	
		D2 OR D1	F94	
E28	USE E165			
E29	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		C041	F97	
		C001	F98	F0
E30	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TM4 2L (DINT/)	0%	F99	2
2	METER TM3 1L (TMMRTP/)	0%	F100	3
3	METER TM3 V3 (WDIS/)	97-99%	F101	4
4	METER TM3 W3 (WDS)	1%	F102	F103
E31	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		C041	F104	
		C023	F105	F0
E32	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TM4 1H (TMSTL)	1%	F106	F107
E33	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F108	

E34	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TM4 2I (STINT/)	0%	F109	2
2	FORCE STEP AND COMPARE MIR	MIR =		
		C041	F110	
		4001	F111	F0
E35	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F112	
E36	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F113	
E37	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F114	
E37A	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		0081	F115	
		0001	2	F0
2	METER TM4 J3 (5MGEN/)	0%	3	F116
3	METER TM3 1L (TMMRTP/)	0%	F117	4
4	METER TM3 1L (TMMRTP/)	97-99%	F118	F119
E38	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F120	
E39	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F121	
E40	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F122	
E41	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F123	
E42	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F124	
E43	USE E165			
E44	USE E165			
E45	USE E165			
E46	USE E165			
E47	USE E165			
E47A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F56	
E47B	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F125	
E48	OPERATOR ACTION	MACHINE ACTION	A	D
1	TAPE RUNS FORWARD WHEN PUT ON LINE.		2	F127
2	METER TM4 1U (SFC/)	0%	F128	F129
E49	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F130	
E50	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR.	MIR =		
		0000	2	
		0011	4	
		0018	5	F0
2	TAPE BOT MARKER UNDER DECK BOT DETECTOR.		3	E48
3	METER TM4 1E (LDP/)	0%	F131	F132
4	METER TM4 2E (RDY/)	0%	F133	F134
5	METER TM4 2G (EOT/)	100%	F135	F136
E51	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TM4 1U (SFC/)	0%	2	F138
2	METER TM4 2V (SRC/)	100%	F137	F142
E52	OPERATOR ACTION	MACHINE ACTION	A	D
1	TAPE SITTING AT BOT		2	F113
2	METER TM4 1V (RWND/)	100%	F139	F140
E53	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TM4 2V (SRC/)	100%	F141	F142
E54	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE TAPE	TAPE AT BOT	F143	2
2	METER TM4 2V (SRC/)	0%	F144	F145
E55	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP, OBSERVE MIR SELECT BIT SET.	MIR BIT SET =		
		C2	2	
		C1	F143	F0
2	GO TO ERR # E 168			
E56	USE E165			
E57	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F146	
E58	USE ERROR # E 168			
E59	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 3 TIMES AND OBSERVE MIR.	MIR C2 BIT SET	2	3
2	METER TM4 2T (SWS/)	0%	4	F148 C

3	OBSERVE MIR	MIR = 0000	F149	F0
4	GO TO ERROR # E 168			
E60	USE E165			
E61	OPERATOR ACTION	MACHINE ACTION	A	D
1	OBSERVE TAPE	TAPE SITTING AT BOT	F150	2
2	METER TM4 1V (RWND/)	0%	F151	F152
E62	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F153	
E63	USE E165			
E64	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F154	
E65	GO TO ERROR # E 16,			
E66	USE E165			
E66A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F155	
E67	USE E165			
E68	USE E165			
E68A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F156	
E69	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F112	
E69A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F157	
E70	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F158	
E70A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F159	
E71	USE E165			
E72	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRESS SYS CLEAR, SELECT PORT, SELECT NUMERIC 09. OBSERVE SYNC POINTS, TIME/CM SETTINGS AND COMPARE WAVEFORMS IN WAVEFORM SETS 1,2 AND 3. SCOPE FOLLOWING SIGNALS IN THE ORDER LISTED.			C
	SCOPE:			
	WAVEFORM SET 1.			
	A. WDS/ (SYNC POINT)			F210
	B. SWS/			F211
	C. IWD7/ THRU IWD0/			F212
	D. IWDP/			F212
	WAVEFORM SET 2.			
	E. RDS/ (SYNC POINT)			F213
	F. TMRDSTRB			F214
	WAVEFORM SET 3.			
	G. GAPCT			F215
	H. TMGAP		F217	F216
E73	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F160	
E74	OPERATOR ACTION	MACHINE ACTION	A	D
1	PRESS SYS CLEAR, SELECT PORT, SELECT NUMERIC 09. OBSERVE SYNC POINTS, TIME/CM SETTINGS AND COMPARE WAVEFORMS IN WAVEFORM SETS 1 AND 2. SCOPE FOLLOWING SIGNALS IN THE ORDER LISTED.			C
	SCOPE:			
	WAVEFORM SET 1			
	A. WDS/ (SYNC POINT)			
	B. IWD7/ THRU IWD0/			F218
	C. IWDP/			F219
	D. WARS/			F220
	WAVEFORM SET 2			
	E. RDS/ (SYNC POINT)			F213
	F. TMRDSTRB			F221
	G. IRD7/ THRU IRD0/			F222
	H. IRDP/			F223
	NO WAVEFORM			
	I. TM1 U3 (PERPF/)= HIGH (3-5V)		F225	F224
E74A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F208	
E75	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 3 TIMES AND OBSERVE MIR	MIR C2 BIT SET	F161	F0
E76	USE E165			
E77	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F162	
E78	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F163	
E79	USE E165			
E80	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		4020 OR 4022	F164	
		4000	F165	F0
E81	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		C022	F166	
		C000	F167	F0

E82	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F11	
E82A	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 4 TIMES AND OBSERVE MIR	MIR = 8000	F168	F169
E82B	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F170	
E83	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F171	
E84	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F172	
E85	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F173	
E86	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F174	
E87	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F175	
E88	USE E165			
E88A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F176	
E89	USE E165			
E90	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND OBSERVE MIR	MIR = 4060	F11	F0
E91	USE E165			
E92	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F177	
E93	USE E165			
E94	USE E165			
E94A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F178	
E95	USE E165			
E96	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F179	
E97	USE E165			
E98	USE E165			
E99	USE E165			
E100	USE E165			
E101	USE E165			
E102	USE E165			
E103	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F180	
E104	USE E165			
E105	USE E165			
E106	USE E165			
E107	USE E165			
E108	USE E165			
E109	USE E165			
E110	USE E165			
E111	USE E165			
E111A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F163	
E112	USE E165			
E113	USE E165			
E114	USE E165			
E115	USE E165			
E116	USE E165			
E117	USE E165			
E118	USE E165			
E119	USE E165			
E119A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F181	
E120	USE E165			
E121	USE E165			
E122	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F182	
E123	USE E165			
E124	USE E165			
E125	USE E165			
E126	USE E165			
E127	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F183	
E128	USE E165			
E129	OPERATOR ACTION	MACHINE ACTION	A	D

1	NONE	NONE	F184	
E129A	USE E165			
E129B	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 2 TIMES, OBSERVE MIR AND SELECT	MIR BIT SET = D1 OR D2	F185	
		D4 OR D8	F186	
		C1 OR C2	F187	
		C4 OR C8	F188	
		B1	F189	F0
E129C	USE E165			
E129D	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 2 TIMES OBSERVE MIR AND SELECT.	MIR BIT SET = D1 OR D2	F190	
		D4 OR D8	F191	
		C1 OR C2	F192	
		C4 OR C8	F193	
		B1	F194	F0
E130	USE E165			
E131	USE E165			
E132	USE E165			
E133	USE E165			
E134	USE E165			
E135	USE E165			
E136	USE E165			
E137	USE E165			
E137A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F11	
E137B	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F179	
E137C	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F179	
E137D	USE E165			
E137E	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F163	
E138	USE E165			
E139	USE E165			
E140	USE E165			
E141	OPERATOR ACTION	MACHINE ACTION	D	D
1	NONE	NONE	F195	
E142	USE E165			
E142A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F196	
E143	USE E165			
E144	USE E165			
E145	USE E165			
E147	USE E165			
E148	USE E165			
E149	USE E165			
E149A	USE E165			
E150	USE E165			
E151	USE E165			
E151A	OPERATOR ACTION	MACHINE ACTION	A	D
1.	OPERATOR STARTED TEST 4		2	F197
2.	READ NOTE 1, MANUAL PROCEDURE			
E151B	SEE NOTE 1, MANUAL PROCEDURE			
E151C	OPERATOR ACTION	MACHINE ACTION	A	D
1	WITH TAPE DECK POWER ON, PLACE A PIECE OF WHITE PAPER UNDER EOT DETECTOR AND METER TM4 2G (EOT/)	0%	F198	F199
E152	USE E165			
E153	USE E165			
E154	USE E165			
E155	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F200	
E156	USE E165			
E157	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER TM2 1X (FPT/)	0%	F201	F202
E158	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F203	
E159	USE E165			
E160	USE E165			
E161	USE E165			
E162	USE E165			
E163	USE E165			
E164	USE E165			
E165	ERROR NUMBERS REFERING TO E165 WERE NON FAILURES DURING BUGGING. THE ERROR NUMBERS REMAIN AS A REFERANCE FOR INTERMITTANT FAILURES OR UNPREDICTED FAILURES IN THE DRIVE. SEE F 204			

E166 OPERATOR ACTION

1 FORCE STEP 3 TIMES AND OBSERVE MIR.
MIR CONTAINS THE AMOUNT OF 256 CHAR
RECORDS THAT FAILED AFTER 10 RETRYS

2 FORCE STEP 1 TIME AND OBSERVE MIR.
MIR CONTAINS THE AMOUNT OF 256 CHAR
RECORDS THAT WERE CORRECTED BY RETRY. SEE F204

E167 OPERATOR ACTION

1 FORCE STEP 5 TIMES AND OBSERVE MIR.
MIR CONTAINS THE AMOUNT OF 256 CHAR.
RECORDS READ, INCLUDING RETRYS.

2 FORCE STEP 1 TIME AND OBSERVE MIR.
MIR CONTAINS THE AMOUNT OF 256 CHAR
RECORDS THAT FAILED. SEE F204

E168 OPERATOR ACTION A D

1 TO VERIFY TAPE ERASE FUNCTION, PUT TAPE
TO LOAD POINT AND ON LINE. SELECT NUMERIC
6 TEST AND ALLOW TO WRITE ONES TAPE LONG
ENOUGH TO GIVE OPERATOR TIME TO PROBE IN
FOLLOWING STEPS. WHEN TAPE WRITTEN PRESS
SYS CLR AND SELECT NUMERIC 07 TO REWIND C
SELECT NUMERIC 11 TO START ERASE, AND SCOPE C
FOLLOWING POINTS IN THE ORDER LISTED.

SCOPE:				
TM4 2T (SWS/)	*LOW (OV)		F206	
TM4 1J (WDS/)	*HIGH(3-5V)		F207	
TM3 2Q (RDS/)	*HIGH(3-5V)	F0	F205	C

*NOTE: SIGNALS WDS/ AND RDS/ CAN BE SCOPED WHEN
TEST 6 RUNNING TO OBSERVE SIGNAL
CONDITION AS A NON ERASE FUNCTION

FAILURE DICTIONARY

NOTE 0: IF DDP IS IN ONE OF PORTS 1 THRU 4 USE PS1-1
IF DDP IS IN ONE OF PORTS 5 THRU 8 USE PS1-2 B
IF DDP IS IN ONE OF PORTS 9 THRU 12 USE PS1-3 B

NOTE 1: DATA ERRORS THAT ARE CORRECTED BY RETRY CAN BE
CAUSED BY A BAD SECTION OF TAPE OR BY DIRTY
TAPE PATH. ALSO SEE F 126. IF RUNNING TEST 4
THE OPERATOR CAN OVERIDE ERRORS AND OBTAIN AN
ACCUMULATED ERROR COUNT AT EOT OF TOTAL RETRYS
THAT PASSED OR FAILED. TO OVERIDE ERRORS IN
TEST 4 PLACE EXT/IRQ SW TO EXT AND RESELECT TEST 4.

NOTE 2: A DEGRADED TEST TAPE OR A DIRTY TAPE PATH CAN CAUSE
UNPREDICTABLE FAILURES TO OCCURE, THE OPERATOR
SHOULD ASSURE THE CONDITION OF BOTH.

NOTE 3: EITHER A PREVIOUSLY TESTED FUNCTION IS NOW FAILING
OR A LARGE SECTION OF TAPE IS BAD. RESTART THE
MIR FROM TEST 1, IF THIS SAME FAILURE OCCURES THE
OPERATOR CAN OVERIDE ERRORS IN TEST 4 AND OBTAIN
AN ACCUMULATED COUNT AT EOT OF TOTAL RETRYS THAT
PASSED OR FAILED. TO OVERIDE ERRORS PLACE EXT/IRQ
SW TO EXT AND RESELECT TEST 4. ALSO SEE F 126

FAILURE	SUSPECT CHIPS OR PROCEDURE		
F0	FAILURES OTHER THAN THOSE LISTED WERE NOT DETECTED WITH BUGGING. PUNT		
F1	PARITY ERROR OCCURED DURING TMMTR PERFORM F E MEMORY TEST		
F2	TM1 B3, C7, E1, E7		
F3	TM2 E3 TM4 F5		
F4	TM2 E3, F5		
F5	TM2 F3, F7		
F6	TM2 F3, F5		
F7	TM2 E7, F7	1 5	
F8	TM2 E7 TM4 F5	1 9	
F9	B711/B771- CG1 C1 B721-CG2 C3 CD2 A5	2 5 9	D D
F10	TM4 B5	2	
F11	TM4 C1	2 82 90 137	
F12	TM4 F5	2	
F13	TM4 A3	2	
F14	TM4 E1	2	
F15	TM3 F1, A1 TM4 D3	2 2	
F16	TM4 E5, C7, D5, E3, A1	2	
F17	TM4 F3, D3, E5	2	B
F18	TM1 E1 PS1-(NOTE 0) B7	3 3	B B B B
F19	PS1-(FROM TABLE) F7 E7 MU4 D5	5 5	B B B B
F20	PS1-(FROM TABLE) D1, A7	5	
F21	TM1 E1, E7, C7	5	
F22	TM1 B3, C7	5	
F23	TM4 D7, B7	5	
F24	TM4 E7 OR SIGNAL RDY/ FROM TAPE GROUNDED	5	
F25	TM2 E7 TM1 E3, E7, A3	5 5	
F26	TM2 E3, E1	5	
F27	TM2 F1 OR SIGNAL FPT/ FROM TAPE GROUNDED	5	
F28	TM2 F3 TM4 C7, B5	5 5	

F29	TM2 F3	5
	TM4 D7, B7	5
F30	TM4 E7 OR SIGNAL LDP/ FROM TAPE GROUNDED	5
F31	TM1 A3	5
	TM2 F3	5
	TM3 C5	5
	TM4 D3, C1	5
F32	TM2 E3, D5	5
	TM4 B1	5
F33	TM2 E3, D5	5
	TM3 E3, F5	5
F34	TM2 E7	5
F35	TM2 E3	5
F36	TM4 E7	5
F37	TM2 F3, E3	5
F38	TM4 A1, A3, A5	6
F39	PS1-(NOTE 0) D7, C1, E3	6 7
F40	GO TO CONSOLE MTR	2
F41	TM4 A5, A3	8
F42	CD1 OR CD2 - REPLACE CD SCLK DRIVER CHIP THAT	9 B
	CORRESPONDS TO THE MAG TAPE PORT	9 B
F43	PS1-(NOTE 0) E7	9
F44	TM4 A1, A3, A5, A7, E7	9
F45	TM4 E1, D1	9
F46	TM4 A5, A3	9
F47	TM3 F1, F5	9
	TM4 B1, B5, C3	9
F48	TM4 A3, A5, E5	10
F49	TM4 A7, E1, D1	11
F50	TM4 A3, A5	11
F51	TM4 A1, A3, A5	11
F52	TM2 E3	11
	TM3 F1, F5, E5	11
	TM4 F5	11
F53	TM3 F5	11
	TM4 B5, A7, C7, A1, D1, B1, C3	11
F54	TM3 D3, C5, F1, E3, A1	11
F55	TM3 C3, B3, A1, C1, D5	11
F56	TM4 D1	12 47A
F57	PS1-(NOTE 0) E7, E5, E3, A3, C1, D1, D7, B3	12
F58	TM4 E1	12
F59	PS1-(NOTE 0) F7, A5, A3, E5, C1	13
F60	TM4 E1, D1, B5	14
F61	PS1-(NOTE 0) D1	14
F62	TM3 E3, F5, E5	15
	TM4 A3	15
F63	PS1-(NOTE 0) E7, E5, A3, C1	15
F64	PS1-(NOTE 0) F7, A5, C3, B3, D3	17
F65	TM3 F3, F1	9
F66	PS1-(NOTE 0) E7	18
F67	TM4 E1, D1	18
F68	PS1-(NOTE 0) A5, C1, B5, A7	18
F69	PS1-(NOTE 0) D5, D3, C3, E3, A7	20
F70	PS1-(NOTE 0) B3, E3	21
F71	IF IN ONE OF PORTS 1 THRU 4	22
	PS1-1 C5 A7 B5 C7 A5 B3 D3	22
	PS1-2 B5 D3	22
	IF IN ONE OF PORTS 5 THRU 8	22
	PS1-2 C5 A7 B5 C7 A5 B3 D3	22
	E01 A7	22
F72	PS1-(NOTE 0) F7 E7	22
F73	TM1 E7 C7 E1	22
F74	PS1-(NOTE 0) B7	22
F75	TM3 B3 C1 A1	22
F76	PS1-(NOTE 0) F7 E7	23
	MU4 D5	23
F77	PS1-(NOTE 0) A5 B5	24
F78	TM4 C7 B5	24A
F79	TM4 D1	25
F80	TM2 E7 SEE F90	26
F81	TM1 E7 E1	26
	TM2 C7	26
F82	TM1 E7 E3	26
F83	TM1 B3 E1 C7	26
F84	TM2 D1 C7 (SEE F90)	26
F85	TM2 B5 C3 E7 F7 (SEE F90)	26
F86	TM2 B5 B3 F3 F5 (SEE F90)	26
F87	TM2 B5 B3 F3 F7 (SEE F90)	26
F88	TM2 B1 A3 E3 F5 (SEE F90)	26
F89	TM2 B1 A3 E3	26
	TM4 F5	26

F90	FOLLOWING CHIPS CAUSE UNPREDICTABLE FAILURES, AND SHOULD BE REPLACED ONLY AFTER PREVIOUS CHIPS FAIL TO CORRECT PROBLEM. TM2 C7 F1	26
F91	TM2 C7 TM1 E7 E3 C7	27 27
F92	TM2 B1 A3 E3	27
F93	TM2 B5 B3 F3	27
F94	TM2 B5 C3 E7	27
F95	TM4 C1 B1	11
F96	TM3 F1 F3 F5	11
F97	TM3 B3 C1 D3 A1 E3 F5 E5 F1 D5	29
F98	TM3 F7 C3 C1 E3 A7 D5 A1 TM4 E1 D1	29 29
F99	TM3 E3 F1 C1	30
F100	TM3 D3 A1 F1 C5 E3 C7 D7 E1	30
F101	TM3 E3 F1 TM4 C3	30 30
F102	TM3 F5 E5 D7 F1 D5	30
F103	TM3 B3 C3 C1 F3 D5	30
F104	TM2 D5 TM3 D3 TM4 B1	31 31 31
F105	TM3 B1 E1 D1 B7	31
F106	TM1 C3 TM2 C7 D5 E3	32 32
F107	TM4 C1 B1	32
F108	TM4 E5 C5	33
F109	PS1-(NOTE 0) D7 C1 E3	34
F110	TM3 E1 TM4 D7	34 34
F111	TM4 A5 A3 C7 E5 D5	34
F112	TM4 C3	35 69
F113	TM4 E5	36 52
F114	TM3 A5 A3 D3 B3 F5 E7	37
F115	TM4 D3 F3 E3 D5 C7 A1	37A
F116	TM4 A5 A3 A1	37A
F117	TM3 A1 E1 F1 TM4 D1	37A 37A
F118	TM3 E5 C1 D7	37A
F119	TM3 A3 B3 D3 A5 A7 E3 F5 E7	37A
F120	TM2 D5 E3	38
F121	TM3 A7 D3 C7 A1 TM4 D5 TM4 D5	39 39 39
F122	TM2 D5 E3	40
F123	TM3 C7 TM4 D5	41 41
F124	PS1-(NOTE 0) E7 B3 B5	42
F125	TM3 F5	47B
F126	THE FOLLOWING CHIPS CAUSE UNPREDICTABLE TAPE ERRORS AND SHOULD BE REPLACED ONLY AFTER PREVIOUS PROCEDURE OR CHIPS FAIL TO CORRECT PROBLEM. TM1 C3 E3	142A
F127	FAILURES OTHER THAN THE ONES LISTED ARE INTERNAL FAILURES OF THE MAG TAPE DRIVE	48
F128	TM4 F7 OR SIGNAL SFC/ LOADED AT DECK	48
F129	SIGNAL SFC/ FAILING AT TAPE DECK	48
F130	TM4 C1 E3	49
F131	TM2 F3 TM4 D7 B7 E7	50 50
F132	TM4 E7 OR SIGNAL LDP/ BAD FROM DECK	50
F133	TM2 E7 TM4 D7 E7 B7	50 50
F134	TM4 E7 OR SIGNAL RDY/ BAD FROM DECK	50
F135	TM4 E7 D7 C7	50
F136	TM4 E7 OR SIGNAL EOT/ FROM DECK LOADED	50
F137	TAPE DECK FAILING TO RESPOND TO SIGNAL SFC/	51
F138	TM3 F1 A1 TM4 F7	51 51
F139	SIGNAL RWND/ FAILING AT TAPE DECK	52
F140	TM4 B1 B3 F5 OR SIGNAL RWND/ LOADED AT DECK	52
F141	SIGNAL SRC/ BAD AT TAPE DECK OR F 143	53
F142	TM3 E3 TM4 F7 OR SIGNAL SRC/ TO DECK LOADED	53 53 51
F143	TAPE SPEED OR RAMP TIME OUT OF TOLERANCE SEE TAPE MANUAL TO ADJUST. BEFORE DOING SPEED ADJUSTMENT, IT IS SUGGESTED THAT THE OPERATOR DO A RETRY AND WHEN PERFORMING TAPE LOAD SEQUENCE THE BOT TAB SHOULD NOT INITIALLY BE UNDER BOT DETECTOR. TAPE SHOULD MOVE TO BOT WHEN LOADING.	53 54)
F144	TAPE DECK NOT RESPONDING TO SIGNAL SRC/	54
F145	TM3 E3 TM4 A1 A3 A5 F7	54 54

F146	TM4 D3 E3 C1 C5	57
	OR RDY/ TIMER IN TAPE DECK	57
F147	TAPE DECK FAILING TO RESPOND TO SIGNAL SWS/	59
F148	TM3 A5	59
	TM4 F7	59
F149	TM4 E3 D3 C5	59
F150	SIGNAL RDY/ FROM DECK FAILING UNDER	61
	REWIND CONDITION	61
F151	TAPE DECK FAILING TO RESPOND TO SIGNAL RWND/	61
F152	TM4 A1 A3 A5 B1 B3	61
F153	TM4 D3 C1 OR TAPE REWIND SPEED (50 IPS) BAD	62
	OR F143	62
F154	TM3 F1	64
	TM4 B3 D3	64
F155	TM4 B1 B3	66A
F156	TM4 A7	68A
F157	TM3 E1 E5	69A
F158	TM2 E1 D1 C5	70
F159	TM3 C1	70A
	TM4 C1	70A
F160	TM1 A3 A7 F1	73
	TM2 F3	73
	TM4 D3	73
F161	TM1 A3	75
	TM3 C5	75
F162	TM4 B3	77
F163	TM3 D1	78 111A 137
F164	TM3 F3 B5 C7 E7 D7 C3	80
	TM4 D7 C3	80
F165	TM3 A5 E7 B7 E1 A5 D3	80
	TM4 F7	80
F166	TM3 D1 E7 B5	81
F167	TM4 D3 D5 E5	81
F168	TM1 E7 E3	82A
	TM2 E1 D1 C5	82A
F169	TM2 A3 B3 C3 D1	82A
	TM3 D1	82A
F170	TM1 C3 E3	82B
	TM2 A3 B3 C3 D1	82B
F171	TM3 D7	83
F172	TM3 F3 D1	84
F173	TM3 D7 D1 B1 B5 E7 E1	85
F174	TM2 A3 B3 C3	86
F175	TM3 B7 C7 D7 E7	87
F176	TM3 A3 C1	88A
F177	TM3 B1	92
F178	TM4 D3 D5	94A
F179	TM3 E1	96 137B 137
F180	TM1 C3 D3	103
	TM2 B1 C1 F1 D3	103
	SEE F126 AND NOTE 2, MANUAL PROCEDURE	103
F181	TM4 E5 C5 F3	119A
F182	TM4 E3	122
F183	TM1 C3 D3 A7 E3 E7 A3 B3 C7 A5 E1	127
	TM2 E7	127
F184	TM1 A3	129
F185	TM1 E5 B3 C1 D1 E1 A7 C3	129B
F186	TM1 D5 C1	129B
F187	TM1 C5 C1 C3	129!
F188	TM1 B5 C1	129B
F189	TM1 A5 C1	129!
F190	TM1 E5 E3 C1	129D
F191	TM1 D5	129D
F192	TM1 C5	129D
F193	TM1 B5	129D
F194	TM1 A5	129:
F195	TM3 A5 E1	141
F196	TM2 C1	142A
	TM1 E5 OR SEE F126	142A
F197	TM1 E3 C3	151A
F198	TM4 D7 C7 E7 B5	151'
F199	SIGNAL EOT/ FROM TAPE DECK FAILING	151C
F200	TM4 B5 C7	155
F201	TM2 E1 F1 F3	157
F202	SIGNAL FPT/ FROM TAPE DECK FAILING	157
F203	ERASE FUNCTION IN TAPE DECK FAILING	158
F204	THE FOLLOWING ARE TAPE DECK FAILURES WHICH DUE TO THE DEGREE THEY CAN BE OUT OF TOLERANCE ARE UNPREDICTABLE AND MAY APPEAR AS INTERMITTANT FAILURES: TAPE, DIRTY TAPE PATH, SKEW, TAPE SPEED, RAMP TIME OR READ AMP GAIN	
F205	ERASE FUNCTION IN TAPE DECK FAILING	1658
F206	TM3 E1 A5	168
	TM4 F7	168

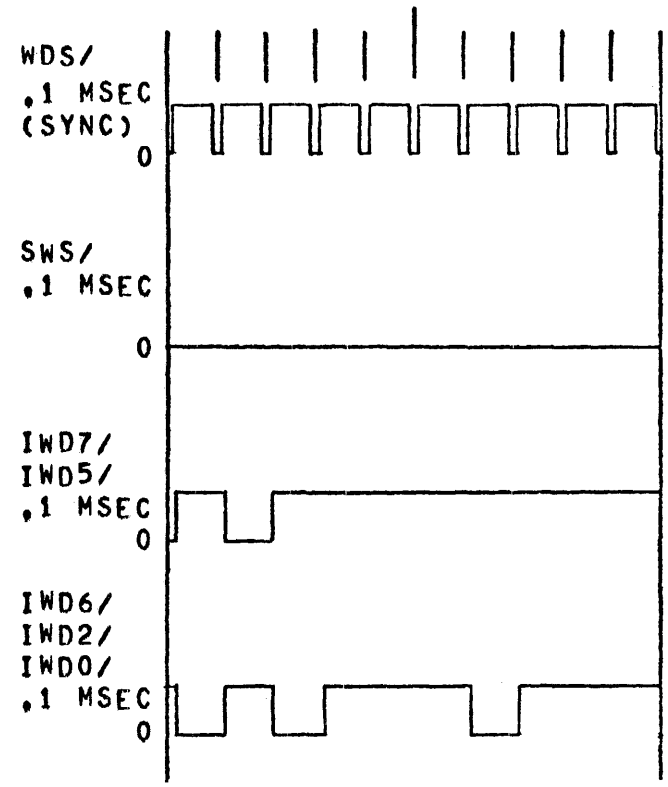
F207	TM3 F3	168
F208	TM3 E7 B7 B1	74A
	OR NOTE 1	74A
F209	TM1 C3	5
F210	TM4 F7	72
F211	TM2 A5	72
	TM4 F7	
F212	TM2 B7 C1 E1 A7 A5	72
	OR SIGNAL LOADED AT DRIVE	72
F213	TM3 F7	72 74
	OR SIGNAL RDS/ FROM DECK FAILING	72 74
F214	TM3 E7 B7 B1 E1 A1 E3 F7	72
F215	TM3 A3 C1 D1 B5	72
F216	TM3 A1 C5	72
	TM4 C1 D3	72
F217	TM3 B5	72
	TM4 E3	72
F218	TM2 A7 B7 B5	74
	OR TAPE DECK LOADING SIGNAL	74
F219	TM2 B7 C1 E1 D3	74
F220	TM2 B1	74
	TM3 C1	71
F221	TM1 A7	74
	TM3 E7 B7 B1 D3 E1 B5	74
F222	DATA LINE FROM DECK BAD	74
	OR TM1 F7 F5 LOADING SIGNAL	74
F223	SIGNA IRDP/ FROM DECK BAD	74
	OR TM2 F1 LOADING SIGNAL	74
F224	TM2 B1	74
	TM1 D7 C7 B3 A5 D3	74
	OR F126	74
F225	TM1 E1 D1 E5 D5 C5 B5 A5 C1 B3	74
	OR F126	74

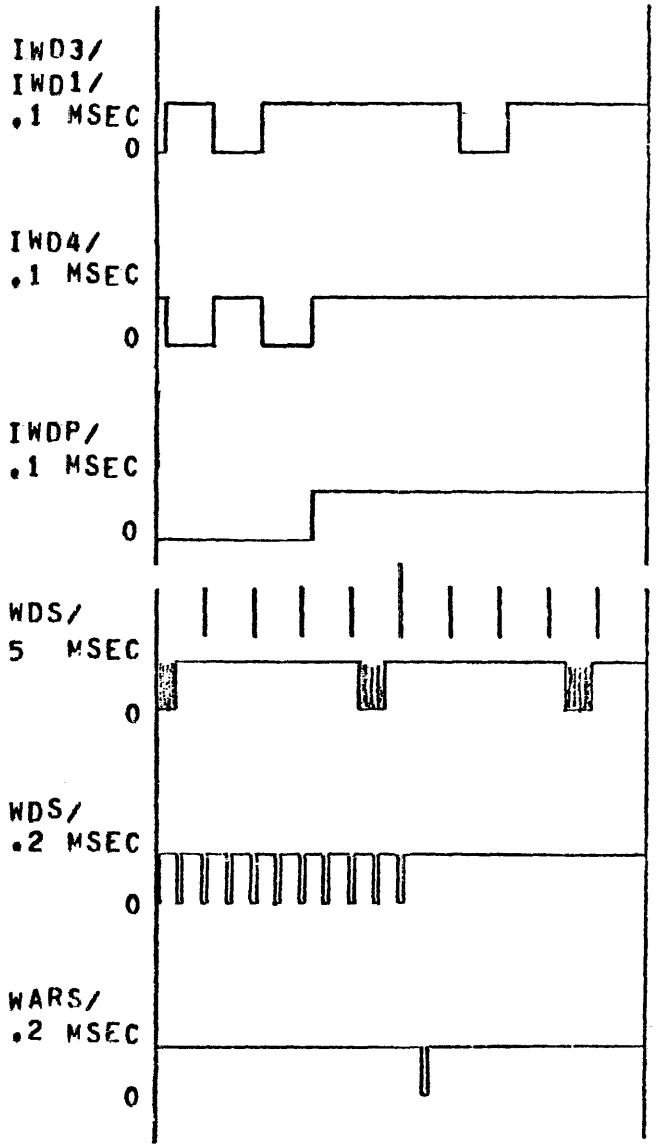
ILLUSTRATIONS

SET #1 TEST 9 - WRITE LOOP DATA TO TAPE SEQUENCE

ALL WAVEFORMS IN SET #1 ARE IN SYNC WITH WDS/ - NEG EDGE
TAPE DECK MAY BE SWITCHED OFF LINE TO SCOPE WAVEFORM SET #1

SIGNAL	TEST POINT
WDS/	TM4-1J
SWS/	TM4-2T
IWD7/	TM2-2K
IWD6/	TM2-1K
IWD5/	TM2-2L
IWD4/	TM2-1N
IWD3/	TM2-1P
IWD2/	TM2-2R
IWD1/	TM2-1I
IWD0/	TM2-2X
IWDP/	TM2-2M
WARS/	TM1-1C

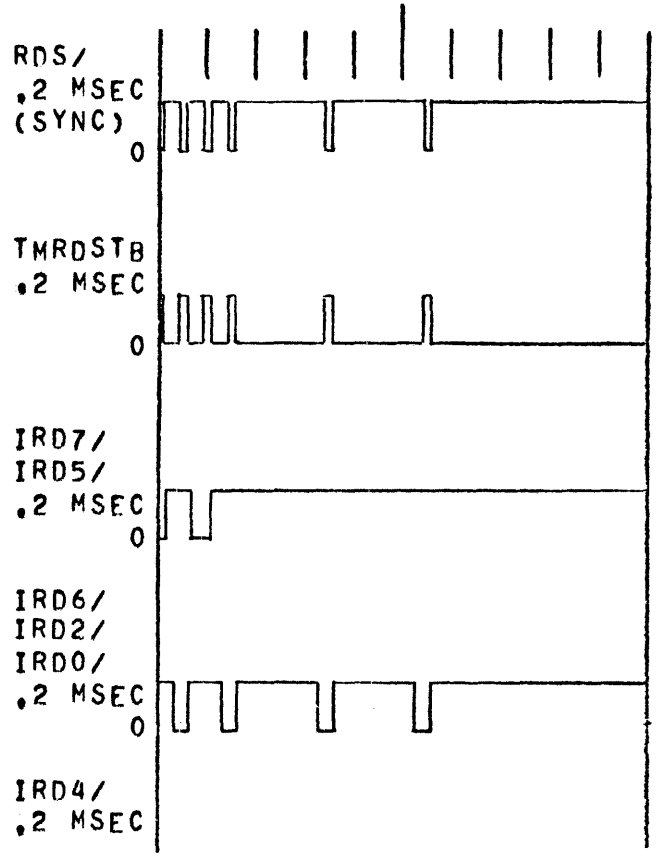


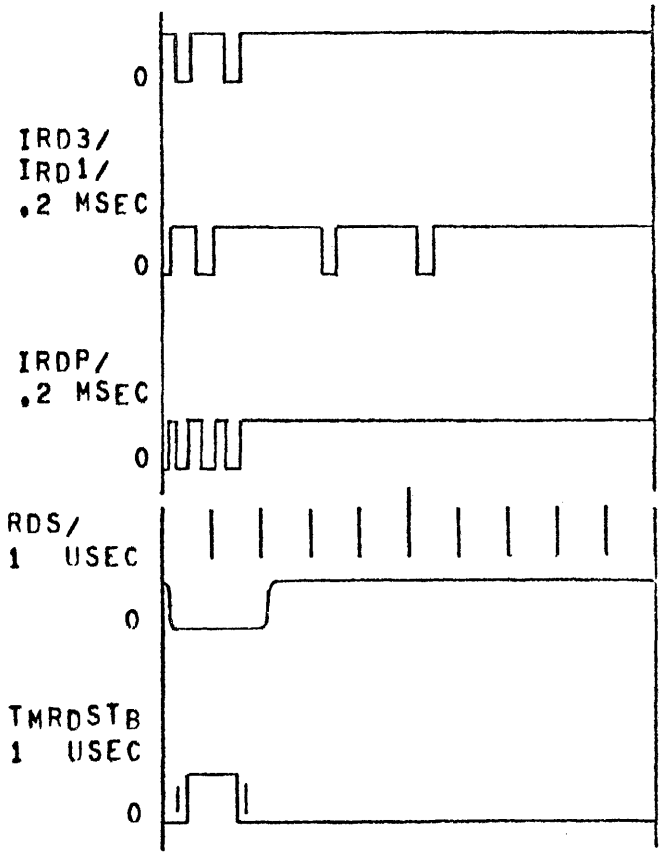


SET #2 TEST 9 - WRITE LOOP DATA FROM TAPE SEQUENCE

ALL WAVEFORMS IN SET #2 ARE IN SYNC WITH RDS/ - NEG EDGE
TAPE DECK MAY BE SWITCHED OFF LINE WHILE CHANGING PROBE BUT
MUST BE BACK ON LINE FOR WAVEFORMS

SIGNAL	TEST POINT
RDS/	TM3-2Q
TMRDSTB	TM3-2B
IRD7/	TM1-1L
IRD6/	TM1-2Q
IRD5/	TM1-1S
IRD4/	TM1-2U
IRD3/	TM1-2V
IRD2/	TM1-2E
IRD1/	TM1-1K
IRD0/	TM1-1P
IRDP/	TM2-2Y

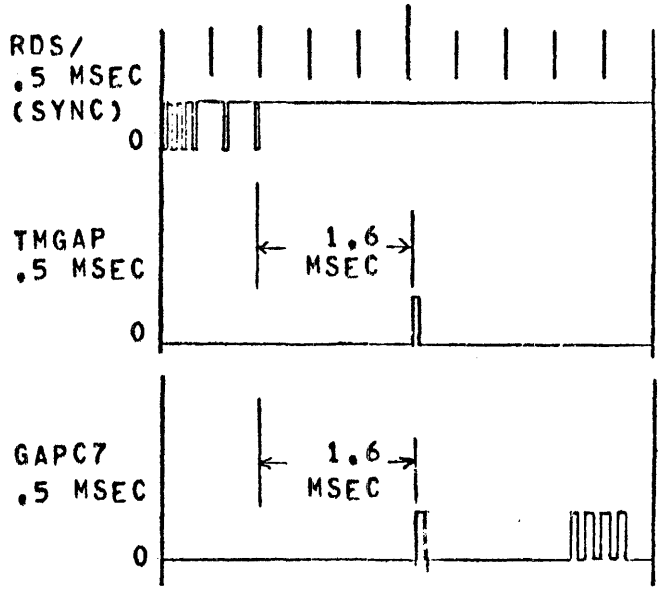




SET #3 TEST 9 - WRITE LOOP GAP DETECTION SEQUENCE

ALL WAVEFORMS IN SET #3 ARE IN SYNC WITH RDS/ - NEG EDGE
TAPE DECK MAY BE SWITCHED OFF LINE WHILE CHANGING PROBE BUT MUST BE BACK ON LINE FOR WAVEFORMS

SIGNAL	TESTPOINT
RDS/	TM3-2Q
TMGAP	TM4-2N
GAPCT	TM3-M4



SLCMTR SINGLE LINE CONTROL B 253 AND B 351 SINGLE LINE CONTROL

```
 PROGRAM-ID   SLCMTR.
* NOTE:    THIS  MTR APPLIES   TO SINGLE  LINE  CONTROL
*          DDPS  B351,    B253
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*  *                                                        *
*  *SET-UP    INSTRUCTIONS                                  *
*  *                                                        *
*  *REMOVE  CUSTOMER  SLC  I/O  CABLE  AND  INSTALL  MTR    *
*  *TEST  BLOCK,  PART  # 2601  7616  AND PLACE  BOTH       *
*  *SWITCHES  TO  MODEM POSITION.                           *
*  *REMOVE  LC5  BOARD  AND  REPLACE  CLOCK  JUMPERS        *
*  *E5  AND  C5  WITH  MTR  CLOCK  JUMPERS,  PART  #        *
*  *2601    7624   IN  E5  AND  2601    7632   IN  C5.      *
*  *REINSTALL   LC5.                                        *
*  *PLACE   MTR/MEM  SWITCH  IN  MTR  POSITION.             *
*  *PLACE   IRQ/EXT   SWITCH  IN  CENTER  POSITION          *
*  *LOAD  SLCMTR  CARD  DECK  2601   4068                   *
*  *PLACE   LOAD  SWITCH  IN  NORMAL  -  PRESS  CLEAR       *
*  *                                                        *
*  *                        NOTE                            *
*  *                                                        *
*  *ANY  DISAGREEMENT   WITH  OPERATOR  INSTRUCTIONS        *
*  *SEE  INCREMENTER  ADDRESS  FOR  FURTHER  ACTION         *
*  *                                                        *
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*
*                    OPERATOR  INSTRUCTIONS
*
*                          NOTE
*
*
*    IF  SYSTEM  HAS  A  SPO,  THE  TRANSMIT  AND  RECEIVE
*    INDICATORS   SHOULD  OPERATE  AS  FOLLOWS:
*
*    TRANSMIT   INDICATOR:
*
*              1.  OFF  BEFORE  A  TEST  IS  SELECTED.
*
*              2.  FLASHES  ON  DURING  TEST  1  AND  2.
*
*              3.  ON  DURING  TEST  3.
*
*              4.  OFF  DURING  TEST  4.
*
*    RECEIVE    INDICATOR:
*
*              1.  OFF  BEFORE  A  TEST  IS  SELECTED.
*
*              2.  ON  DURING  TEST  3.
*
*              3.  OFF  DURING  TESTS  1,  2  AND  4.
*
*    IF  MTR  RUNS  OK,  BUT  INDICATORS   DO  NOT  OPERATE
*    AS  SPECIFIED    USE----ERROR     #  M179
*
*    PROG  STEP      INCR      OPERATOR  ACTION
*
*         1          000E      VERIFY  MIR  =  SYS  CONFIG.
*                              IF  YES  PRESS  CONSOLE  READY  OR
*                                      SPO  INPUT  REQ.
*                              IF  NO   SEE  INCR  FOR  INST.
*
*         2          01C4      SELECT  SLC  PORT  NUMBER  -
*                              SELECT  FROM  PK  1  THRU  12  IF
*                              CONSOLE  OR  01  THRU  12  IF  SPO
*
*         3          01C5      SELECT  TEST  -  PRESS  TWO  NUMERIC
*                              KEYS  TO  SELECT.     EXAMPLE:
*                              01  =  TEST  1.
*                              (SEE  TEST  SELECT  TABLE)
*         4          0648      PORT  SELECT  TEST  (SEE  0648)
*                              FST  TO  CONTINUE  MTR
*         5          01C5      SELECT  TEST  2.
*         6          01C5      SELECT  TEST  3.
*         7          08B7      PLACE  A  JUMPER  ON  LC7-1C.    TOUCH
*                              JUMPER  TO  GRD  THEN  REMOVE.  IF
*                              INCR  FAILS  TO  STEP-ERROR  #  M166
*         8          01C5      CHANGE  MTR  TEST  BLOCK  SWITCH
*                              S1  TO  DIRECT  AND  S2  TO  TDI  AND
*                              REPEAT  TEST  3.  IF  ANY  ERRORS
*                              OCCUR  IN  THIS  MODE  USE  ERROR
*                              #  M167
*         9          08B7      FORCE  STEP.
*        10          01C5      CHANGE  MTR  TEST  BLOCK  SWITCH
*                              S2  TO  BDDI  AND  REPEAT  TEST  3.
*                              IF  ANY  ERRORS  OCCUR  IN  THIS
*                              MODE  USE  ERROR  #  M168
*        11          08B7      FORCE  STEP.
*        12          01C5      SELECT  TEST  4.  NOTE:  DUE  TO
*                              LONG  RUN  TIME  THE  OPERATOR
*                              CAN  MONITOR  MIR  TO  DETERMINE
*                              WHEN  TEST  HALTS.
*        13          01C5      RETURN  MTR  TEST  BLOCK  SWITCHES
*                              S1  AND  S2  TO  MODEM.  IF
*                              CUSTOMER  USE  IS  ASYNCHRONOUS
*                              GO  TO  STEP  14,  IF  NOT  GO  TO
*                              STEP  15.
*        14                    RESTORE  CUSTOMER  CLOCK  JUMPERS
*                              E5  AND  C5  ON  LC5  BOARD  AND  RUN
*                              TEST  5.
*        14A         09BB      TEST  5  STOP  SEE  INCR  09BB  FOR
*                              INSTRUCTIONS.
*        15          01C5      DDP  TEST  COMPLETE,  RESTORE
*                              SYSTEM  TO  CUSTOMER  CONFIGURATION
*                              IF  FURTHER  TESTING  DESIRED  FOR
*                              MODEM  OR  DATA  LINE  CHECK  OUT,
*                              SEE  TEST  7  INSTRUCTIONS.
*
*  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *  *
*  *                                                        *
*  *                    TEST  SELECT  TABLE                 *
*  *                                                        *
*  *  NUMERIC      TEST                                     *
*  *                                                        *
*  *    01         TEST  DDP  STATUS-WRAP   AROUND          *
*  *                                                        *
*  *    02         TEST  XMITTER  WITH  SOFT  RECEIVER      *
*  *                                                        *
*  *    03         TEST  FULL  DUPLEX  ALL  MODES           *
*  *                                                        *
*  *    04         TEST  TIMER                              *
*  *                                                        *
*  *    05         ASYNCHRONOUS  CLOCK  TEST                *
*  *                                                        *
*  *    06         MANUAL  READOUT  OF  SND  AND  RCV       *
*  *               BUFF  ERRORS                             *
*  *                                                        *
*  *    07         OPTIONAL  TESTING  -  SEE  SECTION  5    *
*  *               SPECIAL   INSTRUCTIONS                   *
*  *                                                        *
*  *    08         NOISE  MONITOR  -  SEE  SECTION  5       *
*  *               SPECIAL   INSTRUCTIONS.                  *
*  *                                                        *
*  *    09         PRINT  RCV  BUFFER  -  TERMINATE  WITH*
*  *               CONS  RDY  OR  SPO  INPUT  REQ
```

```
*   *
*   *       10          PRINT  RCV  AND XMITTED  CHAR ERRORS*
*   *                   TERMINATE  WITH CONS  RDY OR SPO
*   *                   INPUT  REQ.
*   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *   *
****TEST    7  INSTRUCTIONS    -  SEE  SECTION  5
*
 STARTCONTROLLER.           START  FROM SYSTEM  CLEAR
```

