TABLE OF CONTENTS

1. PURPOSE

THE KEYBOARD PRINTER FUNCTION TEST CHECKS THE OPERATING PERFORMANCE OF THE PRINTER AND KEYBOARD AND AIDS IN THEIR PROPER ADJUSTMENT WHILE BEING RUN IN OVERLAP WITH OTHER SYSTEM FUNCTIONS.

2. PREREQUISITES

THIS PROGRAM MUST RUN UNDER CONTROL OF THE DIAGNOSTIC MONITOR.
THE DIAGNOSTIC MONITOR PROGRAM USES 1,500 STORAGE WORDS, AND THIS PROGRAM USES 1,200 STORAGE WORDS.

3. OPERATING PROCEDURE

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO SPECIFY OPTIONS BEFORE RUNNING.

IF HALTED AFTER LOADINGS SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).

3. LOAD DIAGNOSTIC MONITOR AND KEYBOARD PRINTER TEST.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

STANDARD MONITOR OPERATING PROCEDURES APPLY.
THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED.

1. TO SET ROUTINE SELECTION

   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15

RTN	DESCRIPTION	
1	PRINT LAST KEYBOARD ENTRY	NORMAL ROUTINES-
2	TAB AND CARRIER RETURN	THE PROGRAM STARTS WITH
3	UPPER CASE CHARACTERS	ROUTINE 1, RUNS EACH
4	LOWER CASE CHARACTERS	ROUTINE IN SEQUENCE
5	REGISTRATION	THEN TERMINATES AFTER
6	BACKSPACE AND INDEX	ROUTINE A.
7	END OF LINE CARRIER RETURN	
8	ROCK	
9	TWIST	
A	ROLL	

B	*	PRINT BIT SWITCH IMAGE	OPTIONAL ROUTINES MUST BE SELECTED

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION SET AS IF SELECTING ROUTINE ZERO.

**

3.2.3 PRINT FROM BIT SWITCHES

ROUTINE B WILL ALTERNATELY PRINT TWO CHARACTERS SET IN THE BIT SWITCHES. TO SPECIFY THE DESIRED CHARACTERS, SET SWITCH 0-7 AND 8-15 TO THE ROTATE AND TILT CODE FOR THE CHARACTERS.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE-PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 7. ROUTINE 7.A, AND E WILL ONLY RUN SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN OORR AAAA                (MESSAGE)
OR
EPPNN OORR AAAA                (MESSAGE)
```

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE

  THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 04 FOR MESSAGES ORIGINATED BY THIS PROGRAM.
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

A0000
```
NUM  PID  ADRS REL  LD
XXXX XXXX XXXX XXXX
```

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR). THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001
```
SWS  PID
XXXX XXXX
```

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

A0400 000R AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

```
A0401 000R AAAA        CONSOLE
      OR
A0401 000R AAAA        KEYBOARD
```

THIS MESSAGE INDICATES THE POSITION OF THE CONSOLE/KEYBOARD SWITCH EACH TIME IT IS CHANGED.

******

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

TYPEWRITER-KEYBOARD DSW

BIT	
0	TYPEWRITER SERVICE RESPONSE
1	KEYBOARD RESPONSE
2	KEYBOARD REQUEST
3	ON - CONSOLE ENTRY OFF - KEYBOARD
4	TYPEWRITER BUSY
5	TYPEWRITER NOT READY
6	KEYBOARD BUSY
7	NOT USED
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	NOT USED
15	NOT USED

E0001
```
SWS  INVLD
XXXX
```

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003
```
OVR CORE
```

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004
```
CKSUM
```

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005
```
OOON XXXX
```

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0401 000R AAAA
```
XXXX X000
```

DSW ERROR ON CHECKING FOR READY

E0402 000R AAAA XXXX XC00

DSW ERROR IMMEDIATELY AFTER OUTPUT COMMAND.

E0403 000R AAAA XXXX XX00

INTERRUPT DSW ERROR

E0404 000R AAAA XXXX X000

LOST PRINTER INTERRUPT.
DSW AFTER LAST XIO WRITE COMMAND IS PRINTED

E0405 000R AAAA XXXX

KEYCODE ENTRY ERROR. AN ILLEGAL KEYBOARD CODE HAS BEEN DETECTED.
THE KEYBOARD CODE SHOULD HAVE BEEN AN IMAGE OF CARD HOLERITH. COLS
12 - 9 IN BITS 0-11, RESPECTIVELY.

E0406 000R AAAA XXXX X200

DSW ERROR ON PLACING KEYBOARD IN PROCEED STATUS

E0407 000R AAAA XXXX 0000

DSW ERROR AFTER READ KEYBOARD COMMAND

---

5. COMMENTS

THIS FUNCTION TEST CHECKS THE PROPER OPERATION OF THE PRINTER-KEYBOARD STATUS INDICATORS. THE VARIOUS ROUTINES AID IN DETERMINING THE PROPER ADJUSTMENT OF THE PRINTER.

5.1*** THE PRINTER TEST.

THE PRINTER TEST IS A SERIES OF STANDARD TESTS PERFORMED IN ORDER OF COMPLEXITY. EACH TEST HAS TWO LINES OF OUTPUT (THE FIRST IN BLACK AND THE SECOND IN RED). THE ONLY EXCEPTION IS THE REGISTRATION TEST WHICH HAS ONLY ONE LINE.

A. THE NORMALLY RUN ROUTINES ARE DONE SEQUENTIALLY AS FOLLOWS,

1. PRINT LAST KEYBOARD ENTRY.
2. CARRIER RETURN AND TABULATE.
3. UPPER CASE CHARACTERS.
4. LOWER CASE CHARACTERS. (SHIFT SIDE OF ELEMENT).
5. REGISTRATION

   THIS TEST PRINTS A BLACK '+' ENCLOSED BY A RED 'O'. IT CHECKS THE BACKSPACE FUNCTION AND THE ALIGNMENT OF THE PRINT.

6. BACKSPACE, INDEX.

   CHECKS TABULATE, BACKSPACE, AND LINE FEED FUNCTIONS.

7. END OF LINE CARRIER RETURN

   CHECKS TO SEE THAT THE END OF LINE CARRIER RETURN WORKS PROPERLY.

8. ROCK

   TESTS THE TILT MECHANISM BY TYPING CHARACTERS LOCATED ONE AFTER ANOTHER IN VERTICAL COLUMNS ON THE PRINT HEAD.

9. ROLL

   TESTS THE ROTATE MECHANISM BY SELECTING CHARACTERS ONE AFTER ANOTHER IN HORIZONTAL BANDS AROUND THE PRINT HEAD.

A. TWIST

   TESTS THE COMBINED ROTATE AND TILT MECHANISM BY CAUSINGA MAXIMUM ROTATION AND TILT BETWEEN CHARACTERS.

B. ROUTINES AVAILABLE FOR EXECUTION ON AN OPTIONAL BASIS FOLLOW,

B. PRINT BIT SWITCH IMAGE

   THE TWO CHARACTERS IN THE BIT SWITCHES ARE ALTERNATELY PRINTED.

   TO ENTER THIS MODE, ROUTINE B MUST BE SPECIFIED (FCN 1).

5.2*** THE KEYBOARD TEST (ROUTINE C)

THE KEYBOARD TEST IS ENTERED BY SWITCHING THE CONSOLE/KEYBOARD SWITCH TO THE KEYBOARD POSITION.

AT THIS TIME THE OPERATOR MAY ENTER ANY NUMBER OF CHARACTERS. EACH CHARACTER ENTERED IS PRINTED AS IT IS KEYED IN. WHEN THE CONSOLE/KEYBOARD SWITCH IS RETURNED TO THE CONSOLE POSITION, THE PROGRAM WILL LOOP ON ROUTINE ONE PRINTING THE FIRST 48 CHARACTERS ENTERED VIA THE KEYBOARD. IF NO ENTRY WAS MADE THEN THE PROGRAM COMPLETES THE PRINTER TEST.

ALL KEYBOARD KEYS RETAIN THEIR NORMAL USE EXCEPT,

KEY	FUNCTION
EOF	CARRIER RETURN
ERASE FIELD	THE NEXT CHARACTER (IF ALPHABETIC) WILL BE IN LOWER CASE.
0-2-8	LINE FEED

FIGURE 1. STANDARD TESTS PRINTOUTS