PROGRAM LISTING

```
0000   81DD        CPCR = BUSSTEST   - 1.     TEST  EXTERNAL  BUSS
                 *********ERROR      # M1
                   TESTNUMBERLIMIT   VALUE  IS  10.
                 *
0001   F18E        IF  IRQ  SKIP.           TEST  FOR  ERROR  IRQ
0002   4005        MPCR = IRQOFF   - 1.
0003   F108        ASR  BEX.
0004   F0E1        MIR = B.
0005   F000        WAIT.      UNEXPECTED  IRQ,  ADDRESS  IN  MIR
                 *
                 *********ERROR      # M2
                 *
                  IRQOFF.
0006   F17D        DLD.                    READ  CONFIGURATION   CARD
0007   F0F9        WHEN RDC  BEX.
0008   F0E1        MIR = B.         SYSTEM  CONFIGURATION   IN  MIR
0009   F017        A1 = B.
000A   F0F9        WHEN RDC  BEX.
000B   F0FF        0 EQV B.
000C   F09D        IF  ABT  SKIP.
000D   F000        WAIT.            CONFIG  FF  NOT RESET  BY  BEX-
                 **********          FAILURE  IS  CON1  CHIP  D7
000E   F0F8        WHEN IRQ  STEP.
                 * IF  PROGRAM HANGS HERE  RUN SPO  OR CONSOLE  MTR
                 * VERIFY  CORRECT  SYSTEM  CONFIGURATION   DISPLAYED   IN  MIR
                 * IF  YES,  PUSH  READY  BUTTON  ON CONSOLE  OR
                 * INPUT  REQUEST  ON SPO
                 * IF  NO,  PRESS  FST
                 *
                 * METER  CON1  PIN  2K
                 *  IF  0%  REPLACE  CHIPS   D5,D3,C7,D7      ON  CON1  CARD
                 *  IF  NOT  0%  REPLACE  CHIPS   D5,A5,A7,F5,F7        ON  CON1  CARD
                 *
000F   F18E        IF  IRQ  SKIP.
0010   4072        MPCR = CON1LOOP   - 1.
                 *
0011   8C5C        CPCR = BUSS2   - 1.          TEST  EXT  BUSS
                 *********ERROR      # M3
0012   F108        ASR  BEX.
0013   F051        A3 = B.          SAVE  CONTROLLER  ADDRESS
0014   F07A        B = BITT.        SET  STATUS  WORD DATA  REQUEST  BIT
0015   C820        SAR = 8  LIT  = @20@.
0016   F07F        B = B  R.
0017   F036        A2 = B  L.       CLEAR  BITS  9-16
0018   F066        B = A1.  SYSTEM  CONFIGURATION   FOR SPO-CONSOLE   CHECK
0019   F0C3        IF  NOT  LST  SKIP.     SPO-CONSOLE   CHECK
001A   E000        LIT = 0.                SPO  ON SYSTEM
001B   F1CC        MIR = A2  OR LIT.
                 * FOR  SPO  CONTPORTADDRESS          = 1000XXXX00000000
                 * FOR  CONSOLE  CONTPORTADDRESS    = 1000XXXX00100000
001C   F0CF        MAR1 = AMPCR.
001D   01DD        AMPCR = CONTPORTADDRESS.
001E   F0F3        MW1.             STORE  CONTROLLER  PORT  ADDRESS
001F   8189        CPCR = CLEARFLAGS   - 1.     CLEAR  ALL  FLAGS
0020   81A0        CPCR = SETCONTADDRS   - 1.
0021   8228        CPCR = INITMAINSTACK   - 1.     SET  MAIN  STACK  ADDRESS
0022   822F        CPCR = INITFLOSTACK   - 1.    SET  FLOW  STACK  ADDRESS
0023   0029        AMPCR = CONSPORTSELECT   - 1.
                 **
0024   F0DE        MIR = A3.
0025   F066        B = A1.  SYSTEM  CONFIGURATION   FOR SPO-CONSOLE   CHECK
                 **
0026   F0C2        IF  NOT  LST  JUMP.
0027   C001        SAR = 0  LIT  = 1.
                 * SET  FLAG  0  IN  FLAG  WORD 1  TO  1  FOR SPO,  0  FOR CONSOLE
0028   8259        CPCR = SETFLAGW1   - 1.
0029   4077        MPCR = SPOPORTSELECTP    - 1.
                 *
```

```
                CONSPORTSELECT.
               * CONSOLE ON SYSTEM
               * PORT SELECT, OPERATOR ENTERS PK 1-12 TO INDICATE-
               * THE PORT NUMBER OF THE DEVICE TO BE TESTED
               *
002A  81A0           CPCR = SETCONTADDRS - 1.
002B  F1D5           MIR = B001 + 1.      ENABLE KEYBOARD.
002C  F099           DW1.
002D  81AE           CPCR = LITEINDA - 1.
002E  E0FF           LIT = @FF@.                LIGHT PK 1-8
002F  81B4           CPCR = LITEINDB - 1.
0030  E00F           LIT = @0F@.                LIGHT PK 9-12
               * GET PORT NUMBER (PK KEY 1-12)
0031  81C2           CPCR = SELECTPORT - 1.
0032  F017           A1 = B.            SAVE PORT ADDRESS
0033  81AE           CPCR = LITEINDA - 1.
0034  E000           LIT = 0.                   TURN OFF PK 1-8
0035  81B4           CPCR = LITEINDB - 1.
0036  E000           LIT = 0.                   TURN OFF PK 9-11
0037  F066           B = A1.            PORT ADDRESS TO B FOR SAVEPORT
              STOREPORT.              FROM SPO PORT SELECT
0038  81C9           CPCR = CSAVEPORT - 1.  SAVE PORT ADDRESS
0039  CF01           SAR = 15 LIT = 1.          SET FLAG 15 TO INDICATE-
003A  8259           CPCR = SETFLAGW1 - 1.  PORT HAS BEEN SELECTED
               * PRINT TEST SELECT MESSAGE FOR FIRST ENTRY TO SPO-
               * TEST SELECT
003B  C001           SAR = 0 LIT = 1.
003C  827C           CPCR = TESTFLAGW1 - 1. TEST SPO-CONSOLE FLAG
003D  4092           MPCR = SPOTESTSELECTP - 1.  TRUE RETURN SPO
               *
                TESTSELECTCLEAR.           PROGRAM JUMPS HERE TO CLEAR-
               * MEMORY FLAG WORDS 2,3,AND 4 BEFORE ALLOWING THE-
               * OPERATOR TO SELECT A TEST.  MEMORY FLAG WORD 1 AND-
               * THE PORT ADDRESS ARE NOT CHANGED.
003E  8192           CPCR = CLEARFW2-3-4 - 1.
                TESTSELECT.                PROGRAM JUMPS HERE TO ALLOW THE-
               *                 OPERATOR TO SELECT A TEST.  THE MEMORY-
               *                 FLAG WORDS 2,3,4  ARE NOT CHANGED
               * CLEAR ERROR FLAG, IF ON IT REFERS TO LAST TEST
003F  C100           SAR = 1 LIT = 0.
0040  8259           CPCR = SETFLAGW1 - 1.
0041  81A0           CPCR = SETCONTADDRS - 1.
0042  F096           DR1 BEX.           RESET STATUS INTERRUPT
0043  8075           CPCR = TESTSPO-CONSOLE - 1.
0044  4094           MPCR = SPOTESTSELECT - 1.  SPO ON SYSTEM
               *
               * CONSOLE ON SYSTEM
               *
0045  81B4           CPCR = LITEINDB - 1.
0046  E000           LIT = 0.                   CLEAR B INDICATORS
0047  F1D5           MIR = B001 + 1.      ENABLE KEYBOARD
0048  F099           DW1.
               *
0049  81B6           CPCR = LITEINDS - 1.
004A  E008           LIT = 8.                   LIGHT NUMERIC INDICATOR
               *
               *
               * GET FIRST DIGIT OF TEST NUMBER (10 S DIGIT)
004B  81C4           CPCR = SELECTTEST - 1.
004C  F051           A3 = B.            SAVE (10 S DIGIT)
               *
               * GET SECOND DIGIT OF TEST NUMBER (1 S DIGIT)
004D  81C4           CPCR = SELECTTEST - 1.
               *
004E  81B6           CPCR = LITEINDS - 1.
004F  E000           LIT = 0.                   TURN OFF NUMERIC INDICATOR
               * IF STATUS INT. GO TO MEMORY-MODIFY FOR ANY TEST #
0050  F1AE           IF NOT URQ SKIP.           CONSOLE URQ TEST
0051  4316           MPCR = MEMORY-MODIFY - 1.
               *
                TENSLOOPCHECK.
               * TEST TENS DIGIT FOR 0 THRU 9
0052  E00A           LIT = 10.
0053  F032           A2 = A3.
0054  F11B           A2 - LIT.
0055  F0B7           IF NOT AOV SKIP.
0056  40A7           MPCR = INVALIDTEST - 1.
               * TEST ONES DIGIT FOR 0 THRU 9
0057  F033           A2 = B.
0058  F11B           A2 - LIT.
0059  F0B7           IF NOT AOV SKIP.
005A  40A7           MPCR = INVALIDTEST - 1.
               *
                TENSLOOP.
005B  F04B           A3 = A3 - 1.
005C  E00A           LIT = 10.
005D  F09E           IF AOV SKIP.
005E  4060           MPCR = ENDTENSLOOP - 1.
005F  F083           B = LIT + B.
0060  405A           MPCR = TENSLOOP - 1.
               *
                ENDTENSLOOP.
0061  F017           A1 = B.                    SAVE TEST NUMBER
               * INSURE THAT TEST NUMBER IS NOT GREATER THAN THE UPPER
               * LIMIT FOR THIS MTR (SEE DEFINE TESTNUMBERLIMIT)
0062  E00A           LIT = TESTNUMBERLIMIT.
0063  F109           A1 - LIT - 1.
0064  F0B7           IF NOT AOV SKIP.
0065  40A7           MPCR = INVALIDTEST - 1.    ILLEGAL TEST NUMBER
               *
               * DISPLAY TEST NUMBER IN A INDICATORS
0066  F082           B = LIT L.
0067  C890           SAR = 8 LIT = @90@.
0068  F0DC           MIR = A1 + B.
0069  F098           DW2.
               * DISABLE SYSTEM CONTROLLER (SPO OR CONSOLE)
006A  F0E6           MIR = 0.
006B  F099           DW1.
               * INSURE THAT BOTH STATUS AND DATA INTERRUPTS FROM SPO-
               * OR CONSOLE ARE CLEARED BEFORE JUMPING TO MTR
006C  F096           DR1 BEX.           RESET STATUS INTERRUPT
006D  F097           DR2 BEX.           RESET DATA INTERRUPT
               *
006E  81B8           CPCR = SETPORTADDR - 1.  BR1 = INST.  BR2 = DATA
006F  049A           AMPCR = TESTTABLE - 1.
0070  F100           AMPCR = A1 + AMPCR.
0071  F05F           B.
0072  F0C9           JUMP.
               / SUBROUTINES
               * LOOP USED TO METER PIN 2K (TP 92) ON CON1 CARD
                CON1LOOP.
0073  F17D           DLD.
0074  F0F9           WHEN RDC BEX.
0075  4072           MPCR = CON1LOOP - 1.
               *
                TESTSPO-CONSOLE.
0076  C001           SAR = 0 LIT = 1.  SPO-CONSOLE FLAG (1 = SPO)
0077  427C           MPCR = TESTFLAGW1 - 1.
               *
               *
                SPOPORTSELECTP.
               * ENTER HERE TO PRINT SELECT PORT MESSAGE
0078  80D3           CPCR = CONTPRINT - 1.
0079  0252           AMPCR = PORTPRINT.
                SPOPORTSELECT.
               * ENTER HERE TO AVOID PRINTING
007A  81A0           CPCR = SETCONTADDRS - 1.
007B  F0E7           MIR = B001.
007C  F099           DW1.               ENABLE SPO INPUT
```

```
                * SELECT  PORT # PER NUMERIC KEYS (01   THRU 12)
007D  81C2          CPCR = SELECTPORT  - 1.          FOR TENS DIGIT
007E  F017          A1 = B.                          SAVE TENS DIGIT
007F  81C2          CPCR = SELECTPORT  - 1.          FOR ONES DIGIT
                *       ONES DIGIT IS IN B
                * OPERATOR ENTERS PORT NUMBER (1  THROUGH 12)
0080  F0E6          MIR = 0.
0081  F099          DW1.             DISABLE SPO INPUT
                * TEST TENS DIGIT FOR 0 OR 1
0082  E001          LIT = 1.
0083  F109          A1 - LIT - 1.
0084  F0B7          IF NOT AOV SKIP.
0085  41D7          MPCR = INVALIDPORT  - 1.         TENS DIGIT > 1
                * TEST ONES DIGIT FOR 0 THRU 9
0086  E00A          LIT = 10.
0087  F033          A2 = B.                          ONES DIGIT IN A2
0088  F11B          A2 - LIT.
0089  F0B7          IF NOT AOV SKIP.
008A  41D7          MPCR = INVALIDPORT  - 1.         ONES DIGIT > 9
                *
008B  E00A          LIT = 10.
008C  F066          B = A1.
008D  F0C3          IF NOT LST SKIP.
008E  F029          A2 = A2 + LIT.
008F  F068          B = A2.                    PORT ADDRESS IN B
                * SUBSTRACT 1 FROM PORT NUMBER TO GET PORT ADDRESS
0090  F162          B = 0 - B.
0091  F163          B = 0 - B - 1.
0092  8037          CPCR = STOREPORT  - 1.
                *
                SPOTESTSELECTP.
0093  80D3          CPCR = CONTPRINT  - 1.
0094  0256          AMPCR = TESTPRINT.          ADDRESS OF MESSAGE
                *
                SPOTESTSELECT.
                * ENTRY POINT FOR NO PRINTING
0095  81A0          CPCR = SETCONTADDRS  - 1.
0096  F0E7          MIR = B001.
0097  F099          DW1.             ENABLE SPO INPUT
                * SELECT TEST # PER NUMERIC KEYS (00   THRU 99)
0098  81C4          CPCR = SELECTTEST  - 1.          FOR TENS DIGIT
0099  F051          A3 = B.                          SAVE TENS DIGIT
009A  81C4          CPCR = SELECTTEST  - 1.          FOR ONES DIGIT
                *       ONES DIGIT IN B
009B  F0E6          MIR = 0.
009C  F099          DW1.             DISABLE SPO INPUT
009D  F033          A2 = B.          SAVE ONES DIGIT
                *  IF STINT GO TO SPO MEMORY MODIFY
009E  F1B5          IF URQ SKIP.
009F  40A1          MPCR = CSPACEP  - 1.
                *
00A0  F096          DR1 BEX.         RESET STINT
00A1  4417          MPCR = SPO-MEM-MOD  - 1.
                *
                CSPACEP.
00A2  80D3          CPCR = CONTPRINT  - 1.    SPACE AFTER TESTNUMBER
00A3  00A7          AMPCR = SPACEPRINT.       ADDRESS OF PRINT MESSAGE
00A4  81A0          CPCR = SETCONTADDRS  - 1.
00A5  F068          B = A2.          ONES DIGIT TO B.
00A6  4051          MPCR = TENSLOOPCHECK  - 1.
                *
                SPACEPRINT.
00A7  2080          CNST = @2080@.          - STOP
                *
                INVALIDTEST.
00A8  80B0          CPCR = ALARM - 1.          SOUND BELL
00A9  403E          MPCR = TESTSELECT  - 1.
                *
                /
```

```
                INDICATE-ERROR.
                * SPO SYSTEMS-  SOUND ALARM
                * CONSOLE SYSTEMS-  SOUND ALARM AND TURN ERROR LIGHT ON
                *
00AA  F0DA          MIR = AMPCR.
00AB  F05F          B.
00AC  81E5          CPCR = STACK  - 1.  SAVE AMPCR, A1,  A2,  A3
                *  SET FLAG 1 IN FLAG WORD 1 TO 1 TO INDICATE ERROR
00AD  C101          SAR = 1 LIT = 1.
00AE  8259          CPCR = SETFLAGW1  - 1.
00AF  80B0          CPCR = ALARM - 1.          SOUND ALARM
00B0  4206          MPCR = UNSTACKRESTOREA  - 1.  RETURN TO MTR
                *



                ALARM.
                *
00B1  F0DA          MIR = AMPCR.
00B2  F05F          B.
00B3  81E5          CPCR = STACK  - 1.
00B4  81A0          CPCR = SETCONTADDRS  - 1.
00B5  8075          CPCR = TESTSPO-CONSOLE  - 1.
00B6  40C7          MPCR = SPOALARM  - 1.     SPO ON SYSTEM
                * CONSOLE ON SYSTEM
00B7  E008          LIT = @08@.
00B8  F0EA          MIR = LIT.
00B9  F099          DW1.
00BA  C207          SAR = 2 LIT = 7.
00BB  F089          B = LIT.
00BC  F0E2          MIR = B C.     ALARM DATA WORD FOR CONSOLE
00BD  F0FC          WHEN SRQ STEP.
00BE  F098          DW2.
00BF  F05F          B.
00C0  F0FC          WHEN SRQ STEP.
                * TURN ERROR LIGHT ON, IF ERROR FLAG IS ON
00C1  C100          SAR = 1 LIT = 0.
00C2  827C          CPCR = TESTFLAGW1  - 1.
00C3  40CF          MPCR = CALARM - 1.        ERROR FLAG IS OFF
                * ERROR FLAG IS ON
00C4  81B6          CPCR = LITEINDS  - 1.
00C5  E004          LIT = @04@.          ERROR LIGHT
00C6  40CF          MPCR = CALARM - 1.
                *
00C7  40CF          MPCR = CALARM - 1.
                *
                SPOALARM.     SPO ON SYSTEM
00C8  F1D5          MIR = B001  + 1.     ENABLE OUTPUT
00C9  F099          DW1.
00CA  F0EA          MIR = LIT.
00CB  E007          LIT = @07@.     RING BELL
00CC  F0FC          WHEN SRQ STEP.
00CD  F098          DW2.
00CE  F05F          B.
00CF  F0FC          WHEN SRQ STEP.
                *
                CALARM.
00D0  F0E6          MIR = 0.          DISABLE SPO OR CONSOLE
00D1  F099          DW1.
00D2  81B8          CPCR = SETPORTADDR  - 1.  BR1 = INST.  BR2 = DATA
00D3  4206          MPCR = UNSTACKRESTOREA  - 1.  RETURN
                *
                CONTPRINT.
                * SELECT SPO OR CONSOLE TO PRINT ASCII FROM MEMORY
00D4  F0DA          MIR = AMPCR.
00D5  F05F          B.
00D6  81E5          CPCR = STACK  - 1.          SAVE AMPCR AND A REG
00D7  81A0          CPCR = SETCONTADDRS  - 1.
00D8  8075          CPCR = TESTSPO-CONSOLE  - 1.
00D9  4168          MPCR = SPOPRINT  - 1.          SPO ON SYSTEM
                *
```

```
                    CONSOLE-PRINT.
                  * CONSOLE  PRINT  FROM MEMORY
00DA  CC01              SAR = 12  LIT  = 1.
00DB  827C              CPCR = TESTFLAGW1   - 1.          TEST  PLATN  CLOSED
00DC  40E9              MPCR = CONSPRINT1   - 1.
00DD  CC01              SAR = 12  LIT  = 1.
00DE  8259              CPCR = SETFLAGW1    - 1.
00DF  F0EA              MIR = LIT.
00E0  E008              LIT  = 8.
00E1  F099              DW1.                          ENABLE  FORMS
00E2  F0CA              LCTR.
00E3  E03F              LIT  = @3F@.
00E4  F0EF              MIR  = Z.
00E5  E004              LIT  = 4.
00E6  F0FC              WHEN SRQ  STEP.
00E7  F098              DW2.                          CLOSE  PLATN
00E8  F05F              B.
00E9  F0FC              WHEN SRQ  STEP.
                    CONSPRINT1.
00EA  8247              CPCR = RDSTACKAMPCRTOB  - 1.  FETCH  AMPCR  FOR  EXEC
00EB  F05B              AMPCR = B.
00EC  F05F              B.
00ED  F09A              EXEC.
00EE  F023              A2  = AMPCR.                  MSG  ADDRESS
00EF  F05F              B.
                    CONSPRINT2.
00F0  8122              CPCR = ENABCONSPRT  - 1.ENABLE   PRINTER
00F1  F0D1              MAR1 = A2.
00F2  F0F1              MR1.
00F3  F0F9              WHEN RDC  BEX.
00F4  F02A              A2  = A2  + 1.                INC  ADDR
00F5  F017              A1  = B.
00F6  8266              CPCR = RSTBR1   - 1.
                    CONSPRINT3.
00F7  F10B              A1  = A1  C.
00F8  D800              SAR = 8.
00F9  F0C4              IF  NOT MST  SKIP.
00FA  4105              MPCR = ENDCONSPRT   - 1.  STOP  CODE  DET
00FB  F062              B  = A1  AND LIT.
00FC  E0FF              LIT  = @FF@.
00FD  810B              CPCR = EXEC-CODE    - 1.
00FE  F10B              A1  = A1  C.
00FF  D800              SAR = 8.
0100  F0C4              IF  NOT MST  SKIP.
0101  4105              MPCR = ENDCONSPRT   - 1.  STOP  CODE  DET
0102  F062              B  = A1  AND LIT.
0103  E0FF              LIT  = @FF@.
0104  810B              CPCR = EXEC-CODE    - 1.
0105  40EF              MPCR = CONSPRINT2   - 1.
                    ENDCONSPRT.
0106  F0FC              WHEN SRQ  STEP.               WAIT  FOR  LAST  CHAR  TO  PRINT
0107  8266              CPCR = RSTBR1   - 1.
0108  F1D5              MIR  = B001   + 1.
0109  F099              DW1.                          ENABLE  KYBD
010A  81B8              CPCR = SETPORTADDR  - 1.
010B  4206              MPCR = UNSTACKRESTOREA  - 1.
                    EXEC-CODE.
010C  F0FF              0  EQV  B.
010D  F0B5              IF  NOT ABT  SKIP.
010E  F0C9              JUMP.                         NO  OPT
010F  F0CB              LIT  EQV  B.
0110  E00A              LIT  = @0A@.
0111  F0B5              IF  NOT ABT  SKIP.
0112  4128              MPCR = ADVFORMS  - 1.
0113  F0CB              LIT  EQV  B.
0114  E00D              LIT  = @0D@.
0115  F0B5              IF  NOT ABT  SKIP.
0116  4135              MPCR = INITLEFT   - 1.
0117  F0CB              LIT  EQV  B.
0118  E020              LIT  = @20@.
0119  F09D              IF  ABT  SKIP.

011A  411C              MPCR = EXEC-CODE1   - 1.
011B  C848              SAR = 8  LIT  = @48@.
011C  F0F7              SKIP.
                    EXEC-CODE1.
011D  C849              SAR = 8  LIT  = @49@.
011E  F057              A3  = LIT  L.
011F  F0DF              MIR = A3  OR  B.
0120  F0FC              WHEN SRQ  STEP.
0121  F098              DW2.
0122  F0C9              JUMP.
                    ENABCONSPRT.
0123  F0EA              MIR = LIT.
0124  E004              LIT  = 4.
0125  F099              DW1.                          ENABLE  PRINTER
0126  F05F              B.
0127  F0FC              WHEN SRQ  STEP.
0128  F0C9              JUMP.
                    ADVFORMS.
0129  F0FC              WHEN SRQ  STEP.               WAIT  FOR  PRINT  COMPLETE
012A  F0EA              MIR = LIT.
012B  E008              LIT  = 8.
012C  F099              DW1.                          ENABLE  FORMS
012D  F0CA              LCTR.
012E  E03F              LIT  = @3F@.
012F  F0EF              MIR  = Z.
0130  E050              LIT  = @50@.
0131  F0FC              WHEN SRQ  STEP.
0132  F098              DW2.                          ADV  FORMS
0133  F05F              B.
0134  F0FC              WHEN SRQ  STEP.               FORMS  COMPLETE
0135  4122              MPCR = ENABCONSPRT  - 1.RE-ENABLE   PRINTER
                    INITLEFT.
0136  F0FC              WHEN SRQ  STEP.               WAIT  FOR  PRINT  COMPLETE
0137  F0EA              MIR = LIT.
0138  E010              LIT  = @10@.
0139  F099              DW1.                          ENABLE  CARRIER
013A  F0EE              MIR = LIT  L.
013B  C803              SAR = 8  LIT  = 3.
013C  F0FC              WHEN SRQ  STEP.               INITIALIZE   LEFT
013D  F098              DW2.
013E  F05F              B.
013F  F0FC              WHEN SRQ  STEP.               WAIT  FOR  CARRIER  LEFT
0140  4122              MPCR = ENABCONSPRT  - 1.RE-ENABLE   PRINTER
                    IFCONSPRINT.
0141  F0DA              MIR = AMPCR.
0142  F05F              B.
0143  81E5              CPCR = STACK  - 1.
0144  81A0              CPCR = SETCONTADDRS   - 1.
0145  8075              CPCR = TESTSPO-CONSOLE    - 1.
0146  4184              MPCR = SPOSTOP.                SPO  ON  SYSTEM  -  EXIT
                    CONSKEYPRINT.                     CONV  CONS  KEY  TO  ASCII
0147  F109              A1  - LIT  - 1.
0148  E02F              LIT  = @2F@.
0149  F0B7              IF  NOT AOV  SKIP.
014A  4153              MPCR = CONSPRINTA   - 1.  GREATER  THAN  2F
014B  F011              A1  = A1  + LIT.
014C  E010              LIT  = @10@.
014D  F109              A1  - LIT  - 1.
014E  E029              LIT  = @29@.
014F  F0B7              IF  NOT AOV  SKIP.
0150  4153              MPCR = CONSPRINTA   - 1.  GREATER  THAN  29
0151  F011              A1  = A1  + LIT.
0152  E010              LIT  = @10@.
0153  4162              MPCR = CONSKEYPRINT1    - 1.
                    CONSPRINTA.
0154  F109              A1  - LIT  - 1.
0155  E04F              LIT  = @4F@.
0156  F0B7              IF  NOT AOV  SKIP.
0157  F00A              A1  = A1  - LIT.              GREATER  THAN  4F
0158  E010              LIT  = @10@.
0159  F109              A1  - LIT  - 1.
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015A  E03F        LIT  = @3F@.
015B  F0B7        IF  NOT AOV SKIP.
015C  4162        MPCR = CONSKEYPRINT1   - 1.     GREATER  THAN 3F
015D  F109        A1 - LIT  - 1.
015E  E039        LIT  = @39@.
015F  F09E        IF  AOV SKIP.
0160  4162        MPCR = CONSKEYPRINT1   - 1.
0161  F011        A1 = A1 + LIT.                  GREATER  THAN 39
0162  E007        LIT  = 7.
                  CONSKEYPRINT1.
0163  F00B        A1 = A1 L.
0164  D800        SAR = 8.
0165  F011        A1 = A1 + LIT.
0166  E080        LIT  = @80@.                          STOP  CODE
0167  8122        CPCR = ENABCONSPRT  - 1.              ENABLE  PRINTER
0168  40F6        MPCR = CONSPRINT3   - 1.              PRINT  DATA KEY
                  *
                  *
                  SPOPRINT.
                  * SPO  PRINT  FROM MEMORY
                  *
0169  8247        CPCR = RDSTACKAMPCRTOB  - 1.
016A  F05B        AMPCR = B.     RETURN AMPCR FOR  EXEC
016B  F05F        B.
016C  F09A        EXEC.     ADDRESS  OF MESSAGE  TO AMPCR
016D  F0EA        MIR = LIT.
016E  C802        SAR = 8 LIT  = @02@.
016F  F099        DW1.                          ENABLE  SPO  PRINTER
                  SPOREADY.
0170  F096        DR1 BEX.                 READ SPO  STATUS
0171  F05F        B.
0172  F0C3        IF  NOT LST SKIP.     CHECK  FOR  READY
0173  416F        MPCR = SPOREADY  - 1.
                  *
0174  F0CF        MAR1 = AMPCR.         BR1  = ADDRESS  OF MESSAGE
                  SPOFETCH.
0175  F0F1        MR1.
0176  F0FA        WHEN RDC BEX MAR1 = BMAR + 1.
0177  F07D        B = B C.
0178  F0C4        IF  NOT MST SKIP.              MST = STOP  CODE
0179  4183        MPCR = SPOSTOP   - 1.          END  PRINT
017A  F0FC        WHEN SRQ STEP.           WAIT  FOR  PRINTER  INTERRUPT
017B  F0E1        MIR = B.
017C  F098        DW2.                     WRITE  FIRST  CHARACTER
017D  F07D        B = B C.
017E  F0C4        IF  NOT MST SKIP.              MST = STOP  CODE
017F  4183        MPCR = SPOSTOP   - 1.          END  PRINT
0180  F0E1        MIR = B.
0181  F0FC        WHEN SRQ STEP.           WAIT  FOR  PRINTER  INTERRUPT
0182  F098        DW2.                     WRITE  SECOND  CHARACTER
0183  4174        MPCR = SPOFETCH  - 1.
                  *
                  SPOSTOP.
0184  F0FC        WHEN SRQ STEP.           WAIT  FOR LAST  CHARACTER  TO PRINT
0185  8266        CPCR = RSTBR1  - 1.            RESTORE  BR1
0186  F0E6        MIR = B000.
0187  F099        DW1.                           DISABLE  SPO  OUTPUT
0188  81B8        CPCR = SETPORTADDR  - 1.  RESTORE  DEVICE  PORT  ADDRS
0189  4206        MPCR = UNSTACKRESTOREA  - 1.  RETURN
                  *
                  CLEARFLAGS.
018A  F023        A2 = AMPCR.                    SAVE  RETURN
018B  F0E6        MIR = 0.
018C  F0CF        MAR1 = AMPCR.
018D  01DC        AMPCR = PORTADDRESS.
018E  F0F3        MW1.                           CLEAR  PORT  ADDRESS
018F  F0CF        MAR1 = AMPCR.
0190  0298        AMPCR = MEMFLAGW1.
0191  F0F3        MW1.                           CLEAR  MEMORY FLAG  WORD 1
0192  F102        AMPCR = A2.                    RESTORE  RETURN
                  CLEARFW2-3-4.
0193  F023        A2 = AMPCR.                    SAVE  RETURN
0194  F0E6        MIR = 0.
0195  F0CF        MAR1 = AMPCR.
0196  0299        AMPCR = MEMFLAGW2.
0197  F0F3        MW1.                           CLEAR  MEMORY FLAG  WORD 2
0198  F0CF        MAR1 = AMPCR.
0199  029A        AMPCR = MEMFLAGW3.
019A  F0F3        MW1.                           CLEAR  MEMORY FLAG  WORD 3
019B  F0CF        MAR1 = AMPCR.
019C  029B        AMPCR = MEMFLAGW4.
019D  F0F3        MW1.                           CLEAR  MEMORY FLAG  WORD 4
019E  F102        AMPCR = A2.                    RESTORE  RETURN
019F  F05F        B.
01A0  F0C9        JUMP.
                  *
                  SETCONTADDRS.
01A1  F060        B = AMPCR.             SAVE  RETURN
01A2  F0CF        MAR1 = AMPCR.
01A3  01DD        AMPCR = CONTPORTADDRESS.
01A4  F05B        AMPCR = B.             RESTORE  RETURN
01A5  D800        SAR = 8.
01A6  F0F1        MR1.
01A7  F0F9        WHEN RDC BEX.          CONTROLLER  ADDRESS  TO B
01A8  F07F        B = B R.
01A9  F07C        B = B L.         CLEAR  ALL  BITS  EXCEPT  5,6,7,8
01AA  F078        B = B0TT.
01AB  F16E        BR2 = B.               BR2 = 0000XXXX   DATA
01AC  F07A        B = B1TT.
01AD  F0D5        MAR1 = B.              BR1 = 1000XXXX   INSTRUCTION
01AE  F0C9        JUMP.
                  *
                  LITEINDA.                      LIGHT  A  INDICATORS
01AF  E06F        LIT  = @6F@.
01B0  F0CA        LCTR.
01B1  F09A        EXEC.                          LOAD  VARIABLE  LIT
01B2  F0EF        MIR = Z.
01B3  F098        DW2.
01B4  F0C9        JUMP.
                  LITEINDB.                      LIGHT  B  INDICATORS
01B5  E077        LIT  = @77@.
01B6  41AF        MPCR = LITEINDA.
                  *
                  LITEINDS.                      LIGHT  S  INDICATORS
01B7  E07E        LIT  = @7E@.
01B8  41AF        MPCR = LITEINDA.
                  *
                  SETPORTADDR.
01B9  F060        B = AMPCR.             SAVE  RETURN
01BA  F0CF        MAR1 = AMPCR.
01BB  01DC        AMPCR = PORTADDRESS.
01BC  F05B        AMPCR = B.             RESTORE  RETURN
01BD  F0F1        MR1.
01BE  F0F9        WHEN RDC BEX.          PORT  ADDRESS  TO B
01BF  F16E        BR2 = B.          BR2  FOR  DATA
01C0  F07A        B = B1TT.
01C1  F0D5        MAR1 = B.         BR1  FOR  INSTRUCTION
01C2  F0C9        JUMP.
                  *
                  SELECTPORT.
01C3  F0DE        MIR = A3.      CONTROLLER  ADDRESS  (ASR  AFTER  IRQ)
                  * CONTROLLER  ADDRESS  IS  DISPLAYED  IN  MIR
                  * IF  CONTROLLER  ADDRESS  IS  NOT CORRECT,  RUN SPO  OR
                  * CONSOLE  MTR
01C4  F0FC        WHEN SRQ STEP.         ENTER  PORT  ADDRESS
                  SELECTTEST.
01C5  F0FC        WHEN SRQ STEP.         ENTER  TEST  NUMBER
01C6  F097        DR2 BEX.
01C7  F086        B = LIT  AND B.        STRIP  UPPER  DIGIT
01C8  E00F        LIT  = @0F@.
01C9  F0C9        JUMP.
```

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                CSAVEPORT.                      SAVE  PORT  ADDRESS    (DATA  IN  B)
               *  TEST  PORT  ADDRESS  FOR  PORT  12  OR  LESS
01CA  E00B          LIT  =  11.
01CB  F017          A1  =  B.
01CC  F109          A1  -  LIT  -  1.
01CD  F0B7          IF  NOT  AOV  SKIP.
01CE  41D7          MPCR  =  INVALIDPORT  -  1.          PORT  ADDRESS  >  12
               *  CLEAR  ALL  BITS  EXCEPT  5,6,7,8
01CF  F07C          B  =  B  L.
01D0  D400          SAR  =  4.
01D1  F0E5          MIR  =  B  R.
01D2  F060          B  =  AMPCR.      SAVE  RETURN
01D3  F0CF          MAR1  =  AMPCR.
01D4  01DC          AMPCR  =  PORTADDRESS.
01D5  F05B          AMPCR  =  B.      RESTORE  RETURN
01D6  F0F3          MW1.
01D7  F0C9          JUMP.
               *
                INVALIDPORT.
               *
01D8  80B0          CPCR  =  ALARM  -  1.          SOUND  BELL
               *
01D9  8075          CPCR  =  TESTSPO-CONSOLE  -  1.
01DA  4079          MPCR  =  SPOPORTSELECT  -  1.
01DB  4029          MPCR  =  CONSPORTSELECT  -  1.
                PORTADDRESS.
01DC  0000          CNST  =  @0000@.
                CONTPORTADDRESS.
01DD  0000          CNST  =  @0000@.
               *
                BUSSTEST.              EXTERNAL  BUSS  TEST
01DE  F0F9          WHEN RDC BEX.
01DF  F0FF          0  EQV  B.
01E0  F09C          IF  ABT  JUMP.
01E1  F0E1          MIR  =  B.
01E2  F000          WAIT.
               *********EXTERNAL       BUSS  FAILURE  OR  PARITY  ERROR
               *********ERROR      #  M1
01E3  F0DA          MIR  =  AMPCR.
01E4  F000          WAIT.
01E5  7FFF          MPCR  =  STARTCONTROLLER  -  1.
               /
                STACK.
               *UNCONDITIONAL  SAVE  A1,  A2,  A3,  AMPCR  IN  MEMORY  STACK
               *DISTROYS  -  B,  SAR,  LIT,  MIR
               *ASSUMES  BR1,  BR2  DIFFER  BY  INST  BIT  ONLY
01E6  F082          B  =  LIT  L.
01E7  C818          SAR  =  8  LIT  =  @18@.
01E8  F0D5          MAR1  =  B.                    STACK  POINTER  =  6144
                STACKW3.
01E9  F0F1          MR1.
01EA  F0F9          WHEN RDC BEX.              FETCH  POINTER
01EB  F083          B  =  LIT  +  B.               INCRAMENT  POINTER
01EC  E004          LIT  =  4.
01ED  F08C          BMI  MIR  =  B.
01EE  F0F3          MW1.                           RESTORE  NEW POINTER
01EF  F08C          BMI  MIR  =  B.
01F0  F0D5          MAR1  =  B.                    NEW STACK  ADDRESS
01F1  F0F3          MW1.                           STORE  AMPCR TOP  OF  STACK
01F2  F0DB          MIR  =  A1.
01F3  F089          B  =  LIT.
01F4  E003          LIT  =  3.
01F5  F01C          A1  =  BMAR.
01F6  F064          B  =  A1  -  B.
01F7  F0D5          MAR1  =  B.       OLD  TOP  OF  STACK  ADDRESS  +  1.
01F8  F08D          BMI.
01F9  F017          A1  =  B.
01FA  F0F3          MW1.                           SAVE  A1
01FB  F0D7          MAR1  =  BMAR  +  1.
01FC  F0DD          MIR  =  A2.
01FD  F0F3          MW1.                           SAVE  A2
01FE  F0D7          MAR1  =  BMAR  +  1.
01FF  F0DE          MIR  =  A3.
0200  F0F3          MW1.                           SAVE  A3
0201  F05F          B.
0202  4266          MPCR  =  RSTBR1  -  1.         RESTORE  BR1  EXIT
                UNSTACK.
               *RESTORE  AMPCR  FROM  TOP  OF  MEMORY  STACK
               *A  REGISTERS  REMAIN  UNCHANGED
0203  8216          CPCR  =  STACKR  -  1.
0204  F05B          AMPCR  =  B.                   RESTORE  AMPCR
0205  F05F          B.
0206  4266          MPCR  =  RSTBR1  -  1.         RESTORE  BR1  EXIT
                UNSTACKRESTOREA.
               *RESTORE  AMPCR  AND  A  REGISTERS  FROM  TOP  OF  STACK
0207  8216          CPCR  =  STACKR  -  1.
0208  F05B          AMPCR  =  B.                   RESTORE  AMPCR
0209  F08D          BMI.  (ADDRESS  -  1)  OF  STORED  A1
020A  F0D6          MAR1  =  B  +  1.
020B  F0F1          MR1.                           FETCH  A1
020C  F0F9          WHEN RDC BEX.
020D  F0D7          MAR1  =  BMAR  +  1.
020E  F017          A1  =  B.                      RESTORE  A1
020F  F0F1          MR1.                           FETCH  A2
0210  F0F9          WHEN RDC BEX.
0211  F0D7          MAR1  =  BMAR  +  1.
0212  F033          A2  =  B.                      RESTORE  A2
0213  F0F1          MR1.                           FETCH  A3
0214  F0F9          WHEN RDC BEX.
0215  F051          A3  =  B.                      RESTORE  A3
0216  4266          MPCR  =  RSTBR1  -  1.         RESTORE  BR1  AND  EXIT


                STACKR.
0217  F082          B  =  LIT  L.
0218  C818          SAR  =  8  LIT  =  @18@.       STACK  POINTER  =  6144
0219  F0D5          MAR1  =  B.