```
A0400 0000                            CONSOLE

CARRIER RETURN                        TABULATE
CARRIER RETURN                        TABULATE

ABCDEFGHIJKLMNOPQRSTUVWXYZ (+<¬);*'"|=_?:>!%¢
ABCDEFGHIJKLMNOPQRSTUVWXYZ (+<¬);*'"|=_?:>!%¢

ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890#/-,&$@.
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890#/-,&$@.

@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
                              BACK SPACE
                                       I
                                       N
                                       D
                                       E
                                       X
                              BACK SPACE
                                       I
                                       N
                                       D
                                       E
                                       X

CARRIER RETURN
                                              CARRIER RETURN

#,$.IRZ96WOFDMU42SKB@&-08YQHGPX75VNECLT31/JA ¢!:="ZRIFOW;¬UMDBKS+|?>%HQY'*XPGENV)<TLCAJ_(
#,$.IRZ96WOFDMU42SKB@&-08YQHGPX75VNECLT31/JA ¢!:="ZRIFOW;¬UMDBKS+|?>%HQY'*XPGENV)<TLCAJ_(

#9642087531/TVXY-SUWZ,$ROMK&QPNLJACEGH@BDFI. ACEGH%BDFI¢!ROMK>QPNLJ_TVXY?SUWZ:=";¬+|'*)<(
#9642087531/TVXY-SUWZ,$ROMK&QPNLJACEGH@BDFI. ACEGH%BDFI¢!ROMK>QPNLJ_TVXY?SUWZ:=";¬+|'*)<(

#A,J$_.(I<RTZL9C6EWNOVF)D*MXUP4G2HSQKYB'@|&?->0%8BYKQSH+G¬PUXM7D5FVONWE;C"LZTR3I1¢/!J:A=
#A,J$_.(I<RTZL9C6EWNOVF)D*MXUP4G2HSQKYB'@|&?->0%8BYKQSH+G¬PUXM7D5FVONWE;C"LZTR3I1¢/!J:A=
A04FF 0000                            0004 END
```

NOTE: SEE SECTION 5 (COMMENTS) FOR RED PRINT/BLACK PRINT DESIGNATION.

6.1 APPENDIX A

PRINTER CHARACTER CODING

LATCH MAGNETS

T2
T1
R1
R2A
R-2
R-5

B0	B1	B2	B3	B4	B5	LOWER CASE B6=0	LOWER CASE HEXADECIMAL	UPPER CASE B6=1	UPPER CASE HEXADECIMAL	B7
0	0	1	1	1	1	A	3C	A	3E	0
0	0	0	1	1	0	B	18	B	1A	0
0	0	0	1	1	1	C	1C	C	1E	0
0	0	1	1	0	0	D	30	D	32	0
0	0	1	1	0	1	E	34	E	36	0
0	0	0	1	0	0	F	10	F	12	0
0	0	0	1	0	1	G	14	G	16	0
0	0	1	0	0	1	H	24	H	26	0
0	0	1	0	0	0	I	20	I	22	0
0	1	1	1	1	1	J	7C	J	7E	0
0	1	0	1	1	0	K	58	K	5A	0
0	1	0	1	1	1	L	5C	L	5E	0
0	1	1	1	0	0	M	70	M	72	0
0	1	1	1	0	1	N	74	N	76	0
0	1	0	1	0	0	O	50	O	52	0
0	1	0	1	0	1	P	54	P	56	0
0	1	1	0	0	1	Q	64	Q	66	0
0	1	1	0	0	0	R	60	R	62	0
1	0	0	1	1	0	S	98	S	9A	0
1	0	0	1	1	1	T	9C	T	9E	0
1	0	1	1	0	0	U	B0	U	B2	0
1	0	1	1	0	1	V	B4	V	B6	0
1	0	0	1	0	0	W	90	W	92	0
1	0	0	1	0	1	X	94	X	96	0
1	0	1	0	0	1	Y	A4	Y	A6	0
1	0	1	0	0	0	Z	A0	Z	A2	0
1	1	1	1	1	1	1	FC	(	FE	0
1	1	0	1	1	0	2	D8	+	DA	0
1	1	0	1	1	1	3	DC	<	DE	0
1	1	1	1	0	0	4	F0	¬	F2	0
1	1	1	1	0	1	5	F4	)	F6	0
1	1	0	1	0	0	6	D0	;	D2	0
1	1	0	1	0	1	7	D4	*	D6	0
1	1	1	0	0	1	8	E4	.	E6	0
1	1	1	0	0	0	9	E0	¢	E2	0
1	1	0	0	0	1	0	C4	|	C6	0
1	1	0	0	0	0	#	C0	=	C2	0
1	0	1	1	1	1	/	BC	-	BE	0
1	0	0	0	0	1	-	84	?	86	0
1	0	0	0	0	0	,	80	:	82	0
0	1	0	0	0	1	&	44	>	46	0
0	1	0	0	0	0	$	40	↓	42	0
0	0	0	0	0	1	@	04	%	06	0
0	0	0	0	0	0	.	00	↑	02	0

TILT/ROTATE TABLE FOR PRINT ELEMENT 969

ROTATE - / + ROTATE

TILT	5	4	3	2	1	0	1	2	3	4	5
0	)	<	(	÷	'	1	+	¬	!	"	=
1	_	T	V	X	Y	?	S	U	W	Z	:
2	J	L	N	P	Q	~	K	M	O	R	!
3	A	C	E	G	H	%	B	D	F	I	¢

UPPER CASE

ROTATE - / + ROTATE

TILT	5	4	3	2	1	0	1	2	3	4	5
0	1	3	5	7	8	0	2	4	6	9	#
1	/	T	V	X	Y	-	S	U	W	Z	.
2	J	L	N	P	Q	¢	K	M	O	R	$
3	A	C	E	G	H	@	B	D	F	I	.

LOWER CASE

```
                     *                                                      30400020
*********************************************************************** 30400030
                     *                                                      30400040
                     *  THIS ENGINEERING CHANGE REFLECTS MAJOR              30400050
                     *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS        30400060
                     *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.      30400070
                     *                                                      30400080
                     *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.      30400090
                     *                                                      30400100
                     *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966         30400110
                     *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC           30400120
                     *  MONITOR II.                                         30400130
                     *                                                      30400140
*********************************************************************** 30400150
                     ***************************************************  30400160
                     *             EQUATE TABLE                        *  30400170
                     ***************************************************  30400180
                     *     THIS TABLE EQUATES TEST PROGRAM LABELS          30400190
                     *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR          30400200
                     *     ADDRESSES.                                      30400210
                     *                                                     30400220
0160                 BEGIN EQU     /160       BEGIN ROUTINE              30400230
0161                 START EQU     BEGIN&1    SUPERVISOR ROUTINE         30400240
0162                 ERROR EQU     START&1    ERROR LOG ROUTINE          30400250
0163                 LOG   EQU     ERROR&1    STATUS LOG ROUTINE         30400260
0164                 END   EQU     LOG&1      END ROUTINE                30400270
                     *-------------------------------------------------    30400280
                     *     MONITOR CONTROL WORD ADDRESSES                  30400290
                     *                                                     30400300
0165                 RTNSW EQU     END&1      ROUTINE START SWITCH       30400310
0166                 ERLCK EQU     END&2      LOCK ON ERROR CONTROL      30400320
0167                 LOGBY EQU     END&3      I/O BUSY SW ADR            30400330
0168                 RLCF  EQU     END&4      RELOCATION FACTOR ADR      30400340
                     *-------------------------------------------------    30400350
                     *     INTERRUPT TRANSFER VECTOR ADDRESSES             30400360
                     *                                                     30400370
017A                 IL0   EQU     /17A       INTERRUPT LEVEL ZERO       30400380
018A                 IL1   EQU     IL0&16     INTERRUPT LEVEL ONE        30400390
019A                 IL2   EQU     IL1&16     INTERRUPT LEVEL TWO        30400400
01AA                 IL3   EQU     IL2&16     INTERRUPT LEVEL THREE      30400410
01BA                 IL4   EQU     IL3&16     INTERRUPT LEVEL FOUR       30400420
01BB                 RQTY  EQU     IL4&1      TYPR SVC REQUEST INTERPT   30400430
01BC                 RQKB  EQU     RQTY&1     KEYBOARD REQUEST INTERPT   30400440
01BD                 SVKB  EQU     RQKB&1     KEYBOARD SERVICE INTERPT   30400450
                     ***************************************************  30400460
                     *                                                    30400470
                     *                                                    30400480
                     *                                                    30400490
                     *            TABLE OF INDEXES FOR REFERENCE          30400500
                     *               TO PRINTER STATUS TABLES             30400510
                     *                                                    30400520
                     *            INDEX REG 3 ALWAYS HAS THE ADDR         30400530
                     *                 OF THE PRINTER TABLE               30400540
                     *                      PTRO                          30400550
                     *                                                    30400560
0000                 ADR   EQU     0                                      30400570
0001                 RTN   EQU     1                                      30400580
0002                 STS   EQU     2                                      30400590
0003                 OUT   EQU     3                                      30400600
0004                 ITR   EQU     4                                      30400610
0005                 SLT   EQU     5                                      30400620
0006                 NOS   EQU     6                                      30400630
0007                 PAD   EQU     7                                      30400640
0008                 WRT   EQU     8                                      30400650
000A                 PTR   EQU     10                                     30400660
000C                 SNR   EQU     12                                     30400670
000E                 KEY   EQU     14                                     30400680
0010                 SEE   EQU     16                                     30400690
```