                STACKR1.
021A  F0F1          MR1.
021B  F0F9          WHEN RDC BEX.                  FETCH  POINTER
021C  F0DD          MIR  =  A2.       SAVE  A2
021D  F033          A2  =  B.
021E  E004          LIT  =  4.
021F  F146          B  =  A2  -  LIT.         DECRAMENT  STACK  POINTER
0220  F08C          BMI,  MIR  =  B.          EXCHANGE  MIR  &  B
0221  F033          A2  =  B.                 RESTORE  A2
0222  F08D          BMI.       POINTER  ADDRESS  TO  B
0223  F0F3          MW1.                           RESTORE  POINTER
0224  F083          B  =  LIT  +  B.  ADDRESS  OF  SAVED  AMPCR  TO  B
                STACKR2.
0225  F0D5          MAR1  =  B.
0226  F0F1          MR1.                           FETCH  AMPCR  FROM  STACK
0227  F0F9          WHEN RDC BEX.
0228  F0C9          JUMP.
                INITMAINSTACK.                     INITIALIZE     STACK  POINTER
0229  F082          B  =  LIT  L.
022A  C818          SAR  =  8  LIT  =  @18@.
022B  F0D5          MAR1  =  B.
022C  F0E1          MIR  =  B.
022D  F0F3          MW1.                           POINTER  =  6144
022E  F05F          B.
022F  4266          MPCR  =  RSTBR1  -  1.         RESTORE  BR1  EXIT
                INITFLOSTACK.                      INITIALIZE     FLO  POINTER
0230  F082          B  =  LIT  L.
0231  C81A          SAR  =  8  LIT  =  @1A@.
0232  F0D5          MAR1  =  B.
0233  F0E1          MIR  =  B.
0234  F0F3          MW1.                           POINTER  =  6656
0235  4266          MPCR  =  RSTBR1  -  1.         RESTORE  BR1  EXIT
```

```
                    MARKFLOSTACK.
                   *SAVE  AMPCR FROM MAIN PROGRAM FLOW-FOR  GLOBAL  RETURN
                   *ASSUMES  B,  MIR,  SAR,  LIT  CAN BE  DISTROYED  AND THAT
                   *BR1,   BR2  DIFFER   BY  INST   BIT   ONLY
0236  F0DA               MIR = AMPCR.
0237  F082               B = LIT  L.
0238  C81A               SAR = 8  LIT  = @1A@.
0239  F0D5               MAR1 = B.                    FLO  POINTER  = 6656
023A  41E8               MPCR = STACKW3  -  1.        WRITE  AMPCR  TO  STACK
                    FLOSTACKRDDEC.
                   *RESTORE  AMPCR  FROM  TOP  OF  FLOW  STACK  AND  DECRAMENT
                   *STACK  POINTER
023B  F082               B = LIT  L.
023C  C81A               SAR = 8  LIT  = @1A@.
023D  F0D5               MAR1 = B.                    FLO  POINTER  = 6656
023E  8219               CPCR = STACKR1  -  1.        READ  POINTER  AND  AMPCR
023F  4203               MPCR = UNSTACK.              OPTIONAL  NO  A  WD  RESTORE
                    FLOSTACKRD.
                   *RESTORE  AMPCR  FROM  TOP  OF  FLOW  STACK  WITHOUT
                   *DECRAMENTING  FLOW  STACK  POINTER.
0240  F082               B = LIT  L.
0241  C81A               SAR = 8  LIT  = @1A@.
0242  F0D5               MAR1 = B.                    FLO  POINTER  = 6656
0243  F0F1               MR1.
0244  F0F9               WHEN RDC  BEX.               FETCH  POINTER
0245  F05F               B.
0246  8224               CPCR = STACKR2  -  1.        READ  TOP  OF  STACK
0247  4203               MPCR = UNSTACK.              OPTIONAL  NO  A  WD  RESTORE
                    RDSTACKAMPCRTOB.
                   *READ  TOP  AMPCR  IN  STACK  TO  B  REG  -  USE  FOR
                   *NESTED  EXEC.
0248  F082               B = LIT  L.
0249  C818               SAR = 8  LIT  = @18@.        POINTER  ADDRESS  = 6144
024A  F0D5               MAR1 = B.
024B  F0F1               MR1.                         FETCH  POINTER
024C  F0F9               WHEN RDC  BEX.
024D  F0D5               MAR1 = B.                    TOP  OF  STACK  ADDRESS
024E  F0F1               MR1.
024F  F0F9               WHEN RDC  BEX.               B = AMPCR  FROM  STACK
0250  F05F               B.
0251  4266               MPCR = RSTBR1  -  1.         RESTORE  BR1  EXIT
                   /
                    PORTPRINT.
0252  0D0A               CNST = @0D0A@.               CR  LF
0253  504F               CNST = @504F@.          PO
0254  5254               CNST = @5254@.          RT
0255  2080               CNST = @2080@.          -  STOP
                    TESTPRINT.
0256  0D0A               CNST = @0D0A@.               CRLF
0257  5445               CNST = @5445@.          TE
0258  5354               CNST = @5354@.          ST
0259  2080               CNST = @2080@.          -  STOP
                   /
                   *  TEST  FLAG  AND  SET  FLAG  ROUTINES
                   *
                    SETFLAGW1.                  FLAG  NO.  IN  SAR,  STATE  IN  LIT
025A  F060               B = AMPCR.             SAVE  RETURN
025B  F0CF               MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD  1  TO  MAR1
025C  0298               AMPCR = MEMFLAGW1.
                   *
                    SETFLAGS.                   COMMON  POINT  TO  SETFLAGW1-2-3-4
025D  F0F1               MR1.
025E  F05B               AMPCR = B.             RESTORE  RETURN
025F  F0F9               WHEN RDC  BEX.              FLAG  WORD  TO  B
0260  F092               CSAR.                  CHANGE  VALUE  TO  SHIFT  FLAG  TO  LSB
0261  F172               CSAR  B = B  C.             MOVE  FLAG  IN  B  TO  LSB
0262  F075               B = BTT0.
0263  F087               B = LIT  OR  B.             SET  FLAG  PER  LIT
0264  F07D               B = B  C.              SHIFT  FLAGS  BACK  TO  POSITION
0265  F0E1               MIR = B.               MODIFIED  FLAG  WORD  TO  MIR
0266  F0F3               MW1.                   FLAG  WORD  TO  MEMORY
                    RESTORE-BR1.
                    RSTBR1.                     COMMON  POINT  FROM  ABOVE  AND  -
                   *                            AND  TESTFLAGW1-2-3-4
0267  F0E1               MIR = B.                    SAVE  B
0268  F05D               ASE.                   SELECT  BR2
0269  FQ80               B = BMAR.
                   *  GENERATE  NEW  BR1   (MSB  INST-DATA   SET  OPPOSITE   BR2)
026A  F159               B = BFTF.
026B  D800               SAR = 8.
026C  F07F               B = B  R.
026D  F07C               B = B  L.              CLEAR  MAR  (DO  NOT  USE  LIT  HERE)
026E  F0D5               MAR1 = B.
026F  F08D               BMI.                        RESTORE  B
0270  F0C9               JUMP.                  RETURN
                   *
                    SETFLAGW2.                  FLAG  NO.  IN  SAR,  STATE  IN  LIT
0271  F060               B = AMPCR.             SAVE  RETURN
0272  F0CF               MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD  2  TO  MAR1
0273  0299               AMPCR = MEMFLAGW2.
0274  425C               MPCR = SETFLAGS  -  1.
                   *
                    SETFLAGW3.                  FLAG  NO.  IN  SAR,  STATE  IN  LIT
0275  F060               B = AMPCR.             SAVE  RETURN
0276  F0CF               MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD  3  TO  MAR1
0277  029A               AMPCR = MEMFLAGW3.
0278  425C               MPCR = SETFLAGS  -  1.
                   *
                    SETFLAGW4.                  FLAG  NO.  IN  SAR,  STATE  IN  LIT
0279  F060               B = AMPCR.             SAVE  RETURN
027A  F0CF               MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD  4  TO  MAR1
027B  029B               AMPCR = MEMFLAGW4.
027C  425C               MPCR = SETFLAGS  -  1.
                   *
                    TESTFLAGW1.                 FLAG  NO.  IN  SAR,  STATE  IN  LIT
027D  F060               B = AMPCR.             SAVE  RETURN
027E  F0CF               MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD  1  TO  MAR1
027F  0298               AMPCR = MEMFLAGW1.
                   *
                    TESTFLAGS.                  COMMON  POINT  TO  TESTFLAGW1-2-3-4
0280  F0F1               MR1.
0281  F05B               AMPCR = B.             RESTORE  RETURN
0282  F0F9               WHEN RDC  BEX.              FLAG  WORD  TO  B
0283  F092               CSAR.
0284  F07F               B = B  R.              SHIFT  FLAG  TO  LSB
0285  F157               B = BT0T.
0286  F078               B = B0TT.
0287  F05F               B.
0288  F0CB               LIT  EQV  B.
0289  F09D               IF  ABT  SKIP.
028A  F105               AMPCR = AMPCR  +  1.        SET  AMPCR  FOR  FALSE  RETURN
028B  4266               MPCR = RSTBR1  -  1.
                   *
                    TESTFLAGW2.                 FLAG  NO.  IN  SAR,  STATE  IN  LIT
028C  F060               B = AMPCR.             SAVE  RETURN
028D  F0CF               MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD  2  TO  MAR1
028E  0299               AMPCR = MEMFLAGW2.
028F  427F               MPCR = TESTFLAGS  -  1.
                   *
                    TESTFLAGW3.                 FLAG  NO.  IN  SAR,  STATE  IN  LIT
0290  F060               B = AMPCR.             SAVE  RETURN
0291  F0CF               MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD  3  TO  MAR1
0292  029A               AMPCR = MEMFLAGW3.
0293  427F               MPCR = TESTFLAGS  -  1.
                   *
                    TESTFLAGW4.                 FLAG  NO.  IN  SAR,  STATE  IN  LIT
0294  F060               B = AMPCR.             SAVE  RETURN
0295  F0CF               MAR1 = AMPCR.               ADDRESS  OF  FLAG  WORD  4  TO  MAR11
0296  029B               AMPCR = MEMFLAGW4.
0297  427F               MPCR = TESTFLAGS  -  1.
                   *
```

```
                    * MEMORY WORDS FOR PROGRAM FLAGS
                      MEMFLAGW1.
0298  0000                CNST = @0000@.          FLAGS 1 THRU 16 OF WORD 1
                      MEMFLAGW2.
0299  0000                CNST = @0000@.          FLAGS 1 THRU 16 OF WORD 2
                      MEMFLAGW3.
029A  0000                CNST = @0000@.          FLAGS 1 THRU 16 OF WORD 3
                      MEMFLAGW4.
029B  0000                CNST = @0000@.          FLAGS 1 THRU 16 OF WORD 4
                    * END OF FLAG ROUTINES
                    *
                      READDATAKEYTOA1.
                    * SUB-ROUTINE   TO READ 1 DATA CHARACTER FROM SPO OR -
                    *  CONSOLE AND RETURN WITH CHARACTER IN A1
                    *  A2 AND A3 ARE SAVED
                    *  ALL OTHER REGISTERS ARE DESTROYED
                    *
029C  F0DA              MIR = AMPCR.
029D  F05F              B.
029E  81E5              CPCR = STACK - 1.  SAVE AMPCR FOR RETURN
029F  81A0              CPCR = SETCONTADDRS - 1.
02A0  8075              CPCR = TESTSPO-CONSOLE - 1.
02A1  42B1              MPCR = SPOKEY - 1.        SPO ON SYSTEM
                    *
                    * CONSOLE ON SYSTEM
02A2  F1D5              MIR = B001 + 1.      ENABLE KEYBOARD
02A3  F099              DW1.
02A4  81B6              CPCR = LITEINDS - 1.
02A5  E008              LIT = 8.          LIGHT NUMERIC INDICATOR
02A6  F0FC              WHEN SRQ STEP.
02A7  F097              DR2 BEX.
02A8  F017              A1 = B.          SAVE DATA CHARACTER IN A1.
02A9  F009              A1 = A1 AND LIT.     USE ONLY LOWER DIGIT
02AA  E07F              LIT = @7F@.
                    * DISPLAY LOWER DIGIT IN B INDICATORS
02AB  F082              B = LIT L .
02AC  C888              SAR = 8 LIT = @88@.
02AD  F0DC              MIR = A1 + B.
02AE  F098              DW2.
02AF  81B6              CPCR = LITEINDS - 1.
02B0  E000              LIT = 0.         TURN NUMERIC INDICATOR OFF
02B1  42B8              MPCR = EXITDKEY - 1.
                    *
                      SPOKEY.       SPO ON SYSTEM
02B2  F0E7              MIR = B001.
02B3  F099              DW1.       ENABLE SPO INPUT
02B4  F0FC              WHEN SRQ STEP.
02B5  F097              DR2 BEX.
02B6  F017              A1 = B.          SAVE DATA CHARACTER IN A1
02B7  F009              A1 = A1 AND LIT.     USE ONLY LOWER DIG
02B8  E07F              LIT = @7F@.
                    *
                      EXITDKEY.
02B9  F0E6              MIR = 0.
02BA  F099              DW1.       DISABLE SPO OR CONSOLE
02BB  81B8              CPCR = SETPORTADDR - 1.        RESTORE BR1 AND BR2
02BC  8202              CPCR = UNSTACK - 1.        RETURN (CHARACTER IN A1)
                    *
                    / SIMULATED REGISTERS     SIMREG1,    SIMREG2,    SIMREG3
                      ZROSREG1.
02BD  F0E6              MIR = B000.
                      WRSREG1.
02BE  F060              B = AMPCR.
02BF  F0CF              MAR1 = AMPCR.
02C0  02FC              AMPCR = SIMREG1.
                      ZROSREG1A.
02C1  F05B              AMPCR = B.
02C2  F0F3              MW1.
02C3  F05F              B.
02C4  42E7              MPCR = INCSREG1A - 1.
                      ZROSREG2.
02C5  F0E6              MIR = B000.
                      WRSREG2.
02C6  F060              B = AMPCR.
02C7  F0CF              MAR1 = AMPCR.
02C8  02FD              AMPCR = SIMREG2.
02C9  42C0              MPCR = ZROSREG1A - 1.
                      ZROSREG3.
02CA  F0E6              MIR = B000.
                      WRSREG3.
02CB  F060              B = AMPCR.
02CC  F0CF              MAR1 = AMPCR.
02CD  02FE              AMPCR = SIMREG3.
02CE  42C0              MPCR = ZROSREG1A - 1.
                      RDSREG1.
02CF  F060              B = AMPCR.
02D0  F0CF              MAR1 = AMPCR.
02D1  02FC              AMPCR = SIMREG1.
                      RDSREG1A.
02D2  F05B              AMPCR = B.
02D3  F0F1              MR1.
02D4  F0F9              WHEN RDC BEX.
02D5  F0E1              MIR = B.
02D6  42E7              MPCR = INCSREG1A - 1.
                      RDSREG2.
02D7  F060              B = AMPCR.
02D8  F0CF              MAR1 = AMPCR.
02D9  02FD              AMPCR = SIMREG2.
02DA  42D1              MPCR = RDSREG1A - 1.
                      RDSREG3.
02DB  F060              B = AMPCR.
02DC  F0CF              MAR1 = AMPCR.
02DD  02FE              AMPCR = SIMREG3.
02DE  42D1              MPCR = RDSREG1A - 1.
                      INCSREG1.
02DF  F060              B = AMPCR.
02E0  F0CF              MAR1 = AMPCR.
02E1  02FC              AMPCR = SIMREG1.
                      INCSREG1B.
02E2  F05B              AMPCR = B.
02E3  F0F1              MR1.
02E4  F0F9              WHEN RDC BEX.
02E5  F07E              B = B + 1.
02E6  F0E1              MIR = B.
02E7  F0F3              MW1.
                      INCSREG1A.
02E8  4266              MPCR = RESTORE-BR1 - 1.
                      INCSREG2.
02E9  F060              B = AMPCR.
02EA  F0CF              MAR1 = AMPCR.
02EB  02FD              AMPCR = SIMREG2.
02EC  42E1              MPCR = INCSREG1B - 1.
                      INCSREG3.
02ED  F060              B = AMPCR.
02EE  F0CF              MAR1 = AMPCR.
02EF  02FE              AMPCR = SIMREG3.
02F0  42E1              MPCR = INCSREG1B - 1.
                      DECSREG2.
02F1  F060              B = AMPCR.
02F2  F0CF              MAR1 = AMPCR.
02F3  02FD              AMPCR = SIMREG2.
02F4  F05B              AMPCR = B.
02F5  F0F1              MR1.
02F6  F0F9              WHEN RDC BEX.
02F7  F162              B = 0 - B.
02F8  F163              B = 0 - B - 1.
02F9  F0E1              MIR = B.
02FA  F0F3              MW1.
02FB  42E7              MPCR = INCSREG1A - 1.
                      SIMREG1.
02FC  0000              CNST = @0000@.
```

```
                SIMREG2.
02FD    0000            CNST  = @0000@.
                SIMREG3.
02FE    0000            CNST  = @0000@.
                SET-CONT-DINT.
                *  SET  CONTROLLER  DATA  INTERRUPT,   RESTORE  PORT  ADDRESS
                *  IN  BR1  AND  BR2  THEN  JUMP
02FF    F0DA            MIR  = AMPCR.
0300    F05F            B.
0301    81E5            CPCR  = STACK  -  1.  SAVE  AMPCR,  A1,A2,A3     IN  STACK
0302    81A0            CPCR  = SETCONTADDRS  -  1.
0303    8075            CPCR  = TESTSPO-CONSOLE     -  1.
0304    4306            MPCR  = SCDINT  -  1.          SPO  ON  SYSTEM
                *
                *  CONSOLE  ON  SYSTEM
0305    E004            LIT  = @04@.     ENABLE  CONSOLE  PRINTER  DINT
0306    F0F7            SKIP.
                SCDINT.
0307    E002            LIT  = @02@.     ENABLE  SPO  OUTPUT
0308    F0EA            MIR  = LIT.
0309    F099            DW1.
030A    F0FC            WHEN SRQ  STEP.
                ********        STOP  HERE  IF  CONTROLLER  ENABLE  DOES  NOT  CAUSE
                *                SRQ    (NOTE-   SPO  SRQ  HAS  BEEN  USED  PRIOR  TO
                *                          THIS  STOP
                *               RUN  SPO  OR  CONSOLE  MTR
                *
                RSCDINT.
030B    81B8            CPCR  = SETPORTADDR  -  1.          RESTORE  BR1  AND  BR2
030C    4206            MPCR  = UNSTACKRESTOREA  -  1.  RETURN
                *
                *
                RESET-CONT-DINT.
                *   DISABLE   CONTROLLER,   RESTORE  PORT  ADDRESS  IN  BR1  AND
                *   BR2,   THEN  JUMP
030D    F0DA            MIR  = AMPCR.
030E    F05F            B.
030F    81E5            CPCR  = STACK  -  1.  SAVE  AMPCR,A1,A2,A3     IN  STACK
0310    81A0            CPCR  = SETCONTADDRS  -  1.
0311    F0E6            MIR  = 0.
0312    F099            DW1.
0313    F05F            B.
0314    430A            MPCR  = RSCDINT  -  1.
                *
                /
                MEM-MOD-SETLC3.      SET  WRITE-BEFORE-READ     FLAG
                *   JUMP  TO  ABOVE  LABEL  FROM  UPPER  CASE  RESET  KEY  CODE
                *   ALLOWS  WRITE-BEFORE-READ     OF  FIRST  ADDRESS
0315    F01A            SET  LC3.
0316    F0F7            SKIP.
                MEMORY-MODIFY.
0317    F0AD            IF  LC3  STEP.
0318    F01F            RESET   GC2.
0319    F0A9            IF  LC2   STEP.
031A    81A0            CPCR  = SETCONTADDRS  -  1.
                *  RETURNS  WITH  BR1  =  INSTRUCTION,     BR2  =  DATA
031B    F0EA            MIR   =   LIT.
031C    C881            SAR  =  8  LIT  =  @81@.
031D    F082            B  =  LIT  L.
031E    F0EC            MIR  =  LIT  OR  B.
031F    E009            LIT  =  9.
0320    F098            DW2.
0321    E010            LIT    =   @10@.
0322    F099            DW1.
0323    F082            B  =   LIT  L.
0324    C803            SAR   =  8,    LIT    =  @03@.
0325    F0E1            MIR   =   B.
0326    F0FC            WHEN SRQ  STEP.
0327    F098            DW2.                                          READY  THE      R
0328    F0EA             MIR   =   LIT.
0329    E008             LIT   =   @08@.
032A    F0FC            WHEN SRQ  STEP.
032B    F099            DW1.
032C    F082            B  =  LIT  L.
032D    E0C0            LIT   =  @C0@.
032E    F0ED            MIR   =  LIT   +  B.
032F    E004            LIT   =  @04@.
0330    F0FC            WHEN SRQ  STEP.
0331    F098            DW2.
0332    03D0            AMPCR  =  MM-POSITION   -  1.
0333    F01D            A1    =    LIT.
0334    E00A            LIT   =  @0A@.
0335    F091            CALL.                                         POSITION   RIG
                MM-LIST-NEXT.
0336    03BF            AMPCR  =   MM-ADVANCE   -  1.
0337    F091            CALL.                                         ADVANCE  1  L   E
0338    F018             SET   LC1.
0339    F019            SET   LC2.
033A    F0CA            LCTR.
033B    E003            LIT   =  @03@.
033C    036E            AMPCR  =   MM-KYBD   -  1.
033D    F091            CALL.                                         ACCEPT  AND  P   N
033E    F0D1            MAR1  =  A2.
033F    F0E7            MIR  =  B001.
0340    F0AF            IF  LC3  SET  LC3  ELSE  SKIP.
0341    F0F3            MW1.      WRITE  BEFORE  TO  PREVENT  PE.
0342    F0F1            MR1.
0343    F0F9            WHEN RDC  BEX.                                GET  THE  CONT   T
0344    F033            A2  =  B.
0345    E003            LIT   =  @03@.
0346    034E            AMPCR  =  MM-CONTENTS   -  1.
0347    F041             A3   =   AMPCR.
0348    F0CA            LCTR.
0349    03D0            AMPCR  =  MM-POSITION    -  1.
034A    F01D            A1   =  LIT.
034B    E003            LIT   =  @03@.
034C    F091            CALL.
034D    03E2            AMPCR  =  MM-PRINT   -  1.
034E    F0C9            JUMP.                                         PRINT  THE  CO   E
                MM-CONTENTS.
034F    F0CA            LCTR.
0350    E000            LIT   =  @00@.
0351    F00C            RESET   GC1.
0352    F0AD            IF  LC3  STEP.          RESET  WRITE-BEFORE-READ     FLAG
0353    0358            AMPCR  =  RESET-GC1LC3    -  1.  FOR  RETURN  FROM  MM-KYBD
0354    436E            MPCR  =  MM-KYBD  -  1.
                *
                *  MM-KYBD  JUMPS  HERE  FOR  OCK  I,II,III      KEYS
                SET-LC3GC1.
0355    F01A            SET  LC3.
                SET-GC1.
0356    F006            SET  GC1.
0357    F0F7            SKIP.
                SET-LC3.
0358    F01A            SET  LC3.
                RESET-GC1LC3.
0359    F0CA            LCTR.
035A    E003            LIT   =  @03@.
035B    03D0            AMPCR  =  MM-POSITION    -  1.
035C    F01D             A1   =  LIT.
035D    F091            CALL.
035E    F018            SET   LC1.
035F    036E            AMPCR  =   MM-KYBD   -  1.
0360    F091            CALL.                                         ACCEPT  AND  P   N
0361    F0DD            MIR   =   A2.
0362    F0F3            MW1.
0363    0317            AMPCR  =  MEMORY-MODIFY.
0364    F19C            IF  NOT  GC1   JUMP.
0365    F019            SET  LC2.                              POS  TO  LEFT.
0366    F01D            A1  =  LIT.
0367    E012            LIT     =  @12@.
0368    03D0            AMPCR    =  MM-POSITION    -  1.
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0369  F0D7        MAR1  = BMAR  + 1.
036A  F035        A2  = BMAR.
036B  F091        CALL.
036C  0335        AMPCR  =  MM-LIST-NEXT     -  1.
036D  F0F6        SET  GC2.
036E  F0C9        JUMP.
                MM-KYBD.
036F  F041        A3  =  AMPCR.                                    SAVE  RETURN     D
0370  F081        B  =  NOT  CTR  R.
0371  D800        SAR  =  8.
0372  03E2        AMPCR  =  MM-PRINT  -  1.
0373  F0A2        IF  GC2  SKIP.
0374  4376        MPCR  =  MM-NANO-SAVE  -  1.
0375  F01F        RESET  GC2.
0376  F0C9        JUMP.
                MM-NANO-SAVE.
0377  F017        A1  =  B.
0378  F05D        ASE.       SELECT  BR2
0379  F080        B  =  BMAR.
037A  F16F        BR2  =  BITT.          BR2  =  CONTROL  PORT
037B  F1DB        MIR  =  0  +  Z.
037C  E002        LIT  =  @02@.
037D  F098        DW2.                                             ENABLE  KBD  D     A
037E  F034        A2  =  B000.
037F  F05D        ASE.       SELECT  BR2
0380  F080        B  =  BMAR.
0381  F078        B  =  B0TT.
0382  F16E        BR2  =  B.             BR2  =  DATA  PORT
                MM-KYBD-LOOP.
0383  F0C5        IF  SRQ  DR2  BEX  SKIP.
0384  4382        MPCR  =  MM-KYBD-LOOP  -  1.
0385  0317        AMPCR  =  MEMORY-MODIFY.
0386  F0CB        LIT    EQV  B.
0387  E01F        LIT  =  @1F@.    RESET  KEY  LOWER  SHIFT  MECHANICAL
0388  F09B        IF  ABT  LUOP  JUMP.  RESET  KEY  START  OVER
0389  E0AB        LIT  =  @AB@.    RESET  KEY  LOWER  SHIFT  ELECTRONIC
038A  F09B        IF  ABT  LUOP  JUMP.  RESET  KEY  START  OVER
038B  0314        AMPCR  =  MEM-MOD-SETLC3  -  1.
038C  E09F        LIT  =  @9F@.    RESET  KEY  UPPER  SHIFT  MECHANICAL
038D  F09B        IF  ABT  LUOP  JUMP.
038E  E08B        LIT  =  @8B@.    RESET  KEY  UPPER  SHIFT  ELECTRONIC
038F  F09B        IF  ABT  LUOP  JUMP.
0390  0411        AMPCR  =  MICRO-TOOL  -  1.
0391  E04C        LIT  =  @4C@.          OCK  IIII    KEY  MECHANICAL
0392  F09B        IF  ABT  LUOP  JUMP.   OCK  IIII    KEY   GO  TO  END
0393  E0A0        LIT  =  @A0@.          OCK  IIII    KEY  ELECTRONIC
0394  F09B        IF  ABT  LUOP  JUMP.   OCK  IIII    KEY   GO  TO  END
0395  0354        AMPCR  =  SET-LC3GC1    -  1.
0396  E0CE        LIT  =  @CE@.          OCK  II   UPPER  SHIFT  MECHANICAL
0397  F09B        IF  ABT  LUOP  JUMP.
0398  E083        LIT  =  @83@.          OCK  II   UPPER  SHIFT  ELECTRONIC
0399  F09B        IF  ABT  LUOP  JUMP.
039A  0355        AMPCR  =  SET-GC1  -  1.
039B  E04E        LIT  =  @4E@.          OCK  II   LOWER  SHIFT  MECHANICAL
039C  F09B        IF  ABT  LUOP  JUMP.
039D  E0A3        LIT  =  @A3@.          OCK  II   LOWER  SHIFT  ELECTRONIC
039E  F09B        IF  ABT  LUOP  JUMP.
039F  0357        AMPCR  =  SET-LC3  -  1.
03A0  E0CD        LIT  =  @CD@.          OCK  I    UPPER  SHIFT  MECHANICAL
03A1  F09B        IF  ABT  LUOP  JUMP.
03A2  E081        LIT  =  @81@.          OCK  I    UPPER  SHIFT  ELECTRONIC
03A3  F09B        IF  ABT  LUOP  JUMP.
03A4  F0E1        MIR  =  B.
03A5  F07F        B  =  B  R.
03A6  C400        SAR  =  4  LIT  =  0.
03A7  03AE        AMPCR  =  ABCDEF-KEY  -  1.
03A8  E004        LIT  =  @04@.    UPPER  DIGIT  FOR  ALPHA  ELECTRONIC
03A9  F0CB        LIT  EQV  B.
03AA  F09B        IF  ABT  LUOP  JUMP.
03AB  E005        LIT  =  @05@.    UPPER  DIGIT  FOR  ALPHA  MECHANICAL
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03AC  F09B        IF  ABT  LUOP  JUMP.
03AD  E000        LIT  =  0.
03AE  F0F7        SKIP.                    NUMERIC  KEY  ENTERED
              ABCDEF-KEY.                  ALPHA  KEY  ENTERED
03AF  E009        LIT  =  @09@.
03B0  F08D        BMI.              RESTORE  B  (CHARACTER  ENTERED)
03B1  F083        B  =  LIT  +  B.  ADD  9  IF  ALPHA  KEY
03B2  F086        B  =  LIT    AND  B.
03B3  CC0F        SAR  =  12,    LIT  =  @0F@.
03B4  F025        A2  =  A2  C.
03B5  F031        A2  =  A2  +  B.                                 CONCATENATE
03B6  0382        AMPCR  =  MM-KYBD-LOOP  -  1.
03B7  F030        INC.
03B8  F0B9        IF  NOT  COV    JUMP.                            TEST  FOR  A
03B9  F066        B  =  A1.
03BA  F095        CTR  =  B.                                       RESTORE  COUN     R
03BB  03E2        AMPCR  =  MM-PRINT  -  1.
03BC  F0A6        IF  LC1    JUMP.                                 PRINT  FLAG.
03BD  F101        AMPCR  =  A3.
03BE  F05F        B.
03BF  F0C9        JUMP.
              MM-ADVANCE.
03C0  F05D        ASE.       SELECT  BR2
03C1  F080        B  =  BMAR.
03C2  F16F        BR2  =  BITT.          BR2  =  CONTROL  PORT
03C3  F0EA        MIR  =  LIT.
03C4  E008        LIT  =  @08@.
03C5  F098        DW2.                                             ENABLE  FORM      I
03C6  F082        B  =  LIT  L.
03C7  E0C0        LIT  =  @C0@.
03C8  F0ED        MIR  =  LIT  +  B.
03C9  E050        LIT  =  @50@.
03CA  F05D        ASE.       SELECT  BR2
03CB  F080        B  =  BMAR.
03CC  F078        B  =  B0TT.
03CD  F16E        BR2  =  B.             BR2  =  DATA  PORT
03CE  F0FC        WHEN SRQ  STEP.
03CF  F098        DW2.
03D0  F0C9        JUMP.
              MM-POSITION.
03D1  F05D        ASE.       SELECT  BR2
03D2  F080        B  =  BMAR.
03D3  F16F        BR2  =  BITT.          BR2  =  CONTROL  PORT
03D4  F0EA        MIR  =  LIT.
03D5  C810        SAR  =  8,  LIT  =  @10@.
03D6  F098        DW2.                                             ENABLE  CARRI
03D7  E001        LIT  =  @01@.                                    LEFT  POSITIO     P
03D8  F015        IF  LC2  SKIP.
03D9  E000        LIT  =  @00@.                                    RIGHT  POSITI
03DA  F082        B  =  LIT  L.
03DB  F0DC        MIR  =  A1  +  B.
03DC  F05D        ASE.       SELECT  BR2
03DD  F080        B  =  BMAR.
03DE  F078        B  =  B0TT.
03DF  F16E        BR2  =  B.             BR2  =  DATA  PORT
03E0  F0FC        WHEN SRQ  STEP.
03E1  F098        DW2.
03E2  F0C9        JUMP.
              MM-PRINT.
03E3  F0A5        IF  LC1    STEP.
03E4  F1DB        MIR  =  0  +  Z.
03E5  E004        LIT  =  @04@.
03E6  F05D        ASE.       SELECT  BR2
03E7  F080        B  =  BMAR.
03E8  F16F        BR2  =  BITT.          BR2  =  CONTROL  PORT
03E9  F098        DW2.                                             ENABLE  PRINT
03EA  C84B        SAR  =  8,  LIT  =  @4B@.
03EB  F015        IF  LC2  SKIP.                                   LC2  MEANS  RE    R
03EC  C849        SAR  =  8,  LIT  =  @49@.
03ED  F089        B  =  LIT.
03EE  F01B        A1  =  B  L.
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03EF  F081      B  =  NOT  CTR  R.
03F0  F07C      B  = B  L.
03F1  DE00      SAR  = 14.
03F2  F05F      B.
03F3  F0F4      SAR  = B.
03F4  F025      A2  = A2  C.
03F5  F05D      ASE.      SELECT  BR2
03F6  F080      B  = BMAR.
03F7  F078      B  = B0TT.
03F8  F16E      BR2  = B.              BR2  = DATA  PORT
            MM-PRINT-LOOP.
03F9  F147      B  =  A2   C.
03FA  D400      SAR  =  4.
03FB  F07F      B  =  B  R.
03FC  DC00      SAR  = 12.                          ISOLATE  NEXT  I
03FD  F0CC      LIT  -  B.
03FE  E009      LIT  =  @09@.
03FF  F09E      IF  AOV  SKIP.
0400  F018      SET  LC1.                           UNDIGIT
0401  E037      LIT  =  @37@.
0402  F014      IF  LC1  SKIP.
0403  E030      LIT  =  @30@.
0404  F083      B  = LIT  + B.                      PUT  ZONE  ON.
0405  F0DC      MIR  = A1  + B.
0406  F0FC      WHEN  SRQ  STEP.
0407  F098      DW2.
0408  F030      INC.
0409  F0C5      IF  SRQ  DR2  BEX  SKIP.
040A  F101      AMPCR  =  A3.
            MM-NANO-DUMB.
040B  F0C5      IF  SRQ  DR2  BEX  SKIP.
040C  440A      MPCR  = MM-NANO-DUMB  -  1.
040D  F09F      IF  COV  JUMP.                      END  OF  PRINT
040E  F025      A2  =  A2  C.
040F  DC00      SAR  = 12.                          LINE  UP  NEXT  I
0410  03F8      AMPCR  =  MM-PRINT-LOOP  -  1.
0411  F0C9      JUMP.
          *******************************************************    *
            MICRO-TOOL.                     PRESS  OCK  IIII
          *  MEMORY-MODIFY  USES  LC1,LC2,LC3,GC1,GC2
0412  F0AD      IF  LC3  STEP.
0413  F0A5      IF  LC1  STEP.
0414  F0A9      IF  LC2  STEP.
0415  F00C      RESET  GC1.
0416  F01F      RESET  GC2.
0417  403E      MPCR  = TESTSELECT  -  1.
          /
            SPO-MEM-MOD.
0418  F0A9      IF  LC2  STEP.  RESET  WRITE-BEFORE-READ   FLAG
0419  81A0      CPCR  = SETCONTADDRS  -  1.
          *   RETURN  WITH  BR1  = INST,   BR2  = DATA
041A  F0A5      IF  LC1.
            SMM-NEW-ADDRESS.
041B  8445      CPCR  = SMM-ENABLE-OUT  -  1.
041C  E00D      LIT  = @0D@.
041D  8482      CPCR  = SMM-DEV-WT-LIT  -  1.
041E  E00A      LIT  = @0A@.
041F  8482      CPCR  = SMM-DEV-WT-LIT  -  1.
0420  844D      CPCR  = SMM-SPACE-4  -  1.
0421  8442      CPCR  = SMM-ENABLE-IN  -  1.
0422  F0A8      IF  LC1  SET  LC1  SKIP.
0423  8456      CPCR  = SMM-ACCEPT-4  -  1.
0424  8445      CPCR  = SMM-ENABLE-OUT  -  1.
0425  F0BF      IF  NOT  LC1  SKIP.
0426  8467      CPCR  = SMM-PRINT-4  -  1.
0427  844D      CPCR  = SMM-SPACE-4  -  1.
0428  F0D1      MAR1  = A2.
0429  F0E7      MIR  = B001.
042A  F0AB      IF  LC2  SET  LC2  ELSE  SKIP.
042B  F0F3      MW1.   WRITE  BEFORE  READ   PREVENT  PE
042C  F0F1      MR1.
042D  F0F9      WHEN  RDC  BEX.
042E  F033      A2  = B.
042F  8467      CPCR  = SMM-PRINT-4  -  1.
0430  8442      CPCR  = SMM-ENABLE-IN  -  1.
            SMM-WHAT-TO-DO.
0431  847B      CPCR  = SMM-DEV-RD  -  1.
0432  F0CB      LIT  EQV  B.
0433  E020      LIT  = @20@.
0434  0439      AMPCR  = SMM-NEW-CONTENT  -  1.
0435  F09B      IF  ABT  LUOP  JUMP.
0436  E01B      LIT  = @1B@.
0437  F09D      IF  ABT  SKIP.
0438  4430      MPCR  = SMM-WHAT-TO-DO  -  1.
0439  F018      SET  LC1.
            SMM-NEW-CONTENT.
043A  8445      CPCR  = SMM-ENABLE-OUT  -  1.
043B  844D      CPCR  = SMM-SPACE-4  -  1.
043C  8442      CPCR  = SMM-ENABLE-IN  -  1.
043D  8456      CPCR  = SMM-ACCEPT-4  -  1.
043E  F0DD      MIR  = A2.
043F  F0F3      MW1.
0440  F0FB      WHEN  RMI  MAR1  = BMAR  + 1.
0441  F035      A2  = BMAR.
0442  441A      MPCR  = SMM-NEW-ADDRESS  -  1.
            SMM-ENABLE-IN.
0443  F0FC      WHEN  SRQ  STEP.
0444  F0E7      MIR  = B001.
0445  4446      MPCR  = SMM-SEND-CW  -  1.
            SMM-ENABLE-OUT.
0446  F1D5      MIR  = B001   + 1.
            SMM-SEND-CW.
0447  F05D      ASE.
0448  F080      B  = BMAR.
0449  F16F      BR2  = BITT.
044A  F098      DW2.
044B  F05F      B.
044C  F16E      BR2  = B.
044D  F0C9      JUMP.
            SMM-SPACE-4.
044E  F007      A1  = AMPCR.
044F  F05F      B.
0450  F05F      B.
0451  E020      LIT  = @20@.
0452  8482      CPCR  = SMM-DEV-WT-LIT  -  1.
0453  8483      CPCR  = SMM-DEV-WT  -  1.
0454  8483      CPCR  = SMM-DEV-WT  -  1.
0455  8483      CPCR  = SMM-DEV-WT  -  1.
0456  4478      MPCR  = SMM-JUMP-A1  -  1.
            SMM-ACCEPT-4.
0457  F007      A1  = AMPCR.
0458  F0CA      LCTR.
0459  CC02      SAR  = 12,   LIT  = 2.
045A  F034      A2  = B000.
            SMM-ACCEPT-LOOP.
045B  F026      A2  = A2  L.
045C  847B      CPCR  = SMM-DEV-RD  -  1.
045D  F0CC      LIT  -  B.
045E  E040      LIT  = @40@.
045F  F09E      IF  AOV  SKIP.
0460  F083      B  = LIT  + B.
0461  E009      LIT  = 9.
0462  F086      B  = LIT  AND  B.
0463  E00F      LIT  = @0F@.
0464  F031      A2  = A2  + B.
0465  F0C8      INC  IF  COV  SKIP.
0466  445A      MPCR  = SMM-ACCEPT-LOOP  -  1.
0467  4478      MPCR  = SMM-JUMP-A1  -  1.
            SMM-PRINT-4.
0468  F007      A1  = AMPCR.
0469  F0CA      LCTR.
046A  CC02      SAR  = 12,   LIT  = 2.
```

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                SMM-PRINT-LOOP.
046B  F025          A2  = A2  C.
046C  F06D          B  = A2  AND LIT.
046D  E00F          LIT  = @0F@.
046E  F0CC          LIT  - B.
046F  E009          LIT  = 9.
0470  F09E          IF  AOV  SKIP.
0471  F083          B  = LIT  + B.
0472  E007          LIT  = @07@.
0473  F0ED          MIR  = LIT  + B.
0474  E030          LIT  = @30@.
0475  8483          CPCR  = SMM-DEV-WT  - 1.
0476  F0C8          INC  IF  COV  SKIP.
0477  446A          MPCR  = SMM-PRINT-LOOP  - 1.
0478  4478          MPCR  = SMM-JUMP-A1  - 1.
                SMM-JUMP-A1.
0479  F05C          AMPCR  = A1.
047A  F05F          B.
047B  F0C9          JUMP.
                SMM-DEV-RD.
047C  F1AE          IF  NOT  URQ  SKIP.
047D  4488          MPCR  = SMM-STINTS  - 1.
047E  F0C5          IF  SRQ  DR2  BEX  SKIP.
047F  447B          MPCR  = SMM-DEV-RD  - 1.
0480  F086          B  = LIT  AND B.
0481  E07F          LIT  = @7F@.
0482  F0C9          JUMP.
                SMM-DEV-WT-LIT.
0483  F0EA          MIR  = LIT.
                SMM-DEV-WT.
0484  F1AE          IF  NOT  URQ  SKIP.
0485  4488          MPCR  = SMM-STINTS  - 1.
0486  F0C6          IF  SRQ  DW2  SKIP.
0487  4483          MPCR  = SMM-DEV-WT  - 1.
0488  F0C9          JUMP.
                SMM-STINTS.
0489  F05D          ASE.
048A  F035          A2  = BMAR.
048B  F08E          BR2  = A2  OR  B100.
048C  F097          DR2  BEX.
048D  F07D          B  = B  C.
048E  D300          SAR  = 3.       ERROR  STATUS  TO  LSB,  E-O-M  TO  MSB
048F  F090          BR2  = A2.
0490  F05F          B.
                *
                *  PUSH  INPUT-REQUEST  TO  RESET  LC2  (NORMAL  OPERATION
                *                  BEFORE  ERROR  WAS  PUSHED)
                *  PUSH  ERROR  TO  SET  LC2  (WRITE  BEFORE  READ  FLAG)
                *  PUSH  END-OF-MESSAGE  TO  EXIT  SPO-MEMORY-MODIFY
0491  F0C4          IF  NOT  MST  SKIP.
0492  4497          MPCR  = SMM-EXIT  - 1.    E-O-M  STATUS
0493  F019          SET  LC2.       WRITE-BEFORE-READ  FLAG
0494  F05F          B.
0495  F0B2          IF  LST  SKIP.
0496  4417          MPCR  = SPO-MEM-MOD  - 1.       INPUT-REQUEST  STATUS
0497  4418          MPCR  = SPO-MEM-MOD.  ERROR  STATUS  (LEAVE  LC2  SET)
                SMM-EXIT.
                *  SPO-MEM-MOD  USES  LC1  AND  LC2
0498  F0A5          IF  LC1  STEP.
0499  F0A9          IF  LC2  STEP.
049A  403E          MPCR  = TESTSELECT  - 1.
                /
                TESTTABLE.
049B  44A5          MPCR  = TEST-0  - 1.
049C  44A5          MPCR  = TEST-1  - 1.
049D  4691          MPCR  = TEST-2  - 1.
049E  476F          MPCR  = TEST-3  - 1.
049F  491B          MPCR  = TEST-4  - 1.
04A0  4996          MPCR  = TEST-5  - 1.
04A1  49BE          MPCR  = TEST-6  - 1.
04A2  49CB          MPCR  = TEST-7  - 1.
04A3  4AF7          MPCR  = TEST-8  - 1.
04A4  4B05          MPCR  = TEST-9  - 1.
04A5  4B26          MPCR  = TEST-10  - 1.
                TEST-0.
                TEST-1.
                SLC01.
04A6  E000          LIT  = 0.
04A7  8C8E          CPCR  = STATCHK2  - 1.    TEST  STATUS
04A8  8C33          CPCR  = SLCSTAT1  - 1.    FIRST  STATUS  READ  FAILED
                *********ERROR  # M4
04A9  04A5          AMPCR  = SLC01  - 1.      LOOP  ON  READ
                SLC01A.
04AA  E000          LIT  = 0.
04AB  8C95          CPCR  = CWEDLI  - 1.      WRITE  CONTROL  WORD  8000
04AC  8CCA          CPCR  = T3USEC  - 1.      DELAY
04AD  F1AE          IF  NOT  URQ  SKIP.       TEST  STINT
04AE  8C32          CPCR  = SLCSTATSR  - 1.   STINT  SET  AFTER  NO-OP
                *********ERROR  # M5
04AF  04A9          AMPCR  = SLC01A  - 1.     LOOP  ON  WRITE
04B0  F1AD          IF  NOT  SRQ  SKIP.       TEST  DINT
04B1  8C32          CPCR  = SLCSTATSR  - 1.   DINT  SET  AFTER  NO-OP
                *********ERROR  # M6
04B2  04A9          AMPCR  = SLC01A  - 1.     LOOP  ON  WRITE
04B3  E000          LIT  = 0.
04B4  8C8E          CPCR  = STATCHK2  - 1.    TEST  STATUS
04B5  8C33          CPCR  = SLCSTAT1  - 1.    STATUS  FAILURE
                *********ERROR  # M7
                SLC01B.
04B6  F0E6          MIR  = B000.
04B7  F098          DW2.                      DATA  WRITE  0000
04B8  F05F          B.
04B9  F098          DW2.                      DATA  WRITE  0000
04BA  F05F          B.
04BB  CC18          SAR  = 12  LIT  = @18@.   T  1MSEC
04BC  8CA1          CPCR  = MTIMESH  - 1.     DELAY
04BD  F1AE          IF  NOT  URQ  SKIP.
04BE  8C32          CPCR  = SLCSTATSR  - 1.   STINT  SET
                *********ERROR  # M8
04BF  04B5          AMPCR  = SLC01B  - 1.     LOOP  ON  DATA  WRITE
04C0  F1AD          IF  NOT  SRQ  SKIP.
04C1  8C32          CPCR  = SLCSTATSR  - 1.   DINT  SET
                *********ERROR  # M9
04C2  04B5          AMPCR  = SLC01B  - 1.
04C3  E000          LIT  = 0.
04C4  8C8E          CPCR  = STATCHK2  - 1.
04C5  8C33          CPCR  = SLCSTAT1  - 1.    STATUS  FAILURE
                *********ERROR  # M10
                SLC01C.
04C6  E010          LIT  = @10@.
04C7  8C95          CPCR  = CWEDLI  - 1.      WRITE  CONTROL  WORD  8010
04C8  8CCA          CPCR  = T3USEC  - 1.      DELAY
04C9  F1AE          IF  NOT  URQ  SKIP.
04CA  44CE          MPCR  = SLC01D  - 1.
04CB  F18E          IF  IRQ  SKIP.
04CC  8C32          CPCR  = SLCSTATSR  - 1.   STINT  NOT  SET  FOR  CC  L.E.
                *********ERROR  # M11
04CD  04C5          AMPCR  = SLC01C  - 1.     FOR  LOOPING
04CE  8C30          CPCR  = SLCSTATASR  - 1.  SLC  DESELECTED
                *********ERROR  # M12
                SLC01D.
04CF  F0BD          IF  NOT  IRQ  SKIP.
04D0  8C30          CPCR  = SLCSTATASR  - 1.  IRQ  SET  WITH  URQ
                *********ERROR  # M13
                SLC01E.
04D1  8C5C          CPCR  = BUSS2  - 1.       TEST  EXT  BUSS
                *********ERROR  # M3
04D2  E004          LIT  = 4.
04D3  8C8E          CPCR  = STATCHK2  - 1.    TEST  STATUS
04D4  8C33          CPCR  = SLCSTAT1  - 1.    STATUS  FAILURE
                *********ERROR  # M14
04D5  04D0          AMPCR  = SLC01E  - 1.     FOR  LOOPING
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04D6  F1AE        IF  NOT  URQ  SKIP.
04D7  8C32        CPCR  =  SLCSTATSR  -  1.   STINT  NOT  RESET
                  *********ERROR      # M15
04D8  04D0        AMPCR  =  SLC01E  -  1.     LOOP  ON  READ
04D9  E004        LIT  =  4.
04DA  8C95        CPCR  =  CWEDLI  -  1.      WRITE  CONTROL  WORD  8004
04DB  8CCA        CPCR  =  T3USEC  -  1.      DELAY
04DC  F1AE        IF  NOT  URQ  SKIP.
04DD  8C32        CPCR  =  SLCSTATSR  -  1.   STINT  SET  ON  L.E.  OF  RING
                  *********ERROR      # M16
04DE  E000        LIT  =  0.
04DF  8C95        CPCR  =  CWEDLI  -  1.      RESET  IR  14
04E0  8CCA        CPCR  =  T3USEC  -  1.      DELAY
04E1  F1B5        IF  URQ  SKIP.
04E2  8C32        CPCR  =  SLCSTATSR  -  1.   STINT  NOT  SET  T.E.  OF  RING
                  *********ERROR      # M17
04E3  F097        DR2  BEX.                   DATA  READ
04E4  F05F        B.
04E5  F05F        B.
04E6  F1B5        IF  URQ  SKIP.
04E7  8C33        CPCR  =  SLCSTAT1  -  1.    DATA  READ  RESET  STINT
                  *********ERROR      # M18
04E8  8C5C        CPCR  =  BUSS2  -  1.       TEST  EXT  BUSS
                  *********ERROR      # M3      EXT  BUSS  FAILURE
04E9  E002        LIT  =  2.
04EA  8C8E        CPCR  =  STATCHK2  -  1.    TEST  STATUS
04EB  8C33        CPCR  =  SLCSTAT1  -  1.    STATUS  FAILURE
                  *********ERROR      # M19
04EC  8CCA        CPCR  =  T3USEC  -  1.      DELAY
04ED  F1AE        IF  NOT  URQ  SKIP.
04EE  8C32        CPCR  =  SLCSTATSR  -  1.   STINT  NOT  RESET
                  *********ERROR      # M20
04EF  E008        LIT  =  8.
04F0  8C95        CPCR  =  CWEDLI  -  1.      WRITE  CONTROL  WORD  8008
04F1  E000        LIT  =  0.
04F2  8C95        CPCR  =  CWEDLI  -  1.      WRITE  CONTROL  WORD  8000
04F3  8CCA        CPCR  =  T3USEC  -  1.      DELAY
04F4  F1AE        IF  NOT  URQ  SKIP.
04F5  8C32        CPCR  =  SLCSTATSR  -  1.
                  *********ERROR      # M21
04F6  E001        LIT  =  1.
04F7  8C95        CPCR  =  CWEDLI  -  1.      CW  =  8001  SET  RCV  MODE
04F8  8CCA        CPCR  =  T3USEC  -  1.
04F9  F1AD        IF  NOT  SRQ  SKIP.
04FA  8C32        CPCR  =  SLCSTATSR  -  1.   DINT  SET  IN  RCV  MODE
                  *********ERROR      # M22
04FB  F1AE        IF  NOT  URQ  SKIP.
04FC  8C32        CPCR  =  SLCSTATSR  -  1.   STINT  SET  IN  RCV  MODE
                  *********ERROR      # M23
04FD  E009        LIT  =  9.
04FE  8C95        CPCR  =  CWEDLI  -  1.      CW  =  8009
04FF  8CCA        CPCR  =  T3USEC  -  1.      DELAY
0500  F1AE        IF  NOT  URQ  SKIP.
0501  8C32        CPCR  =  SLCSTATSR  -  1.   STINT  SET  L.E.  OF  CARR  DET
                  *********ERROR      # M24
0502  8C5C        CPCR  =  BUSS2  -  1.       TEST  EXT  BUSS
                  *********ERROR      # M3
0503  E080        LIT  =  @80@.
0504  8C8E        CPCR  =  STATCHK2  -  1.    TEST  STATUS
0505  8C33        CPCR  =  SLCSTAT1  -  1.    STATUS  FAILURE
                  *********ERROR      # M25
0506  E001        LIT  =  1.
0507  8C95        CPCR  =  CWEDLI  -  1.      WRITE  CONTROL  WORD  8001
0508  8CCB        CPCR  =  T2USEC  -  1.      DELAY
0509  F1B5        IF  URQ  SKIP.
050A  8C32        CPCR  =  SLCSTATSR  -  1.   NO  STINT  T.E.  OF  CARR  DET.
                  *********ERROR      # M26
050B  8C5C        CPCR  =  BUSS2  -  1.       TEST  EXT  BUSS
                  *********ERROR      # M3
050C  E001        LIT  =  1.
050D  8C8E        CPCR  =  STATCHK2  -  1.    TEST  STATUS
050E  8C33        CPCR  =  SLCSTAT1  -  1.    STATUS  FAILURE
                  *********ERROR      # M27
050F  E000        LIT  =  0.
0510  8C8E        CPCR  =  STATCHK2  -  1.
0511  8C33        CPCR  =  SLCSTAT1  -  1.    CARR  LOST  FLAG  NOT  RESET
                  *********ERROR      # M27A
0512  F079        B  =  B100.
0513  F0EC        MIR  =  LIT  OR  B.
0514  E010        LIT  =  @10@.
0515  F098        DW2.                        DATA  WRITE  8010
0516  F05F        B.
0517  8CCA        CPCR  =  T3USEC  -  1.
0518  F1AE        IF  NOT  URQ  SKIP.
0519  8C32        CPCR  =  SLCSTATSR  -  1.   STINT  SET  BY  DATA  WRITE
                  *********ERROR      # M28
                  SLC01F.
051A  E010        LIT  =  @10@.
051B  8C95        CPCR  =  CWEDLI  -  1.      WRITE  CW  8010
051C  F0FD        WHEN  URQ  STEP.
051D  8C93        CPCR  =  CWNULL  -  1.      WRITE  NULL  0000  CW
051E  F05F        B.
051F  F1AE        IF  NOT  URQ  SKIP.
0520  8C32        CPCR  =  SLCSTATSR  -  1.   STINT  NOT  RESET  BY  NULL
                  *********ERROR      # M29
0521  F008        IF  GC1  SKIP.              TST  LOOP  FLAG
0522  F0BD        IF  NOT  IRQ  SKIP.
0523  8C30        CPCR  =  SLCSTATASR  -  1.  DEV  WRITES  AFFECTED
                  *********ERROR      # M30   OTHER  DEVICE
0524  0519        AMPCR  =  SLC01F  -  1.     LOOP  ON  WRITE
0525  E010        LIT  =  @10@.
0526  8C95        CPCR  =  CWEDLI  -  1.      WRITE  CW  8010
0527  F07B        B  =  B000.
0528  F0FD        WHEN  URQ  STEP.
0529  F108        ASR  BEX.                   ASR  WITH  NO  IRQ
052A  F05F        B.
052B  F05F        B.
052C  F1AE        IF  NOT  URQ  SKIP.         TEST  STINT
052D  4530        MPCR  =  SLC01G  -  1.
052E  F18E        IF  IRQ  SKIP.
052F  8C33        CPCR  =  SLCSTAT1  -  1.    ASR  RESET  STINT  WHILE  SEL.
                  *********ERROR      # M31
0530  8C33        CPCR  =  SLCSTAT1  -  1.    ASR  DESELECTED
                  *********ERROR      # M32
                  SLC01G.
0531  F0FF        0  EQV  B.
0532  F09D        IF  ABT  SKIP.
0533  8C33        CPCR  =  SLCSTAT1  -  1.    ASR  WHILE  IRQ  NOT  SET
                  *********ERROR      # M33   READ  STATUS
0534  8CD2        CPCR  =  DESELRSET1  -  1.  DESELECT
0535  8C5C        CPCR  =  BUSS2  -  1.       TEST  EXT  BUSS
                  *********ERROR      # M3
0536  F18E        IF  IRQ  SKIP.
0537  8C33        CPCR  =  SLCSTAT1  -  1.    IRQ  NOT  SET  BY  STINT
                  *********ERROR      # M34
0538  F1AE        IF  NOT  URQ  SKIP.
0539  8C33        CPCR  =  SLCSTAT1  -  1.    URQ  AND  IRQ  BOTH  SET
                  *********ERROR      # M35
053A  F097        DR2  BEX.                   DATA  READ
053B  F05F        B.
053C  F1B5        IF  URQ  SKIP.
053D  8C32        CPCR  =  SLCSTATSR  -  1.   READ  FAILED  TO  SELECT
                  *********ERROR      # M36
053E  8CD2        CPCR  =  DESELRSET1  -  1.  DESELECT
                  SLC01H.
053F  F108        ASR  BEX.                   ENABLE  STATUS
0540  F05F        B.
0541  F05F        B.
0542  F0BD        IF  NOT  IRQ  SKIP.
0543  8C33        CPCR  =  SLCSTAT1  -  1.    IRQ  NOT  RESET  BY  ENST
```

```
                *********ERROR      # M37
0544  053E        AMPCR = SLC01H  - 1.        LOOP  ON ASR
0545  E004        LIT  = 4.
0546  8C81        CPCR  = STATCHKASR.         TEST  STATUS
0547  8C33        CPCR  = SLCSTAT1  - 1.      STAT  FAILED  ON ASR
                *********ERROR      # M38
0548  8C93        CPCR  = CWNULL - 1.         CW  = 0000
0549  E010        LIT  = @10@.
054A  8C95        CPCR  = CWEDLI  - 1.        CW  = 8010
054B  F0FD        WHEN URQ STEP.              WAIT  FOR  STINT
054C  8CCD        CPCR  = DESELSET1  - 1.     DESELECT  SAVE  BR1
054D  F089        B  = LIT.
054E  C880        SAR  = 8  LIT  = @80@.
054F  4553        MPCR  = MRDDSL + 3.         SET  UP  PRIORITY  TEST
              MRDDSL.
0550  F096        DR1  BEX.                   STATUS  READ
0551  F080        B  = BMAR.
0552  F07D        B  = B C.
0553  F07E        B  = B + 1.
0554  F0CB        LIT  EQV  B.
0555  E090        LIT  = @90@.
0556  F0B5        IF  NOT ABT  SKIP.
0557  455D        MPCR  = MRDDSLA  - 1.
0558  F07D        B  = B C.
0559  F0D5        MAR1  = B.
055A  F116        A2  EQV  B.
055B  F09D        IF  ABT  SKIP.              PORT  UNDER  TEST
055C  454F        MPCR  = MRDDSL  - 1.
055D  4550        MPCR  = MRDDSL.             BY  PASS  READ
              MRDDSLA.
055E  F0D1        MAR1  = A2.
055F  F097        DR2  BEX.                   DATA  READ  SELECT
0560  F05F        B.
0561  F1B5        IF  URQ SKIP.
0562  8C33        CPCR  = SLCSTAT1  - 1.
                *********ERROR      # M39
0563  82FE        CPCR  = SET-CONT-DINT  - 1.
0564  01DD        AMPCR  = CONTPORTADDRESS.
0565  F0CF        MAR1  = AMPCR.
0566  F0F1        MR1.
0567  F0F9        WHEN RDC BEX.               FETCH  CONTROLLER  ADDR
0568  F017        A1  = B.
0569  8CD2        CPCR  = DESELRSET1  - 1.    DESELECT  AND  RESOTRE  BR1
056A  F108        ASR  BEX.                   READ  PRIORITY  DEVICE
056B  F003        A1  EQV  B.
056C  F09D        IF  ABT  SKIP.
056D  8C33        CPCR  = SLCSTAT1  - 1.      PRIORITY  ERROR  OR  CONT
                *********ERROR      # M39A     ASR  WENT  TO  SLC  IF  EXT  14
056E  830C        CPCR  = RESET-CONT-DINT  - 1.
056F  82FE        CPCR  = SET-CONT-DINT  - 1.  SEL  CONT
0570  E004        LIT  = 4.
0571  8C80        CPCR  = STATCHKASR  - 1.    TEST  SLC  STATUS
0572  8C33        CPCR  = SLCSTAT1  - 1.      ASR  STATUS  FAILED
                *********ERROR      # M39B
0573  830C        CPCR  = RESET-CONT-DINT  - 1.
0574  F096        DR1  BEX.                   RESELECT
0575  F05F        B.
0576  8C9A        CPCR  = CWGEN2L  - 1.       CW  = 9000  FULL  DUPLEX
0577  E090        LIT  = @90@.
0578  E000        LIT  = 0.
0579  8CCA        CPCR  = T3USEC  - 1.        DELAY
057A  F1AE        IF  NOT URQ SKIP.
057B  8C32        CPCR  = SLCSTATSR  - 1.     STINT  SET
                *********ERROR      # M40
057C  E040        LIT  = @40@.
057D  8C8E        CPCR  = STATCHK2  - 1.      TST  STATUS
057E  8C33        CPCR  = SLCSTAT1  - 1.      STATUS  FAILURE
                *********ERROR      # M41
057F  F054        A3  = B000.                 ZERO  DATA  REG
0580  8CEB        CPCR  = DATCHK  - 1.        TST  MONITOR  WORD
0581  8C33        CPCR  = SLCSTAT1  - 1.      MONITOR  DATA  WD  FAILED
```