```
0012                 ERR   EQU     18                                     30400700
                     *                                                    30400710
                     *                                                    30400720
0000                       ORG     *&1500                                 30400730
                     ***********************************************      30400740
                     *                DIAGNOSTIC MONITOR         *        30400750
                     *                    CONTROLLED             *        30400760
                     *                1130 KEYBOARD  PRINTER     *        30400770
                     *                FUNCTION TEST.             *        30400780
                     ***********************************************      30400790
05DC 0 0304          PID   DC      /0304      PROGRAM ID NO               30400800
05DD 0 0000          RID   DC      0          ROUTINE NUMBER              30400810
05DE 1 0646          RAD   DC      GO         ROUTINE ADDRESS             30400820
05DF 0 0000          SW0   DC      /0000      FCN 0 - CONTROL             30400830
05E0 0 0000          SW1   DC      0          FCN 1 - RTN SELECTION       30400840
05E1 0 0000          SW2   DC                 NOT USED                    30400850
05E2 0 0000          SW3   DC                 NOT USED                    30400860
05E3 1 0646                DC      GO         LOOP PROGRAM ADDRESS        30400870
05E4 1 0646                DC      GO         INITIALIZE ADDR             30400880
05E5 0 0000          MLSCF DC      *-*        PROGRAM CONTROL FLD         30400890
05E6 0 FFFF          TERM  DC      /FFFF      TERMINATOR                  30400900
                     ***********************************************      30400910
                     *                                                    30400920
                     *                PRINTER INTERRUPT ROUTINE           30400930
                     *                                                    30400940
                     *                                                    30400950
                     *                THIS ROUTINE CHECKS THE             30400960
                     *                 INTERRUPT DSW FOR THE              30400970
                     *                 PROPER BITS.                       30400980
                     *                                                    30400990
                     *                IF AN ERROR IS DETECTED             30401000
                     *                 THE ERROR IS SAVED IN THE          30401010
                     *                 PRINTER TABLE, PTRO,               30401020
                     *                 AND THE ERROR INDICATOR            30401030
                     *                 IS SET.                            30401040
                     *                                                    30401050
                     *                THE ERROR WILL BE PRINTED           30401060
                     *                 WHEN THE PROGRAM RETURNS           30401070
                     *                 TO MAIN LINE.                      30401080
                     *                                                    30401090
                     *                                                    30401100
05E7 0 0000          COMIN DC      /0000                                  30401110
05E8 1 6700 0A28           LDX   L3 PTRO                                  30401120
                     *     XIO    3 PTR       SENSE - RESET DSW           30401130
05EA 1 D400 063D           STO   L  DSWIT     SAVE DSW                    30401140
                     ***********************************************      30401150
                     *                                                    30401160
05EC 0 18DE                RTE      30                                    30401170
05ED 1 4C28 0603           BSC   L  KBDRQ,&Z  BR IF KBD RQST INTRPT       30401180
05EF 0 18D2                RTE      18        PLACE DSW IN Q              30401190
05F0 0 C302                LD     3 STS       FETCH PRINTER STATUS        30401200
05F1 1 9400 07CF           S      L  KF000                                 30401210
05F3 1 4C18 062A           BSC   L  KBDSV,&-  BR IF S/B KBD SVC INT       30401220
05F5 0 C302                LD     3 STS       FETCH PRINTER STATUS        30401230
05F6 1 9400 0844           S      L  KE000                                 30401240
05F8 1 4C28 05FD           BSC   L  COMI3,&Z  BR IF S/NB TYPR SVC INT     30401250
05FA 0 4808                BSC      &         SKIP IF NOT KBD RTN         30401260
05FB 0 C040                LD       KA000     SELECT KEYBOARD NEXT        30401270
05FC 0 7021                MDX      TYPSV     CHECK TYPR SVC INT          30401280
                     *                                                    30401290
05FD 0 C03E          COMI3 LD       KA000     SELECT KEYBOARD NEXT        30401300
05FE 0 D302                STO    3 STS                                   30401310
05FF 0 C03D                LD       DSWIT     SAVE SPURRIOUS INT ERR      30401320
0600 1 E400 0774           AND   L  KCNSL                                  30401330
0602 0 7033                MDX      KEYER                                 30401340
                     *                                                    30401350
                     *                THE USE OF THE KEYBOARD             30401360
                     *                 HAS BEEN REQUESTED BY              30401370
```

```
                        *                   THE INTERRUPT REQUEST KEY      30401380
                        *                   WHILE THE CONSOLE SW WAS       30401390
                        *                   IN THE KEYBOARD POSITION       30401400
                        *                                                  30401410
0603 0 18C1             KBDRQ RTE     1                                    30401420
0604 1 4C10 060A              BSC   L KBD2,-      BR IF DSW OK             30401430
0606 0 18D1                   RTE     17                                   30401440
0607 0 C035                   LD      DSWIT                                30401450
0608 0 E039                   AND     KBE00                                30401460
0609 0 702C                   MDX     KEYER                                30401470
                        *                                                  30401480
                        *                                                  30401490
060A 0 C031             KBD2  LD      KA000     SELECT KEYBOARD NEXT       30401500
060B 0 D302                   STO   3 STS                                  30401510
060C 0 0B10                   XIO   3 SEE       DESELECT KEYBOARD          30401520
                        *                                                  30401530
060D 0 C033                   LD      TWLVE                                30401540
060E 0 D301                   STO   3 RTN       SET RTN NUMBER             30401550
                        *                                                  30401560
060F 0 63E7                   LDX   3 -25       INITIALIZE KEYBOARD        30401570
0610 1 6F00 07AC              STX   L3 WRDCT&1   INPUT TABLE                30401580
0612 0 6300                   LDX   3 0                                    30401590
0613 1 6F00 07CA              STX   L3 SLTWD                               30401600
0615 1 6F00 085C              STX   L3 ANY&3                               30401610
0617 0 1010                   SLA     16                                   30401620
0618 1 D400 0640              STO   L ERIND                                30401630
061A 0 6301                   LDX     3 1                                  30401640
061B 1 6F00 085B              STX   L3 ANY&2                               30401650
                        *                                                  30401660
061D 0 701B                   MDX     COMIX     EXIT                       30401670
                        *                                                  30401680
061E 0 D302             TYPSV STO   3 STS       RESTORE PTR STS            30401690
061F 0 C01D                   LD      DSWIT     CHECK TYPR RESP DSW        30401700
0620 1 E400 0773              AND   L KEFFF                                30401710
0622 0 F01B                   EOR     K8000                                30401720
0623 1 4C18 0639              BSC   L COMIX,&-   BR IF DSW OK              30401730
0625 0 C017                   LD      DSWIT     SAVE TYPR RESP DSW ERR     30401740
0626 1 E400 0774              AND   L KCNSL                                30401750
0628 0 E815                   OR      K8000                                30401760
0629 0 700C                   MDX     KEYER                                30401770
                        *                                                  30401780
062A 0 C014             KBDSV LD      KC000     READ KEYBOARD NEXT         30401790
062B 0 D302                   STO   3 STS                                  30401800
062C 0 C010                   LD      DSWIT     CHECK KEYBOARD RESP        30401810
062D 0 F00D                   EOR     K4200      DSW                       30401820
062E 1 E400 0773              AND   L KEFFF                                30401830
0630 1 4C18 0639              BSC   L COMIX,&-   BR IF DSW OK              30401840
0632 0 C00A                   LD      DSWIT     SAVE KBD RESP DSW ERR      30401850
0633 1 E400 0774              AND   L KCNSL                                30401860
0635 0 E805                   OR      K4200                                30401870
0636 0 18D0             KEYER RTE     16                                   30401880
                        *                                                  30401890
0637 0 DB12                   STD   3 ERR       SAVE DSW ERROR             30401900
0638 0 6B07                   STX   3 ERIND     SET ERROR INDICATOR        30401910
                        *                                                  30401920
0639 1 4C80 05E7        COMIX BSC   I COMIN     BUG - OUT OF INTRPT        30401930
                        *                                                  30401940
063B 0 4200             K4200 DC      /4200     CONSTANTS                  30401950
063C 0 A000             KA000 DC      /A000                                30401960
063D 0 0000             DSWIT DC      /0000     INTRPT DSW STORAGE         30401970
063E 0 8000             K8000 DC      /8000     PTR SVC INT DSW S/B        30401980
063F 0 C000             KC000 DC      /C000                                30401990
0640 0 0000             ERIND DC      /0000     ERROR INDICATOR            30402000
0641 0 000C             TWLVE DC      12                                   30402010
0642 0 BE00             KBE00 DC      /BE00                                30402020
                        *********************************************      30402030
                        *                                                  30402040
                        *********************************************      30402050
```



```
0643 0 4480 0160        TYCUS BSI   I BEGIN                          * SC  30402060
0645 1 05DC                   DC      PID                            *     30402070
                        *********************************************      30402080
                        *                                                  30402090
                        *********************************************      30402100
                        *                                           *      30402110
                        *                INITIAL PROGRAM ENTRY      *      30402120
                        *                      POINT                *      30402130
                        *                                           *      30402140
                        *********************************************      30402150
                        *                                                  30402160
0646 1 6C00 0A81        GO    STX   L0 FIRST     SET TO PRINT SW STS        30402170
0648 1 6C00 0A2A              STX   L0 PTRO&STS                            30402180
064A 0 1010                   SLA     16        RESET LOOP RTN 1           30402190
064B 1 D400 085C              STO   L ANY&3                                30402200
064D 1 D400 0640              STO   L ERIND                                30402210
064F 1 D400 05DD              STO   L RID                                  30402220
0651 1 C400 05E0              LD    L SW1                                  30402230
0653 0 18C1                   RTE     1                                    30402240
0654 0 4820                   BSC     Z                                    30402250
0655 0 1081                   SLT     1                                    30402260
0656 1 D400 05E0              STO   L SW1                                  30402270
                        *                                                  30402280
0658 0 6500 FFFF              LDX   L1 -1       TERMINATE KBD INPUT        30402290
065A 1 6D00 085B              STX   L1 ANY&2                               30402300
                        *                                                  30402310
065C 1 6700 0A28        GO3   LDX   L3 PTRO     INTR PTR STATUS TABL       30402320
065E 1 C400 0859              LD    L ANY                                  30402330
0660 0 D304                   STO   3 ITR                                  30402340
0661 0 D305                   STO   3 SLT                                  30402350
0662 0 1801                   SRA     1                                    30402360
0663 0 D306                   STO   3 NOS                                  30402370
0664 0 D307                   STO   3 PAD                                  30402380
                        *                                                  30402390
0665 0 63E7                   LDX   3 -25       INITIALIZE KEYBOARD        30402400
0666 1 6F00 07AC              STX   L3 WRDCT&1   INPUT TABLE                30402410
0668 0 6300                   LDX   3 0                                    30402420
0669 1 6F00 07CA              STX   L3 SLTWD                               30402430
066B 0 7000                   MDX     PRCON                                30402440
                        *********************************************      30402450
                        *********************************************      30402460
                        *                                                  30402470
                        *                ROUTINE CONTROLLER                30402480
                        *                                                  30402490
                        *               THIS ROUTINE CONTROLS THE          30402500
                        *                EXECUTION OF ALL PRINTER          30402510
                        *                AND KEYBOARD ROUTINES.            30402520
                        *                                                  30402530
                        *               IF THIS ROUTINE TIMES OUT          30402540
                        *                WHEN WAITING FOR AN               30402550
                        *                INTERRUPT FROM THE PRINTER        30402560
                        *                AN ERROR WILL BE PRINTED.         30402570
                        *                                                  30402580
                        *               THE SEQUENCING OF ROUTINES         30402590
                        *                IS CONTROLLED BY THE MARK         30402600
                        *                ROUTINE WHICH BUILDS THE          30402610
                        *                CHARACTERS TO BE PRINTED.         30402620
                        *                                                  30402630
066C 0 C0D3             PRCON LD      ERIND                                30402640
066D 1 4C20 075F              BSC   L INERR,Z   BR IF ERROR INDICATD       30402650
                        *                                                  30402660
066F 1 C400 05DD              LD    L RID       FETCH ROUTINE NUMBER       30402670
0671 0 90CF                   S       TWLVE                                30402680
0672 1 4418 0A3F              BSI   L SWSET,&-  CHECK SWS IF KBD RTN       30402690
                        *                                                  30402700
0674 1 6700 0A28              LDX   L3 PTRO     FETCH PRINTER STATUS       30402710
0676 0 C302                   LD      3 STS                                30402720
0677 0 D025                   STO     RESTO     SAVE IT                    30402730
```