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                *********ERROR      # M42
0582  8C9A        CPCR  = CWGEN2L  - 1.       WRITE  CW  0200
0583  E002        LIT  = 2.
0584  E000        LIT  = 0.
0585  8CC8        CPCR  = T5USEC  - 1.        DELAY
0586  8CEB        CPCR  = DATCHK  - 1.        TST  MONITOR  DATA  WD
0587  8C33        CPCR  = SLCSTAT1  - 1.      DATA  WD  FAILED
                *********ERROR      # M43
0588  8C9A        CPCR  = CWGEN2L  - 1.       CW  = 8A00
0589  E08A        LIT  = @8A@.
058A  E000        LIT  = 0.
058B  8CC9        CPCR  = T4USEC  - 1.        DELAY
058C  8CEB        CPCR  = DATCHK  - 1.        TEST  MONITOR  DATA  WORD
058D  8C33        CPCR  = SLCSTAT1  - 1.      DATA  WORD  FAILED
                *********ERROR      # M44
058E  8C9A        CPCR  = CWGEN2L  - 1.       CW  = 8002  SET  XMIT
058F  E080        LIT  = @80@.
0590  E002        LIT  = 2.
0591  8CC8        CPCR  = T5USEC  - 1.        DELAY
0592  F1B5        IF  URQ SKIP.
0593  8C32        CPCR  = SLCSTATSR  - 1.     STINT  NOT  SET-CLR  TO  SEND
                *********ERROR      # M45
0594  F1AD        IF  NOT SRQ SKIP.
0595  F0F7        SKIP.
0596  8C32        CPCR  = SLCSTATSR  - 1.     NO  DINT  FOR  XMIT
                *********ERROR      # M46
0597  F05D        ASE.                        SELECT  BR2
0598  8C5C        CPCR  = BUSS2  - 1.         TEST  EXT  BUSS
                *********ERROR      # M3
0599  E060        LIT  = @60@.
059A  8C83        CPCR  = STATGEN8  - 1.      TEST  STATUS
059B  8C33        CPCR  = SLCSTAT1  - 1.      STATUS  FAILURE
                *********ERROR      # M47
059C  F1AE        IF  NOT URQ SKIP.
059D  8C32        CPCR  = SLCSTATSR  - 1.     STINT  NOT  RESET  BY  READ
                *********ERROR      # M48
059E  8CC8        CPCR  = T5USEC  - 1.        DELAY
059F  F1AD        IF  NOT SRQ SKIP.
05A0  F0F7        SKIP.
05A1  8C32        CPCR  = SLCSTATSR  - 1.     DINT  RESET
                *********ERROR      # M49
05A2  8CCD        CPCR  = DESELSET1  - 1.     DESELECT
05A3  F18E        IF  IRQ SKIP.
05A4  8C33        CPCR  = SLCSTAT1  - 1.      NO  IRQ  FOR  DINT
                *********ERROR      # M50
05A5  F1AD        IF  NOT SRQ SKIP.
05A6  8C33        CPCR  = SLCSTAT1  - 1.      SRQ  WHILE  DESELECTED
                *********ERROR      # M50A
05A7  E060        LIT  = @60@.
05A8  8C80        CPCR  = STATCHKASR  - 1.    TEST  STATUS
05A9  8C33        CPCR  = SLCSTAT1  - 1.      STATUS  FAILURE
                *********ERROR      # M51
05AA  F097        DR2  BEX.                   DATA  RD  SELECT
05AB  F05F        B.
05AC  F1AD        IF  NOT SRQ SKIP.
05AD  F0F7        SKIP.
05AE  8C33        CPCR  = SLCSTAT1  - 1.      DINT  RESET  BY  DATA  READ
                *********ERROR      # M52
05AF  8C9A        CPCR  = CWGEN2L  - 1.       CW  = 8202  ENAB  MONITOR
05B0  E082        LIT  = @82@.
05B1  E002        LIT  = 2.
05B2  8CC8        CPCR  = T5USEC  - 1.        DELAY
05B3  F0EE        MIR  = LIT  L.
05B4  C808        SAR  = 8  LIT  = 8.
05B5  8CC8        CPCR  = T5USEC  - 1.
05B6  E000        LIT  = 0.
05B7  8CE4        CPCR  = DATCHKX  - 1.       TST  MONITOR  DATA  WD
05B8  8C33        CPCR  = SLCSTAT1  - 1.      DATA  WORD  FAILED
                *********ERROR      # M53
05B9  F1AE        IF  NOT URQ SKIP.
05BA  8C32        CPCR  = SLCSTATSR  - 1.     STINT  SET
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                *********ERROR      # M54
05BB  8C9A          CPCR  = CWGEN2L  -  1.      CW = 8A02   SET  LINE  BREAK
05BC  E08A          LIT   = @8A@.
05BD  E002          LIT   = 2.
05BE  8CCA          CPCR  = T3USEC   -  1.      DELAY
05BF  8C5C          CPCR  = BUSS2    -  1.      TEST  EXT  BUSS
                *********ERROR      # M3
05C0  F096          DR1  BEX.                   ATTEMPT  RESET  LINE  CHANGE
05C1  F05F          B.
05C2  E003          LIT   = 3.
05C3  8CE4          CPCR  = DATCHKX  -  1.      TST  MONITOR  DATA  WORD
05C4  8C33          CPCR  = SLCSTAT1   -  1.    LINE  STATUS  FAILED
                *********ERROR      # M55
05C5  E001          LIT   = 1.
05C6  8CE4          CPCR  = DATCHKX  -  1.      TST  MONITOR  DATA  WORD
05C7  8C33          CPCR  = SLCSTAT1   -  1.    LINE  CHANGE  NOT  RESET
                *********ERROR      # M56
05C8  CBC0          SAR  = 11  LIT  = @C0@.      18.33MSEC
05C9  8CA1          CPCR  = MTIMESH  -  1.      DELAY
05CA  E001          LIT   = 1.
05CB  8CE4          CPCR  = DATCHKX  -  1.      LINE  BRK  NOT  HOLDING  OR
05CC  8C33          CPCR  = SLCSTAT1   -  1.    MONITOR  BAD
                *********ERROR      # M57       IN  IDLE  CONDITION
05CD  8C9A          CPCR  = CWGEN2L  -  1.      CW = 0802   DISABLE   INTERRUPT
05CE  E008          LIT   = 8.
05CF  E002          LIT   = 2.
05D0  F05F          B.
05D1  F1AD          IF  NOT  SRQ  SKIP.
05D2  8C32          CPCR  = SLCSTATSR   -  1.   DINT  NOT  DISABLED
                *********ERROR      # M58
05D3  E000          LIT   = 0.
05D4  8CE4          CPCR  = DATCHKX  -  1.      TST  MONITOR  WORD
05D5  8C33          CPCR  = SLCSTAT1   -  1.    LINE  STATUS  NOT  RESET
                *********ERROR      # M59
05D6  F054          A3  = B000.                 ZERO  DATA  REG
05D7  8C9A          CPCR  = CWGEN2L  -  1.      RESET  XMIT  CW = 8200
05D8  E082          LIT   = @82@.
05D9  E000          LIT   = 0.
05DA  F1AD          IF  NOT  SRQ  SKIP.
05DB  8C32          CPCR  = SLCSTATSR   -  1.   DINT  NOT  RESET
                *********ERROR      # M60
05DC  F05F          B.
05DD  F097          DR2  BEX.                   PRE-ASYNC   CLAMP  TIME
05DE  F017          A1  = B.                    T4
05DF  CC28          SAR  = 12  LIT  = @28@.     T1926USEC
05E0  8CA1          CPCR  = MTIMESH  -  1.      DELAY  1  BIT  TIME  + 2  CLK
05E1  F097          DR2  BEX.
05E2  F05F          B.
05E3  F0C3          IF  NOT  LST  SKIP.         TEST  LINE  STAT
05E4  8C33          CPCR  = SLCSTAT1   -  1.    NO  ASYNC  OR  SYNC  DATA  CLAMP
                *********ERROR      # M61
                 SLC01I.
05E5  F001          A1.
05E6  F0B2          IF  LST  SKIP.
05E7  8C33          CPCR  = SLCSTAT1   -  1.    LINE  BREAK  RESET  EARLY
                *********ERROR      # M63
05E8  E060          LIT   = @60@.
05E9  8C8E          CPCR  = STATCHK2   -  1.    TEST  STATUS
05EA  8C33          CPCR  = SLCSTAT1   -  1.    STATUS  FAILURE
                *********ERROR      # M64
05EB  CC1E          SAR  = 12  LIT  = @1E@.     T1.9MSEC
05EC  8C64          CPCR  = PURQTMOUT  -  1.    TIME  OUT  EARLY  SHUTDOWN
05ED  F0F7          SKIP.
05EE  8C32          CPCR  = SLCSTATSR   -  1.   EARLY  XMIT  SHUTDOWN
                *********ERROR      # M65
05EF  CC84          SAR  = 12  LIT  = @84@.     T8.4MSEC
05F0  8C64          CPCR  = PURQTMOUT  -  1.
05F1  8C32          CPCR  = SLCSTATSR   -  1.   XMIT  SHUTDOWN  LATE
                *********ERROR      # M66
05F2  E000          LIT   = 0.
05F3  8C8E          CPCR  = STATCHK2   -  1.    TST  STATUS
05F4  8C33          CPCR  = SLCSTAT1   -  1.    STATUS  FAILED
                *********ERROR      # M67
05F5  8CEB          CPCR  = DATCHK   -  1.      TST  MONITOR  WORD
05F6  8C33          CPCR  = SLCSTAT1   -  1.    MONITOR  WORD  FAILED
                *********ERROR      # M68
05F7  CCD0          SAR  = 12  LIT  = @D0@.     T9.9MSEC
05F8  8CA1          CPCR  = MTIMESH  -  1.      DELAY  FOR  LAST  CHAR  XMIT
05F9  8C9A          CPCR  = CWGEN2L  -  1.      WRITE  CW 8202
05FA  E082          LIT   = @82@.
05FB  E002          LIT   = 2.
05FC  CC2A          SAR  = 12  LIT  = @2A@.     T 2  MSEC
05FD  8CA1          CPCR  = MTIMESH  -  1.      DELAY
05FE  E060          LIT   = @60@.
05FF  8C83          CPCR  = STATGEN8   -  1.    TEST  STATUS
0600  8C33          CPCR  = SLCSTAT1   -  1.    STATUS  FAILURE
                *********ERROR      # M69
0601  E000          LIT   = 0.
0602  8CE4          CPCR  = DATCHKX  -  1.      TEST  MONITOR  WORD
0603  8C33          CPCR  = SLCSTAT1   -  1.    DATA  WORD FAILED
                *********ERROR      # M70
0604  F0E6          MIR  = B000.
0605  F098          DW2.                        DATA  WRITE
0606  F05F          B.
0607  F05F          B.
0608  F1AD          IF  NOT  SRQ  SKIP.
0609  8C32          CPCR  = SLCSTATSR   -  1.   WRITE  FAILED  TO  RESET  DINT
                *********ERROR      # M71
060A  8CC8          CPCR  = T5USEC   -  1.
060B  F1AD          IF  NOT  SRQ  SKIP.
060C  F0F7          SKIP.
060D  8C32          CPCR  = SLCSTATSR   -  1.   DINT  NOT  SET  2ND  TIME
                *********ERROR      # M72
060E  CC50          SAR  = 12  LIT  = @50@.     T3.7MSEC
060F  8CA1          CPCR  = MTIMESH  -  1.      DELAY
0610  F097          DR2  BEX.                   DATA  READ
0611  F05F          B.
0612  C101          SAR  = 1  LIT  = 1.
0613  8C76          CPCR  = PRSTATLST.          TEST  BIT  15  = 1
0614  8C33          CPCR  = SLCSTAT1   -  1.    NO  LINE  CHANGE  FOR  DATA
                *********ERROR      # M73
0615  C81C          SAR  = 8  LIT  = @1C@.      T21.5MSEC
0616  8CA1          CPCR  = MTIMESH  -  1.      DELAY
0617  F097          DR2  BEX.                   RESET  LINE  CHANGE
0618  F05F          B.
0619  C81C          SAR  = 8  LIT  = @1C@.      T21.5MSEC
061A  8CA1          CPCR  = MTIMESH  -  1.      DELAY
061B  E000          LIT   = 0.
061C  8CE4          CPCR  = DATCHKX  -  1.      TEST  LINE  STAT
061D  8C33          CPCR  = SLCSTAT1   -  1.    LINE  CHANGE  AFTER  DATA
                *********ERROR      # M74       TIME
061E  F096          DR1  BEX.                   SET  1  BIT
061F  F0EA          MIR  = LIT.
0620  E040          LIT   = @40@.               SET  IR  10
0621  F05F          B.                          SET  UP  CTR  INHIBIT
0622  F098          DW2.                        DATA  WRITE
0623  F05F          B.
0624  F1AD          IF  NOT  SRQ  SKIP.
0625  8C32          CPCR  = SLCSTATSR   -  1.   LOAD  TIMER  INHIBIT   SET
                *********ERROR      # M75
0626  F05F          B.
0627  F05F          B.
0628  F1AD          IF  NOT  SRQ  SKIP.
0629  F0F7          SKIP.
062A  8C32          CPCR  = SLCSTATSR   -  1.   DINT  NOT  SET
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                *********ERROR      # M76
062B  E042      LIT  = @42@.
062C  8C95      CPCR = CWEDLI - 1.        CW = 8042  SET  LOAD  TIMER
062D  F0E6      MIR  = B000.
062E  F098      DW2.                      ATTEMPT  RESET  DINT
062F  F05F      B.
0630  F1AD      IF  NOT  SRQ  SKIP.
0631  F0F7      SKIP.
0632  8C32      CPCR = SLCSTATSR  - 1.    LOAD  TIMER  INHIBIT  FAILED
                *********ERROR      # M77
0633  E002      LIT  = 2.
0634  8C95      CPCR = CWEDLI - 1.        CW WRITE
0635  F098      DW2.                      ATTEMPT  2ND  DINT  RESET
0636  F05F      B.
0637  F1AD      IF  NOT  SRQ  SKIP.
0638  F0F7      SKIP.
0639  8C32      CPCR = SLCSTATSR  - 1.    2ND  LOAD  TIMER  INHIBIT
                *********ERROR      # M78  FAILED
063A  F098      DW2.
063B  F05F      B.
063C  F1AD      IF  NOT  SRQ  SKIP.
063D  8C32      CPCR = SLCSTATSR  - 1.    LOAD  TIMER  INHIBIT  NOT
                *********ERROR      # M79  CLEARED  BY  2  DATA  WRITES
063E  F0EA      MIR  = LIT.
063F  E020      LIT  = @20@.              SET  IR  11
0640  F05F      B.
0641  C835      SAR  = 8  LIT  = @35@.    T40.7MSEC
0642  8CA1      CPCR = MTIMESH - 1.       DELAY
0643  E060      LIT  = @60@.
0644  8C83      CPCR = STATGEN8  - 1.     TEST  STATUS
0645  8C33      CPCR = SLCSTAT1  - 1.     STATUS  FAILURE
                *********ERROR      # M80
0646  8CCD      CPCR = DESELSET1  - 1.    DESELECT
0647  F05E      ASR.
0648  F000      WAIT.
                *********PORT      SELECT  CARD  ENABLE  STATUS  GATING  TEST.
                *********TO      VERIFY  ONLY  THE  DEVICE  GENERATING  AN
                *********INTERRUPT      IS  ADDRESSED  BY  ASR,  METER  THE
                *********FOLLOWING      SIGNALS.
                *********ONLY      THE  SIGNAL  CORRESPONDING  TO  THE  PORT  NO.
                *********OF      SINGLE  LINE  CONTROL  SHOULD  BE  0%  ALL  OTHERS
                *********SHOULD      BE  100%.
                *
                *********IF      AGREE  -  FORCE  STEP.
                *********IF      DISAGREE  -  FAILURE  IS  PS  #  A5,  B5,  C5,  C7
                *
                **      PORT          PS1-3
                **
                *        12      2J(PSENST12/)
                *        11      1J(PSENST11/)
                *        10      1K(PSENST10/)
                *         9      2B(PSENST09/)
                **                                  PS1-2
                **
                **         8                    2J(PSENST8/)
                **         7                    1J(PSENST7/)
                **         6                    1K(PSENST6/)
                **         5                    2B(PSENST5/)
                **                                                PS1-1
                **
                **         4                                    2J(PSENST4/)
                **         3                                    1J(PSENST3/)
                **         2                                    1K(PSENST2/)
                **         1                                    2B(PSENST1/)
                **
                **      NOTE:  SYSTEM  MAY  HAVE  1,  2  OR  3  PS1  CARDS
                *
                *
0649  8C9A      CPCR = CWGEN2L  - 1.      CW = C202  SET  SYNC  MODE
064A  E0C2      LIT  = @C2@.
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064B  E002      LIT  = 2.
064C  CC2A      SAR  = 12  LIT  = @2A@.   T 2MSEC
064D  8CA1      CPCR = MTIMESH - 1.       DELAY
064E  E000      LIT  = 0.
064F  8CE4      CPCR = DATCHKX - 1.       TEST  MONITOR  WORD
0650  8C33      CPCR = SLCSTAT1  - 1.     DATA  WORD  FAILED
                *********ERROR      # M81
0651  F0E6      MIR  = B000.
0652  F098      DW2.                      DATA  WRITE
0653  F05F      B.
0654  CC20      SAR  = 12  LIT  = @20@.   T1.5  MSEC
0655  8CA1      CPCR = MTIMESH - 1.       DELAY
0656  F097      DR2  BEX.                 READ  MONITOR  WORD
0657  F05F      B.
0658  C101      SAR  = 1  LIT  = 1.
0659  8C76      CPCR = PRSTATLST.         TEST  LINE  CHANGE
065A  8C33      CPCR = SLCSTAT1  - 1.     NO  DATA  IN  SYNC  MODE
                *********ERROR      # M82  NEW  CLOCK  PATH
065B  8C9A      CPCR = CWGEN2L  - 1.      CW = CA02  SET  BREAK
065C  E0CA      LIT  = @CA@.
065D  E002      LIT  = @02@.
065E  8CCB      CPCR = T2USEC  - 1.       DELAY
065F  F097      DR2  BEX.                 RESET  LINE  CHANGE
0660  F05F      B.
0661  8C9A      CPCR = CWGEN2L  - 1.      CW = C200  RESET  XMIT
0662  E0C2      LIT  = @C2@.
0663  E000      LIT  = 0.                 T1
0664  CC20      SAR  = 12  LIT  = @20@.   T 1.5MSEC
0665  8CA1      CPCR = MTIMESH - 1.       DELAY  IDLE  CHAR  +  3  CLKS
0666  F097      DR2  BEX.                 READ  MONITOR  WORD
0667  F05F      B.
0668  F0C3      IF  NOT  LST  SKIP.
0669  8C33      CPCR = SLCSTAT1  - 1.     NO  SYNC  CLAMP
                *********ERROR      # M83
066A  CCE0      SAR  = 12  LIT  = @E0@.   T 10.7MSEC
066B  8C64      CPCR = PURQTMOUT - 1.
066C  8C32      CPCR = SLCSTATSR  - 1.    XMIT  SHUT  DOWN  FAILED
                *********ERROR      # M84  OR  LATE
066D  E000      LIT  = 0.
066E  8C8E      CPCR = STATCHK2  - 1.     TEST  STATUS
066F  8C33      CPCR = SLCSTAT1  - 1.     STATUS  FAILURE
                *********ERROR      # M85
0670  8C93      CPCR = CWNULL - 1.        RESET  ALL  CONTROL  BITS
0671  8C9A      CPCR = CWGEN2L  - 1.      CW = 901D
0672  E090      LIT  = @90@.
0673  E01D      LIT  = @1D@.
0674  8CC8      CPCR = T5USEC  - 1.       DELAY
0675  8C9A      CPCR = CWGEN2L  - 1.      CW = 9015  RESET  DTR  CAUSE
                *                                    CARR  LOST  FLAG
0676  E090      LIT  = @90@.
0677  E015      LIT  = @15@.
0678  8CC8      CPCR = T5USEC  - 1.
0679  8C9A      CPCR = CWGEN2L  - 1.      RESET  ENAB  SET  DTR
067A  E010      LIT  = @10@.
067B  E01D      LIT  = @1D@.
067C  8CC8      CPCR = T5USEC  - 1.
067D  E000      LIT  = 0.
067E  8C8E      CPCR = STATCHK2  - 1.     TEST  STATUS
067F  8C33      CPCR = SLCSTAT1  - 1.     STATUS  NOT  RESET  BY  ENAB
                *********ERROR      # M86
0680  8C9A      CPCR = CWGEN2L  - 1.      CW = 8202  ENAB  MONITOR
0681  E082      LIT  = @82@.              AND  XMIT
0682  E002      LIT  = 2.
0683  F0FD      WHEN URQ  STEP.           WAIT  FOR  CLR  TO  SND
0684  F096      DR1  BEX.
0685  8C9A      CPCR = CWGEN2L  - 1.      SET  BREAK
0686  E08A      LIT  = @8A@.
0687  E002      LIT  = 2.
0688  8CC8      CPCR = T5USEC  - 1.
0689  E000      LIT  = 0.
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068A  8C95        CPCR = CWEDLI - 1.          SHUT OFF XMIT AND ENABLE
068B  F0FD        WHEN URQ STEP.              WAIT FOR XMITCYC TO DROP
068C  F096        DR1 BEX.
068D  F054        A3 = B000.
068E  8CEB        CPCR = DATCHK - 1.
068F  8C33        CPCR = SLCSTAT1 - 1.        LINE CHANGE NOT RESET BY
                  *********ERROR # M86A       ENAB
0690  8C93        CPCR = CWNULL - 1.
0691  403E        MPCR = TESTSELECT - 1.      EXIT TEST
                  TEST-2.
                  SLC02.
0692  8C9A        CPCR = CWGEN2L - 1.         START XMITTER CW = A202
0693  E0A2        LIT = @A2@.
0694  E002        LIT = @02@.
0695  8CCA        CPCR = T3USEC - 1.          DELAY FOR CLR TO SEND
0696  F1B5        IF URQ SKIP.
0697  8C32        CPCR = SLCSTATSR - 1.       NO STINT FOR CLR TO SEND
                  *********ERROR # M87
0698  E060        LIT = @60@.
0699  8C83        CPCR = STATGEN8 - 1.        TEST STATUS
069A  8C33        CPCR = SLCSTAT1 - 1.        STATUS FAILURE
                  *********ERROR # M88
069B  E0FF        LIT = @FF@.
069C  8DD0        CPCR = WRITEDATLL - 1.
069D  F05F        B.
069E  F0FC        WHEN SRQ STEP.
069F  8DD1        CPCR = WRITEDAT - 1.        WRITE CHAR 2
06A0  F05F        B.
06A1  F0FC        WHEN SRQ STEP.
06A2  8DD1        CPCR = WRITEDAT - 1.        WRITE CHAR 3
06A3  CF20        SAR = 15 LIT = @20@.        T192 USEC
06A4  8CA1        CPCR = MTIMESH - 1.
06A5  F1AD        IF NOT SRQ SKIP.
06A6  8C32        CPCR = SLCSTATSR - 1.       DATA STROBE BEFORE
                  *********ERROR # M88A       CHARACTER XMITTED
06A7  C850        SAR = 8 LIT = @50@.         T61MSEC
06A8  8CA1        CPCR = MTIMESH - 1.         DELAY
06A9  C101        SAR = 1 LIT = 1.
06AA  8C73        CPCR = PRDATLST - 1.        TEST LINE CHANGE
06AB  8C33        CPCR = SLCSTAT1 - 1.        NO START BIT ASYNC MODE
                  *********ERROR # M87A
06AC  E0FF        LIT = @FF@.                 FIRST DATA CHAR
06AD  8DD0        CPCR = WRITEDATLL - 1.      WRITE DATA
06AE  8D2B        CPCR = SOFTRCV - 1.         MONITOR DATA XMIT
06AF  8DC6        CPCR = SETSTOP - 1.
06B0  8CDF        CPCR = DATCHKA1 - 1.        TEST DATA RECEIVED
06B1  8C32        CPCR = SLCSTATSR - 1.       DATA FAILURE
                  *********ERROR # M89
06B2  F1AD        IF NOT SRQ SKIP.
06B3  F0F7        SKIP.
06B4  8C32        CPCR = SLCSTATSR - 1.       DINT NOT SET
                  *********ERROR # M90
06B5  E000        LIT = 0.
06B6  8DD0        CPCR = WRITEDATLL - 1.      WRITE CHAR 00
06B7  8D2B        CPCR = SOFTRCV - 1.         MONITOR DATA XMIT
06B8  8DC6        CPCR = SETSTOP - 1.
06B9  8CDF        CPCR = DATCHKA1 - 1.        TEST DATA RECEIVED
06BA  8C32        CPCR = SLCSTATSR - 1.       DATA FAILURE
                  *********ERROR # M91
06BB  E0EF        LIT = @EF@.
06BC  8DD0        CPCR = WRITEDATLL - 1.      WRITE CHAR EF
06BD  8D2B        CPCR = SOFTRCV - 1.         MONITOR DATA XMIT
06BE  8DC6        CPCR = SETSTOP - 1.
06BF  8CDF        CPCR = DATCHKA1 - 1.        TEST NO PARITY BIT
06C0  8C32        CPCR = SLCSTATSR - 1.       PARITY SET EBCDIC MODE
                  *********ERROR # M92
06C1  E000        LIT = 0.
06C2  8DD0        CPCR = WRITEDATLL - 1.      WRITE 00 CHAR
                  SLC02A.
06C3  F097        DR2 BEX.
06C4  F05F        B.
06C5  F0B2        IF LST SKIP.                TEST LINE STATUS
06C6  46C2        MPCR = SLC02A - 1.
06C7  F039        A2 = LIT L.                 T7 MAX T3 MIN
06C8  C813        SAR = 8 LIT = @13@.
06C9  F02F        A2 = A2 OR LIT.
06CA  E066        LIT = @66@.
06CB  8CA5        CPCR = MTIME - 1.
06CC  F097        DR2 BEX.                    T14835MIN T14900MAX
06CD  F05F        B.
06CE  F0B2        IF LST SKIP.                TEST LINE STAT
06CF  8C33        CPCR = SLCSTAT1 - 1.        CHAR TIME SHORT
                  *********ERROR # M93
06D0  E042        LIT = @42@.
06D1  8CA3        CPCR = MTIMELI - 1.
06D2  F097        DR2 BEX.                    T15100 MIN
06D3  F05F        B.
06D4  F0C3        IF NOT LST SKIP.            TEST LINE STAT
06D5  8C33        CPCR = SLCSTAT1 - 1.        CHAR TIME LONG
                  *********ERROR # M94
06D6  E000        LIT = 0.
06D7  8DD0        CPCR = WRITEDATLL - 1.      WRITE CHAR 00
06D8  E000        LIT = 0.
06D9  F0FC        WHEN SRQ STEP.
06DA  8DD0        CPCR = WRITEDATLL - 1.      WRITE 2ND CHAR 00
06DB  8D2B        CPCR = SOFTRCV - 1.         MONITOR 1ST CHAR
06DC  8DC6        CPCR = SETSTOP - 1.
06DD  8CDF        CPCR = DATCHKA1 - 1.        TEST DATA
06DE  8C33        CPCR = SLCSTAT1 - 1.        DATA ERROR ON FIRST OF
                  *********ERROR #M95         2 CHARS SENT - STOP BIT
06DF  CF8C        SAR = 15 LIT = @8C@.        T840USEC
06E0  8CA1        CPCR = MTIMESH - 1.         DELAY TO SECOND STOP BIT
06E1  C001        SAR = 0 LIT = 1.
06E2  8C73        CPCR = PRDATLST - 1.        TEST LINE STATUS
06E3  F018        SET LC1.                    FLAG 2 STOP BITS
06E4  8C9A        CPCR = CWGEN2L - 1.         RESET MONITOR
06E5  E0A0        LIT = @A0@.
06E6  E002        LIT = 2.
06E7  8C9A        CPCR = CWGEN2L - 1.         ENABLE MONITOR
06E8  E0A2        LIT = @A2@.
06E9  E002        LIT = 2.
06EA  8D2B        CPCR = SOFTRCV - 1.         MONITOR 2ND CHAR
06EB  8CDF        CPCR = DATCHKA1 - 1.        TEST DATA
06EC  8C32        CPCR = SLCSTATSR - 1.       2ND DATA CHAR FAILED
                  *********ERROR # M96
06ED  8C9A        CPCR = CWGEN2L - 1.         CW = 8202 START ASCII MODE
06EE  E082        LIT = @82@.
06EF  E002        LIT = 2.
06F0  8CC8        CPCR = T5USEC - 1.          DELAY
06F1  F1AE        IF NOT URQ SKIP.
06F2  8C32        CPCR = SLCSTATSR - 1.       STINT SET
                  *********ERROR # M97
06F3  E0EF        LIT = @EF@.
06F4  8DD0        CPCR = WRITEDATLL - 1.      WRITE DATA EF
06F5  8D2B        CPCR = SOFTRCV - 1.         MONITOR DATA XMIT
06F6  8BF4        CPCR = PARGENEVEN - 1.      GEN PARITY
06F7  8DC6        CPCR = SETSTOP - 1.
06F8  8CDF        CPCR = DATCHKA1 - 1.        TEST DATA
06F9  8C32        CPCR = SLCSTATSR - 1.       FIRST ASCII CHAR FAILED
                  *********ERROR @ M98
06FA  E055        LIT = @55@.
06FB  8DD0        CPCR = WRITEDATLL - 1.      WRITE DATA 55
06FC  8D2B        CPCR = SOFTRCV - 1.         MONITOR DATA XMIT
06FD  8BF4        CPCR = PARGENEVEN - 1.      GEN PARITY
06FE  8DC6        CPCR = SETSTOP - 1.
06FF  8CDF        CPCR = DATCHKA1 - 1.        TEST DATA
0700  8C32        CPCR = SLCSTATSR - 1.       DATA FAILURE
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                *********ERROR      # M99
0701    E08F            LIT  = @8F@.
0702    8DD0            CPCR = WRITEDATLL  - 1.   WRITE DATA 8F
0703    8D2B            CPCR = SOFTRCV  - 1.      MONITOR DATA XMIT
0704    8BF4            CPCR = PARGENEVEN  - 1.   GEN PARITY
0705    8DC6            CPCR = SETSTOP  - 1.
0706    8CDF            CPCR = DATCHKA1  - 1.     TEST DATA
0707    8C32            CPCR = SLCSTATSR  - 1.    DATA FAILURE
                *********ERROR      # M100
0708    E000            LIT  = 0.
0709    8DD0            CPCR = WRITEDATLL  - 1.   WRITE DATA CHAR
070A    F05F            B.
070B    F0FC            WHEN SRQ STEP.
070C    8DD0            CPCR = WRITEDATLL  - 1.   2ND DATA CHAR
070D    F05F            B.
070E    F0FC            WHEN SRQ STEP.
070F    8DD0            CPCR = WRITEDATLL  - 1.   3RD DATA CHAR
0710    8C9A            CPCR = CWGEN2L  - 1.      CW = 8200  SHUT OFF XMITTER
0711    E082            LIT  = @82@.
0712    E000            LIT  = 0.
0713    8D2B            CPCR = SOFTRCV  - 1.      MONITOR XMIT
0714    8DC6            CPCR = SETSTOP  - 1.
0715    8CDF            CPCR = DATCHKA1  - 1.     TEST DATA
0716    8C32            CPCR = SLCSTATSR  - 1.    DATA FAILED IN SHUTDOWN
                *********ERROR      # M100A
0717    CCA0            SAR = 12 LIT = @A0@.      T7.7  MSEC
0718    8CA1            CPCR = MTIMESH  - 1.      DELAY
0719    F097            DR2 BEX.                  TEST LINE STATUS
071A    F05F            B.
071B    F0B2            IF LST SKIP.
071C    8C33            CPCR = SLCSTAT1  - 1.     2ND DATA CHAR FAIL SHUTDWN
                *********ERROR      # M100D
071D    CBB0            SAR = 11 LIT = @B0@.      T 16.8  MSEC
071E    8CA1            CPCR = MTIMESH  - 1.      DELAY
071F    F097            DR2 BEX.                  TEST LINE STATUS
0720    F05F            B.
0721    F0B2            IF LST SKIP.
0722    8C33            CPCR = SLCSTAT1  - 1.     3RD DATA CHAR FAIL SHUTDWN
                *********ERROR      # M100E
0723    F0F5            SAVE.
0724    F097            DR2 BEX.
0725    F05F            B.
0726    F0C3            IF NOT LST SKIP.          LOOP ON LINE STATUS READ
0727    F0C9            JUMP.
0728    F097            DR2 BEX.                  RESET LINE CHANGE
0729    CC44            SAR = 12 LIT = @44@.      T3.2MSEC
072A    8CA1            CPCR = MTIMESH  - 1.      DELAY
072B    C100            SAR = 1 LIT = 0.
072C    8C73            CPCR = PRDATLST  - 1.     TEST NO LINE CHANGE
072D    8C33            CPCR = SLCSTAT1  - 1.     ASYNC DATA CLAMP FAILED
                *********ERROR      # M100B
072E    CCB0            SAR = 12 LIT = @B0@.      T 11MSEC
072F    8C64            CPCR = PURQTMOUT  - 1.    TIMEOUT SHUTDOWN
0730    8C32            CPCR = SLCSTATSR  - 1.    XMITTER SHUTDOWN FAILED
                *********ERROR      # M100C
0731    CCD0            SAR = 12 LIT = @D0@.      T9.9MSEC
0732    8CA1            CPCR = MTIMESH  - 1.      DELAY FOR LAST CHAR XMIT
0733    F0F6            SET GC2.                  SYNC MODE FLAG
0734    8C9A            CPCR = CWGEN2L  - 1.      CW = E202  START SYNC MODE
0735    E0E2            LIT  = @E2@.
0736    E002            LIT  = 2.
0737    8CC8            CPCR = T5USEC  - 1.       DELAY
0738    F1B5            IF URQ SKIP.
0739    8C32            CPCR = SLCSTATSR  - 1.    STINT NOT SET CLR TO SEND
                *********ERROR      # M101
073A    E060            LIT  = @60@.
073B    8C83            CPCR = STATGEN8  - 1.     TEST STATUS
073C    8C33            CPCR = SLCSTAT1  - 1.     STATUS FAILURE
```

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                *********ERROR      # M102
073D    E000            LIT  = 0.
073E    8DD0            CPCR = WRITEDATLL  - 1.   FIRST DATA WORD 00
073F    F05F            B.
0740    F0FC            WHEN SRQ STEP.
0741    8DD1            CPCR = WRITEDAT  - 1.     SECOND DATA WORD 00
0742    8D2B            CPCR = SOFTRCV  - 1.      MONITOR DATA XMIT
0743    8CDF            CPCR = DATCHKA1  - 1.     TEST DATA NO STOP BIT
0744    8C32            CPCR = SLCSTATSR  - 1.    SYNCHRONOUS DATA FAILURE
                *********ERROR      # M103
0745    CC10            SAR = 12 LIT = @10@.      T 768USEC
0746    8CA1            CPCR = MTIMESH  - 1.      DELAY TO END OF CHAR
0747    F097            DR2 BEX.                  RESET LINE CHANGE
0748    F05F            B.
0749    CC20            SAR = 12 LIT = @20@.      T 1.5MSEC
074A    8CA1            CPCR = MTIMESH  - 1.      DELAY
074B    E000            LIT  = 0.
074C    8CE4            CPCR = DATCHKX  - 1.      TEST LINE STAT
074D    8C33            CPCR = SLCSTAT1  - 1.     SYNCHRONOUS IDLE BAD
                *********ERROR      # M105
074E    8C9A            CPCR = CWGEN2L  - 1.      CW = C202  START ASCII SYNC
074F    E0C2            LIT  = @C2@.
0750    E002            LIT  = 2.
0751    E05A            LIT  = @5A@.              DATA WORD
0752    8DD0            CPCR = WRITEDATLL  - 1.   WRITE DATA WD
0753    8D2B            CPCR = SOFTRCV  - 1.      MONITOR DATA XMIT
0754    F057            A3 = LIT L.
0755    C803            SAR = 8 LIT = 3.
0756    F04A            A3 = A3 OR LIT.
0757    E0DA            LIT  = @DA@.              FINAL DATA = 03DA ODD PAR
0758    8CDF            CPCR = DATCHKA1  - 1.     TEST DATA
0759    8C32            CPCR = SLCSTATSR  - 1.    SYNC ASCII DATA FAILED
                *********ERROR      # M106
075A    E000            LIT  = 0.
075B    8DD0            CPCR = WRITEDATLL  - 1.   WRITE DATA CHAR
075C    8C9A            CPCR = CWGEN2L  - 1.      CW = E200  SHUT OFF XMIT
075D    E0E2            LIT  = @E2@.
075E    E000            LIT  = 0.
075F    8D2B            CPCR = SOFTRCV  - 1.      MONITOR DATA XMIT
0760    F057            A3 = LIT L.
0761    C803            SAR = 8 LIT = 3.
0762    8CDF            CPCR = DATCHKA1  - 1.     TEST DATA
0763    8C32            CPCR = SLCSTATSR  - 1.    DATA CLAMP FAILURE
                *********ERROR      # M106A
0764    CCB0            SAR = 12 LIT = @B0@.      T 11MSEC
0765    8C64            CPCR = PURQTMOUT  - 1.    TIME OUT SHUT DOWN
0766    8C32            CPCR = SLCSTATSR  - 1.    XMITTER SHUT DOWN FAILED
                *********ERROR      # M107
0767    F05F            B.
0768    E000            LIT  = 0.
0769    8C8E            CPCR = STATCHK2  - 1.     TEST STATUS
076A    8C33            CPCR = SLCSTAT1  - 1.     STATUS FAILURE
                *********ERROR      # M108
076B    8C93            CPCR = CWNULL  - 1.
076C    F0BF            IF NOT LC1 SKIP.          TEST 2 STOP BITS
076D    F000            WAIT.
                *********XMITTER      PUTTING OUT 2 STOP BITS IN
                *********ASYNCHRONOUS      MODE. IF CORRECT FORCE STEP
                *********IF      NOT CORRECT--ERROR      # M109
076E    F01F            RESET GC2.
076F    403E            MPCR = TESTSELECT  - 1.
                TEST-3.
                SLC03.
0770    F1D5            MIR = B001  + 1.                                  D
0771    82C5            CPCR = WRSREG2  - 1.      COMPARE OPTION          D
0772    8228            CPCR = INITMAINSTACK  - 1.
0773    822F            CPCR = INITFLOSTACK  - 1.
0774    E000            LIT  = 0.
0775    8C8E            CPCR = STATCHK2  - 1.     TEST STATUS
0776    8C33            CPCR = SLCSTAT1  - 1.     STATUS FAILURE
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                    *********ERROR      # M130
0777  8C9A            CPCR = CWGEN2L - 1.        CW = B003  START FDUPLX
0778  E0B0            LIT  = @B0@.
0779  E003            LIT  = 3.
077A  F0FD            WHEN URQ STEP.             WAIT FOR CLR TO SEND
077B  E060            LIT  = @60@.
077C  8C83            CPCR = STATGEN8 - 1.       TEST STATUS = 8060
077D  8C33            CPCR = SLCSTAT1 - 1.       STATUS FAILURE
                    *********ERROR      # M131
077E  C860            SAR  = 8 LIT = @60@.       T98MSEC
077F  8C64            CPCR = PURQTMOUT - 1.      TIMEOUT 5 CHARS
0780  F0F7            SKIP.
0781  8C32            CPCR = SLCSTATSR - 1.      STINT SET IN IDLE
                    *********ERROR      # M132
0782  E000            LIT  = 0.
0783  8CE4            CPCR = DATCHKX - 1.        TEST DATA WORD
0784  8C33            CPCR = SLCSTAT1 - 1.       ERROR FDUPLEX IDLE
                    *********ERROR      # M133
0785  E0FF            LIT  = @FF@.
0786  8DD0            CPCR = WRITEDATLL - 1.     WRITE DATA WORD FF
0787  C81B            SAR  = 8 LIT = @1B@.       T20.7MSEC
0788  8CA1            CPCR = MTIMESH - 1.        DELAY
0789  8C5C            CPCR = BUSS2 - 1.          TEST EXT BUSS
                    *********ERROR      # M3      EXT BUSS FAILURE
078A  E0FF            LIT  = @FF@.
078B  8CE1            CPCR = DATCHKXR - 1.       TEST DATA RECEIVED
078C  F0F7            SKIP.                      DATA FAILED
078D  479A            MPCR = SLC03A - 1.
078E  CE00            SAR  = 14 LIT = 0.
078F  8C74            CPCR = PRDATLST.           TEST RCV TEST BIT
0790  8C47            CPCR = SLCDAT1 - 1.        FIRST DATA CHAR ERROR
                    *********ERROR      # M134
0791  F017            A1 = B.                    SAVE FIRST DATA READ
0792  8CF5            CPCR = SYNC-EBC - 1.       ATTEMPT SYNC MODE
0793  F0FC            WHEN SRQ STEP.
0794  8DD1            CPCR = WRITEDAT - 1.       SEND DATA CHAR FF
0795  C848            SAR  = 8 LIT = @48@.       T55MSEC
0796  8CA1            CPCR = MTIMESH - 1.        DELAY 3 CHARS
0797  CE01            SAR  = 14 LIT = 1.
0798  8C73            CPCR = PRDATLST - 1.       TEST RCV TEST BIT
0799  8C47            CPCR = SLCDAT1 - 1.        NO RCV DINT-ASYNC OR SYNC M
                    *********ERROR      # M135
079A  8C47            CPCR = SLCDAT1 - 1.        RECEIVER SET IN SYNC MODE
                    *********ERROR      # M136
                  SLC03A.
079B  8CCA            CPCR = T3USEC - 1.
079C  E000            LIT  = 0.
079D  8CE4            CPCR = DATCHKX - 1.        TEST DATA WORD
079E  8C47            CPCR = SLCDAT1 - 1.        DATA NOT RESET
                    *********ERROR      # M137
079F  E000            LIT  = 0.
07A0  8DD0            CPCR = WRITEDATLL - 1.     WRITE DATA CHAR 00
07A1  C81B            SAR  = 8 LIT = @1B@.       T20.7MSEC
07A2  8CA1            CPCR = MTIMESH - 1.        DELAY 1 CHAR TIME
07A3  E000            LIT  = 0.
07A4  8CE1            CPCR = DATCHKXR - 1.       TEST DATA
07A5  8C47            CPCR = SLCDAT1 - 1.        DATA CHAR 00 FAILED
                    *********ERROR      # M138
07A6  F054            A3 = B000.
                  SLC03B.
07A7  F04C            A3 = A3 + 1.
07A8  8DD1            CPCR = WRITEDAT - 1.       WRITE DATA
07A9  C81B            SAR  = 8 LIT = @1B@.       T20.7MSEC
07AA  8CA1            CPCR = MTIMESH - 1.        DELAY CHAR TIME
07AB  8CEF            CPCR = DATCHKLD - 1.       TEST DATA
07AC  8C47            CPCR = SLCDAT1 - 1.        DATA FAILURE
                    *********ERROR      # M139
07AD  F03E            A3 EQV LIT.
07AE  E0FF            LIT  = @FF@.
07AF  F09D            IF ABT SKIP.               TEST LAST CHAR
07B0  47A6            MPCR = SLC03B - 1.
07B1  F1AE            IF NOT URQ SKIP.
07B2  8C32            CPCR = SLCSTATSR - 1.      STINT SET
                    *********ERROR      # M140
07B3  F054            A3 = B000.
07B4  F0FC            WHEN SRQ STEP.             XMIT DINT
07B5  8DCC            CPCR = WRITEINCDAT - 1.XMIT 01
07B6  F05F            B.
07B7  F0FC            WHEN SRQ STEP.
07B8  8DCC            CPCR = WRITEINCDAT - 1.XMIT 02
07B9  F05F            B.
07BA  F0FC            WHEN SRQ STEP.
07BB  8DCC            CPCR = WRITEINCDAT - 1.XMIT 03
07BC  C81B            SAR  = 8 LIT = @1B@.       T20.7MSEC
07BD  8CA1            CPCR = MTIMESH - 1.        DELAY 1 CHAR
07BE  8DCC            CPCR = WRITEINCDAT - 1.XMIT 04
07BF  C848            SAR  = 8 LIT = @48@.       T55MSEC
07C0  8CA1            CPCR = MTIMESH - 1.        DELAY 3 CHARS
07C1  E060            LIT  = @60@.
07C2  8C83            CPCR = STATGEN8 - 1.       TEST STATUS
07C3  8C33            CPCR = SLCSTAT1 - 1.       STATUS FAILURE
                    *********ERROR      # M141
07C4  8DCC            CPCR = WRITEINCDAT - 1.XMIT 05
07C5  C81B            SAR  = 8 LIT = @1B@.       T20.7MSEC
07C6  8CA1            CPCR = MTIMESH - 1.        DELAY 1 CHAR
07C7  E001            LIT  = 1.
07C8  8CE1            CPCR = DATCHKXR - 1.       TEST DATA 01
                  SLC03C.
07C9  8C47            CPCR = SLCDAT1 - 1.        DATA ERROR ON DATA STACKED
                    *********ERROR      # M142    IN BUFFER
07CA  F04C            A3 = A3 + 1.
07CB  8CEB            CPCR = DATCHK - 1.         TEST DATA 02
07CC  47C8            MPCR = SLC03C - 1.
07CD  F04C            A3 = A3 + 1.
07CE  8CEB            CPCR = DATCHK - 1.         TEST DATA 03
07CF  47C8            MPCR = SLC03C - 1.
07D0  F04E            A3 = A3 + LIT.
07D1  E002            LIT  = 2.
07D2  8CEB            CPCR = DATCHK - 1.         TEST DATA 05
07D3  47C8            MPCR = SLC03C - 1.
07D4  E000            LIT  = 0.
07D5  8CE4            CPCR = DATCHKX - 1.
07D6  8C47            CPCR = SLCDAT1 - 1.        EXTRA DATA CHAR IN BUFF
                    *********ERROR      # M143
07D7  F1B5            IF URQ SKIP.
07D8  8C32            CPCR = SLCSTATSR - 1.      NO STINT FOR SERVICE LATE
                    *********ERROR      # M144
07D9  E068            LIT  = @68@.
07DA  8C83            CPCR = STATGEN8 - 1.       TEST STATUS
07DB  8C33            CPCR = SLCSTAT1 - 1.       STATUS FAILURE
                    *********ERROR      # M145
07DC  E068            LIT  = @68@.
07DD  8C83            CPCR = STATGEN8 - 1.       TEST STATUS
07DE  8C33            CPCR = SLCSTAT1 - 1.       RECEIVER STATUS RESET
                    *********ERROR      # M146
07DF  E006            LIT  = 6.
07E0  8DD0            CPCR = WRITEDATLL - 1.     XMIT DATA 06
07E1  C81B            SAR  = 8 LIT = @1B@.       T20.7MSEC
07E2  8CA1            CPCR = MTIMESH - 1.        DELAY 1 CHAR
07E3  F096            DR1 BEX.                   RESET STATUS
07E4  F05F            B.
07E5  E060            LIT  = @60@.
07E6  8C83            CPCR = STATGEN8 - 1.       TST RECEIVER STAT RESET
07E7  8C33            CPCR = SLCSTAT1 - 1.       STATUS FAILURE
                    *********ERROR=M147
07E8  8DCC            CPCR = WRITEINCDAT - 1.XMIT 07
07E9  8C9A            CPCR = CWGEN2L - 1.        CW = B801
07EA  E0B8            LIT  = @B8@.
07EB  E001            LIT  = 1.                  RESET XMIT SET BREAK
07EC  C814            SAR  = 8 LIT = @14@.       T20.4 MSEC
07ED  8C64            CPCR = PURQTMOUT - 1.      TIME OUT BREAK
07EE  8C32            CPCR = SLCSTATSR - 1.      NO STINT FOR BREAK
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                *********ERROR      # M148
07EF  8CC8      CPCR = T5USEC - 1.
07F0  E060      LIT = @60@.
07F1  8C87      CPCR = STATGENC - 1.        TEST STATUS
07F2  8C33      CPCR = SLCSTAT1 - 1.        STATUS FAILURE
                *********ERROR      # M149
07F3  F1AD      IF NOT SRQ SKIP.
07F4  F0F7      SKIP.
07F5  8C32      CPCR = SLCSTATSR - 1.       NO DINT FOR RECEIVE
                *********ERROR      # M150
07F6  E006      LIT = 6.
07F7  8CE6      CPCR = DATCHKR - 1.         TEST DATA
07F8  8C47      CPCR = SLCDAT1 - 1.         DATA FAILURE
                *********ERROR      # M151
07F9  F1AD      IF NOT SRQ SKIP.
07FA  F0F7      SKIP.
07FB  8C32      CPCR = SLCSTATSR - 1.       DINT NOT SET
                *********ERROR      # M152
07FC  F080      B = BMAR.
07FD  F0D5      MAR1 = B.
07FE  F0F1      MR1.                        MEMORY READ
07FF  F0F9      WHEN RDC BEX.
0800  F1AD      IF NOT SRQ SKIP.
0801  F0F7      SKIP.
0802  8C33      CPCR = SLCSTAT1 - 1.        MEMORY READ DESELECTED OR
                *********ERROR      # M153   CAUSED DATA READ
0803  8266      CPCR = RSTBR1 - 1.
0804  F097      DR2 BEX.                    RESET DATA
0805  F05F      B.
0806  8C9A      CPCR = CWGEN2L - 1.         RESET RCV TO CLR BREAK
0807  E0B8      LIT = @B8@.
0808  E000      LIT = 0.
0809  CCE0      SAR = 12 LIT = @E0@.        T 10.7MSEC
080A  8CA1      CPCR = MTIMESH - 1.         DELAY END XMIT CYCLE
080B  E040      LIT = @40@.
080C  8C8E      CPCR = STATCHK2 - 1.        TEST STATUS
080D  8C33      CPCR = SLCSTAT1 - 1.        STATUS FAILURE
                *********ERROR      # M154
080E  C816      SAR = 8 LIT = @16@.         T16.8MSEC
080F  8CA1      CPCR = MTIMESH - 1.         DELAY TO EMPTY XMITTER
0810  8DE5      CPCR = ZEROMEMREG1AB - 1.
0811  8E24      CPCR = ZEROMEMREG2AB - 1.ZERO BUFF POINTERS
0812  F058      A3 = LIT.
0813  E07F      LIT = @7F@.                 END BUFF PAR
0814  F07B      B = B000.                   START BUFF PAR
0815  8D00      CPCR = LDSEQBUF - 1.        LOAD SEND BUFFER
0816  8C9A      CPCR = CWGEN2L - 1.         WR CW = 9003 ASYNC ASCII
0817  E090      LIT = @90@.
0818  E003      LIT = 3.
0819  82BD      CPCR = WRSREG1 - 1.         SAVE CONTROL WORD
081A  E060      LIT = @60@.
081B  8C83      CPCR = STATGEN8 - 1.        TEST STATUS
081C  8C33      CPCR = SLCSTAT1 - 1.        STATUS FAILURE
                *********ERROR      # M155
081D  8D55      CPCR = RCVXMIT - 1.         XMIT AND RECEIVE DATA
081E  F0BF      IF NOT LC1 SKIP.
081F  8C32      CPCR = SLCSTATSR - 1.       STATUS ERROR WHILE XMITING
                *********ERROR      # M156
0820  8DE5      CPCR = ZEROMEMREG1AB - 1.RESET POINTER
0821  8E24      CPCR = ZEROMEMREG2AB - 1.ZERO POINTER
0822  8D1A      CPCR = DATATEST - 1.        TEST DATA RECEIVED
0823  F0BF      IF NOT LC1 SKIP.
0824  8C47      CPCR = SLCDAT1 - 1.         ASYNC ASCII DATA ERROR
                *********ERROR      # M157