```
0678 1 4C10 068D          BSC  L  EXEC3,-    BR IF PTR SVC RQSTD        30402740
                       *                                               30402750
                       *                                               30402760
                       *                                               30402770
                       *                 WHEN STS IS,                  30402780
                       *                                               30402790
                       *                  ZERO-POS   GO SERVICE PTR    30402800
                       *                  NEGATIVE,                    30402810
                       *                   A000      SELECT KBD         30402820
                       *                   C000      READ KBD NEXT      30402830
                       *                   FC00-FFFE COUNT FOR INT      30402840
                       *                   FFFF      LOST INT ERR       30402850
                       *                   E000      WAIT TYPWR INT     30402860
                       *                   F000      WAIT KBD INT       30402870
                       *                   8000      IGNORE             30402880
                       *                                               30402890
067A 0 1001               SLA      1                                    30402900
067B 1 4C18 0876          BSC  L   TYEND,&-   BR IF END PROGRAM         30402910
067D 0 180C               SRA      12                                   30402920
067E 1 4C04 0688          BSC  L   SVC,E      BR IF WAIT KBD INT         30402930
0680 0 1802               SRA      2                                    30402940
0681 0 901D               S        K0001                                30402950
0682 1 4C18 0781          BSC  L   SELC2,&-   BR IF SELECT KBD           30402960
0684 0 901A               S        K0001                                30402970
0685 1 4C18 07A3          BSC  L   KEYBD,&-   BR IF READ KEYBD           30402980
0687 0 700E               MDX      EXEC9      IGNORE OR WAIT             30402990
                       *                                               30403000
0688 1 7401 0A2A    SVC   MDX  L   PTR0&STS,1 COUNT DOWN FOR INT         30403010
068A 0 700B               MDX      EXEC9      WAIT FOR INTRPT            30403020
068B 1 4C00 0775          BSC  L   NOIN       PRINT NO INTRPT ERROR      30403030
                       *                                               30403040
068D 1 4400 0A3F    EXEC3 BSI  L   SWSET      CK CON/KBD SW SETTING      30403050
068F 0 C00E               LD       KF800      SERVICE PRINTER            30403060
0690 0 D302               STO   3  STS        UPDATE PTR STATUS          30403070
0691 1 4C00 0736          BSC  L   READY                                 30403080
                       *                                               30403090
0693 0 C009         EXEC7 LD       RESTO      RESTORE TO TRY LATER       30403100
0694 1 D400 0A2A          STO  L   PTR0&STS                              30403110
0696 1 6500 066C    EXEC9 LDX  L1  PRCON       TRY AGAIN - LATER          30403120
0698 1 6D00 05E5          STX  L1  MLSCF                                 30403130
069A 0 4480 0161          BSI  I   START                                 30403140
                       *                                               30403150
069C 0 0001         I     DC       1                                    30403160
069D 0 0000         RESTO DC       /0000                                30403170
069E 0 F800         KF800 DC       /F800                                30403180
069F 0 0001         K0001 DC       /0001      CONSTANT                  30403190
                       *                                               30403200
                       ***********************************************30403210
                       *                                               30403220
                       *                                               30403230
                       *                 THIS ROUTINE BUILDS THE       30403240
                       *                  NEXT CHARACTER TO BE         30403250
                       *                  PRINTED.  THE CHARACTER      30403260
                       *                  IS FETCHED FROM THE          30403270
                       *                  PROPER ROUTINE TABLE OR      30403280
                       *                  IS TAKEN FROM THE BIT SWS.   30403290
                       *                                               30403300
                       *                 A ROUTINE WHICH IS RUNNING    30403310
                       *                  WILL NOT TERMINATE UNTIL     30403320
                       *                  IT HAS BEEN COMPLETED.       30403330
                       *                                               30403340
06A0 1 C400 05E0    MARK  LD   L   SW1                                  30403350
06A2 0 100C               SLA      12                                   30403360
06A3 0 180C               SRA      12                                   30403370
06A4 1 9400 084D          S    L   ELVEN      IS TYPE SWS ROUTINE        30403380
06A6 1 4C20 06E3          BSC  L   MARKG,Z    BR IF NO                   30403390
                       *                                               30403400
06A8 1 C400 084D          LD   L   ELVEN      SET ROUTINE ID             30403410
```



```
06AA 1 D400 05DD          STO  L   RID                                  30403420
06AC 0 6B09               STX   3  MARKU&1    SAVE IX                    30403430
06AD 0 C006               LD       MARKT      SET MLSCF                  30403440
06AE 1 D400 05E5          STO  L   MLSCF      *                          30403450
06B0 0 6C00 0165          STX  L   RTNSW      SET RTN SW                 30403460
06B2 0 4480 0161          BSI  I   START      GO TO START                30403470
06B4 1 06B5         MARKT DC       MARKU                                30403480
06B5 0 6700 0000    MARKU LDX  L3  0          RESTORE IX                 30403490
                       *                                               30403500
06B7 1 0C00 0A3C          XIO  L   RDBS       READ BIT SWITCHES          30403510
06B9 1 C400 0A3E          LD   L   BITSW                                 30403520
06BB 0 6500 0000    MARK1 LDX  L1  /0000      FETCH SHIFT COUNT          30403530
06BD 0 1100               SLA   1  0                                     30403540
06BE 0 1808               SRA      8                                     30403550
06BF 0 F0DC               EOR      I                                     30403560
06C0 0 4820               BSC      Z          SKIP IF ILLEGAL CODE       30403570
06C1 0 F0DA               EOR      I                                     30403580
06C2 0 1008               SLA      8                                     30403590
06C3 0 D303               STO   3  OUT                                   30403600
06C4 0 C0F7               LD       MARK1&1    RESET SHIFT COUNT          30403610
06C5 0 4830               BSC      -Z                                    30403620
06C6 0 6100               LDX   1  0                                     30403630
06C7 0 4808               BSC      &                                     30403640
06C8 0 6108               LDX   1  8                                     30403650
06C9 0 69F2               STX   1  MARK1&1                               30403660
06CA 0 70CB               MDX      EXEC9                                 30403670
                       *                                               30403680
                       *                                               30403690
06CB 1 4C00 0876    MARK2 BSC  L   TYEND      END PROGRAM                30403700
                       *                                               30403710
06CD 0 7201         MARK3 MDX    2 1                                    30403720
06CE 1 6E00 0A29    MARK4 STX  L2  PTR0&RTN                             30403730
06D0 1 D400 05DD          STO  L   RID        SAVE THE ROUTINE NO        30403740
                       *                                               30403750
06D2 1 6E80 06E6          STX  I2  MARKL&1                               30403760
                       *                                               30403770
06D4 1 C680 084D          LD   I2  FUNR-1     FETCH ADRS OF TEST         30403780
06D6 0 D304               STO   3  ITR                                   30403790
                       *                                               30403800
06D7 0 1810               SRA      16         RESTORE WORDS PT           30403810
06D8 0 D307               STO   3  PAD                                   30403820
                       *                                               30403830
06D9 1 C600 084D    MARK5 LD   L2  FUNR-1     RESTORE TEST PT            30403840
06DB 1 4C28 06CB          BSC  L   MARK2,Z&   BR IF PTR FINISHED          30403850
                       *                                               30403860
06DD 0 8307               A     3  PAD                                   30403870
06DE 0 D300               STO   3  ADR                                   30403880
                       *                                               30403890
06DF 0 1810               SRA      16         RESTORE WORDS PRTD         30403900
06E0 0 D306               STO   3  NOS                                   30403910
                       *                                               30403920
06E1 0 C0BA               LD       I          RESTORE SHIFT WORD         30403930
06E2 0 D305               STO   3  SLT                                   30403940
                       *                                               30403950
06E3 1 6580 0A28    MARKG LDX  I1  PTR0&ADR                             30403960
06E5 1 6680 0A29    MARKL LDX  I2  PTR0&RTN                             30403970
06E7 0 6916               STX   1  MARKP&1    SAVE IXING                 30403980
06E8 0 6A17               STX   2  MARKQ&1    *                          30403990
06E9 0 6B18               STX   3  MARKR&1    *                          30404000
06EA 1 C400 0A29          LD   L   PTR0&RTN   GET RTN                    30404010
06EC 1 F400 05DD          EOR  L   RID        HAS IT CHANGED             30404020
06EE 1 4C18 06FD          BSC  L   MARKP,&-    NO                         30404030
06F0 1 C400 0A29          LD   L   PTR0&RTN   SET RTN                    30404040
06F2 1 D400 05DD          STO  L   RID        *                          30404050
06F4 0 6C00 0165          STX  L   RTNSW      SET SWITCH                 30404060
06F6 1 C400 06FC          LD   L   MARKZ      SET MLSCF                  30404070
06F8 1 D400 05E5          STO  L   MLSCF      *                          30404080
06FA 0 4480 0161          BSI  I   START      GO TO START                30404090
```

```
06FC 1 06FD          MARKZ DC       MARKP
06FD 0 6500 0000     MARKP LDX  L1 0          RESTORE IXING                30404100
06FF 0 6600 0000     MARKQ LDX  L2 0          *                            30404110
0701 0 6700 0000     MARKR LDX  L3 0          *                            30404120
                     *                                                     30404130
0703 0 C305                LD    3 SLT       BUMP SFF WT BY ONE           30404140
0704 0 8097                A     I                                          30404150
0705 0 D305                STO   3 SLT                                      30404160
                     *                                                     30404170
0706 1 4C04 070A           BSC   L MARKS,E   SHIFT IF ODD                   30404180
0708 0 C101                LD    1 1         FETCH OUTPUT WORD            30404190
0709 0 7008                MDX     MARKN                                    30404200
                     *                                                     30404210
070A 0 C306          MARKS LD    3 NOS       BUMP WORDS BY ONE            30404220
070B 0 8090                A     I                                          30404230
070C 0 D306                STO   3 NOS                                      30404240
                     *                                                     30404250
070D 0 7101                MDX   1 1                                        30404260
070E 1 6D80 06E4           STX   I1 MARKG&1                                 30404270
0710 0 C100                LD    1 0         FETCH OUTPUT CHAR            30404280
0711 0 1008                SLA     8         SHIFT IT                     30404290
                     *                                                     30404300
0712 0 D303          MARKN STO   3 OUT       SAVE NEXT OUTPUT WD          30404310
                     *                                                     30404320
0713 0 F05C                EOR     KFF00                                    30404330
0714 1 4C20 0696           BSC   L EXEC9,Z   BR IF NOT END OF FCN           30404340
                     *                                                     30404350
0716 0 C304                LD    3 ITR       DECREMENT ITCNT              30404360
0717 1 9400 069C           S     L I                                        30404370
0719 0 D304                STO   3 ITR                                      30404380
071A 1 4C20 06D9           BSC   L MARK5,Z   BR IF NO DO AGAIN            30404390
                     *                                                     30404400
071C 0 C306                LD    3 NOS       UPDATE MODIFIER WORD         30404410
071D 1 8400 069C           A     L I                                        30404420
071F 0 D306                STO   3 NOS                                      30404430
0720 0 8307                A     3 PAD                                      30404440
0721 0 D307                STO   3 PAD                                      30404450
                     *                                                     30404460
0722 0 C101                LD    1 1         FETCH NEXT REPEAT CT         30404470
0723 0 D304                STO   3 ITR                                      30404480
0724 1 F400 05E6           EOR   L TERM                                     30404490
0726 1 4C20 06D9           BSC   L MARK5,Z   BR IF NOT END OF RTN           30404500
0728 1 C400 05E0           LD    L SW1                                      30404510
072A 0 E00A                AND     BASIC     ASSURE PROPER ENTRY          30404520
072B 1 4C18 06CD           BSC   L MARK3,&-  BR IF NO RTN SELECT          30404530
                     *                                                     30404540
072D 0 D004                STO     MARKE&1                                  30404550
072E 0 9005                S       ALL                                      30404560
072F 1 4C30 06CD           BSC   L MARK3,-Z  BR IF RTN TOO LARGE            30404570
0731 0 6600 0001     MARKE LDX  L2 1                                        30404580
0733 0 709A                MDX     MARK4                                    30404590
                     *                                                     30404600
                     *                                                     30404610
                     *                                                     30404620
                     ***************************************************   30404630
                     ***************************************************   30404640
                     *                                                     30404650
                     *                                                     30404660
0734 0 000A          ALL   DC       FUND-FUNR  ALL TYPEWRITER RTNS         30404670
0735 0 000F          BASIC DC       /000F                                    30404680
                     ***************************************************   30404690
                     *                                                     30404700
                     *                THIS ROUTINE CHECKS IF THE           30404710
                     *                 PRINTER CAN BE USED AND             30404720
                     *                 IF THE PRINTER IS READY.            30404730
                     *                                                     30404740
                     *                WHEN LOGBY INDICATES THAT            30404750
                     *                 THE PRINTER IS LOGICALLY            30404760
                     *                 NOT BUSY, THE DSW IS                30404770
                     *                 CHECKED FOR READY.                  30404780
                     *                                                     30404790
                     *                                                     30404800
0736 0 C480 0167     READY LD    I   LOGBY                                30404810
0738 1 4C20 074C           BSC   L   RDY2,Z    BR IF NO TYPE NOW           30404820
                     *                                                     30404830
073A 1 6500 05E7           LDX   L1 COMIN      SET INT VECTOR              30404840
073C 0 6D00 01BB           STX   L1 RQTY                                    30404850
073E 1 6700 0A28           LDX   L3 PTRO                                    30404860
0740 0 10A0                SLT     32                                       30404870
                     *                                                     30404880
0741 0 0B0A                XIO   3 PTR         SENSE - RESET DSW           30404890
0742 0 D02C                STO     DSWAS                                    30404900
0743 0 E02F                AND     KEFFF                                    30404910
0744 1 4C18 0750           BSC   L TYPIT,&-    BR IF DSW OK                30404920
0746 0 C828                LDD     DSWAS                                    30404930
0747 0 E02C                AND     KCNSL                                    30404940
0748 0 18D0                RTE     16                                       30404950
                     *                                                     30404960
0749 0 6101                LDX   1 1           ERROR - NOT READY            30404970
074A 1 4400 0833           BSI   L PRDSW       PRINT THE ERROR MSG          30404980
074C 1 6500 0736     RDY2  LDX   L1 READY                                   30404990
074E 1 4C00 0840           BSC   L PDSWX                                    30405000
                     *                                                     30405010
                     *                   PRINT ONE CHARACTER               30405020
                     *                                                     30405030
                     *                THIS ROUTINE PRINTS ONE              30405040
                     *                 CHARACTER ON THE CONSOLE            30405050
                     *                 PRINTER AND THEN CHECKS             30405060
                     *                 IF THE PRINTER BECAME               30405070
                     *                 BUSY-NOT READY BY THE               30405080
                     *                 OUTPUT COMMAND.                     30405090
                     *                                                     30405100
0750 0 0B08          TYPIT XIO   3 WRT         PRINT CHARACTER             30405110
0751 0 0B0A                XIO   3 PTR         SENSE - RESET DSW           30405120
0752 0 D01A                STO     DSWBY                                    30405130
                     *                                                     30405140
                     *                   CHECK BUSY DSW                    30405150
0753 0 E01F                AND     KEFFF                                    30405160
0754 0 F019                EOR     KOC00                                    30405170
0755 1 4C18 06A0     BSYOK BSC   L MARK,&-     BR IF DSW OK                30405180
                     *                                                     30405190
0757 0 C815                LDD     DSWBY                                    30405200
0758 0 E01B                AND     KCNSL                                    30405210
0759 0 E814                OR      KOC00                                    30405220
075A 0 18D0                RTE     16                                       30405230
075B 0 6102                LDX   1 2                                        30405240
075C 1 4400 0833           BSI   L PRDSW       PRINT THE ERROR MSG          30405250
075E 0 70F6                MDX     BSYOK                                    30405260
                     ***************************************************   30405270
                     *                                                     30405280
                     *                PRINT INTERRUPT DSW ERROR            30405290
                     *                                                     30405300
075F 0 10A0          INERR SLT       32          RESET ERROR IND          30405310
0760 1 D400 0640           STO   L   ERIND                                  30405320
                     *                                                     30405330
0762 1 CC00 0A3A           LDD   L   ERR&PTRO    FETCH THE ERROR MESG       30405340
0764 0 6103                LDX   1 3           SET MSG ID - 3               30405350
0765 1 4400 0833           BSI   L PRDSW       PRINT THE ERROR MSG          30405360
0767 0 10A0                SLT     32                                       30405370
0768 0 DB12                STD   3 ERR         RESET ERROR IND              30405380
0769 1 4C00 066C           BSC   L PRCON       RETURN TO MAIN LINE          30405390
                     ***************************************************   30405400
                     *                                                     30405410
                     *                                                     30405420
076C   0001                BSS   E 1                                        30405430
076D 0 0000          DSWBY DC       /0000      LAST BUSY DSW                30405440
076E 0 0C00          KOC00 DC       /0C00      BUSY DSW S/B                 30405450
```


IBM MAINTENANCE DIAGNOSTIC PROGRAM FOR THE 1130 SYSTEM
1131 KEYBOARD-PRINTER TEST

DATE 02JAN66 15NOV66 15JUN67
EC NO. 415490 419643 420317
PROG ID 0304-2