0825  C816      SAR = 8 LIT = @16@.         T16.8MSEC
0826  8CA1      CPCR = MTIMESH - 1.         DELAY TO EMPTY XMITTER
0827  8C9A      CPCR = CWGEN2L - 1.         CW = D003 START SYNC ASCII
0828  E0D0      LIT = @D0@.
0829  E003      LIT = 3.
082A  82BD      CPCR = WRSREG1 - 1.         SAVE CONTROL WORD
082B  F0FD      WHEN URQ STEP.              WAIT FOR CLR TO SEND
082C  E060      LIT = @60@.
082D  8C83      CPCR = STATGEN8 - 1.        TEST STATUS
082E  8C33      CPCR = SLCSTAT1 - 1.        STATUS ERROR
                *********ERROR      # M158
082F  CC40      SAR = 12 LIT = @40@.        T 3MSEC
0830  8CA1      CPCR = MTIMESH - 1.         DELAY
0831  E0FF      LIT = @FF@.
0832  8CE4      CPCR = DATCHKX - 1.         TEST DATA WORD
0833  8C47      CPCR = SLCDAT1 - 1.         SYNC RECEIVER IDLE BAD
                *********ERROR      # M158A
0834  E0FF      LIT = @FF@.
0835  8DD0      CPCR = WRITEDATLL - 1.      WRITE DATA - NO SYNC
0836  CC48      SAR = 12 LIT = @48@.        T3.4MSEC
0837  8CA1      CPCR = MTIMESH - 1.         DELAY
0838  CE00      SAR = 14 LIT = 0.
0839  8C73      CPCR = PRDATLST - 1.        TST DATA WORD
083A  8C47      CPCR = SLCDAT1 - 1.         RCV DINT WITH NO SYNC SENT
                *********ERROR      # M158B
083B  E016      LIT = @16@.
083C  8DD0      CPCR = WRITEDATLL - 1.      WRITE GOOD SYNC CHAR
083D  F05F      B.
083E  F0FC      WHEN SRQ STEP.
083F  E000      LIT = 0.
0840  8DD0      CPCR = WRITEDATLL - 1.      2ND CHAR NON-SYNC
0841  CC4C      SAR = 12 LIT = @4C@.        T3.65MSEC
0842  8CA1      CPCR = MTIMESH - 1.         DELAY FOR XMIT
0843  CE00      SAR = 14 LIT = 0.
0844  8C73      CPCR = PRDATLST - 1.        TST RCV BIT
0845  8C47      CPCR = SLCDAT1 - 1.         RCV DINT WITH 1 SYNC CHAR
                *********ERROR      # M158D
0846  E016      LIT = @16@.
0847  8DD0      CPCR = WRITEDATLL - 1.      2ND SYNC CHAR
0848  CC49      SAR = 12 LIT = @49@.        T3.5MSEC
0849  8CA1      CPCR = MTIMESH - 1.         DELAY
084A  CE00      SAR = 14 LIT = 0.
084B  8C73      CPCR = PRDATLST - 1.        TST RCV BIT
084C  8C47      CPCR = SLCDAT1 - 1.         FIRST SYNC DET NOT RESET
                *********ERROR      # M158E
084D  8CF3      CPCR = SYNC-ASC - 1.        XMIT 2 SYNC CHARS
084E  CC70      SAR = 12 LIT = @70@.        T5.3 MSEC
084F  8CA1      CPCR = MTIMESH - 1.         DELAY FOR XMIT
0850  8C5C      CPCR = BUSS2 - 1.
                *********ERROR      # M3
0851  CE01      SAR = 14 LIT = 1.
0852  8C73      CPCR = PRDATLST - 1.        TST RCV TEST BIT
0853  8C47      CPCR = SLCDAT1 - 1.         NO RCV SYNC DET
                *********ERROR      # M158G
0854  CF01      SAR = 15 LIT = 1.
0855  8C74      CPCR = PRDATLST.            TST PARITY BIT
0856  8C47      CPCR = SLCDAT1 - 1.         PARITY ERROR NOT SET
                *********ERROR      # M158H   BAD PARITY = FF CHAR (IDLE)
0857  CE01      SAR = 14 LIT = 1.
0858  8C73      CPCR = PRDATLST - 1.
0859  8C47      CPCR = SLCDAT1 - 1.         LOST SYNC AFTER 1 CHAR
                *********ERROR      # M158I
085A  8C9A      CPCR = CWGEN2L - 1.         CLR RECEIVER
085B  E0D0      LIT = @D0@.
085C  E002      LIT = 2.
085D  8C9A      CPCR = CWGEN2L - 1.         SET RCV
085E  E0D0      LIT = @D0@.
085F  E003      LIT = 3.
0860  8CF3      CPCR = SYNC-ASC - 1.        XMIT 2 SYNC CHARS
0861  8D55      CPCR = RCVXMIT - 1.         XMIT AND RECEIVE DATA
0862  F0BF      IF NOT LC1 SKIP.            TST ERROR FLAG
0863  8C32      CPCR = SLCSTATSR - 1.       STATUS ERROR WHILE XMITTING
                *********ERROR      # M159
0864  8DE5      CPCR = ZEROMEMREG1AB - 1.
0865  8E24      CPCR = ZEROMEMREG2AB - 1.ZERO POINTERS
0866  8D1A      CPCR = DATATEST - 1.
0867  F0BF      IF NOT LC1 SKIP.            TST DATA ERROR FLAG
0868  8C47      CPCR = SLCDAT1 - 1.         SYNC ASCII DATA ERROR
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                    *********ERROR      # M160
0869  8DE5            CPCR = ZEROMEMREG1AB - 1.
086A  F058            A3 = LIT.
086B  E0FF            LIT = @FF@.                 STOP PAR
086C  F07B            B = B000.                   START PAR
086D  8D00            CPCR = LDSEQBUF - 1.        LOAD SEND BUFF
086E  CC12            SAR = 12 LIT = @12@.        T 864USEC
086F  8CA1            CPCR = MTIMESH - 1.         DELAY FOR XMITTER EMPTY
0870  8C9A            CPCR = CWGEN2L - 1.         WR CW = F003 SYNC EBCDIC
0871  E0F0            LIT = @F0@.
0872  E003            LIT = 3.
0873  82BD            CPCR = WRSREG1 - 1.         SAVE CONTROL WORD
0874  F0FD            WHEN URQ STEP.              WAIT FOR CLR TO SEND
0875  E060            LIT = @60@.
0876  8C83            CPCR = STATGEN8 - 1.        TEST STATUS
0877  8C33            CPCR = SLCSTAT1 - 1.        STATUS ERROR
                    *********ERROR      # M161
0878  F038            A2 = LIT.
0879  E001            LIT = 1.
087A  487C            MPCR = SLC03E + 1.
                  SLC03E.
087B  F025            A2 = A2 C.
087C  DF00            SAR = 15.
087D  F089            B = LIT.
087E  E032            LIT = @32@.
087F  F145            B = A2 XOR B.               COMP 1 BIT
0880  F0FC            WHEN SRQ STEP.
0881  8DCE            CPCR = WRITEDATLB - 1.      WRITE DATA CHAR
0882  F05F            B.
0883  F0FC            WHEN SRQ STEP.
0884  8DCE            CPCR = WRITEDATLB - 1.      WRITE DATA
0885  F05F            B.
0886  F0FC            WHEN SRQ STEP.
0887  8DCE            CPCR = WRITEDATLB - 1.      WRITE DATA
0888  F117            A2 EQV LIT.
0889  E080            LIT = @80@.
088A  F09D            IF ABT SKIP.
088B  487A            MPCR = SLC03E - 1.
088C  CC4C            SAR = 12 LIT = @4C@.        T3.65MSEC
088D  8CA1            CPCR = MTIMESH - 1.         DELAY 3 CHARS
088E  CE00            SAR = 14 LIT = 0.
088F  8C73            CPCR = PRDATLST - 1.        TST DATA WORD
0890  8C47            CPCR = SLCDAT1 - 1.         RECEIVER SYNC ERROR
                    *********ERROR      # M158C
0891  8CF5            CPCR = SYNC-EBC - 1.        WRITE 2 SYNC CHARS
0892  CC4C            SAR = 12 LIT = @4C@.        T3.65MSEC
0893  8CA1            CPCR = MTIMESH - 1.         DELAY FOR XMIT
0894  CE01            SAR = 14 LIT = 1.
0895  8C73            CPCR = PRDATLST - 1.        TST RCV BIT
0896  8C47            CPCR = SLCDAT1 - 1.         NO EBCDIC SYNC DET
                    *********ERROR      # M161A
0897  8C9A            CPCR = CWGEN2L - 1.         RESET RECEIVER
0898  E0F0            LIT = @F0@.
0899  E002            LIT = 2.
089A  8C9A            CPCR = CWGEN2L - 1.         SET RCV
089B  E0F0            LIT = @F0@.
089C  E003            LIT = 3.
089D  8CF5            CPCR = SYNC-EBC - 1.        XMIT 2 SYNC CHARS
089E  8D55            CPCR = RCVXMIT - 1.         XMIT AND RECEIVE DATA
089F  F0BF            IF NOT LC1 SKIP.
08A0  8C32            CPCR = SLCSTATSR - 1.       STATUS ERROR WHILE XMITTING
                    *********ERROR      # M162
08A1  8DE5            CPCR = ZEROMEMREG1AB - 1.
08A2  8E24            CPCR = ZEROMEMREG2AB - 1.
08A3  8D1A            CPCR = DATATEST - 1.        TEST DATA RECEIVED
08A4  F0BF            IF NOT LC1 SKIP.
08A5  8C47            CPCR = SLCDAT1 - 1.         SYNC EBCDIC DATA ERROR
                    *********ERROR      # M163
08A6  8C9A            CPCR = CWGEN2L - 1.         XMIT RCV - NO FDUPLX
08A7  E0A0            LIT = @A0@.
08A8  E003            LIT = 3.
08A9  F0FD            WHEN URQ STEP.              WAIT FOR CLR TO SND
08AA  F096            DR1 BEX.                    RESET STATUS
08AB  F05F            B.
08AC  E055            LIT = @55@.
08AD  8DD0            CPCR = WRITEDATLL - 1.      WRITE DATA CHAR
08AE  C81B            SAR = 8 LIT = @1B@.         T20.7MSEC
08AF  8CA1            CPCR = MTIMESH - 1.         DELAY
08B0  CE00            SAR = 14 LIT = 0.
08B1  8C73            CPCR = PRDATLST - 1.        TST NO RCV DINT
08B2  8C47            CPCR = SLCDAT1 - 1.         RCV DINT SET
                    *********ERROR      # M164
08B3  8C9A            CPCR = CWGEN2L - 1.         RESET XMIT-RCV ON
08B4  E0A0            LIT = @A0@.
08B5  E001            LIT = 1.
08B6  F0FD            WHEN URQ STEP.              WAIT FOR XMIT SHUT-OFF
08B7  F0FC            WHEN SRQ STEP.              WAIT FOR START BIT-RCV ONLY
                    *********OPERATOR      PLACE A JUMPER ON LC7-1C.   TOUCH
                    *********JUMPER      TO GROUND AND THEN REMOVE IT.  IF
                    *********INCREMENTER      FAILS TO STEP---ERROR      # M166
08B8  8C9A            CPCR = CWGEN2L - 1.         RESET ENABLE
08B9  E020            LIT = @20@.
08BA  E001            LIT = 1.
08BB  8CC8            CPCR = T5USEC - 1.
08BC  F1AD            IF NOT SRQ SKIP.
08BD  8C32            CPCR = SLCSTATSR - 1.       DINT NOT RESET BY ENABLE
                    *********ERROR      # M165
08BE  F097            DR2 BEX.
08BF  8C93            CPCR = CWNULL - 1.
08C0  E002            LIT = 2.
08C1  8C95            CPCR = CWEDLI - 1.          TURN ON XMITTER
08C2  F1AD            IF NOT SRQ SKIP.
08C3  8C32            CPCR = SLCSTATSR - 1.       DINT SET BEFORE CTS
                    *********ERROR      # M171
08C4  8C9A            CPCR = CWGEN2L - 1.
08C5  E0B0            LIT = @B0@.
08C6  E003            LIT = 3.
08C7  E0FF            LIT = @FF@.
08C8  8DD0            CPCR = WRITEDATLL - 1.      WRITE DATA CHAR 1
08C9  F05F            B.
08CA  F0FC            WHEN SRQ STEP.
08CB  8DD1            CPCR = WRITEDAT - 1.        CHAR 2
08CC  F05F            B.
08CD  F0FC            WHEN SRQ STEP.
08CE  8DD1            CPCR = WRITEDAT - 1.        CHAR 3
08CF  C81B            SAR = 8 LIT = @1B@.         T20.7MSEC
08D0  8CA1            CPCR = MTIMESH - 1.         DELAY 1 CHAR
08D1  8DD1            CPCR = WRITEDAT - 1.        CHAR 4
08D2  C81B            SAR = 8 LIT = @1B@.         T20.7MSEC
08D3  8CA1            CPCR = MTIMESH - 1.         DELAY 1 CHAR
08D4  8DD1            CPCR = WRITEDAT - 1.        CHAR 5
08D5  C848            SAR = 8 LIT = @48@.         T55MSEC
08D6  8CA1            CPCR = MTIMESH - 1.         DELAY 3 CHARS
08D7  F057            A3 = LIT L.
08D8  C820            SAR = 8 LIT = @20@.
08D9  8C9A            CPCR = CWGEN2L - 1.         RESET RCV CLEAR FIFO
08DA  E0B0            LIT = @B0@.                 AND STATUS
08DB  E002            LIT = 2.
08DC  F097            DR2 BEX.
08DD  F03C            A3 EQV B.
08DE  F09D            IF ABT SKIP.
08DF  8C33            CPCR = SLCSTAT1 - 1.        FIFO NOT CLEARED
                    *********ERROR      # M172
08E0  C300            SAR = 3 LIT = 0.
08E1  8C75            CPCR = PRSTATLST - 1.
08E2  8C33            CPCR = SLCSTAT1 - 1.        SERV LATE NOT CLEARED
                    *********ERROR      # M173
08E3  8C9A            CPCR = CWGEN2L - 1.
08E4  E0B8            LIT = @B8@.
08E5  E003            LIT = 3.
08E6  E000            LIT = 0.
08E7  8CE4            CPCR = DATCHKX - 1.
08E8  8C33            CPCR = SLCSTAT1 - 1.
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                 *********ERROR      #  M174
                  SLC03F.
08E9  C81B            SAR  =  8  LIT  =  @1B@.      T20.7MSEC
08EA  8CA1            CPCR  =  MTIMESH  -  1.       DELAY  1  CHAR  FOR  BREAK
08EB  CE01            SAR  =  14  LIT  =  1.
08EC  8C75            CPCR  =  PRSTATLST  -  1.     TST  BRK  SET
08ED  48E8            MPCR  =  SLC03F  -  1.
08EE  8CCD            CPCR  =  DESELSET1  -  1.
08EF  F108            ASR  BEX.
08F0  CE01            SAR  =  14  LIT  =  1.
08F1  8C76            CPCR  =  PRSTATLST.
08F2  8C33            CPCR  =  SLCSTAT1  -  1.
                 *********ERROR      #  M175
08F3  8CC8            CPCR  =  T5USEC  -  1.
08F4  F096            DR1  BEX.
08F5  F096            DR1  BEX.
08F6  F05F            B.
08F7  CE00            SAR  =  14  LIT  =  0.
08F8  8C76            CPCR  =  PRSTATLST.           TST  STATUS  RESET
08F9  8C33            CPCR  =  SLCSTAT1  -  1.      BREAK  NOT  RESET  BY  READ
                 *********ERROR      #  M176
08FA  8C9A            CPCR  =  CWGEN2L  -  1.       RESET  XMIT
08FB  E0B0            LIT  =  @B0@.
08FC  E000            LIT  =  0.
08FD  CCE0            SAR  =  12  LIT  =  @E0@.     T10.7MSEC
08FE  8CA1            CPCR  =  MTIMESH  -  1.       DELAY  FOR  XMIT  CYC  RESET
08FF  8C93            CPCR  =  CWNULL  -  1.
0900  8C9A            CPCR  =  CWGEN2L  -  1.       SYNC  MODE
0901  E0F0            LIT  =  @F0@.
0902  E003            LIT  =  3.
                  SLC03F2.
0903  8CF5            CPCR  =  SYNC-EBC  -  1.      WRITE  ZERO,  SYNC,  SYNC
                  SLC03F1.
0904  CE01            SAR  =  14  LIT  =  1.
0905  8C73            CPCR  =  PRDATLST  -  1.      TST  RCV  DINT
0906  4902            MPCR  =  SLC03F2  -  1.
0907  F0FD            WHEN URQ  STEP.
0908  C301            SAR  =  3  LIT  =  1.
0909  8C75            CPCR  =  PRSTATLST  -  1.
090A  4903            MPCR  =  SLC03F1  -  1.
                  SLC03G.
090B  8C9A            CPCR  =  CWGEN2L  -  1.       RESET  RCV
090C  E0F0            LIT  =  @F0@.
090D  E002            LIT  =  2.
090E  8C9A            CPCR  =  CWGEN2L  -  1.       SET  RCV
090F  E0F0            LIT  =  @F0@.
0910  E003            LIT  =  3.
0911  8CC8            CPCR  =  T5USEC  -  1.
0912  C300            SAR  =  3  LIT  =  0.
0913  8C75            CPCR  =  PRSTATLST  -  1.     TST  SERV  LATE  RESET
0914  8C33            CPCR  =  SLCSTAT1  -  1.      RECEIVER  NOT  CLEARED
                 *********ERROR      #  M177
0915  8C9A            CPCR  =  CWGEN2L  -  1.       RESET  RCV  AND  XMIT
0916  E0E0            LIT  =  @E0@.
0917  E000            LIT  =  0.
0918  CCE0            SAR  =  12  LIT  =  @E0@.
0919  8CA1            CPCR  =  MTIMESH  -  1.       DELAY  FOR  XMIT  CYC  OFF
091A  8C93            CPCR  =  CWNULL  -  1.
091B  403E            MPCR  =  TESTSELECT  -  1.
                  TEST-4.
                  TSTTIMER.
091C  F054            A3  =  B000.                  TIME  COUNT
091D  E000            LIT  =  0.
091E  8C8E            CPCR  =  STATCHK2  -  1.      TST  STATUS  =  0
091F  8C33            CPCR  =  SLCSTAT1  -  1.      STATUS  FAILURE
                 *********ERROR      #  M110
0920  8C23            CPCR  =  TMLDSEQ2  -  1.      LOAD  AND  START  TIMER  1MSEC
0921  F05F            B.                            T1
0922  F05F            B.                            T2
0923  F1AE            IF  NOT  URQ  SKIP.           TEST  STINT
0924  8C32            CPCR  =  SLCSTATSR  -  1.     STINT  SET  START  OF
                 *********ERROR      #  M111                TIMER  RUN
0925  CF7E            SAR  =  15  LIT  =  @7E@.     T  1.008
0926  8C64            CPCR  =  PURQTMOUT  -  1.     TIME  OUT  STINT
0927  F0F7            SKIP.                         NO TIME  FLAG  SET
0928  4936            MPCR  =  TSTTIMER1  -  1.     STINT  GOOD FIRST  RUN
0929  C400            SAR  =  4  LIT  =  0.
092A  8C75            CPCR  =  PRSTATLST  -  1.     TEST  TIME  FLAG
092B  8C33            CPCR  =  SLCSTAT1  -  1.      FLAG  SET  -  NO STINT
                 *********ERROR      #  M112
092C  8C0F            CPCR  =  MSECURQT  -  1.      RUN OUT TIMER  FIRST  STINT
092D  8C32            CPCR  =  SLCSTATSR  -  1.     TM FLAG  STINT  NEVER  SET
                 *********ERROR      #  M113
092E  F096            DR1  BEX.                     RESET  STATUS
092F  F05F            B.
0930  8C0F            CPCR  =  MSECURQT  -  1.      TIME  2ND  RUN
0931  8C32            CPCR  =  SLCSTATSR  -  1.     NO STINT  2ND  RUN
                 *********ERROR      #  M114
0932  E000            LIT  =  0.                    USEC  ADJ
0933  8CB2            CPCR  =  MSECCHK  -  1.       TEST  TIME
0934  E0F0            LIT  =  @F0@.                 MSEC  ADJ
0935  8C33            CPCR  =  SLCSTAT1  -  1.      2ND  RUN TIME  FAILED
                 *********ERROR      #  M115
0936  8C33            CPCR  =  SLCSTAT1  -  1.      2ND  RUN TIME  PASSED
                 *********ERROR      #  M116
                  TSTTIMER1.
0937  C401            SAR  =  4  LIT  =  1.
0938  8C75            CPCR  =  PRSTATLST  -  1.     TEST  TIME  FLAG  SET
0939  8C33            CPCR  =  SLCSTAT1  -  1.      NO TIME  FLAG  STATUS
                 *********ERROR      #  M117
093A  C400            SAR  =  4  LIT  =  0.
093B  8C75            CPCR  =  PRSTATLST  -  1.     TEST  TIME  FLAG  RESET
093C  8C33            CPCR  =  SLCSTAT1  -  1.      FLAG  FAILED  TO  RESET
                 *********ERROR      #  M118
093D  8C0F            CPCR  =  MSECURQT  -  1.      CHK TIME  AFTER  RELOAD
093E  8C32            CPCR  =  SLCSTATSR  -  1.     STINT  NOT  SET
                 *********ERROR      #  M119
093F  E000            LIT  =  0.                    MSEC  ADJ
0940  8CB2            CPCR  =  MSECCHK  -  1.       TEST  TIME
0941  E0F2            LIT  =  @F2@.                 USEC  ADJ
0942  8C33            CPCR  =  SLCSTAT1  -  1.      TIMER  FAILED  AFTER  RELOAD
                 *********ERROR      #  M120
0943  8C5C            CPCR  =  BUSS2  -  1.         TEST  EXT  BUSS
                 *********ERROR      #  M3
0944  8C21            CPCR  =  TMLDSEQ1  -  1.      RESTART  TIMER
0945  F0E7            MIR  =  B001.                 RESET  IR  11
0946  CF54            SAR  =  15  LIT  =  @54@.     T  504  USEC
0947  8CA1            CPCR  =  MTIMESH  -  1.       DELAY
0948  8C2A            CPCR  =  TMLDSEQ2  +  6.      ATTEMPT  RESTART
0949  CF40            SAR  =  15  LIT  =  @40@.     T  512  USEC
094A  8C64            CPCR  =  PURQTMOUT  -  1.     TIME  OUT STINT
094B  8C32            CPCR  =  SLCSTATSR  -  1.     STINT  NOT  SET  1MSEC
                 *********ERROR      #  M121
                  TSTTIMER2.
094C  F058            A3  =  LIT.                   TIME  AMT
094D  E00F            LIT  =  @0F@.
094E  8C21            CPCR  =  TMLDSEQ1  -  1.      LOAD  TIMER
094F  8C0F            CPCR  =  MSECURQT  -  1.      RUN OUT TIMER
0950  8C32            CPCR  =  SLCSTATSR  -  1.     STINT  NOT  SET
                 *********ERROR      #  M122
0951  E000            LIT  =  0.                    MSEC  ADJ
0952  8CB2            CPCR  =  MSECCHK  -  1.       TEST  TIME
0953  E0F0            LIT  =  @F0@.                 USEC  ADJ
0954  8C33            CPCR  =  SLCSTAT1  -  1.      TIME  RUN FAILED
                 *********ERROR      #  M123
0955  896D            CPCR  =  TSTTIMER3  -  1.
0956  8C23            CPCR  =  TMLDSEQ2  -  1.      LOAD  NEW TIMER  VALUE
0957  8C0F            CPCR  =  MSECURQT  -  1.      RUN OUT TIMER
0958  8C32            CPCR  =  SLCSTATSR  -  1.     STINT  NOT  SET
                 *********ERROR      #  M124
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0959  E000          LIT  = 0.                    MSEC  ADJ
095A  8CB2          CPCR = MSECCHK - 1.          TEST  TIME
095B  E047          LIT  = @47@.                 USEC  ADJ
095C  8C33          CPCR = SLCSTAT1 - 1.         TIME  RUN FAILED
                  *********ERROR     # M125
095D  896D          CPCR = TSTTIMER3 - 1.
095E  8C23          CPCR = TMLDSEQ2 - 1.         LOAD  NEW TIMER  VALUE
095F  8C0F          CPCR = MSECURQT - 1.         RUN OUT TIMER
0960  8C32          CPCR = SLCSTATSR - 1.        STINT  NOT SET
                  *********ERROR     # M126
0961  E00B          LIT  = @0B@.                 MSEC  ADJ
0962  8CB2          CPCR = MSECCHK - 1.          TEST  TIME
0963  E081          LIT  = @81@.                 USEC  ADJ
0964  8C33          CPCR = SLCSTAT1 - 1.         TIME  RUN FAILED
                  *********ERROR     # M127
0965  896D          CPCR = TSTTIMER3 - 1.
0966  8C23          CPCR = TMLDSEQ2 - 1.         LOAD  NEW TIMER  VALUE
0967  8C0F          CPCR = MSECURQT - 1.         RUN OUT TIMER
0968  8C32          CPCR = SLCSTATSR - 1.        STINT  NOT SET
                  *********ERROR     # M128
0969  E0B7          LIT  = @B7@.                 MSEC  ADJ
096A  8CB2          CPCR = MSECCHK - 1.          TEST  TIME
096B  E03A          LIT  = @3A@.                 USEC  ADJ
096C  8C33          CPCR = SLCSTAT1 - 1.         TIME  RUN FAILED
                  *********ERROR     # M129
096D  4972          MPCR = TSTTIMER4 - 1.
                  TSTTIMER3.
096E  F096          DR1  BEX.                    RESET  STATUS
096F  F044          A3   = A3  C.                TIME  F  LEFT  4
0970  DC00          SAR  = 12.
0971  F05F          B.
0972  F0C9          JUMP.
                  TSTTIMER4.
0973  8C5C          CPCR = BUSS2 - 1.            TEST  EXT  BUSS
                  *********ERROR     # M3
0974  8C93          CPCR = CWNULL - 1.           SHUT  OFF  TIMER
0975  E040          LIT  = @40@.
0976  8C95          CPCR = CWEDLI - 1.           SET  LOAD  TIMER
0977  E00F          LIT  = @0F@.
0978  8DD0          CPCR = WRITEDATLL - 1.       LS  TIME  BYTE
0979  E000          LIT  = 0.
097A  8DD0          CPCR = WRITEDATLL - 1.       MS  TIME  BYTE
097B  E0FF          LIT  = @FF@.
097C  8DD0          CPCR = WRITEDATLL - 1.       TST  REGEN  3  AND  4
097D  8DD1          CPCR = WRITEDAT - 1.         1
097E  8DD1          CPCR = WRITEDAT - 1.         2
097F  8DD1          CPCR = WRITEDAT - 1.         3
0980  E020          LIT  = @20@.
0981  8C95          CPCR = CWEDLI - 1.           RUN  TIMER
0982  C815          SAR  = 8  LIT  = @15@.       T16.1MSEC
0983  8CA1          CPCR = MTIMESH - 1.          DELAY
0984  F1B5          IF  URQ SKIP.
0985  8C32          CPCR = SLCSTATSR - 1.        TIMER  RESET  OR  LOAD  BAD
                  *********ERROR     # M129A
0986  8C93          CPCR = CWNULL - 1.           SHUT  OFF  TIMER
0987  E000          LIT  = 0.
0988  8C95          CPCR = CWEDLI - 1.           CW  =  8000
0989  8DD1          CPCR = WRITEDAT - 1.         DATA  WRITE  FF
098A  8DD1          CPCR = WRITEDAT - 1.
098B  E020          LIT  = @20@.
098C  8C95          CPCR = CWEDLI - 1.           RUN  TIMER
098D  CCB0          SAR  = 12  LIT  = @B0@.      T8.4MSEC
098E  8CA1          CPCR = MTIMESH - 1.          DELAY
098F  E020          LIT  = @20@.
0990  8C95          CPCR = CWEDLI - 1.           REWRITE  RUN  TIMER
0991  CCB0          SAR  = 12  LIT  = @B0@.      T8.4MSEC
0992  8CA1          CPCR = MTIMESH - 1.          DELAY
0993  F1B5          IF  URQ SKIP.                TST  TIME  FLAG
0994  8C32          CPCR = SLCSTATSR - 1.        TIMER  RESET  OR  LOAD  BAD
                  *********ERROR     # M129B
0995  8C93          CPCR = CWNULL - 1.
0996  403E          MPCR = TESTSELECT - 1.
                  TEST-5.
                  CLKTEST.
0997  8C9A          CPCR = CWGEN2L - 1.          WRITE  CW  A202
0998  E0A2          LIT  = @A2@.
0999  E002          LIT  = 2.
099A  F0FD          WHEN URQ STEP.               WAIT  FOR  CLR  TO  SND
099B  F096          DR1  BEX.
099C  F10F          A1   = B000.
099D  C880          SAR  = 8  LIT  = @80@.       T98MSEC
099E  8CA1          CPCR = MTIMESH - 1.
099F  E000          LIT  = 0.
09A0  8CE4          CPCR = DATCHKX - 1.          TST  DATA  WD
09A1  F0F7          SKIP.
09A2  C880          SAR  = 8  LIT  = @80@.       T98MSEC
09A3  8CA1          CPCR = MTIMESH - 1.
09A4  E000          LIT  = 0.
09A5  8CE4          CPCR = DATCHKX - 1.
09A6  8C33          CPCR = SLCSTAT1 - 1.         XMITTER  IDLE  BAD
                  *********ERROR     # M169
                  CLKTEST1.
09A7  F0E6          MIR  = B000.
09A8  F098          DW2.                         DATA  WRITE
09A9  F034          A2   = B000.
                  CLKTEST2.
09AA  F097          DR2  BEX.
09AB  F05F          B.
09AC  F0B2          IF  LST  SKIP.               TEST  LINE  STATUS
09AD  49A9          MPCR = CLKTEST2 - 1.
                  CLKTEST3.
09AE  F012          A1   = A1  + 1.
09AF  F0B7          IF  NOT AOV SKIP.
09B0  F02A          A2   = A2  + 1.
09B1  F097          DR2  BEX.
09B2  F05F          B.
09B3  F0C3          IF  NOT LST SKIP.
09B4  49AD          MPCR = CLKTEST3 - 1.
09B5  E000          LIT  = 0.
09B6  8C95          CPCR = CWEDLI - 1.
09B7  F0FD          WHEN URQ STEP.               WAIT  FOR  CLR  TO  SND  RESET
09B8  F096          DR1  BEX.
09B9  8C93          CPCR = CWNULL - 1.
09BA  F0DD          MIR  = A2.
09BB  F000          WAIT.
                  ****OBSERVE    MIR FOR UPPER TIME VALUE AND COMPARE TO
                  ****FIGURE     1.  IF DISAGREE--ERROR     # M170
                  ****FORCE    STEP  FOR LOWER TIME VALUE
09BC  F0DB          MIR  = A1.
09BD  F000          WAIT.
                  ****OBSERVE    MIR FOR LOWER TIME VALUE AND COMPARE TO
                  ****FIGURE     1.  IF DISAGREE--ERROR     # M170
                  ****FORCE    STEP  TO RETURN TO TEST  SELECT.
09BE  403E          MPCR = TESTSELECT - 1.
                  TEST-6.
                  MANRD1.
09BF  8DE5          CPCR = ZEROMEMREG1AB - 1.
09C0  8E24          CPCR = ZEROMEMREG2AB - 1.
                  MANRD2.
09C1  8D1A          CPCR = DATATEST - 1.         COMPARE  DATA  BUFFERS
09C2  F014          IF  LC1 SKIP.                TST  ERROR  FLAG
09C3  49C9          MPCR = MANRD3 - 1.
09C4  F0DB          MIR  = A1.
09C5  F000          WAIT.
                  ****MIR   CONTAINS  NEXT  RECEIVED  CHARACTER  THAT  FAILED
                  ****TO    COMPARE  TO  XMITTED  CHARACTER.
                  ****NOTE    AND  FORCE  STEP  TO  SEE  XMITTED  CHARACTER
09C6  F0DE          MIR  = A3.
09C7  F000          WAIT.
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                ****MIR   CONTAINS   EXPECTED   CHARACTER   THAT   WAS   XMITTED
                ****FORCE     STEP   TO   SEE   REST   OF   DATA   THAT   FAILED
09C8  F015          IF   LC2   SKIP.
09C9  49C0          MPCR = MANRD2  -  1.
                MANRD3.
09CA  F000          WAIT.
                ****REMAINDER     OF   DATA   COMPARED   GOOD
                ****FORCE     STEP   TO   RETURN   TO   TEST   SELECTOR
09CB  403E          MPCR = TESTSELECT  -  1.
                TEST-7.
                SLC04.
09CC  8B52          CPCR = CWSELECT  -  1.        OPERATOR   SELECT   CONTROL   WD
09CD  8A59          CPCR = MODESEL  -  1.         OPERATOR   SEL   OPTIONS
                SLC04AA.
09CE  8B78          CPCR = DATAWDSEL  -  1.       OPERATOR   LOAD   DATA   BUFF
                SLC04A1.
09CF  E008          LIT  =  8.
09D0  8C95          CPCR = CWEDL1  -  1.          ENABLE   DDP   CW = 8008
09D1  8CC8          CPCR = T5USEC  -  1.
09D2  C600          SAR  =  6   LIT  =  0.
09D3  8C75          CPCR = PRSTATLST  -  1.       TST   CLR   TO   SND   SET
09D4  F0F6          SET  GC2.                     FLAG   CTS   SET
09D5  F017          A1  =  B.
09D6  8BC3          CPCR = HEXREGCONV  -  1.
09D7  F0AE          IF   LC3   SET   LC3   SKIP.
09D8  80D3          CPCR = CONTPRINT  -  1.       PRINT   STATUS
09D9  0BE3          AMPCR = NEWLINEHEXBUFF.
09DA  82D6          CPCR = RDSREG2  -  1.         RD   OPTIONS   WORD
09DB  C301          SAR  =  3   LIT  =  1.
09DC  8C76          CPCR = PRSTATLST.             TST   DIAL-UP
09DD  49F4          MPCR = SLC04A3  -  1.
09DE  F0BB          IF   NOT   GC1   SKIP.        LOOP   FLAG
09DF  49E1          MPCR = SLC04A2  -  1.
09E0  80D3          CPCR = CONTPRINT  -  1.
09E1  0ACF          AMPCR = MSG-PHONE.
                SLC04A2.
09E2  C201          SAR  =  2   LIT  =  1.
09E3  8C75          CPCR = PRSTATLST  -  1.       WAIT   FOR   DATA   SET   RDY
09E4  49E1          MPCR = SLC04A2  -  1.
09E5  82CE          CPCR = RDSREG1  -  1.         FETCH   CONTROL   WORD
09E6  C100          SAR  =  1   LIT  =  0.
09E7  8C76          CPCR = PRSTATLST.             TST   XMIT   SET
09E8  49F1          MPCR = SLC04A2B  -  1.
                SLC04A2A.
09E9  C701          SAR  =  7   LIT  =  1.
09EA  8C75          CPCR = PRSTATLST  -  1.       TST   CARR   ON
09EB  49E8          MPCR = SLC04A2A  -  1.
09EC  E030          LIT  =  @30@.                 T9.8SEC   FIRST   PASS   TIME
09ED  F0BB          IF   NOT   GC1   SKIP.        LOOP   FLAG
09EE  E000          LIT  =  0.                    T192MSEC   LOOP   TIME
09EF  8CAA          CPCR = STIME  -  1.
09F0  F096          DR1  BEX.                     RESET   STATUS
09F1  49F4          MPCR = SLC04A3  -  1.
                SLC04A2B.
09F2  F019          SET  LC2.                     FLAG   DIAL   OPT
09F3  F075          B  =  BTT0.                   RESET   RCV
09F4  F0F7          SKIP.
                SLC04A3.
09F5  82CE          CPCR = RDSREG1  -  1.         FETCH   CONTROL   WORD
09F6  8C97          CPCR = CWGENB  -  1.          WRITE   CONTROL   WORD
09F7  F051          A3  =  B.
09F8  C101          SAR  =  1   LIT  =  1.
09F9  8C76          CPCR = PRSTATLST.             TST   XMIT   SET
09FA  4A1C          MPCR = SLC04C  -  1.
                SLC04A.
09FB  F0FD          WHEN URQ STEP.                WAIT   FOR   CLR   TO   SEND
09FC  C600          SAR  =  6   LIT  =  0.
09FD  8C75          CPCR = PRSTATLST  -  1.       TST   CLR   TO   SND
09FE  4A05          MPCR = SLC04B  -  1.          PASS
09FF  F017          A1  =  B.

0A00  8BC3          CPCR = HEXREGCONV  -  1.          CONV   STAT   TO   HEX   ASCII
0A01  F0AE          IF   LC3   SET   LC3   SKIP.
0A02  80D3          CPCR = CONTPRINT  -  1.           PRINT   STATUS
0A03  0BE3          AMPCR = NEWLINEHEXBUFF.
0A04  F097          DR2  BEX.                         SELECT
0A05  49FA          MPCR = SLC04A  -  1.
                SLC04B.
0A06  F017          A1  =  B.
0A07  F0AE          IF   LC3   SET   LC3   SKIP.      NO   PRINT   OPTION
0A08  80D3          CPCR = CONTPRINT  -  1.           PRINT   CLR   TO   SEND
0A09  0AA4          AMPCR = MSG-CTS.
0A0A  8BC3          CPCR = HEXREGCONV  -  1.          CONV   STAT   TO   HEX   ASCII
0A0B  F0AE          IF   LC3   SET   LC3   SKIP.      NO   PRINT   OPTION
0A0C  80D3          CPCR = CONTPRINT  -  1.           PRINT   STATUS
0A0D  0BE6          AMPCR = HEXBUFF.
0A0E  C81A          SAR  =  8   LIT  =  @1A@.         T19.9   MSEC
0A0F  8CA1          CPCR = MTIMESH  -  1.             DELAY   FOR   SOME   DATA   SETS
0A10  F015          IF   LC2   SKIP.                  TST   DIAL   OPTION
0A11  4A17          MPCR = SLC04B1  -  1.
0A12  E030          LIT  =  @30@.                     T9.8SEC   FIRST   PASS   TIME
0A13  F0BB          IF   NOT   GC1   SKIP.            LOOP   FLAG
0A14  E000          LIT  =  0.                        T192   MSEC   LOOP   TIME
0A15  8CAA          CPCR = STIME  -  1.               DELAY
0A16  82CE          CPCR = RDSREG1  -  1.
0A17  8C97          CPCR = CWGENB  -  1.              RE-WRITE   CW
                SLC04B1.
0A18  F096          DR1  BEX.                         SELECT
0A19  F071          B  =  A3.
0A1A  CE00          SAR  =  14   LIT  =  0.           TST   SYNC   MODE
0A1B  8C76          CPCR = PRSTATLST.
0A1C  4A1E          MPCR = SLC04D  -  1.              PASS
                SLC04C.
0A1D  8D55          CPCR = RCVXMIT  -  1.             ASYNC   FDUPLX   OR   RCV   ONLY
0A1E  4A24          MPCR = SLC04F  -  1.
                SLC04D.
0A1F  CD01          SAR  =  13   LIT  =  1.
0A20  8C76          CPCR = PRSTATLST.                 TST   EBCDIC
0A21  4A23          MPCR = SLC04E  -  1.              FAIL
0A22  8D50          CPCR = RCVXMIT-EBC  -  1.XMIT   AND   RECEIVE   EBCDIC
0A23  4A24          MPCR = SLC04F  -  1.
                SLC04E.
0A24  8D4B          CPCR = RCVXMIT-ASC  -  1.XMIT   AND   RECEIVE   ASCII
                SLC04F.
0A25  F014          IF   LC1   SKIP.
0A26  4A37          MPCR = SLC04H  -  1.
0A27  80A9          CPCR = INDICATE-ERROR  -  1.
0A28  F0AF          IF   LC3   SET   LC3   ELSE   SKIP.   NO   PRINT   OPTION
0A29  4A2D          MPCR = SLC04F1  -  1.
0A2A  8BC3          CPCR = HEXREGCONV  -  1.
0A2B  80D3          CPCR = CONTPRINT  -  1.           PRINT   STATUS   ERROR
0A2C  0BE3          AMPCR = NEWLINEHEXBUFF.
0A2D  4A56          MPCR = FAILEXTIT  -  1.           PRT   FAIL  -  LOOP   OR   EXIT
                SLC04F1.
0A2E  8C33          CPCR = SLCSTAT1  -  1.            ERROR   INTERRUPT   WHILE
*                                                     XMITT   OR   RCV
0A2F  09CE          AMPCR = SLC04A1  -  1.            LOOP   ON   ERROR
                SLC04G.
0A30  82D6          CPCR = RDSREG2  -  1.             FETCH   OPTION   WD
0A31  C100          SAR  =  1   LIT  =  0.
0A32  8C76          CPCR = PRSTATLST.                 TST   COMPARE   OPTION
0A33  4A40          MPCR = SLC04I  -  1.              COMPARE   BUFF
0A34  F0AF          IF   LC3   SET   LC3   ELSE   SKIP.   NO   PRINT   OPTION
0A35  4A51          MPCR = SLC04EXTIT  -  1.          LOOP   OR   EXIT
0A36  8B06          CPCR = PRTRCVBUFF  -  1.
0A37  4A51          MPCR = SLC04EXTIT  -  1.          LOOP   OR   EXIT
                SLC04H.
0A38  82CE          CPCR = RDSREG1  -  1.             FETCH   CONTROL   WD
0A39  C000          SAR  =  0   LIT  =  0.
0A3A  8C76          CPCR = PRSTATLST.                 TST   RCV   ON   (XMIT   ONLY)
0A3B  4A2F          MPCR = SLC04G  -  1.              RCV   SET
0A3C  F0AF          IF   LC3   SET   LC3   ELSE   SKIP.NO   PRINT   OPTION
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0A3D  4A51          MPCR = SLC04EXTIT    - 1.  LOOP OR EXIT
0A3E  80D3          CPCR = CONTPRINT   - 1.
0A3F  0ABF          AMPCR = MSG-FINISH.
0A40  4A51          MPCR = SLC04EXTIT    - 1.  LOOP OR EXIT
                SLC04I.
0A41  8DE5          CPCR = ZEROMEMREG1AB  - 1.
0A42  8E24          CPCR = ZEROMEMREG2AB  - 1.
0A43  8D1A          CPCR = DATATEST   - 1.      COMPARE BUFFS
0A44  F014          IF LC1 SKIP.                DATA ERROR
0A45  4A4D          MPCR = SLC04K    - 1.       NO ERROR
0A46  80A9          CPCR = INDICATE-ERROR     - 1.
0A47  F0AE          IF LC3 SET LC3 SKIP.        NO PRINT OPTION
0A48  4A4B          MPCR = SLC04J    - 1.
0A49  8C6C          CPCR = PEXLOOP   - 1.       TST EXT SW
0A4A  09CE          AMPCR = SLC04A1    - 1.     RESTART
0A4B  49BE          MPCR = MANRD1 - 1.
                SLC04J.
0A4C  8B27          CPCR = PRTBUFFERR  - 1.     PRINT DATA ERRORS
0A4D  4A56          MPCR = FAILEXTIT    - 1.    PRT FAIL - LOOP OR EXIT
                SLC04K.
0A4E  F0AF          IF LC3 SET LC3 ELSE SKIP.NO PRINT OPTION
0A4F  4A51          MPCR = SLC04EXTIT    - 1.   LOOP OR EXIT
0A50  80D3          CPCR = CONTPRINT   - 1.
0A51  0AA0          AMPCR = MSG-PASS.
                SLC04EXTIT.
0A52  8C6C          CPCR = PEXLOOP   - 1.       TST EXT SW
0A53  09CE          AMPCR = SLC04A1    - 1.     LOOP ON ERROR
0A54  F0AD          IF LC3 STEP.                RESET FLAG
0A55  8C93          CPCR = CWNULL - 1.
0A56  403D          MPCR = TESTSELECTCLEAR    - 1.  EXIT
                FAILEXTIT.
0A57  80D3          CPCR = CONTPRINT   - 1.     PRINT FAIL
0A58  0AC4          AMPCR = MSG-FAIL.
0A59  4A51          MPCR = SLC04EXTIT    - 1.  LOOP OR EXTIT
                MODESEL.
0A5A  80D3          CPCR = CONTPRINT   - 1.
0A5B  0AAC          AMPCR = MSG-OPTION.
0A5C  829B          CPCR = READDATAKEYTOA1   - 1.
0A5D  8140          CPCR = IFCONSPRINT    - 1.
0A5E  F009          A1 = A1 AND LIT.
0A5F  E003          LIT = 3.
0A60  F042          A3 = A1.
0A61  80D3          CPCR = CONTPRINT   - 1.
0A62  0AC8          AMPCR = MSG-DOPT.
0A63  829B          CPCR = READDATAKEYTOA1   - 1.
0A64  8140          CPCR = IFCONSPRINT    - 1.
0A65  F062          B = A1 AND LIT.
0A66  CD01          SAR = 13 LIT = 1.
0A67  F07D          B = B C.
0A68  F0DF          MIR = A3 OR B.              ADD PHONE OPTION
0A69  82C5          CPCR = WRSREG2  - 1.
0A6A  F03B          A3.
0A6B  F0C3          IF NOT LST SKIP.
0A6C  F01A          SET LC3.                    NO PRINT FLAG
0A6D  82CE          CPCR = RDSREG1  - 1.        FETCH CW
0A6E  C001          SAR = 0 LIT = 1.
0A6F  8C76          CPCR = PRSTATLST.           TST RCV SET
0A70  49CD          MPCR = SLC04AA   - 1.
0A71  F071          B = A3.
0A72  C100          SAR = 1 LIT = 0.
0A73  8C76          CPCR = PRSTATLST.
0A74  49CD          MPCR = SLC04AA   - 1.
                MODESEL1.
0A75  80D3          CPCR = CONTPRINT   - 1.
0A76  0AB7          AMPCR = MSG-CHARAMT.
0A77  829B          CPCR = READDATAKEYTOA1   - 1.
0A78  8140          CPCR = IFCONSPRINT    - 1.
0A79  F009          A1 = A1 AND LIT.
0A7A  E00F          LIT = @0F@.
0A7B  F024          A2 = A1.                    SAVE HUNDREDS
0A7C  829B          CPCR = READDATAKEYTOA1   - 1.
0A7D  8140          CPCR = IFCONSPRINT    - 1.
0A7E  F009          A1 = A1 AND LIT.
0A7F  E00F          LIT = @0F@.
0A80  F042          A3 = A1.                    SAVE TENS
0A81  829B          CPCR = READDATAKEYTOA1   - 1.
0A82  8140          CPCR = IFCONSPRINT    - 1.
0A83  F009          A1 = A1 AND LIT.
0A84  E00F          LIT = @0F@.
0A85  F066          B = A1.
0A86  8BE8          CPCR = DECTOHEX  - 1.
0A87  F0FF          0 EQV B.
0A88  F0B5          IF NOT ABT SKIP.
0A89  4A9D          MPCR = CHARAMTERR  - 1.
0A8A  F033          A2 = B.
0A8B  F082          B = LIT L.
0A8C  C801          SAR = 8 LIT = 1.
0A8D  F11A          A2 - B - 1.
0A8E  F0B7          IF NOT AOV SKIP.
0A8F  4A9D          MPCR = CHARAMTERR  - 1.
0A90  F043          A3 = A2.
0A91  8E24          CPCR = ZEROMEMREG2AB  - 1.
                MODESEL3.
0A92  F04B          A3 = A3 - 1.
0A93  F09E          IF AOV SKIP.
0A94  4A97          MPCR = MODESEL4  - 1.
0A95  F07B          B = B000.
0A96  8E32          CPCR = WRMEMREG2B  - 1.
0A97  4A91          MPCR = MODESEL3  - 1.
                MODESEL4.
0A98  8E3F          CPCR = WRMEMREG2STP  - 1.
0A99  82CE          CPCR = RDSREG1  - 1.
0A9A  C100          SAR = 1 LIT = 0.
0A9B  8C76          CPCR = PRSTATLST.           TEST XMIT SET
0A9C  49CD          MPCR = SLC04AA   - 1.
0A9D  49CE          MPCR = SLC04AA.             RCV ONLY
                CHARAMTERR.
0A9E  80B0          CPCR = ALARM - 1.
0A9F  4A74          MPCR = MODESEL1  - 1.
                MSG-PASS.
0AA0  0D0A          CNST = @0D0A@.              CRLF
0AA1  5041          CNST = @5041@.              PA
0AA2  5353          CNST = @5353@.              SS
0AA3  8000          CNST = @8000@.              STOP
                MSG-CTS.
0AA4  0D0A          CNST = @0D0A@.              CRLF
0AA5  4354          CNST = @4354@.              CT
0AA6  5320          CNST = @5320@.              SSP
0AA7  8000          CNST = @8000@.              STOP
                MSG-CW.
0AA8  0D0A          CNST = @0D0A@.              CRLF
0AA9  4D4F          CNST = @4D4F@.              MO
0AAA  4445          CNST = @4445@.              DE
0AAB  2080          CNST = @2080@.              SPSTP
                MSG-OPTION.
0AAC  2020          CNST = @2020@.              SPSP
0AAD  4F50          CNST = @4F50@.              OP
0AAE  5420          CNST = @5420@.              TSP
0AAF  8000          CNST = @8000@.              STP
                MSG-DATA.
0AB0  0D0A          CNST = @0D0A@.              CRLF
0AB1  4441          CNST = @4441@.              DA
0AB2  5441          CNST = @5441@.              TA
0AB3  8000          CNST = @8000@.              STP
                MSG-SEQ.
0AB4  2020          CNST = @2020@.              SPSP
0AB5  5345          CNST = @5345@.              SE
0AB6  5180          CNST = @5180@.              QSTP
                MSG-CHARAMT.
0AB7  2020          CNST = @2020@.              SPSP
0AB8  5243          CNST = @5243@.              RC
0AB9  5620          CNST = @5620@.              VSP
```

```
0ABA  4348        CNST  = @4348@.          CH
0ABB  4152        CNST  = @4152@.          AR
0ABC  2041        CNST  = @2041@.          SPA
0ABD  4D54        CNST  = @4D54@.          MT
0ABE  2080        CNST  = @2080@.          SPSTP
                MSG-FINISH.
0ABF  0D0A        CNST  = @0D0A@.          CRLF
0AC0  4649        CNST  = @4649@.          FI
0AC1  4E49        CNST  = @4E49@.          NI
0AC2  5348        CNST  = @5348@.          SH
0AC3  8000        CNST  = @8000@.          STP
                MSG-FAIL.
0AC4  0D0A        CNST  = @0D0A@.          CRLF
0AC5  4641        CNST  = @4641@.          FA
0AC6  494C        CNST  = @494C@.          IL
0AC7  8000        CNST  = @8000@.          STP
                MSG-DOPT.
0AC8  2020        CNST  = @2020@.          SPSP
0AC9  4449        CNST  = @4449@.          DI
0ACA  414C        CNST  = @414C@.          AL
0ACB  204F        CNST  = @204F@.          SPO
0ACC  5054        CNST  = @5054@.          PT
0ACD  2020        CNST  = @2020@.          SPSP
0ACE  8000        CNST  = @8000@.          STP
                MSG-PHONE.
0ACF  0D0A        CNST  = @0D0A@.          CRLF
0AD0  4553        CNST  = @4553@.          ES
0AD1  5441        CNST  = @5441@.          TA
0AD2  424C        CNST  = @424C@.          BL
0AD3  4953        CNST  = @4953@.          IS
0AD4  4820        CNST  = @4820@.          HSP
0AD5  5048        CNST  = @5048@.          PH
0AD6  4F4E        CNST  = @4F4E@.          ON
0AD7  4520        CNST  = @4520@.          ESP
0AD8  4C49        CNST  = @4C49@.          LI
0AD9  4E4B        CNST  = @4E4B@.          NK
0ADA  8000        CNST  = @8000@.          STP
                MSGHEADING.
0ADB  0D0A        CNST  = @0D0A@.          CRLF
0ADC  5245        CNST  = @5245@.          RE
0ADD  4345        CNST  = @4345@.          CE
0ADE  4956        CNST  = @4956@.          IV
0ADF  4544        CNST  = @4544@.          ED
0AE0  2D45        CNST  = @2D45@.          -E
0AE1  5850        CNST  = @5850@.          XP
0AE2  4543        CNST  = @4543@.          EC
0AE3  5445        CNST  = @5445@.          TE
0AE4  4480        CNST  = @4480@.          DSTP
                MSGRCVDAT.
0AE5  0D0A        CNST  = @0D0A@.          CRLF
0AE6  5245        CNST  = @5245@.          RE
0AE7  4345        CNST  = @4345@.          CE
0AE8  4956        CNST  = @4956@.          IV
0AE9  4544        CNST  = @4544@.          ED
0AEA  2044        CNST  = @2044@.          SPD
0AEB  4154        CNST  = @4154@.          AT
0AEC  4180        CNST  = @4180@.          ASTP
                NUMCONVTST.
0AED  F009        A1  = A1  AND LIT.
0AEE  E04F        LIT  = @4F@.
0AEF  F109        A1  - LIT  - 1.
0AF0  E03F        LIT  = @3F@.
0AF1  F183        IF  AOV  JUMP.           GREATER  THAN 3F
0AF2  F1E7        RETN.
                HEXKEYCONV.               HEX CONVERT
0AF3  F011        A1  = A1  + LIT.
0AF4  E009        LIT  = 9.
0AF5  F009        A1  = A1  AND LIT.
0AF6  E00F        LIT  = @0F@.
0AF7  F0C9        JUMP.
```

```
                TEST-8.
                MONITOR.
0AF8  8C9A        CPCR  = CWGEN2L  - 1.    ENABLE  LINE  MONITOR
0AF9  E002        LIT  = 2.
0AFA  E008        LIT  = 8.
                MONITOR1.
0AFB  F0BD        IF  NOT  IRQ  SKIP.      OPERATOR  INTERRUPT
0AFC  4B01        MPCR  = MONITOR2  - 1.
0AFD  F097        DR2  BEX.                READ  DATA  WD
0AFE  F0FF        0  EQV  B.
0AFF  F09D        IF  ABT  SKIP.           LINE  CHANGE  OR  LINE  LOW
0B00  80A9        CPCR  = INDICATE-ERROR  - 1.  SOUND  ALARM
0B01  4AFA        MPCR  = MONITOR1  - 1.
                MONITOR2.
0B02  F108        ASR  BEX.
0B03  8C93        CPCR  = CWNULL  - 1.     DISABLE  MONITOR
0B04  803E        CPCR  = TESTSELECT  - 1.  EXIT
0B05  403E        MPCR  = TESTSELECT  - 1.
                TEST-9.
0B06  003E        AMPCR  = TESTSELECT  - 1.
                PRTRCVBUFF.
0B07  F0DA        MIR  = AMPCR.
0B08  F05F        B.
0B09  81E5        CPCR  = STACK  - 1.
0B0A  80D3        CPCR  = CONTPRINT  - 1.
0B0B  0AE5        AMPCR  = MSGRCVDAT.
0B0C  F0EA        MIR  = LIT.
0B0D  E00D        LIT  = @0D@.
0B0E  82CA        CPCR  = WRSREG3  - 1.    LINE  COUNT
0B0F  8DE5        CPCR  = ZEROMEMREG1AB  - 1.
0B10  8E24        CPCR  = ZEROMEMREG2AB  - 1.
                PRTRCVBUFF1.
0B11  8E37        CPCR  = RMEMREG2AFIFO  - 1.
0B12  F017        A1  = B.
0B13  8BC3        CPCR  = HEXREGCONV  - 1.
0B14  82EC        CPCR  = INCSREG3  - 1.
0B15  F0CB        LIT  EQV  B.
0B16  E00E        LIT  = @0E@.
0B17  F09D        IF  ABT  SKIP.           NEW  LINE
0B18  4B1C        MPCR  = PRTRCVBUFF2  - 1.
0B19  80D3        CPCR  = CONTPRINT  - 1.
0B1A  0BE3        AMPCR  = NEWLINEHEXBUFF.
0B1B  82C9        CPCR  = ZROSREG3  - 1.
0B1C  4B1E        MPCR  = PRTRCVBUFF3  - 1.
                PRTRCVBUFF2.
0B1D  80D3        CPCR  = CONTPRINT  - 1.
0B1E  0BE5        AMPCR  = HEXBUFFSP.
                PRTRCVBUFF3.
0B1F  8E41        CPCR  = MEMREG2ALOOKSTP  - 1.
0B20  F0C0        IF  NOT  LC2  SKIP.
0B21  4202        MPCR  = UNSTACK  - 1.
0B22  F1B5        IF  URQ  SKIP.
0B23  4B10        MPCR  = PRTRCVBUFF1  - 1.
0B24  F096        DR1  BEX.
0B25  F05F        B.
0B26  4202        MPCR  = UNSTACK  - 1.
                TEST-10.
0B27  003E        AMPCR  = TESTSELECT  - 1.
                PRTBUFFERR.
0B28  F0DA        MIR  = AMPCR.
0B29  F05F        B.
0B2A  81E5        CPCR  = STACK  - 1.
0B2B  F0EA        MIR  = LIT.
0B2C  E005        LIT  = 5.
0B2D  82CA        CPCR  = WRSREG3  - 1.
0B2E  8DE5        CPCR  = ZEROMEMREG1AB  - 1.
0B2F  8E24        CPCR  = ZEROMEMREG2AB  - 1.
0B30  8D1A        CPCR  = DATATEST  - 1.
0B31  F0A8        IF  LC1  SET  LC1  SKIP.
0B32  4B36        MPCR  = PRTBUFFERR1.
0B33  80D3        CPCR  = CONTPRINT  - 1.
```

```
0B34  0ADB        AMPCR = MSGHEADING.
0B35  F0F7        SKIP.
                  PRTBUFFERR1.
0B36  8D1A        CPCR = DATATEST - 1.
0B37  F0BF        IF NOT LC1 SKIP.
0B38  4B3A        MPCR = PRTBUFFERR1A - 1.
0B39  F0A9        IF LC2 STEP.
0B3A  4202        MPCR = UNSTACK - 1.
                  PRTBUFFERR1A.
0B3B  8BC3        CPCR = HEXREGCONV - 1.
0B3C  82EC        CPCR = INCSREG3 - 1.
0B3D  F0CB        LIT EQV B.
0B3E  E006        LIT = 6.
0B3F  F09D        IF ABT SKIP.
0B40  4B44        MPCR = PRTBUFFERR2 - 1.
0B41  80D3        CPCR = CONTPRINT - 1.
0B42  0BE3        AMPCR = NEWLINEHEXBUFF.
0B43  82C9        CPCR = ZROSREG3 - 1.
0B44  4B46        MPCR = PRTBUFFERR3 - 1.
                  PRTBUFFERR2.
0B45  80D3        CPCR = CONTPRINT - 1.
0B46  0BE4        AMPCR = HEXBUFFDBLSP.
                  PRTBUFFERR3.
0B47  F016        A1 = A3.
0B48  8BC3        CPCR = HEXREGCONV - 1.
0B49  80D3        CPCR = CONTPRINT - 1.
0B4A  0BE5        AMPCR = HEXBUFFSP.
0B4B  F0C0        IF NOT LC2 SKIP.          LAST CHAR
0B4C  4202        MPCR = UNSTACK - 1.
0B4D  F1B5        IF URQ SKIP.
0B4E  4B35        MPCR = PRTBUFFERR1 - 1.
0B4F  F096        DR1 BEX.
0B50  F05F        B.
0B51  4202        MPCR = UNSTACK - 1.
0B52  F000        WAIT.
                  CWSELECT.
0B53  F0DA        MIR = AMPCR.
0B54  F05F        B.
0B55  81E5        CPCR = STACK - 1.
0B56  80D3        CPCR = CONTPRINT - 1.
0B57  0AA8        AMPCR = MSG-CW.
0B58  829B        CPCR = READDATAKEYTOA1 - 1.
0B59  8140        CPCR = IFCONSPRINT - 1.
0B5A  8AEC        CPCR = NUMCONVTST - 1.  TST NUM OR ALPHA
0B5B  F0F7        SKIP.
0B5C  4B61        MPCR = CWSELECT1 - 1.
0B5D  F111        A1 EQV LIT.
0B5E  E04E        LIT = @4E@.
0B5F  F0B5        IF NOT ABT SKIP.              TEST = N (NO ENTRY)
0B60  4B68        MPCR = CWSELECT2 - 1.         EXIT
0B61  8AF2        CPCR = HEXKEYCONV - 1.  CONV TO HEX
                  CWSELECT1.
0B62  0B69        AMPCR = CWTABLE - 1.
0B63  F100        AMPCR = A1 + AMPCR.
0B64  F0CF        MAR1 = AMPCR.
0B65  F0F1        MR1.
0B66  F0F9        WHEN RDC BEX.                 READ CONTROL WORD
0B67  F0E1        MIR = B.
0B68  82BD        CPCR = WRSREG1 - 1.       SAVE CONTROL WORD
                  CWSELECT2.
0B69  4202        MPCR = UNSTACK - 1.
                  CWTABLE.
0B6A  8009        CNST = @8009@.            RCV ASYNC ASCII
0B6B  A009        CNST = @A009@.            RCV ASYNC EBCDIC
0B6C  C009        CNST = @C009@.            RCV SYNC ASCII
0B6D  E009        CNST = @E009@.            RCV SYNC EBCDIC
0B6E  800A        CNST = @800A@.            XMIT ASYNC ASCII
0B6F  A00A        CNST = @A00A@.            XMIT ASYNC EBCDIC
0B70  C00A        CNST = @C00A@.            XMIT SYNC ASCII
0B71  E00A        CNST = @E00A@.            XMIT SYNC EBCDIC
0B72  900B        CNST = @900B@.            FDUPLX ASYNC ASCII
0B73  B00B        CNST = @B00B@.            FDUPLX ASYNC EBCDIC
0B74  D00B        CNST = @D00B@.            FDUPLX SYNC ASCII
0B75  F00B        CNST = @F00B@.            FDUPLX SYNC EBCDIC
0B76  800B        CNST = @800B@.            XMIT RCV ASYNC ASCII
0B77  A00B        CNST = @A00B@.            XMIT RCV ASYNC EBCDIC
0B78  C00B        CNST = @C00B@.            XMIT RCV SYNC ASCII
                  DATAWDSEL.
0B79  F054        A3 = B000.
0B7A  F0A9        IF LC2 STEP.
0B7B  F0DA        MIR = AMPCR.
0B7C  F05F        B.
0B7D  81E5        CPCR = STACK - 1.
0B7E  80D3        CPCR = CONTPRINT - 1.
0B7F  0AB0        AMPCR = MSG-DATA.
                  DATAWDSEL1.
0B80  F018        SET LC1.
0B81  8DE5        CPCR = ZEROMEMREG1AB - 1.
                  DATAWDSEL2.
0B82  8E12        CPCR = RMEMREG1AFIFO - 1.RD BUFFER
0B83  F017        A1 = B.
0B84  8BC3        CPCR = HEXREGCONV - 1.  CONV TO HEX
0B85  80D3        CPCR = CONTPRINT - 1.   PRINT OLD DATA
0B86  0BE3        AMPCR = NEWLINEHEXBUFF.
                  DATAWDSEL2A.
0B87  829B        CPCR = READDATAKEYTOA1 - 1.  FETCH KYBD DATA
0B88  8140        CPCR = IFCONSPRINT - 1.
0B89  8AEC        CPCR = NUMCONVTST - 1.  TST NUM OR ALPHA
0B8A  F0F7        SKIP.
0B8B  4BAB        MPCR = DATAWDSEL6 - 1.
0B8C  F111        A1 EQV LIT.
0B8D  E04E        LIT = @4E@.                   NO ENTRY KEY = N
0B8E  F0B5        IF NOT ABT SKIP.
0B8F  4BBF        MPCR = DATAWDEXIT - 1.  EXIT
0B90  F111        A1 EQV LIT.
0B91  E04D        LIT = @4D@.                   MISTAKE KEY = M
0B92  F09D        IF ABT SKIP.
0B93  4B9A        MPCR = DATAWDSEL3 - 1.
0B94  F0C0        IF NOT LC2 SKIP.          MISTAKE NOT IN MEM
0B95  4B86        MPCR = DATAWDSEL2A - 1.
0B96  F0BF        IF NOT LC1 SKIP.              SAFE GUARD
0B97  4B7F        MPCR = DATAWDSEL1 - 1.
0B98  8DEF        CPCR = RMEMREG1AFILO - 1.
0B99  8DF3        CPCR = RMEMREG1BFILO - 1.     DECREMENT POINTER
0B9A  4B82        MPCR = DATAWDSEL2.
                  DATAWDSEL3.
0B9B  F111        A1 EQV LIT.
0B9C  E049        LIT = @49@.                   INCREMENT POINTER = I
0B9D  F09D        IF ABT SKIP.
0B9E  4BA2        MPCR = DATAWDSEL4 - 1.
0B9F  8E20        CPCR = RMEMREG1BFIFO - 1.     INCREMENT POINTER
0BA0  F0A9        IF LC2 STEP.                  SAFTY
0BA1  F0A5        IF LC1 STEP.
0BA2  4B81        MPCR = DATAWDSEL2 - 1.
                  DATAWDSEL4.
0BA3  F111        A1 EQV LIT.
0BA4  E04C        LIT = @4C@.                   LAST ENTRY = L
0BA5  F09D        IF ABT SKIP.
0BA6  4BAA        MPCR = DATAWDSEL5 - 1.
0BA7  F0BF        IF NOT LC1 SKIP.
0BA8  4BB8        MPCR = DATAWDSEL8 - 1.        L ON FIRST ENTRY
0BA9  8E4B        CPCR = WRMEMREG1STP - 1.      LOAD STOP CODE
0BAA  4BBF        MPCR = DATAWDEXIT - 1.        EXIT
                  DATAWDSEL5.
0BAB  8AF2        CPCR = HEXKEYCONV - 1.  CONV KEY TO HEX
                  DATAWDSEL6.
0BAC  F0C0        IF NOT LC2 SKIP.
0BAD  4BB2        MPCR = DATAWDSEL7 - 1.
0BAE  F019        SET LC2.
0BAF  F00B        A1 = A1 L.
0BB0  DC00        SAR = 12.
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0BB1  F042          A3 = A1.                              UPPER DIGIT
0BB2  4B86          MPCR = DATAWDSEL2A - 1.
                DATAWDSEL7.
0BB3  F066          B = A1.
0BB4  F06F          B = A3 OR B.                          LOWER DIGIT
0BB5  F051          A3 = B.                               SAVE DATA WD
0BB6  8E03          CPCR = WRMEMREG1B - 1.                LOAD WORD TO BUFFER
0BB7  F0A5          IF LC1 STEP.
0BB8  4B81          MPCR = DATAWDSEL2 - 1.
                DATAWDSEL8.
0BB9  F058          A3 = LIT.
0BBA  E0FF          LIT = @FF@.
0BBB  F07B          B = B000.
0BBC  8D00          CPCR = LDSEQBUF - 1.                  LOAD SEQ DATA TO BUFF
0BBD  80D3          CPCR = CONTPRINT - 1.
0BBE  0AB4          AMPCR = MSG-SEQ.
0BBF  4BBF          MPCR = DATAWDEXIT - 1.
                DATAWDEXIT.
0BC0  F0A5          IF LC1 STEP.
0BC1  F0A9          IF LC2 STEP.
0BC2  8DD4          CPCR = MARKMEM2ASMEM1 - 1.
0BC3  4202          MPCR = UNSTACK - 1.
                HEXREGCONV.
0BC4  F0DA          MIR = AMPCR.
0BC5  F0CA          LCTR.
0BC6  E001          LIT = 1.
0BC7  81E5          CPCR = STACK - 1.
0BC8  0BE6          AMPCR = HEXBUFF.
0BC9  F0CF          MAR1 = AMPCR.
0BCA  F05F          B.
                HEXREGCONV1.
0BCB  8BD5          CPCR = STRIPCONV - 1.
0BCC  F036          A2 = B L.
0BCD  D800          SAR = 8.
0BCE  8BD5          CPCR = STRIPCONV - 1.
0BCF  F1CB          MIR = A2 OR B.
0BD0  F0F3          MW1.
0BD1  F030          INC.
0BD2  F0D7          MAR1 = BMAR + 1.
0BD3  F02E          IF COV SKIP.
0BD4  4BCA          MPCR = HEXREGCONV1 - 1.
0BD5  4202          MPCR = UNSTACK - 1.
                STRIPCONV.
0BD6  F10B          A1 = A1 C.
0BD7  DC00          SAR = 12.
0BD8  F062          B = A1 AND LIT.
0BD9  E00F          LIT = @0F@.
0BDA  F0CC          LIT -. B.
0BDB  E009          LIT = 9.
0BDC  F09E          IF AOV SKIP.                          9 OR LESS
0BDD  4BDF          MPCR = STRIPCONV1 - 1.
0BDE  E030          LIT = @30@.
0BDF  F0F7          SKIP.
                STRIPCONV1.
0BE0  E037          LIT = @37@.
0BE1  F083          B = LIT + B.
0BE2  F0C9          JUMP.
                NEWLINEHEXBUFF.
0BE3  0A0D          CNST = @0A0D@.
                HEXBUFFDBLSP.
0BE4  0020          CNST = @0020@.
                HEXBUFFSP.
0BE5  0020          CNST = @0020@.
                HEXBUFF.
0BE6  0000          CNST = @0000@.
0BE7  0000          CNST = @0000@.
0BE8  8000          CNST = @8000@.
                DECTOHEX.
                HUNDREDS.
0BE9  E064          LIT = @64@.
0BEA  F02B          A2 = A2 - 1.
0BEB  F09E          IF AOV SKIP.
0BEC  4BEE          MPCR = TENS - 1.
0BED  F083          B = LIT + B.
0BEE  4BE8          MPCR = HUNDREDS - 1.
                TENS.
0BEF  E00A          LIT = @0A@.
0BF0  F04B          A3 = A3 - 1.
0BF1  F09E          IF AOV SKIP.
0BF2  F0C9          JUMP.
0BF3  F083          B = LIT + B.
0BF4  4BEE          MPCR = TENS - 1.
                PARGENEVEN.                               GENERATE EVEN PARITY
0BF5  E000          LIT = 0.
0BF6  F0F7          SKIP.
                PARGENODD.                                GENERATE ODD PARITY
0BF7  E001          LIT = 1.
0BF8  F045          A3 = A3 L.
0BF9  D700          SAR = 7.                              7=PXXXXXXX  8=PXXXXXXXX
0BFA  F0DE          MIR = A3.
0BFB  F046          A3 = A3 R.
0BFC  D900          SAR = 9.                              9=PXXXXXXX  ,=PXXXXXXXX
0BFD  F072          B = A3 R.
0BFE  D400          SAR = 4.
0BFF  F049          A3 = A3 XOR B.                        XOR 4 PAIRS
0C00  F072          B = A3 R.
0C01  D200          SAR = 2.
0C02  F049          A3 = A3 XOR B.                        XOR 2 PAIRS
0C03  F072          B = A3 R.
0C04  D100          SAR = 1.
0C05  F049          A3 = A3 XOR B.                        XOR 1 PAIR
0C06  F077          B = B001.
0C07  F130          A3 = A3 AND B.
0C08  F08D          BM1.
0C09  F03E          A3 EQV LIT.
0C0A  F09D          IF ABT SKIP.                          COMPARE = CORRECT PARITY
0C0B  F158          B = BTT1.                             NONCOMPARE SET PARITY BIT
0C0C  F07D          B = B C.
0C0D  D900          SAR = 9.                              9=PXXXXXXX  8=PXXXXXXXX
0C0E  F051          A3 = B.
0C0F  F0C9          JUMP.
                MSECURQT.
0C10  F05F          B.
0C11  F05F          B.
0C12  F10F          A1 = B000.
                MSECURQT1.
0C13  F0DB          MIR = A1.
0C14  E0F8          LIT = @F8@.                           1 MSEC COUNT
0C15  F038          A2 = LIT.
                MSECURQT2.
0C16  F121          A2 = A2 XOR B111.
0C17  F1AE          IF NOT URQ SKIP.
0C18  F1E7          RETN.
0C19  F02A          A2 = A2 + 1.                  USEC COUNT
0C1A  F09E          IF AOV SKIP.                  1 MSEC TST
0C1B  4C16          MPCR = MSECURQT2.
0C1C  F012          A1 = A1 + 1.                  MSEC COUNT
0C1D  F0B7          IF NOT AOV SKIP.
0C1E  F0C9          JUMP.                                 2 SEC EXIT NO URQ
0C1F  F1B5          IF URQ SKIP.
0C20  4C12          MPCR = MSECURQT1 - 1.
0C21  F1E7          RETN.
                TMLDSEQ1.
0C22  F0E6          MIR = B000.
0C23  F099          DW1.                                  RESET RUN TIMER
                TMLDSEQ2.
0C24  F0EA          MIR = LIT.
0C25  C840          SAR = 8 LIT = @40@.
0C26  F099          DW1.                                  LOAD TIMER CW
0C27  F0DE          MIR = A3.
0C28  F098          DW2.                                  LEAST SIG TIME BYTE
0C29  F1CE          MIR = A3 R.
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0C2A  F098          DW2.                          MOST SIG  TIME BYTE
0C2B  F079          B = B100.
0C2C  F0EC          MIR = LIT OR B.
0C2D  E020          LIT = @20@.
0C2E  F099          DW1.                          RUN TIMER CW
0C2F  F05F          B.
0C30  F0C9          JUMP.
                SLCSTATASR.                       ASR DROP IN
0C31  F108          ASR BEX.
0C32  4C33          MPCR = SLCSTAT1 - 1.
                SLCSTATSR.                        STATUS RD DROP IN
0C33  F096          DR1 BEX.
                SLCSTAT1.
0C34  F0BA          IF NOT EXT SKIP.
0C35  F0A0          IF EXT SKIP.
0C36  F0F7          SKIP.
0C37  4C6C          MPCR = PEXLOOP - 1.
0C38  F0DA          MIR = AMPCR.
0C39  F000          WAIT.
                *********GO     TO INCREMENT ADDRESS DISPLAYED IN MIR
0C3A  F0E1          MIR = B.
0C3B  F000          WAIT.
                *   B REG DISPLAY
0C3C  F0DB          MIR = A1.
0C3D  F000          WAIT.
                *   A1 REG DISPLAY
0C3E  F0DD          MIR = A2.
0C3F  F000          WAIT.
                *   A2 REG DISPLAY
0C40  F0DE          MIR = A3.
0C41  F000          WAIT.
                *   A3 REG DISPLAY
0C42  F00C          RESET GC1.                    RESET LOOP FLAG
0C43  F18E          IF IRQ SKIP.                  CONTROLLER STINT
0C44  4C6C          MPCR = PEXLOOP - 1.
                *   END OFF TO FLOW OR LOOP
0C45  F108          ASR BEX.
0C46  F05F          B.
0C47  403E          MPCR = TESTSELECT - 1. EXIT TO TEST SELECT
                SLCDAT1.
0C48  F0BA          IF NOT EXT SKIP.
0C49  F0A0          IF EXT SKIP.
0C4A  F0F7          SKIP.
0C4B  4C6C          MPCR = PEXLOOP - 1.
0C4C  F0DA          MIR = AMPCR.
0C4D  F000          WAIT.
                *********GO     TO INCREMENT ADDRESS DISPLAYED IN MIR
0C4E  F0E1          MIR = B.
0C4F  F000          WAIT.
                *   B REG DISPLAY
0C50  F0DE          MIR = A3.
0C51  F000          WAIT.
                *   A3 REG DISPLAY
0C52  F0DB          MIR = A1.
0C53  F000          WAIT.
                *   A1 REG DISPLAY
0C54  F096          DR1 BEX.
0C55  F0E1          MIR = B.
0C56  F000          WAIT.
                *   DEVICE STATUS DISPLAY
0C57  F00C          RESET GC1.
0C58  F18E          IF IRQ SKIP.
0C59  4C6C          MPCR = PEXLOOP - 1.
                *   END OFF TO FLOW OR LOOP
0C5A  F108          ASR BEX.
0C5B  F05F          B.
0C5C  403E          MPCR = TESTSELECT - 1. EXIT TO TEST SELECT
                BUSS2.
0C5D  F0F9          WHEN RDC BEX.
0C5E  F0FF          0 EQV B.
0C5F  F09C          IF ABT JUMP.
0C60  F0DA          MIR = AMPCR.
0C61  F000          WAIT.
                *********GO     TO INCREMENTER ADDRESS DISPLAYED IN MIR
0C62  F0E1          MIR = B.
0C63  F000          WAIT.
                *********ERROR      BITS ON BUSS
0C64  F0C9          JUMP.
                PURQTMOUT.
0C65  F039          A2 = LIT L.
0C66  F05F          B.                            COMMON TIME
                PURQTMOUT1.
0C67  F121          A2 = A2 XOR B111.
0C68  F1AE          IF NOT URQ SKIP.
0C69  F1E7          RETN.                         STINT SET EXIT
0C6A  F02A          A2 = A2 + 1.
0C6B  F183          IF AOV JUMP .                 TIME OUT EXIT
0C6C  4C67          MPCR = PURQTMOUT1.
                PEXLOOP.
0C6D  F00C          RESET GC1.
0C6E  F0BA          IF NOT EXT SKIP.
0C6F  F0A0          IF EXT SKIP.
0C70  F0C9          JUMP.
0C71  F09A          EXEC.                         FETCH LOOP RETURN
0C72  F006          SET GC1.                      SET LOOP FLAG
0C73  F0C9          JUMP.
                PRDATLST.
0C74  F097          DR2 BEX.
0C75  F0F7          SKIP.
                PRSTATLST.
0C76  F096          DR1 BEX.                      READ STATUS
0C77  F172          CSAR B = B C.
0C78  F1BA          LIT EQV 0.                    LST = 0 OR 1
0C79  F09D          IF ABT SKIP.
0C7A  4C7D          MPCR = PLSTT - 1.
0C7B  F07D          B = B C.                      B THRU ADDR AND RESTORE
0C7C  F0B1          IF LST JUMP.                  TST BIT = 0 FAIL
0C7D  F1E7          RETN.                         TST BIT = 0 PASS
                PLSTT.
0C7E  F07D          B = B C.                      B THRU ADDR AND RESTORE
0C7F  F0C2          IF NOT LST JUMP.              TST BIT = 1 FAIL
0C80  F1E7          RETN.                         TST BIT = 1 PASS
                STATCHKASR.
0C81  F108          ASR BEX.
0C82  F02F          A2 = A2 OR LIT.
0C83  4C90          MPCR = STATCHK2 + 1.
                STATGEN8.                         8000 TO STATUS WD ENTRY
0C84  F077          B = B001.
0C85  4C89          MPCR = STATGEN - 2.
                STATGEN4.                         4000 TO STATUS WD ENTRY
0C86  F077          B = B001.
0C87  4C8A          MPCR = STATGEN - 1.
                STATGENC.                         C000 TO STATUS WD ENTRY
0C88  F077          B = B001.
0C89  F07E          B = B + 1.
0C8A  F07E          B = B + 1.
                STATGEN.                          A DIGIT ENTRY
0C8B  F123          A2 = B C.
0C8C  D200          SAR = 2.
                STATCHK1.                         LIT OR PREVIOUS A2 ENTRY
0C8D  F02F          A2 = A2 OR LIT.
0C8E  F0F7          SKIP.
                STATCHK2.                         LIT ONLY ENTRY
0C8F  F038          A2 = LIT.
0C90  F096          DR1 BEX.
0C91  F116          A2 EQV B.
0C92  F0B4          IF NOT ABT JUMP.              FAILURE EXIT
0C93  F1E7          RETN.                         PASS EXIT
                CWNULL.
0C94  F07B          B = B000.
0C95  4C97          MPCR = CWGENB - 1.
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                CWEDLI.
0C96    F079        B = B100.
                CWGENL.
0C97    F087        B = LIT OR B.
                CWGENB.
0C98    F0E1        MIR = B.
0C99    F099        DW1.
0C9A    F0C9        JUMP.
                CWGEN2L.
0C9B    F09A        EXEC.
0C9C    F105        AMPCR = AMPCR + 1.
0C9D    F082        B = LIT L.
0C9E    D800        SAR = 8.
0C9F    F09A        EXEC.
0CA0    F087        B = LIT OR B.
0CA1    4C97        MPCR = CWGENB - 1.
                MTIMESH.
0CA2    F039        A2 = LIT L.
0CA3    4CA5        MPCR = MTIME - 1.
                MTIMELI.
0CA4    F038        A2 = LIT.
0CA5    4CA5        MPCR = MTIME - 1.
                MTIME.
0CA6    F05F        B.
0CA7    F121        A2 = A2 XOR B111.
                MTIMEA.
0CA8    F02A        A2 = A2 + 1.
0CA9    F183        IF AOV JUMP.
0CAA    4CA7        MPCR = MTIMEA - 1.
                STIME.
0CAB    F0CA        LCTR.
                STIME1.
0CAC    F034        A2 = B000.
0CAD    F02A        A2 = A2 + 1.
0CAE    F09E        IF AOV SKIP.
0CAF    4CAC        MPCR = STIME1.
0CB0    F030        INC.
0CB1    F09F        IF COV JUMP.
0CB2    4CAB        MPCR = STIME1 - 1.
                MSECCHK.
0CB3    F04F        A3 = A3 - LIT.
0CB4    F071        B = A3.
0CB5    F04E        A3 = A3 + LIT.
0CB6    F003        A1 EQV B.
0CB7    F0B5        IF NOT ABT SKIP.
0CB8    4CBB        MPCR = USECCHK - 1.
0CB9    F105        AMPCR = AMPCR + 1.
0CBA    F05F        B.
0CBB    F0C9        JUMP.
                USECCHK.
0CBC    F089        B = LIT.
0CBD    E0F8        LIT = @F8@.             1 MSEC
0CBE    F163        B = 0 - B - 1.          COMP B
0CBF    F09A        EXEC.
0CC0    F105        AMPCR = AMPCR + 1.
0CC1    F083        B = LIT + B.
0CC2    F116        A2 EQV B.
0CC3    F0B5        IF NOT ABT SKIP.
0CC4    F1E7        RETN.                   PASS EXIT
0CC5    F07E        B = B + 1.
0CC6    F116        A2 EQV B.
0CC7    F0B4        IF NOT ABT JUMP.        FAIL EXIT
0CC8    F1E7        RETN.
                T5USEC.
0CC9    F05F        B.
                T4USEC.
0CCA    F05F        B.
                T3USEC.
0CCB    F05F        B.
                T2USEC.
0CCC    F05F        B.
                T1USEC.
0CCD    F0C9        JUMP.
                DESELSETI.              A2 = PARTIAL STAT 8P00
0CCE    F05D        ASE.
0CCF    F080        B = BMAR.
0CD0    F07A        B = BITT.
0CD1    F033        A2 = B.
0CD2    4CD6        MPCR = DESEL - 1.
                DESELRSETI.             A2 = PARTIAL STAT 0P00
0CD3    F05D        ASE.
0CD4    F080        B = BMAR.
0CD5    F033        A2 = B.
0CD6    F07A        B = BITT.
                DESEL.
0CD7    C80F        SAR = 8 LIT = @0F@.
0CD8    F16C        BR1 = LIT L.
0CD9    F099        DW1.                    DESELECT
0CDA    F0D5        MAR1 = B.               RESTORE BR1
0CDB    F082        B = LIT L.
0CDC    E0FF        LIT = @FF@.
0CDD    F143        B = A2 AND B.
0CDE    F033        A2 = B.
0CDF    F0C9        JUMP.
                DATCHKA1.
0CE0    F066        B = A1.
0CE1    4CEC        MPCR = DATCHK.
                DATCHKXR.               6000
0CE2    F079        B = B100.
0CE3    F13A        A3 = B + 1.
0CE4    4CE8        MPCR = DATCHKR + 1.
                DATCHKX.                2000
0CE5    F079        B = B100.
0CE6    F0F7        SKIP.
                DATCHKR.                4000
0CE7    F077        B = B001.
0CE8    F051        A3 = B.
0CE9    F044        A3 = A3 C.
0CEA    D200        SAR = 2.
                DATCHKLIA.
0CEB    F04A        A3 = A3 OR LIT.
                DATCHK.
0CEC    F097        DR2 BEX.
0CED    F03C        A3 EQV B.
0CEE    F0B4        IF NOT ABT JUMP.
0CEF    F1E7        RETN.
                DATCHKLD.               00XX
0CF0    F097        DR2 BEX.
0CF1    F086        B = LIT AND B.
0CF2    E0FF        LIT = @FF@.
0CF3    4CEC        MPCR = DATCHK.
                SYNC-ASC.
0CF4    E016        LIT = @16@.
0CF5    F0F7        SKIP.
                SYNC-EBC.
0CF6    E032        LIT = @32@.
0CF7    F0E6        MIR = B000.
0CF8    F0FC        WHEN SRQ STEP.
0CF9    F098        DW2.
0CFA    F0EA        MIR = LIT.
0CFB    F0FC        WHEN SRQ STEP.
0CFC    F098        DW2.
0CFD    F05F        B.
0CFE    F0FC        WHEN SRQ STEP.
0CFF    F098        DW2.
0D00    F0C9        JUMP.
                LDSEQBUF.
0D01    F023        A2 = AMPCR.
0D02    F0F7        SKIP.
                LDSEQBUF1.
0D03    F07E        B = B + 1.
0D04    8E03        CPCR = WRMEMREG1B - 1.
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0D05  F03C        A3  EQV  B.
0D06  F09D        IF  ABT  SKIP.
0D07  4D02        MPCR = LDSEQBUF1  - 1.
0D08  8E4B        CPCR = WRMEMREG1STP  - 1.
0D09  F102        AMPCR = A2.
0D0A  F05F        B.
0D0B  4DD4        MPCR = MARKMEM2ASMEM1  - 1.
              PARCHK.                          CONFIGURE  PROPER  PARITY
0D0C  F023        A2 = AMPCR.
0D0D  F05F        B.
0D0E  82CE        CPCR = RDSREG1  - 1.         FETCH  CW
0D0F  CD00        SAR = 13  LIT = 0.
0D10  8C76        CPCR = PRSTATLST.            TST  ASCII
0D11  4D17        MPCR = PARCHK2  - 1.
0D12  CE01        SAR = 14  LIT = 1.
0D13  8C76        CPCR = PRSTATLST.            TST  SYNC  MODE
0D14  4D16        MPCR = PARCHK1  - 1.
0D15  8BF6        CPCR = PARGENODD  - 1.       SYNC  PARITY
0D16  F0F7        SKIP.
              PARCHK1.
0D17  8BF4        CPCR = PARGENEVEN  - 1.      ASYNC  PARITY
              PARCHK2.
0D18  F102        AMPCR = A2.
0D19  F05F        B.
0D1A  F0C9        JUMP.
              DATATEST.
0D1B  F0DA        MIR = AMPCR.
0D1C  F05F        B.
0D1D  81E5        CPCR = STACK  - 1.
              DATATEST1.
0D1E  8E12        CPCR = RMEMREG1AFIFO  - 1.FETCH  SEND  CHAR
0D1F  F051        A3 = B.
0D20  8E51        CPCR = MEMREG1ALOOKSTP  - 1.
0D21  8D0B        CPCR = PARCHK  - 1.          PARITY  SET  UP
0D22  8E37        CPCR = RMEMREG2AFIFO  - 1.FETCH  RECEIVED  CHAR
0D23  F03C        A3  EQV  B.
0D24  F09D        IF  ABT  SKIP.
0D25  4D28        MPCR = DATATEST2  - 1.
0D26  F015        IF  LC2  SKIP.
0D27  4D1D        MPCR = DATATEST1  - 1.
0D28  4202        MPCR = UNSTACK  - 1.         GOOD  EXIT
              DATATEST2.
0D29  F017        A1 = B.                      SAVE  RCV  DATA
0D2A  F018        SET  LC1.                    FLAG  ERROR
0D2B  4202        MPCR = UNSTACK  - 1.         EXIT  ON  ERROR
              SOFTRCV.
0D2C  F0DA        MIR = AMPCR.
0D2D  F05F        B.
0D2E  81E5        CPCR = STACK  - 1.
0D2F  F0CA        LCTR.
0D30  E009        LIT = 9.                     BIT  COUNT
0D31  F10F        A1 = B000.                   DATA  REG
              SOFTRCV1.
0D32  C101        SAR = 1  LIT = 1.
0D33  8C73        CPCR = PRDATLST  - 1.        TEST  DATA  WORD
0D34  4D31        MPCR = SOFTRCV1  - 1.        LOOP  ON  LINE  CHANGE
0D35  CF89        SAR = 15  LIT = @89@.        T 828USEC
0D36  F0BC        IF  NOT GC2  SKIP.           TST  SYNC  FLAG
0D37  CF07        SAR = 15  LIT = 7.           T 48USEC
0D38  8CA1        CPCR = MTIMESH  - 1.         DELAY  FOR  STROBE
              RDSTOR.
0D39  F097        DR2  BEX.                    READ  LINE  STATUS
0D3A  F05F        B.
0D3B  F0C3        IF  NOT LST  SKIP.           TEST  LINE  STATUS
0D3C  4D3E        MPCR = RDSTOR1  - 1.
0D3D  F079        B = B100.
0D3E  F10D        A1 = A1  OR  B.
              RDSTOR1.
0D3F  F00D        A1 = A1  R.
0D40  D100        SAR = 1.
0D41  F030        INC.
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0D42  F0B8        IF  NOT COV  SKIP.           TEST  LAST  BIT
0D43  4D48        MPCR = RDSTOR2  - 1.
0D44  CE8A        SAR = 14  LIT = @8A@.        T1662  USEC
0D45  F0BC        IF  NOT GC2  SKIP.           TST  SYNC  FLAG
0D46  CF0E        SAR = 15  LIT = @0E@.        T 90  USEC
0D47  8CA1        CPCR = MTIMESH  - 1.         DELAY
0D48  4D38        MPCR = RDSTOR  - 1.          READ  NEXT  BIT
              RDSTOR2.
0D49  F00D        A1 = A1  R.
0D4A  D500        SAR = 5.
0D4B  4202        MPCR = UNSTACK  - 1.         EXIT
              RCVXMIT-ASC.
0D4C  F0DA        MIR = AMPCR.
0D4D  F05F        B.
0D4E  81E5        CPCR = STACK  - 1.
0D4F  8CF3        CPCR = SYNC-ASC  - 1.        XMIT  2  ASCII  SYNC  CHARS
0D50  4D58        MPCR = RCVXMIT  + 2.
              RCVXMIT-EBC.
0D51  F0DA        MIR = AMPCR.
0D52  F05F        B.
0D53  81E5        CPCR = STACK  - 1.
0D54  8CF5        CPCR = SYNC-EBC  - 1.        XMIT  2  EBCDIC  SYNC  CHARS
0D55  4D58        MPCR = RCVXMIT  + 2.
              RCVXMIT.
0D56  F0DA        MIR = AMPCR.
0D57  F05F        B.
0D58  81E5        CPCR = STACK  - 1.
0D59  F10F        A1 = B000.
0D5A  F054        A3 = B000.
0D5B  8DE5        CPCR = ZEROMEMREG1AB  - 1.
0D5C  8E24        CPCR = ZEROMEMREG2AB  - 1.
              RCVXMIT1.
0D5D  F0BD        IF  NOT IRQ  SKIP.           TST  OPERATOR  RECALL
0D5E  4D77        MPCR = RCVXMIT1B  - 1.       EXIT
0D5F  F1AD        IF  NOT SRQ  SKIP.           TEST  DINT
0D60  4D7C        MPCR = RCVXMIT2  - 1.
0D61  F1B5        IF  URQ  SKIP.               TEST  STINT
0D62  4D5C        MPCR = RCVXMIT1  - 1.
0D63  F096        DR1  BEX.                    READ  STATUS
0D64  F078        B = B0TT.                    RESET  DATA  REQ
0D65  F017        A1 = B.
0D66  F051        A3 = B.
0D67  F089        B = LIT.
0D68  E084        LIT = @84@.
0D69  F132        A3 = A3  NIM  B.             MASK  BITS  8,4
0D6A  82CE        CPCR = RDSREG1  - 1.         FETCH  CW
0D6B  C101        SAR = 1  LIT = 1.
0D6C  8C76        CPCR = PRSTATLST.            TEST  XMIT  ON
0D6D  4D75        MPCR = RCVXMIT1A  - 1.       EXIT
0D6E  CC00        SAR = 12  LIT = 0.
0D6F  8C76        CPCR = PRSTATLST.
0D70  E040        LIT = @40@.
0D71  F03E        A3  EQV  LIT.                STAT = 0000  OR 0040
0D72  F0B5        IF  NOT ABT  SKIP.
0D73  4D5C        MPCR = RCVXMIT1  - 1.        XMIT  CYC  OFF
0D74  F018        SET  LC1.
0D75  4DAD        MPCR = RCVXMIT3A1  - 1.
              RCVXMIT1A.
0D76  F018        SET  LC1.                    FLAG  STATUS - ERROR
0D77  4DBC        MPCR = RCVXMIT4  - 1.
              RCVXMIT1B.
0D78  82CE        CPCR = RDSREG1  - 1.
0D79  C101        SAR = 1  LIT = 1.
0D7A  8C76        CPCR = PRSTATLST.
0D7B  4DBC        MPCR = RCVXMIT4  - 1.        RCV  ONLY  ON  RECALL
0D7C  4DAD        MPCR = RCVXMIT3A1  - 1.      XMIT  SET  ON  RECALL
              RCVXMIT2.
0D7D  CD01        SAR = 13  LIT = 1.
0D7E  8C73        CPCR = PRDATLST  - 1.        TEST  DATA  WORD
0D7F  4D96        MPCR = RCVXMIT3  - 1.        XMIT  DINT  NOT  SET
0D80  F017        A1 = B.                      SAVE  DATA  WORD
```

```
0D81  8E20        CPCR = RMEMREG1BFIFO - 1.FETCH  XMIT CHAR
0D82  8DCE        CPCR = WRITEDATLB - 1.  XMIT DATA
0D83  8E4D        CPCR = MEMREG1BLOOKSTP - 1.  LAST CHAR LOOK
0D84  F015        IF LC2 SKIP.
0D85  4D97        MPCR = RCVXMIT3.
0D86  82CE        CPCR = RDSREG1 - 1.        FETCH CONTROL WORD
0D87  F07D        B = B C.
0D88  D100        SAR = 1.
0D89  F075        B = BTT0.                  RESET XMIT
0D8A  F07D        B = B C.
0D8B  DF00        SAR = 15.
0D8C  8C97        CPCR = CWGENB - 1.         RESET XMITTER
0D8D  F05F        B.
0D8E  F0C3        IF NOT LST SKIP.           TEST RCV SET
0D8F  4D93        MPCR = RCVXMIT2A - 1.
0D90  F0FD        WHEN URQ STEP.             WAIT FOR SHUT DOWN
0D91  F096        DR1 BEX.                   RESET STATUS
0D92  F017        A1 = B.                    SAVE STATUS
0D93  4DB5        MPCR = RCVXMIT3B - 1.      EXIT
                  RCVXMIT2A.
0D94  C000        SAR = 0 LIT = 0.
0D95  8CA1        CPCR = MTIMESH - 1.        OPTIONAL TURN AROUND DELAY
0D96  F0F7        SKIP.
                  RCVXMIT3.
0D97  F0F7        SKIP.
0D98  F066        B = A1.
0D99  CE01        SAR = 14 LIT = 1.
0D9A  8C74        CPCR = PRDATLST.           TEST RCV DINT
0D9B  4D5C        MPCR = RCVXMIT1 - 1.
0D9C  F033        A2 = B.
0D9D  8E45        CPCR = MEMREG2BLOOKSTP - 1.  TST RCV DONE
0D9E  F0C0        IF NOT LC2 SKIP.
0D9F  4DA6        MPCR = RCVXMIT3A - 1.          AMT RECEIVED-DROP CHAR
0DA0  F082        B = LIT L.
0DA1  C860        SAR = 8 LIT = @60@.
0DA2  F144        B = A2 NIM B.              MASK OFF BITS 2, 3
0DA3  8E32        CPCR = WRMEMREG2B - 1.     STORE RECEIVED DATA
0DA4  8E45        CPCR = MEMREG2BLOOKSTP - 1.
0DA5  F015        IF LC2 SKIP.
0DA6  4D5C        MPCR = RCVXMIT1 - 1.
                  RCVXMIT3A.
0DA7  82CE        CPCR = RDSREG1 - 1.        FETCH CW
0DA8  C101        SAR = 1 LIT = 1.
0DA9  8C76        CPCR = PRSTATLST.          TST XMIT ON
0DAA  4DBC        MPCR = RCVXMIT4 - 1.       RCV ONLY
0DAB  8E4D        CPCR = MEMREG1BLOOKSTP - 1.
0DAC  F015        IF LC2 SKIP.
0DAD  4D5C        MPCR = RCVXMIT1 - 1.
                  RCVXMIT3A1.
0DAE  C300        SAR = 3 LIT = 0.
0DAF  8C76        CPCR = PRSTATLST.
0DB0  E008        LIT = 8.                   DATA TERM RDY IN CW
0DB1  8C95        CPCR = CWEDLI - 1.         CW 8000 RESET CONTROL BITS
0DB2  C501        SAR = 5 LIT = 1.
0DB3  8C75        CPCR = PRSTATLST - 1.      TST XMIT RESET
0DB4  4DB5        MPCR = RCVXMIT3B - 1.
0DB5  F0FD        WHEN URQ STEP.             WAIT FOR XCYC RESET
                  RCVXMIT3B.
0DB6  F0BC        IF NOT GC2 SKIP.           CTS ON FLAG
0DB7  4DBC        MPCR = RCVXMIT4 - 1.
0DB8  C600        SAR = 6 LIT = 0.
0DB9  8C75        CPCR = PRSTATLST - 1.      TST CLR TO SND OFF
0DBA  4DB5        MPCR = RCVXMIT3B - 1.      WAIT FOR CLR TO SND OFF
0DBB  C81A        SAR = 8 LIT = @1A@.        T20MSEC
0DBC  8CA1        CPCR = MTIMESH - 1.        DELAY FOR SOME DATA SETS
                  RCVXMIT4.
0DBD  F108        ASR BEX.
0DBE  F05F        B.
0DBF  82CE        CPCR = RDSREG1 - 1.        FETCH CW
0DC0  C300        SAR = 3 LIT = 0.
0DC1  8C76        CPCR = PRSTATLST.
```

```
0DC2  E008        LIT = 8.                   DATA TERM RDY IN CW
0DC3  F07B        B = B000.
0DC4  8C96        CPCR = CWGENL - 1.         NULL OR DATA TERM RDY
0DC5  4202        MPCR = UNSTACK - 1.        EXIT
                  SETA3LSTOP.
0DC6  F058        A3 = LIT.                  LOAD DATA REG
                  SETSTOP.
0DC7  F045        A3 = A3 L.
0DC8  D800        SAR = 8.
0DC9  F04C        A3 = A3 + 1.
0DCA  F044        A3 = A3 C.                 A3 = 0000001XXXXXXXX0
0DCB  D700        SAR = 7.
0DCC  F0C9        JUMP.
                  WRITEINCDAT.
0DCD  F04C        A3 = A3 + 1.
0DCE  4DD1        MPCR = WRITEDAT - 1.
                  WRITEDATLB.                B TO DATA REG
0DCF  F051        A3 = B.
0DD0  4DD1        MPCR = WRITEDAT - 1.
                  WRITEDATLL.                LIT TO DATA REG
0DD1  F058        A3 = LIT.
                  WRITEDAT.
0DD2  F0DE        MIR = A3.
0DD3  F098        DW2.
0DD4  F0C9        JUMP.
                  MARKMEM2ASMEM1.
0DD5  F0DA        MIR = AMPCR.
0DD6  F05F        B.
0DD7  81E5        CPCR = STACK - 1.
0DD8  82D6        CPCR = RDSREG2 - 1.
0DD9  C101        SAR = 1 LIT = 1.           TEST COMPARE OPTION
0DDA  8C76        CPCR = PRSTATLST.
0DDB  4202        MPCR = UNSTACK - 1.
0DDC  8DE5        CPCR = ZEROMEMREG1AB - 1.
0DDD  8E24        CPCR = ZEROMEMREG2AB - 1.
                  MEM2MEM1.                  BUFF STOP SAME FOR COMPARE
0DDE  8E12        CPCR = RMEMREG1AFIFO - 1.
0DDF  F07B        B = B000.                                              D
0DE0  8E32        CPCR = WRMEMREG2B - 1.
0DE1  8E51        CPCR = MEMREG1ALOOKSTP - 1.
0DE2  F015        IF LC2 SKIP.
0DE3  4DDD        MPCR = MEM2MEM1 - 1.
0DE4  8E3F        CPCR = WRMEMREG2STP - 1.
0DE5  4202        MPCR = UNSTACK - 1.
                  ZEROMEMREG1AB.
0DE6  F060        B = AMPCR.
0DE7  F0CF        MAR1 = AMPCR.
0DE8  0E5F        AMPCR = FINISH - 1.
0DE9  F1C7        MIR = AMPCR + 1.
0DEA  F05B        AMPCR = B.
0DEB  F0F3        MW1.
0DEC  F0D7        MAR1 = BMAR + 1.
0DED  F0F3        MW1.
0DEE  F05F        B.
0DEF  4266        MPCR = RSTBR1 - 1.
                  RMEMREG1AFILO.
0DF0  F060        B = AMPCR.
0DF1  F0CF        MAR1 = AMPCR.
0DF2  0E5F        AMPCR = FINISH - 1.
0DF3  4DF6        MPCR = RMEMREGFILOA - 1.
                  RMEMREG1BFILO.
0DF4  F060        B = AMPCR.
0DF5  F0CF        MAR1 = AMPCR.
0DF6  0E60        AMPCR = FINISH.
                  RMEMREGFILOA.
0DF7  F05B        AMPCR = B.
0DF8  F0F1        MR1.
0DF9  F0F9        WHEN RDC BEX.
0DFA  F0E1        MIR = B.
0DFB  F162        B = 0 - B.
0DFC  F163        B = 0 - B - 1.
```

```
0DFD  F08C        BMI  MIR  =  B.
0DFE  F0F3        MW1.
0DFF  F0D5        MAR1 = B.
0E00  F0F1        MR1.
0E01  F0F9        WHEN RDC  BEX.
0E02  F05F        B.
0E03  4266        MPCR = RSTBR1  -  1.
              WRMEMREG1B.
0E04  F0E1        MIR  = B.
0E05  F060        B  = AMPCR.
0E06  F0CF        MAR1 = AMPCR.
0E07  0E60        AMPCR = FINISH.
              WRMEMREGA.
0E08  F05B        AMPCR = B.
0E09  F0F1        MR1.
0E0A  F0F9        WHEN RDC  BEX.
0E0B  F07E        B  = B  + 1.
0E0C  F08C        BMI  MIR  =  B.
0E0D  F0F3        MW1.
0E0E  F08C        BMI  MIR  =  B.
0E0F  F0D5        MAR1 = B.
0E10  F0F3        MW1.
0E11  F08D        BMI.
0E12  4266        MPCR = RSTBR1  -  1.
              RMEMREG1AFIFO.
0E13  F060        B  = AMPCR.
0E14  F0CF        MAR1 = AMPCR.
0E15  0E5F        AMPCR = FINISH  -  1.
              RMEMREGFIFOA.
0E16  F05B        AMPCR = B.
0E17  F0F1        MR1.
0E18  F0F9        WHEN RDC  BEX.
0E19  F07E        B  = B  + 1.
0E1A  F0E1        MIR  = B.
0E1B  F0F3        MW1.
0E1C  F0D5        MAR1 = B.
0E1D  F0F1        MR1.
0E1E  F0F9        WHEN RDC  BEX.
0E1F  F05F        B.
0E20  4266        MPCR = RSTBR1  -  1.
              RMEMREG1BFIFO.
0E21  F060        B  = AMPCR.
0E22  F0CF        MAR1 = AMPCR.
0E23  0E60        AMPCR = FINISH.
0E24  4E15        MPCR = RMEMREGFIFOA  -  1.
              ZEROMEMREG2AB.
0E25  F039        A2  = LIT  L.
0E26  CF82        SAR  = 15  LIT  = @82@.      BASE  + 260
0E27  F060        B  = AMPCR.
0E28  F11D        A2  = A2  + AMPCR.
0E29  0E60        AMPCR = FINISH.
0E2A  F0CF        MAR1 = AMPCR.
0E2B  0E4A        AMPCR = MEMPOINT2AB.
0E2C  F05B        AMPCR = B.
0E2D  F0DD        MIR  = A2.
0E2E  F0F3        MW1.
0E2F  F0D7        MAR1 = BMAR + 1.
0E30  F0F3        MW1.
0E31  F05F        B.
0E32  4266        MPCR = RSTBR1  -  1.
              WRMEMREG2B.
0E33  F0E1        MIR  = B.
0E34  F060        B  = AMPCR.
0E35  F0CF        MAR1 = AMPCR.
0E36  0E4B        AMPCR = MEMPOINT2AB  + 1.
0E37  4E07        MPCR = WRMEMREGA -  1.
              RMEMREG2AFIFO.
0E38  F060        B  = AMPCR.
0E39  F0CF        MAR1 = AMPCR.
0E3A  0E4A        AMPCR = MEMPOINT2AB.
0E3B  4E15        MPCR = RMEMREGFIFOA  -  1.
              RMEMREG2BFILO.
0E3C  F060        B  = AMPCR.
0E3D  F0CF        MAR1 = AMPCR.
0E3E  0E4B        AMPCR = MEMPOINT2AB  + 1.
0E3F  4DF6        MPCR = RMEMREGFILOA  -  1.
              WRMEMREG2STP.
0E40  F076        B  = B111.                BUFF  STOP  CODE
0E41  4E32        MPCR = WRMEMREG2B  -  1.
              MEMREG2ALOOKSTP.
0E42  F060        B  = AMPCR.
0E43  F0CF        MAR1 = AMPCR.
0E44  0E4A        AMPCR = MEMPOINT2AB.
0E45  4E54        MPCR = MEMREG1LOOK  -  1.
              MEMREG2BLOOKSTP.
0E46  F060        B  = AMPCR.
0E47  F0CF        MAR1 = AMPCR.
0E48  0E4B        AMPCR = MEMPOINT2AB  + 1.
0E49  4E54        MPCR = MEMREG1LOOK  -  1.
              MEMPOINT2AB.
0E4A  0000        CNST = @0000@.
0E4B  0000        CNST = @0000@.
              WRMEMREG1STP.
0E4C  F076        B  = B111.                BUFF  STOP  CODE
0E4D  4E03        MPCR = WRMEMREG1B  -  1.
              MEMREG1BLOOKSTP.
0E4E  F060        B  = AMPCR.
0E4F  F0CF        MAR1 = AMPCR.
0E50  0E60        AMPCR = FINISH.
0E51  4E54        MPCR = MEMREG1LOOK  -  1.
              MEMREG1ALOOKSTP.
0E52  F060        B  = AMPCR.
0E53  F0CF        MAR1 = AMPCR.
0E54  0E5F        AMPCR = FINISH  -  1.
              MEMREG1LOOK.
0E55  F05B        AMPCR = B.
0E56  F0F1        MR1.
0E57  F0F9        WHEN RDC  BEX.
0E58  F0D6        MAR1 = B  + 1.
0E59  F0F1        MR1.
0E5A  F0F9        WHEN RDC  BEX.
0E5B  F05F        B.
0E5C  F0B5        IF  NOT  ABT  SKIP.
0E5D  F019        SET  LC2.                 FLAG  STOP  CODE
0E5E  4266        MPCR = RSTBR1  -  1.
0E5F  0000        CNST = @0000@.
              FINISH.
```

MANUAL PROCEDURES

E1 OR M1 OPERATOR ACTION	MACHINE ACTION	A	D
1 OPERATOR DIRECTED TO THIS ERROR FROM FE MEMORY TEST		2	F1
2 USE TABLE TO SELECT FAILURE BUSS BIT.			

EXT BUSS BIT	MIR		
1	8000	F4	
2	4000	F4	
3	2000	F4	
9	0080	F2	
10	0040	F2	
11	0020	F3	
12	0010	F3	
13	0008	F3	
14	0004	F2	
15	0002	F3	
16	0001	F2	F0

M2 OPERATOR ACTION	MACHINE ACTION	A	D
1 OBSERVE MIR	MIR DIGIT B = SLC PORT # MINUS 1	2	F5
2 METER LC1 2Y (STINT/)	METER READING 100%	3	F6
3 METER LC4 2L (DINT/)	METER READING 100%	F7	F8

M3 OPERATOR ACTION	MACHINE ACTION	A	D
1 FORCE STEP AND OBSERVE MIR	MIR =		

0001		F9	
0002		F3	
0003		F10	
0004		F2	
0008		F11	
0010		F11	
0020		F3	
0040		F12	
0080		F2	
2000		F13	
4000		F14	
8000		F4	
4018		F15	
0X00	WHERE X = ANY B BIT	F16	F0

M4 OPERATOR ACTION	MACHINE ACTION	A	D
1 FORCE STEP AND OBSERVE MIR	MIR = 0020	2	3
2 METER LC7 1Y (PSWRIT/)	READING 100%	F17	F18
3 COMPARE MIR	MIR =		

0001		F19	
0002		F20	
0003		F21	
0004		F22	
0008		F23	
0010		F24	
0040		F25	
0080		F26	
2000		F27	
4000		F28	
8000		F29	
4080		F30	
0084		F31	F32

M5 OPERATOR ACTION	MACHINE ACTION	A	D
1 FORCE STEP AND COMPARE MIR	MIR =		

0000		2	
0001		F33	
0002		F34	
0004		4	
0020		F36	
0086		F38	
0085		F39	
8060		F40	F0

2	METER PS1-1 1Q (PSURQ/)	READING 100%		F41	3
3	METER LC1 2Y (STINT/)	READING 100%		F42	F41
4	SCOPE LC1 2Q (DM)	READING = -5 TO -10	VOLTS	F35	F37

M6 OPERATOR ACTION	MACHINE ACTION	A	D
1 FORCE STEP AND COMPARE MIR	MIR =		

0000		F42	
8000		F43	F0

M7 OPERATOR ACTION	MACHINE ACTION	A	D
1 FORCE STEP AND COMPARE MIR	MIR =		

0001		F44	
0002		F45	
0040		2	
0080		6	
0082		F48	F0

2	METER LC7 1V (LCFDUP)	READING = 0%		3	F46
3	METER LC5 W3 (LCFDUP/)	READING = 100%		4	F47
4	METER LC4 U3 (LCXCYC/)	READING = 100%		5	F274
5	SCOPE LC4 1U (CA)	READING = -5 TO -10	VOLTS	F275	F276
6	SCOPE LC1 1S (CD)	READING = -5 TO -10	VOLTS	F277	F278

M8 OPERATOR ACTION	MACHINE ACTION	A	D
1 NONE	NONE	F49	

M9 ERROR NUMBERS REFERRING TO M9 WERE NON-FAILURES DURING BUGGING. THE ERROR NUMBERS REMAIN AS A REFERENCE FOR INTERMITTENT FAILURES OR UNPREDICTABLE FAILURES IN THE XMITTER OR RECEIVER CHIPS.

M10 USE M9

M11 OPERATOR ACTION	MACHINE ACTION	A	D
1 FORCE STEP AND COMPARE MIR	MIR =		

		0000	2		D
		0004	F52	F0	D
					D
					D
2	METER LC1 1B (CDSCLKPN)	READING = 3 - 5%	3	F50	D
					D
					D
3	METER LC1 1H (CGCLEAR)	READING = 0%	4	F342	D
					D
					D
4	SCOPE LC1 2Q (DM)	READING = +5 TO +10			D
		VOLTS	6	5	D
5	METER LC1 2M (LCENBI)	READING = 100%	F51	F279	
					D
					D
6	METER LC1 2M (LCENBI)	READING = 100%	F 280	F281	D
M12	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F53		
M13	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F54		
M14	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP AND COMPARE MIR	MIR =			
		0000	F55		
		0040	F56	F0	
M15	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F57		
M16	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F58		
M17	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP AND COMPARE MIR	MIR =			
		0002	F59		
		0000	F282	F0	
M18	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F60		
M19	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F61		
M20	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F62		
M21	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F63		
M22	OPERATOR ACTION	MACHINE ACTION	A	D	
	METER LC7 J4	READING = 0%	F64	F283	
M23	OPERATOR ACTION	MACHINE ACTION	A	D	

1	FORCE STEP AND COMPARE MIR	MIR =			
		4000	F284		
		0008	F284		
		0001	F65	F0	
M24	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F67		
M25	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP AND COMPARE MIR	MIR =			
		0000	2		
		8080	F69	F0	
2	SCOPE LC1 IS (CD)	READING = +5 TO +10 VOLTS	F68	F285	
M26	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP AND COMPARE MIR	MIR =			
		0001	F286		
		0000	2	F0	
2	METER LC1 L4 (RCVCW)	READING = 100%	F287	F70	
M27	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F71		
M27A	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F72		
M28	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F73		
M29	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F74		
M30	USE M9				
M31	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F75		
M32	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F76		
M33	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F77		
M34	OPERATOR ACTION	MACHINE ACTION	A	D	
1	METER LC1-2Y (STINTN/)	READING 0%	2	F78	
2	METER PS1-1-1Q (PSURQ/)	READING 100%	F339	F340	
M35	USE M9				
M36	OPERATOR ACTION	MACHINE ACTION	A	D	

1	NONE	NONE	F79	
M37	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F80	
M38	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F81	
M39	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F82	
M39A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F83	
M39B	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F84	
M40	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F85	
M41	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		8040	F86	
		0000	2	F0
2	METER LC5 2C (LCCLR/)	READING = 100%	3	F288
3	METER LC7 1V (LCFDUP)	READING = 100%	4	F289
4	METER LC5 W3 (LCFDUP/)	READING = 0%	5	F290
5	SCOPE LC4 1U (CA)	READING = +5 TO +10 VOLTS	F87	F291
M42	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		0001	F88	
		0002	F89	
		0004	F90	
		0008	F91	
		0010	F91	
		0020	F92	
		0040	F93	
		0080	F93	
		2000	F94	
		4000	F95	
		8000	F14	F0
M43	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		0002	F96	
		0003	F97	F0
M44	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F98	

M45	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		0000	F99	
		0020	F100	
		0040	F101	
		8040	F100	
		8060	F102	F0
M46	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		0060	F103	
		8060	F104	F0
M47	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		0020	F105	
		0060	F106	
		8000	F107	
		8040	F108	F0
M48	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F109	
M49	USE M9			
M50	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F110	
M51	USE M9			
M52	USE M9			
M53	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		0000	2	
		2001	6	
		2002	6	
		2003	6	F0
2	METER LC5 Y3 (LCINST)	READING = 0%	3	F292
3	METER LC5 V3 (INST/)	READING = 100%	4	F293
4	METER LC5 1Q (LCSTEN)	READING = 0%	5	F294
5	METER LC4 C3 (LCXBIT/)	READING = 0%	F295	F296
6	METER LC1 2I (LCLNBRK/)	READING = 100%	7	F148
7	SCOPE LC5 G3 (XCLK/) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 104 MICROSECONDS		8	11
8	METER LC4 Q3 (SR/)	READING = 100%	9	F297
9	METER LC4 R4 (XDATA)	READING = 100%	10	F298

10	SCOPE LC4 2T (BA) READING = -5 TO -10 VOLTS		F299	F300
11	SCOPE LC5 E4 (OSCCLK/) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 400 NANOSECONDS		12	F301
12	SCOPE LC5 F4 (TC) WAVEFORM = 400 NANOSECONDS WIDE POSITIVE-GOING PULSE OCCURRING EVERY 52 MICROSECONDS		13	F302
13	SCOPE LC5 S3 (MTRCLK) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 104 MICROSECONDS.		F303	F304
M54	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F151	
M55	OPERATOR ACTION	MACHINE ACTION	A	D
1	**** NOTE:IF SWITCHES S1 OR S2 ON MTR TEST BLOCK ARE SET INCORRECTLY TEST MAY FAIL HERE IF SWITCH SETTINGS ARE RIGHT FORCE STEP 1 TIME AND COMPARE MIR	MIR =		
		2000	2	
		2001	F153	
		2002	F154	
		0003	F155	
2	METER LC1 2I (LCLNBRK/)	READING = 0%	3	F152
3	METER LC1 B4 (MDRCW)	READING = 100%	4	F305
4	SCOPE LC2 1N (BB) READING = +5 TO +10 VOLTS		5	6
5	METER LC2 1Q (LCRDATA)	READING = 0%	F306	F307
6	METER LC4 K4 (XTF)	READING = 0%	F308	F309
M56	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F156	
M57	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F157	
M58	USE M9			
M59	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F158	
M60	USE M9			
M61	OPERATOR ACTION	MACHINE ACTION	A	D
	****NOTE: INCORRECT MTR SOCKET HEADER JUMPERS ON LC5 MAY CAUSE TEST TO FAIL HERE.			

1	SCOPE LC5 G3 (XCLK/) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 104 MICROSECONDS		F161	2
2	SCOPE LC5 E4 (OSCCLK/) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 400 NANOSECONDS		3	F310
3	SCOPE LC5 F4 (TC) WAVEFORM = 400 NANOSECONDS WIDE POSITIVE GOING PULSE OCCURRING EVERY 52 MICROSECONDS		4	F159
4	SCOPE LC5 S3 (MTRCLK) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 104 MICROSECONDS		F160	F311
M62	USE M9			
M63	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F162	
M64	OPERATOR ACTION	MACHINE ACTION	A	D
	FORCE STEP 1 TIME AND COMPARE MIR	MIR =		
		0000	F163	
		4060	F164	
M65	USE M9			
M66	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER LC4 T3 (DXTMT)	READING = 100%	2	F165
2	METER LC5 X3 (DDXTMT)	READING = 100%	3	F312
3	METER LC5 W4 (OSOUT)	READING = 100%	4	F313
4	METER LC4 V3 (RETRCYC/)	READING = 0%	F314	F315
M67	USE M9			
M68	USE M9			
M69	USE M9			
M70	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F166	
M71	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F167	
M72	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F168	
M73	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND COMPARE MIR	MIR =		
		2000	F169	
		2001	F170	
M74	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F171	

M75	USE M9			
M76	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F172	
M77	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F173	
M78	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F174	
M79	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F174	
M80	USE M9			
M81	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F175	
M82	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER LC5 1B (CDSCLKPN)	READING = 3-5%	2	F176
2	SCOPE LC4 2V (MTRCLK/) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 104 MICROSECONDS, AMPLITUDE PEAKS = -4 TO -10 V AND +4 TO +10 VOLTS		3	F316
3	SCOPE LC5 G3 (XCLK/) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 104 MICROSECONDS		F317	F177
M83	OPERATOR ACTION	MACHINE ACTION	A	D
1	SCOPE LC5 S3 (MTRCLK) WAVEFORM = 50% DUTY CYCLE SQUARE WAVE, PERIOD = 104 MICROSECONDS		2	F178
2	METER LC7 2W (LCSYN/)	READING = 0%	F318	F319
M84	USE M9			
M85	USE M9			
M86	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 1 TIME AND COMPARE MIR	MIR =		
		0040	F179	
		0002	F180	
		0001	F181	
		0084	F182	
		0008	F66	
M86A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F180	
M87	USE M9			
M87A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F183	

M88	USE M9			
M88A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F328	
M89	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 2 TIMES AND COMPARE MIR	MIR = 03FF	2	3
2	SCOPE LC5,S3 (MTRCLK) WAVEFORM SHOULD BE A 50 PER CENT DUTY CYCLE SQUARE WAVE, 52 MICROSECONDS LOW AND 52 MICROSECONDS HIGH.		3	F184
3	COMPARE MIR			
		MIR =	A	D
		03FF	F185	
		03FA	F186	
		021E	F187	
		03DE	F188	
		03BE	F188	
		037E	F189	
		02FE	F190	
		0200	F191	
		03E7	F192	
		03F6	F192	
		03FC	F192	
		03E0	F193	F202
M90	USE M9			
M91	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 2 TIMES AND COMPARE MIR	MIR =		
		0300	F197	
		0380	F194	
		0240	F195	
		0280	F196	
		0210	F198	
		0208	F199	
		0202	F199	
		0204	F200	
		021E	F200	
		0220	F201	
		03E0	F203	F202
M92	OPERATOR ACTION	MACHINE ACTION	A	D
	METER LC7 2S (LCEB)	READING = 100%	F204	F205
M93	OPERATOR ACTION	MACHINE ACTION	A	D
	NONE	NONE	F206	
M94	USE M9			
M95	USE M9			
M96	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F207	
M97	USE M9			
M98	OPERATOR ACTION	MACHINE ACTION	A	D

	METER LC7 2S (LCEB)	READING = 0%	F319	F208
M99	USE M9			
M100	USE M9			
M100A	USE M9			
M100B	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F209	
M100C	USE M9			
M100D	USE M9			
M100E	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F210	
M101	USE M9			
M102	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F211	
M103	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F212	
M104	USE M9			
M105	USE M9			
M106	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F213	
M106A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F214	
M107	USE M9			
M108	USE M9			
M109	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F329	
M110	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F111	
M111	OPERATOR ACTION	MACHINE ACTION	A	D
	NONE	NONE	F112	
M112	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F113	
M113	OPERATOR ACTION	MACHINE ACTION	A	D
1	METER LC8 Y3 (RTCW)	READING = 100%	2	F114
2	SCOPE LC8 W4 (HFSCLK/) WAVEFORM = 30 TO 50 NANOSECONDS WIDE NEGATIVE-GOING PULSE OCCURRING EVERY 2 MICROSECONDS		3	F320
	**** NOTE: SCOPE TRACE INTENSITY MUST BE SET HIGH FOR STEP 3 (AND STEP 4,IF REQUIRED)			
3	SCOPE LC8 N4 (PT1MS) WAVEFORM = 1 MICROSECOND WIDE POSITIVE-GOING PULSE OCCURRING EVERY 1 MILLISECOND		4	F321
4	SCOPE LC8 X4 (COUNT) WAVEFORM = 30 TO 50 NANOSECONDS WIDE NEGATIVE-GOING PULSE OCCURRING EVERY 1 MILLISECOND		F322	F323
M114	USE M9			
M115	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 2 TIMES AND COMPARE MIR	MIR =		
		0EF5	F115	
		0008	F116	
		0004	F116	
		0002	F116	
		0001	F116	
		000F	F117	
		7F9E	F118	
		3FCF	F118	
		1FE8	F119	
		0FF4	F118	
		EF89	F118	
		0080	F120	
		0040	F120	
		0020	F121	
		0010	F120	
		00F0	F122	
		1004	F123	
		101E	F123	
		400F	F123	
		0802	F123	
		0000	F124	
		0101	F125	
		0201	F125	
		0401	F125	
		FF3B	F126	
		2008	F127	
		07FA	F128	
		03FD	F128	
		01FF	F128	
		0100	F128	
M116	USE M9			
M117	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F126	
M118	OPERATION ACTION	MACHINE ACTION	A	D
1	FORCE STEP 3 TIMES AND COMPARE MIR	MIR =		
		FFFE	F136	
		FF82	F137	
		FF03	F138	F147
M119	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F139	
M120	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 2 TIMES AND COMPARE MIR	MIR =		

		0000	F140		
		FF3B	F141		
		0021	F126		
M121	USE M9				
M122	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F142		
M123	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP 2 TIMES				
	AND COMPARE MIR	MIR =			
		000E	F129		
		000D	F130		
		000B	F130		
		0001	F131		
		0EF5	F132		
		0007	F133		
		0000	F111		
		000F	F134		
		0F04	F135		
M124	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F121		
M125	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP 2 TIMES				
	AND COMPARE MIR	MIR =			
		1FE8	F143		
		00F0	F144		
		000F	F134		
		00E0	F145		
		0070	F120		
		00B0	F120		
		00D0	F120		
M126	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F115		
M127	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F341		
M128	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP 2 TIMES				
	AND COMPARE MIR	MIR =			
		0001	F146		
		06FB	F128		
		0AF8	F128		
		0CF7	F128		
		0DF6	F128		
		0000	F273		
M129	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F118		
M129A	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F330		
M129B	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F331		
M130	USE M9				
M131	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F215		
M132	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP AND COMPARE MIR	MIR =			
		8068	F216		
		C060	2·	F0	
2	METER LC7-1C (LCRDATA)	READING 100%	F217	3	
3	REMOVE LC3 CARD AND REMETER	READING NOW 100%	F218	F219	
M133	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP AND COMPARE MIR	MIR =			
		2001	F220		
		2002	F220		
		2004	F220		
		2008	F220		
		2010	F221		
		2020	F221		
		2040	F222		
		2080	F222		
		20FF	F223		
		A000	F224	F0	
M134	OPERATOR ACTION	MACHINE ACTION	A	D	
1	FORCE STEP AND COMPARE MIR	MIR =			
		60FE	F225		
		60FD	F226		
		60FB	F225		
		60F7	F227		
		60EF	F228		
		60DF	F228		
		60BF	F229		
		607F	F229		
		60C0	F230		
		6000	F231	F0	
M135	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F232		
M136	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F233		
M137	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F234		
M138	OPERATOR ACTION	MACHINE ACTION	A	D	
1	NONE	NONE	F235		

M139	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F236	
M140	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F332	
M141	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		8061	F237	
		8068	F324	
		C060	F325	F0
M142	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP 2 TIMES AND COMPARE MIR.	MIR =		
		6001	F238	
		6002	F239	
		6003	F239	
		6005	F240	F0
M143	USE M9			
M144	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		8068	F241	
		8060	F242	F0
M145	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F243	
M146	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F244	
M147	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F245	
M148	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		8060	F246	
		C060	F247	F0
M149	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		4060	F248	
		8060	F249	F0
M150	USE M9			
M151	USE M9			
M152	USE M9			
M153	USE M9			
M154	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F250	
M155	USE M9			
M156	USE M9			
M157	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F251	
M158	USE M9			
M158A	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		2000	F252	
		A000	F253	
		E0FF	F254	F0
M158B	USE M9			
M158C	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F255	
M158D	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		6080	F256	
		E0FF	F257	F0
M158E	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F258	
M158F	USE M9			
M158G	OPERATOR ACTION	MACHINE ACTION	A	D
1	FORCE STEP AND COMPARE MIR	MIR =		
		A000	F259	
		A0FF	F260	
		20FE	F261	
		20FF	2	F0
2	METER LC7-1F (LCRCLK)	READING 48-51%	F263	F262
M158H	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F264	
M158I	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F265	
M159	USE M9			
M160	USE M9			
M161	USE M9			

M161A	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F266	
M162	USE M9			
M163	USE M9			
M164	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F267	
M165	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F268	
M166	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F269	
M167	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F270	
M168	OPERATOR ACTION	MACHINE ACTION	A	D
M169	USE M9			
M170	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F272	
M171	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F333	
M172	USE M9			
M173	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F334	
M174	USE M9			
M175	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F335	
M176	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F334	
M177	OPERATOR ACTION	MACHINE ACTION	A	D
1	NONE	NONE	F336	
M179	OPERATOR ACTION	MACHINE ACTION	A	D
1	TRANSMIT INDICATOR NOT CORRECT		F337	2
2	RECEIVE INDICATOR NOT CORRECT		F338	

FAILURE DICTIONARY

FAILURE	SUSPECT CHIPS OR PROCEDURE				
F0	FAILURES OTHER THAN THOSE LISTED WERE NOT DETECTED WITH BUGGING. PUNT				
F1	PARITY ERROR OCCURED DURING SLCMTR, PERFORM F E MEMORY TEST				
F2	LC6 F5 LC2 F5 F7		1 1	3 3	
F3	LC6 F7 LC2 F5 F7		1 1	3 3	
F4	LC6 E7 LC1 F7		1 1	3 3	
F5	GO TO CONSOLE OR SPO MTR ERROR # E2 OR M2		2		
F6	LC6 C7		2		
F7	PS1-(NOTE 1) D5 C3 D3 E3 F7 F5 MU4 D5		2 2		
F8	LC4 C1		2		
F9	LC1 A7 LC6 F5		3 3		
F10	LC1 A3 LC2 C3		3 3		
F11	LC6 F7		3		
F12	LC6 F5		3		
F13	LC4 F3 C7		3		
F14	LC6 E7		3	42	
F15	LC6 A3 B5		3		
F16	PS1-1,2,3 B7		3		
F17	LC2 F7 LC4 B5 D5 F7 A3 F3 LC5 E7 OR F32				4
F18	PS1-(NOTE 1) E7 F7 MU4 D5		4 4		
F19	LC2 B3 C7 F5 OR F32				4
F20	LC2 B3 F5 B7 OR F32				4
F21	LC2 B3 OR F32				4
F22	LC2 D7 F7 OR F32				4
F23	LC6 F7 D7 LC7 B5 OR F32				4

F24	LC6 F7 D7 B5 LC8 A1 B1 E5 OR F32	4
F25	LC2 F3 C5 F7 OR F32	4
F26	LC2 D7 F7 LC7 E7 OR F32	4
F27	LC6 E7 D7 B5 OR F32	4
F28	LC6 E7 D7 LC7 B5 D5 OR F32	4
F29	LC1 B3 F7 OR F32	4
F30	LC7 E7 OR F32	4
F31	LC2 D7 OR F32	4
F32	THE FOLLOWING CHIPS CAUSE UNPREDICTABLE FAILURES, REPLACE ONLY AFTER ALL PREVIOUS MENTIONED CHIPS FAIL TO CORRECT PROBLEM. PS1-(NOTE 1) E7 F7 LC1 B3 B7 C7 LC5 F7 E7 LC7 E7 OR F342	4 D D
F33	LC2 D5	5
F34	LC2 A5 B7	5
F35	LC2 D3 D7 E7	5 D D
F36	LC4 B5 LC5 F7 E7 OR F342	5 D D D
F37	LC1 B3 B7 D7	5
F38	LC1 D7 LC2 E7 D7	5
F39	LC2 D3	5
F40	LC4 B5 C7	5
F41	LC2 A3 A5 A7 C3 C7 D5 D7 LC7 A7	5
F42	PS1-(NOTE 1) D7 C1 E3	5 6
F43	LC4 C1 LC6 E3	6
F44	LC2 D3 C7	7
F45	LC1 C5 C7 D7 LC2 E3	7
F46	LC7 E7 F7	7
F47	LC5 B1	7
F47	LC1 C5 C7 D7 LC2 D3 D7 E7	7
F48	LC1 C5	7
F49	LC8 D5	8
F50	REPLACE CD1 SCLOCK DRIVER THAT CORRESPONDS TO THE LOWER SLC PORT	11
F51	LC1 B3 B7 D7	11
F52	LC1 A3 A5 LC2 C3 A7 D3 D5 C7 D7 PS1-(NOTE 1) E7 E5 A3 C1 D1 B3 D7 E3	11
F53	PS1-(NOTE 1) A3 C1 E5 F7 A3 A5	12
F54	PS1-(NOTE 1) C3	13
F55	LC1 A3 A5 LC2 F7 PS1-(NOTE 1) E7	14
F56	LC2 C7	14
F57	LC2 D3 D7 C3	15
F58	LC2 C3	16
F59	LC2 C3 D5	17
F60	LC1 A3 A5 PS1-1,2,3 E5 D1	18 D
F61	LC1 A3 LC2 B3 F5 C3 B7	19
F62	LC2 B7	20
F63	LC1 C5 C7 LC2 D5	21
F64	LC6 C3 E3 D3 A5	22
F65	LC2 D5 D7	23
F66	REPLACE RECEIVER CHIP LC7 BC3 ONLY AFTER ALL PREVIOUS CHIPS FAIL TO CORRECT PROBLEM	23 25
F67	LC2 D3 D5	24
F68	LC1 C5 C7 D7	25
F69	LC7 A5 A3 OR F66	25
F70	LC1 C5 C7	26
F71	LC2 B3 C7 F5 D3 D5	27
F72	LC2 C7	27A
F73	LC1 A7 A5	28
F74	LC1 B3 B7 F7 LC2 C7	29
F75	PS1-(NOTE 1) F7 A5 MU4 D5	31 31

F76	PS1-(NOTE 1) A5 C1 B5 A7	32
F77	PS1-(NOTE 1) B3 D3	33
F78	PS1-(NOTE 1) C7 B3 B5	34
F79	PS1-(NOTE 1) A5 B5	36
F80	LC1 A5 PS1-(NOTE 1) C5 D3 B5 C7 B3 IF DDP ON PS1-1 (NOTE 1) - PS1-2 D3 B5 IF DDP ON PS1-2 (NOTE 1) - PS1-3 D3 B5 IF AVAILABLE	37
F81	PS1-(NOTE 1) B7	38
F82	PS1-(NOTE 1) B5 C7 B3 D3 MU4 D5	39 39
F83	PS1-(NOTE 1) B5 C7 B3 D3 IF DDP ON PS1-1 (NOTE 1) - PS1-2 D3 B5 IF DDP ON PS1-2 (NOTE 1) - PS1-3 D3 B5 IF AVAILABLE	39A
F84	LC1 A3 A7 B7 LC4 F3 LC7 B7 PS1-(NOTE 1) C7	39B
F85	LC1 A3 A7 LC2 C3 PS1-(NOTE 1) E7	40
F86	LC4 A1 C1 F5 F7	41
F87	LC2 A5 E7 C5 F7	41
F88	LC2 B3 B5 LC6 F5	42
F89	LC2 B3 B7 LC6 F7	42
F90	LC2 F7 LC6 F5	42
F91	LC6 D7	42
F92	LC6 F7	42
F93	LC6 F5	42
F94	LC4 A7 LC6 D7 B5	42
F95	LC6 D7 E3	42
F97	LC2 E3 A5 LC4 E3	43
F96	LC2 A3 B5 B7	43
F98	LC4 A7 E3 C7	44
F99	LC4 A3 A5 B5 D5 C7 LC5 E7	45
F100	LC4 D5	45
F101	LC4 F3	45
F102	LC2 A3 A5 C3 D7 A7	45
F103	LC4 C1 D5 E5 F5 F7	46
F104	LC4 E1 D1 C1 PS1-(NOTE 1) D7 C1 E3 B3	46
F105	LC4 B1 D5 F1 LC5 E3	47
F106	LC1 B3 F7 LC4 E5	47
F107	LC2 F7	47
F108	LC2 F7 LC5 E3	47
F109	LC2 A3 D7	48
F110	LC4 E1 D1 PS1-(NOTE 1) D5	50
F111	LC8 E5	110 123
F112	LC8 C5 E5 A7	111
F113	LC8 D1, F3 LC7 A7	112
F114	LC8 A1 B1 E1 D5 A7	113
F115	LC8 C3	115 126
F116	LC8 D3,E3	115
F117	LC8 E3	115
F118	LC8 B7, C7	115 129
F119	LC8 A3, B5, B7, C7	115
F120	LC8 D7, E7	115 125
F121	LC8 A3, B5, D7, E7	115
F122	LC8 E7	115 124
F123	LC8 D5	115
F124	LC8 A1,B1, E1, B5	115
F125	LC8 D1	115
F126	LC6 B5 D7 LC8 E1	115 117 120
F127	LC8 A3, A5	115
F128	LC8 B3, C3	115 128
F129	LC8 D1, D3, E3, A5	123
F130	LC8 D1, D3, E3	123
F131	LC8 A3 C3 D3 E3 A5 B5 C5 D5 C7 E7	123
F132	LC8 A3	123
F133	LC8 D3, E3, D5, A7	123
F134	LC8 F3	123 125
F135	LC8 A5	123

F136	LC8 E1, C5, E5	118
F137	LC8 A7	118
F138	LC8 F7	118
F139	LC8 A1	119
F140	LC8 C1, F3, A5, A7, F7	120
F141	LC8 E1, D5	120
F142	LC8 A1 B1 D1 E1 E3 A5 B5 D5 A7	122
F143	LC8 E1, A5	125
F144	LC8 F3, F7	125
F145	LC8 D5, D7, E7	125
F146	LC8 A3, B3, B5	128
F147	LC8 E1, A5, C5, E5, A7, F7	118
F148	LC1 C3, B5, C5, C7	53
F149	REPLACE TRANSMITTER CHIP LC4 B3 ONLY AFTER ALL PREVIOUS CHIPS FAIL TO CORRECT PROBLEM.	53
	REPLACE TRANSMITTER CHIP LC4 B3 ONLY AFTER ALL PREVIOUS CHIPS FAIL TO CORRECT PROBLEM.	53
F150	LC4 F3, A7, C7 LC5 A7, E7, F7 LC6 A3, B5, D7, E7	53
F151	LC2 B7 LC4 D1, E1 LC5 E3	54
F152	LC1 C3 B5 C5	53
F153	LC1 A7 LC2 A3, B3, B7	55
F154	LC1 C3, B5 LC2 B3 LC4 D1, E1	55
F155	LC4 D1, E5 LC5 A7, E7	55
F156	LC2 A3, B5, B7 LC4 D1, E3	56
F157	LC4 D1, E1, C5 LC5 E3	57
F158	LC1 B3, B7 LC2 B5	59
F159	LC5 B3 C3 D3 D5 A7	61
F160	LC5 A7 B7 C7 OR F149	61
F161	LC4 A1 B1 C1 D1 E1 F3 A5 B5 C5 E5 OR F149	61
F162	LC1 C3, C5 LC4 B1, F3, E5, OR F149	63
F163	LC4 F1 LC5 F1	64
F164	LC7 C5, D5	64
F165	LC4 D1 C5	66
F166	LC4 A1, C1, D1, C5, OR F149	70
F167	LC4 F3, D5, E5, F5, B7, F7	71
F168	LC4 F3, A5, D5	72
F169	LC4 B1, E3, A5, B5, C5, OR F149	73
F170	LC1 A7	73
F171	LC4 F3 LC5 C3, D5	74
F172	LC4 A3	76
F173	LC4 E5, F5, B7, F7	77
F174	LC4 A7, B7	78 79
F175	LC7 E7, F7	81
F176	CD1 REPLACE CD1 SCLK DRIVER THAT CORRESPONDS TO THE UPPER SLC PORT	82
F177	LC5 A5 A7 B7 C7 D7	82
F178	LC5 A1 B3 C3 D3	83
F179	LC2 C5	86
F180	LC2 B7	86 86A
F181	LC2 C7	86
F182	LC2 D7	86
F183	LC5 A7 LC7 E7, F7	87A
F184	LC5 A1, B3, C3, D3	89
F185	LC4 E1, F1, A3, D7, OR F149	89
F186	LC4 A1, A3, D7, OR F149	89
F187	LC4 A3, E7, OR F149	89
F188	LC4 E1, A3, D7, E7, F7, OR F149	89
F189	LC4 E1, A3, D7, E7, OR F149	89
F190	LC4 E1, A3, E7, F7, OR F149	89
F191	LC4 A3, F5, OR F149	89
F192	LC4 A1, A3, C7, D7, OR F149	89
F193	LC4 A3, D7, OR F149	89

F194	LC5 C3, D3 LC4 F149	91
F195	LC4 A1, A3, D7, E7, F7, OR F149	91
F196	LC4 A3, B7, D7, E7, OR F149	91
F197	LC5 C3, D3 LC4 A3, E7, F7, OR F149	91
F198	LC4 A3, C7, D7, E7, OR F149	91
F199	LC4 A3, C7, D7, OR F149	91
F200	LC4 A3, D7, OR F149	91
F201	LC4 A3, D7, E7, F7, OR F149	91
F202	LC4 A3 D7 E7	89 91
F203	LC4 A3, E7, OR F149	91
F204	LC4 B1 OR F149	92
F205	LC7 C5 A7 B7 E7 F7	92
F206	LC5 D3	93
F207	LC4 A3	96
F208	LC4 A1 B1 OR F149	98
F209	LC4 A7 F1	100B
F210	LC4 A5	100E
F211	LC1 C7	102
F212	LC4 B1 LC7 B7	103
F213	LC4 B3	106
F214	LC4 F1 LC5 B7	106A
F215	LC7 B7 C5 OR F66	131
F216	LC7 C1 C5 OR F66	132
F217	LC7 E1 C5 OR F66	132
F218	LC3 A6F6 D3F6 C4F6	132
F219	LC2 F3 F5	132
F220	LC6 A7 B7 C7 LC7 C1 D1 OR F66	133
F221	LC6 A7 B7 C7 LC7 B1 OR F66	133
F222	LC6 C3 D3 E3 LC7 C1 B1 OR F66	133
F223	LC7 E7 OR F66	133
F224	LC6 C3 E3 D3 LC7 D7	133
F225	LC6 A7 B7 C7 F5 LC7 C1 D1 OR F66	134
F226	LC6 A7 B7 C7 F7 LC7 D1 OR F66	134
F227	LC6 A7 B7 C7 F7 D7 LC7 C1 D1 OR F66	134
F228	LC6 A7 B7 C7 F7 D7 LC7 B1 OR F66	134
F229	LC6 C3 D3 E3 F5 LC7 C1 B1 OR F66	134
F230	LC6 A7 B7 C7	134
F231	LC7 B7 C5 OR F66	134
F232	LC2 F5 LC5 C7 LC6 B1 A3 C3 D3 E3 A5 B5 D7 E7 LC7 E1 A3 A5 C5 D5 D7 E7 F7 OR F66	135 S O R R Y
F233	LC6 B1 LC7 A3 A5	136
F234	LC6 B1 B5 LC7 A3 A5	137
F235	LC7 BC3	138
F236	LC7 A3 A5	139
F237	LC4 F3	141
F238	LC7 E7 D7	142
F239	LC6 A3 B1 B5	142
F240	LC6 C3 LC7 A3	142
F241	LC2 D5 LC7 A7 B5	144
F242	LC7 B5 D5 OR F66	144
F243	LC5 F7 LC6 D7 A3 B5 LC7 B5	145
F244	LC5 F7 LC7 B5	146
F245	LC7 B5	147

F246	LC7 B5 OR F66	148
F247	LC7 A7 B5	148
F248	LC4 C1 LC6 E3	149
F249	LC6 D7 LC7 B5	149
F250	LC7 B5 D5	154
F251	LC7 D7 LC4 A3 OR F66	157
F252	LC7 C1 C5 OR F66	158A
F253	LC7 C7 D7 B7 C5 OR F66	158A
F254	LC7 F1 F7 C7	
F255	LC7 E1 F1	158C
F256	LC6 A5 B1 LC7 D7	158D
F257	LC7 A7 C7	158D
F258	LC7 A7 B7 C7	158E
F259	LC6 B1 LC7 D7 LC5 C7	158G
F260	LC7 C7	158G
F261	LC7 B7 C5 OR F66	158G
F262	LC5 A5 C7 D7	158G
F263	LC7 F1 E1 D7 C7 A7 B7 F7 C5 F3 D5 OR F66	158G
F264	LC6 C3 D3 E3 E7 LC7 D7 OR F66	158H
F265	LC7 C7	158I
F266	LC7 E1	161A
F267	LC7 F7 D5	164
F268	LC4 C1	165
F269	LC7 D5 F7	166
F270	LC3 A6F6 D3F6 C4F6 LC2 E3 OR LC3 Q1, Q2, Q3 AND ASSOCIATED COMPONENTS	167
F271	LC3 D3F6 A6F6 C4F6 F4D8 F1F6 E2F6 OR LC3 DISCRETE COMPONENT	168
F272	LC5 B3 C3 D3 D5	170
F273	LC8 C7	128
F274	LC4 D5	7
F275	LC2 A5 C5 E7	7
F276	LC4 E1 E3 F3	7
F277	LC2 D3 D7 E7	7
F278	LC1 C5 C7 D7	7
F279	LC1 A3 B3 A5 F5 A7 B7 PS1-(NOTE 1) E7 F7 PS1- 1,2,3 D1 MU4 D5	11
F280	LC2 D3 A5 A7 D7 E7	11
F281	LC1 F5 B7 F7 B3	11
F282	LC1 C5 C7 D7 LC2 E3 A5 B7 PS1-(NOTE 1) E7	17
F283	LC7 A3 A5	22
F284	LC7 B5 C5 B7 OR F66	23
F285	LC2 D3 D7 E7 F7	25
F286	LC2 A7	26
F287	LC2 D3 D5 D7	26
F288	LC5 F7	41
F289	LC4 F3 F7 LC5 E7 LC7 A5 C5 A7 B7 E7 F7	41
F290	LC5 B1	41
F291	LC4 E3 F3	41
F292	LC5 E7	53
F293	LC5 A7	53
F294	LC5 F7	53
F295	LC4 F3 C7 LC6 A3 B5 D7 E7	53
F296	LC4 A7	53
F297	LC4 B1 C1	53
F298	LC4 B5 OR F149	53
F299	LC1 C3 OR F149	53
F300	LC4 E3	53
F301	LC5 B1 A7	53
F302	LC5 B3 C3 D3 D5 A7	53
F303	LC5 A7 B7 C7 OR F149	53
F304	LC5 A1 E3	53
F305	LC1 B3 B7	55

F306	LC1 A3 A7 LC2 B3 C3 B5 F5	55
F307	LC2 E3 A5 F5	55
F308	LC4 D1 F1 E3 E5 A7 C7 LC5 E3	55
F309	LC4 C5	55
F310	LC5 B1 A7	61
F311	LC5 A1 E3	61
F312	LC4 C5 LC5 E3 B5	66
F313	LC4 C5 LC5 F1	66
F314	LC4 B1 C5 D5	66
F315	LC4 F1 C5	66
F316	LC4 E3	82
F317	LC4 F1 OR F149	82
F318	LC4 A7 LC5 E3	83
F319	LC7 E7 F7	83 98
F320	LC8 C1 A5 A7	113
F321	LC8 C1 D1 F3 A7 F7	113
F322	LC8 E1 C3 E3 C5 E5 C7 E7	113
F323	LC8 A1 A5	113
F324	LC6 B1	141
F325	LC6 D7	141
F328	LC4 E5	88A
F329	LC4 B3	109
F330	LC8 A3	129A
F331	LC8 A5 B5 B1	129B
F332	LC8 E1	140
F333	LC4 C1	171
F334	LC7 B5	173 176
F335	LC5 F7	175
F336	LC7 B7	177
F337	LC5 E7 F7 SPO2 B7 OR LED (INDICATOR)	179
F338	LC7 E1 A3 SPO2 E5 OR LED (INDICATOR) OR F66	179
F339	PS1-(NOTE 1) D5 C3 E3 D3 A7	34
F340	PS1-(NOTE 1) A3 E5 C1 D1 D7	34
F341	LC8 B3 B5 B7	127
F342	B711/B771 CG1 C1 B721 CG2 C3 CD2 A5	

ILLUSTRATIONS

FIGURE 1

ASYNCHRONOUS BIT RATE	UPPER TIME VALUE(HEX)	LOWER TIME VALUE(HEX)	TOLERANCE CHECKED TO
75	0000	4E10 - 4E30	+.1% -.1%
100	0000	3A80 - 3AB0	+.15%-.15%
110	0000	3530 - 3550	+.15%-.15%
150	0000	2700 - 2720	+.15%-.15%
200	0000	1D40 - 1D50	+.3% -.2%
300	0000	1380 - 1390	+.2% -.2%
600	0000	09C1 - 09C6	+.2% -.2%
1200	0000	04E0 - 04E4	+.2% -.2%
1800	0000	0340 - 0350	+ 1% -.2%
2400	0000	026F - 0273	+.4% -.4%
4800	0000	0136 - 013B	+.5% -.5%
9600	0000	009B - 009D	+.5% -.8%
19200	0000	004E - 004F	+ 1% - 1%

NOTES

TEST 7 INSTRUCTIONS

USER

TEST 7 IS A FLEXIBLE PROGRAM DESIGNED TO GIVE THE OPERATOR A TOOL TO AID IN ISOLATING MODEM AND DATA LINE FAILURES. DUE TO THE NUMEROUS SITE CONFIGURATIONS AND MODEMS QUALIFIED FOR THE SYSTEM, TEST 7 REQUIRES AN OPERATOR FAMILIAR WITH THE SLC DDP AND EXPERIENCED IN DATA COMMUNICATIONS. THIS REQUIREMENT IS NECESSARY TO BE ABLE TO SELECT PROPER PARAMETERS FOR THE PROGRAM AND INTERPRET RESULTS AS REPORTED BY THE PROGRAM.

OPERATOR INPUT

THE OPERATOR IS REQUIRED TO ENTER OPERATING PARAMETERS, VIA THE KEYBOARD, WHICH FIT THE SITE CONFIGURATION AND SUIT THE NEEDS OF THE OPERATOR. THESE PARAMETERS ARE AS FOLLOWS:

1. MODE WORD = FUNCTION DESIRED (RECEIVE, TRANSMIT OR FULL DUPLEX)

   SITE TRANSMISSION TYPE (ASYNCHRONOUS OR SYNCHRONOUS)

   DATA FORMAT (ASCII OR EBCDIC)

2. OPTION WORD = OPTION WORD PART 1, ELIMINATES PRINTED MESSAGES ON THE SPO OR CONSOLE WHEN LOOPING. OPTION WORD PART 2, APPLIES ONLY TO THE RECEIVER DATA. THIS OPTION WILL TELL THE PROGRAM TO COMPARE THE DATA RECEIVED TO AN OPERATOR SELECTED DATA PATTERN AND PRINT ONLY THOSE CHARACTERS THAT FAIL TO COMPARE. IF THIS OPTION IS NOT SELECTED, THE PROGRAM WILL RECEIVE A GIVEN AMOUNT OF CHARACTERS AS SELECTED BY THE OPERATOR AND THEN PRINT ALL CHARACTERS RECEIVED.

3. DIAL OPTION = NOTIFY THE PROGRAM OF A MODEM WITH HANDSET, WHERE IT IS NECESSARY FOR THE OPERATOR TO ESTABLISH THE PHONE LINK.

4. CHARACTER AMOUNT = REQUIRED ONLY WHEN RECEIVE BIT SELECTED IN THE MODE WORD AND THE OPERATOR HAS NOT SELECTED THE OPTION TO COMPARE RECEIVED DATA. THE AMOUNT IS ENTERED AS 3 DECIMAL DIGITS. NOTE THAT 001 TO 256 ARE THE LIMITS ON THE RECEIVE BUFFER.

5. DATA = DATA IS ENTERED FROM THE KEYBOARD AND STORED IN A 256 CHARACTER MEMORY BUFFER THIS DATA WILL BE USED FOR TRANSMITTING AND/OR TO COMPARE THE RECEIVED DATA MEMORY BUFFER. AFTER THE DATA IN EACH BUFFER LOCATION IS PRINTED, THE OPERATOR MUST RESPOND WITH 2 HEX KEYS FROM THE KEYBOARD TO ENTER NEW DATA. CHARACTER PARITY IS TAKEN CARE OF BY THE PROGRAM AND NOT NECESSARY TO BE ENTERED BY THE OPERATOR. ALSO, IN SYNCHRONOUS MODE THE PROGRAM AUTOMATICALLY XMITS TWO SYNC CHARACTERS BEFORE ANY DATA. SPECIAL KEYS ARE PROVIDED AND ARE AS FOLLOWS:

   L = NORMALLY STANDS FOR LAST ENTRY WHEN KEYING DATA TO THE BUFFER. WHEN PRESSED ON FIRST ENTRY THE DATA BUFFER IS AUTOMATICALLY LOADED WITH SEQUENTIAL DATA 00 THRU FF.

   N = NO ENTRY - THE OPERATOR PREVIOUSLY LOADED THE BUFFER AND DATA IS TO REMAIN THE SAME.

   M = MISTAKE - ON FIRST DIGIT - BACK SPACE 1 BUFFER LOCATION FOR CORRECTION. ON 2ND DIGIT - CORRECT FIRST DIGIT.

   I = INCREMENT TO NEXT LOCATION IN BUFFER, OLD DATA RETAINED. USED TO STEP THRU BUFFER UNTIL A CHANGE IS DESIRED.

LOOPING IS ACCOMPLISHED BY PLACING THE FE CARD EXT/IRQ SWITCH TO EXT.

ERROR REPORTING

ON ERRORS DETECTED BY THE PROGRAM THE ALARM WILL SOUND AND FOR STATUS INTERRUPT ERRORS, THE DDP STATUS WILL BE PRINTED IN FOUR HEX CHARACTERS. IF THE NO PRINT OPTION WAS SELECTED AND THE EXT SWITCH IS NOT TO EXT, AFTER THE ALARM, THE PROGRAM WILL STOP IN AN ERROR ROUTINE. THE OPERATOR CAN THEN FORCE STEP AND READ STATUS IN MIR. FOR DATA ERRORS THE ALARM SOUNDS ONCE AND ALL CHARACTERS THAT FAILED ALONG WITH THEIR EXPECTED CHARACTERS WILL BE PRINTED. THIS PRINTING CAN BE STOPPED BY PRESSING INPUT REQUEST ON THE SPO OR RDY BUTTON ON CONSOLE. IF THE NO PRINT OPTION WAS SELECTED AND THE EXT SWITCH IS NOT TO EXT, AFTER THE ALARM, THE PROGRAM WILL STOP IN A DATA ERROR ROUTINE. THE OPERATOR CAN THEN MANUALLY, USING FST BUTTON, DISPLAY ALL DATA ERRORS IN MIR.

OPERATOR DETECTED ERRORS

DUE TO THE VARIATIONS IN MODEM STATUS, THE PROGRAM WILL AT TIMES, AS DESCRIBED UNDER 'TEST EXECUTION', PRINT STATUS WITHOUT SOUNDING THE ALARM. THE OPERATOR WILL HAVE TO DETERMINE IF THIS IS CORRECT FOR THE MODE OF OPERATION AND SITE CONFIGURATION.

OPERATOR TEST INTERRUPT

WHEN SERVICING RECEIVER DATA INTERRUPTS, THE PROGRAM WAITS IN RECEIVE FOR AN AMOUNT OF CHARACTERS. WHEN THE CORRECT AMOUNT OF CHARACTERS ARE NOT RECEIVED, THE OPERATOR CAN OVERRIDE THIS WAIT BY PRESSING INPUT REQUEST ON SPO OR READY BUTTON ON CONSOLE. THE RECEIVE BUFFER PRINTOUT OR NONCOMPARE PRINTOUT WILL THEN INDICATE THE CHARACTERS LOST. THE OPERATOR CAN ALSO TERMINATE LARGE DATA BUFFER PRINTOUTS BY USING INPUT REQUEST OR READY BUTTON.

THE FOLLOWING IS A SUMMARY EXPLANATION OF PROGRAM EXECUTION AFTER THE OPERATOR HAS ENTERED THE LAST PARAMETER:

1. ENABLE SLC DDP LOGIC AND SET DATA TERMINAL READY.
2. READ DDP STATUS WORD AND PRINT.
3. IF DIAL OPTION SELECTED, PRINT 'ESTABLISH PHONE LINK' AND WAIT FOR DATA SET READY FROM MODEM.
4. SET MODE WORD(CONTROL WORD) SELECTED BY OPERATOR.
5. IF TRANSMIT BIT SET IN CONTROL WORD GO TO 6, OTHERWISE GO TO 7.
6. WAIT FOR STATUS INTERRUPT FOR CLEAR TO SEND. IF INTERRUPTS OCCUR BEFORE CLEAR TO SEND, PRINT THEIR STATUS AND CONTINUE TO WAIT. WHEN CLR TO SEND SET, PRINT CTS AND DDP STATUS.
7. SERVICE TRANSMIT AND RECEIVE DATA INTERRUPTS UNTIL ALL DATA TRANSMITTED AND/OR ALL DATA RECEIVED. IF A STATUS INTERRUPT OCCURS DURING THIS TIME, SHUT OFF TRANSMITTER AND RECEIVER, SOUND ALARM, PRINT DDP STATUS, PRINT FAIL AND EXIT TEST 7.
8. SHUTOFF TRANSMITTER AND RECEIVER BUT ALLOW DATA TERMINAL READY TO REMAIN SET. IF RECEIVE SET IN MODE WORD, GO TO 9 OTHERWISE GO TO 10.
9. IF THE COMPARE OPTTION IS SELECTED, COMPARE RECEIVED DATA BUFFER TO TRANSMIT DATA BUFFER. IF DATA ERROR, PRINT ALL NONCOMPARE RECEIVED AND EXPECTED CHARACTERS, PRINT FAIL AN EXIT TEST 7. IF RECEIVE MODE, AND COMPARE OPTION NOT SELECTED, PRINT ALL DATA IN RECEIVE BUFFER.
10. PRINT FINISH OR PASS. IF EXT SWITCH TO EXT, LOOP, OTHERWISE DISABLE ALL DDP LOGIC AND EXIT TEST 7.

STEP	OPERATOR ACTION	MACHINE ACTION
1	SELECT TEST 07	
2		MODE PRINTS
3	SELECT A MODE WORD FROM FOLLOWING TABLE - USE 1 KEY	

MODE WORD TABLE

KEY	MODE	
1	RECEIVE ASYNCHRONOUS ASCII	
2	RECEIVE ASYNC EBCDIC	C
3	RECEIVE SYNCHRONOUS ASCII	C
4	RECEIVE SYNC EBCDIC	
5	TRANSMIT ASYNC ASCII	
6	TRANSMIT ASYNC EBCDIC	C
7	TRANSMIT SYNC ASCII	C
8	TRANSMIT SYNC EBCDIC	
9	FULL DUPLEX ASYNC ASCII	
A	FULL DUPLEX ASYNC EBCDIC	C
B	FULL DUPLEX SYNC ASCII	C
C	FULL DUPLEX SYNC EBCDIC	
D	TRANSMIT SWITCH TO RECEIVE ASYNC ASCII	
E	TRANSMIT SWITCH TO RECEIVE ASYNC EBCDIC	
F	TRANSMIT SWITCH TO RECEIVE SYNC ASCII	

NOTE: MODE WORDS D,E AND F ARE INTENDED PRIMARLY FOR DIRECT CONNECT TERMINAL CHECKOUT. (EXAMPLE TD700-TD800) AS NO DELAY IS INCORPORATED IN THE SWITCH FROM TRANSMIT TO RECEIVE, NOISE PROBLEMS MAY BE ENCOUNTERED IF USED FOR MODEM TESTING.

4		OPT PRINTS
5	SELECT TWO PART OPTION WORD FROM FOLLOWING TABLE:	

KEY	OPTION
0	NO OPTIONS
1	ELIMINATE PRINTING
2	COMPARE RECEIVED DATA TO XMIT DATA BUFFER.
3	BOTH OPTIONS 1 AND 2

6		DIAL OPT PRINTS
7	KEY '1' IF MODEM HAS A HANDSET. KEY '0' IF NO HANDSET	
8		IF RECEIVE BIT IN MODE WORD AND OPTION 2 NOT SELECTED 'CHAR AMT' PRINTS OTHERWISE 'DATA' AND XXXX FOR FIRST TRANSMIT BUFFER LOCATION PRINTS. NOTE: ENTIRE MEMORY BUFFER LOCATION IS PRINTED BUT ONLY THE LOWER TWO DIGITS ARE USED.
9	IF CHAR AMT PRINTED, ENTER 3 KEYS IN DECIMAL FOR THE AMOUNT OF CHARACTERS DESIRED TO RECEIVE. (001 THRU 256)	

IF DATA AND XXXX PRINTED, ENTER 2 HEX KEYS FOR EACH BUFFER LOCATION PRINTED. ONLY THE LOWER TWO DIGITS WILL BE MODIFIED. USE SPECIAL KEYS AS FOLLOWS:

SPECIAL KEYS

L = LAST ENTRY TO BUFFER OR WHEN PRESSED ON FIRST ENTRY LOADS SEQ DATA 00 THRU FF TO BUFFER

M = MISTAKE, REKEY DATA

N = NO ENTRY, PREVIOUS DATA BUFFER OK.

I = INCREMENT TO NEXT BUFFER LOCATION UNTIL CHANGE DESIRED.

10 SEQ PRINTS FOR SEQUENTIAL DATA IF 'L' PRESSED ON FIRST ENTRY

11 XXXX PRINTS = DDP STATUS AFTER DDP ENABLED.

12 IF DIAL OPTION SELECTED 'ESTABLISH PHONE LINK' PRINTS

13 IF DIAL OPTION SET, MAKE PHONE CONNECTION AT DATA SET

14 IF XMIT OR FDUPLEX MODE WORD 'CTS XXXX' PRINTS FOR CLR TO SEND AND DDP STATUS.

15 IF ERROR STATUS INTERRUPT OCCURS, ALARM SOUNDS AND XXXX PRINTS

16 TO TERMINATE DATA BUFF PRINTING PRESS INPUT REQ ON SPO OR RDY BUTTON ON CONSOLE

IF DATA COMPARE ERROR, ALARM SOUNDS AND XXXX XXXX PRINTS FOR RECEIVED DATA-EXPECTED DATA NONCOMPARES

17 IF RECEIVER USED AND NOT OPTION 2, XXXX PRINTS FOR EACH CHARACTER IN RECEIVE DATA BUFFER.

18 FINISH OR PASS PRINTS IF TEST RAN OK. FAIL PRINTS IF TEST FAILED

TEST 8 INSTRUCTIONS

TEST 8 MONITORS THE SLC DDP RECEIVE DATA LINE. IF A LINE CHANGE OCCURS OR THE DATA LINE GOES TO A SPACE CONDITION, THE CONSOLE OR SPO ALARM WILL SOUND, AND WILL CONTINUE TO SOUND AS LONG AS THE CONDITION EXISTS. TEST 8 HAS BEEN FOUND USEFUL IN DETECTING NOISY DATA LINES AND BAD WIRE CONNECTIONS IN THE MODEM/PHONE LINE AREA. TO USE, SELECT TEST 08. TO EXIT TEST, PRESS INPUT REQUEST ON SPO OR RDY BUTTON ON CONSOLE.