```
076F 0 0000          DSWAS DC      /0000      LAST READY DSW          30405460
0770 0 FF00          KFF00 DC      /FF00      CONSTANT                30405470
0771 0 0000          DSWBS DC      /0000                              30405480
0772 0 0200          F0200 DC      /0200                              30405490
0773 0 EFFF          KEFFF DC      /EFFF      MASK CONSOLE SW         30405500
0774 0 1000          KCNSL DC      /1000                              30405510
                     ********************************************     30405520
                     *                                              30405530
                     *                                              30405540
                     *              PRINT NO INTERRUPT ERROR        30405550
                     *                                              30405560
0775 0 0B0A          NOIN  XIO   3 PTR        SENSE - RESET DSW       30405570
0776 0 D0FA                STO     DSWBS                              30405580
0777 0 C8F9                LDD     DSWBS                              30405590
0778 0 E0FB                AND     KCNSL                              30405600
0779 1 EC00 063E           OR    L K8000                              30405610
077B 0 18D0                RTE     16                                 30405620
077C 0 6104                LDX   1 4          ERROR - 4               30405630
077D 1 4400 0833           BSI   L PRDSW      PRINT THE ERROR MSG     30405640
077F 1 4C00 066C           BSC   L PRCON                              30405650
                     ********************************************     30405660
                     *                                              30405670
                     *              KEYBOARD TEST                   30405680
                     *                                              30405690
                     *                                              30405700
                     *              SELECT KEYBOARD ROUTINE         30405710
                     *                                              30405720
0781 1 6600 05E7     SELC2 LDX   L2 COMIN       RESET INT XFR VECTOR    30405730
0783 0 6E00 01BC           STX   L2 RQKB         FOR KEYBOARD REQ        30405740
0785 0 6E00 01BD           STX   L2 SVKB       AND SVC KEYBOARD          30405750
                     *                                              30405760
0787 0 0B0A                XIO   3 PTR        SENSE AND SAVE DSW      30405770
0788 0 D0E6                STO     DSWAS                              30405780
                     *                                              30405790
0789 0 C045                LD      KF000      RESET PTR STATUS        30405800
078A 0 D302                STO   3 STS                                30405810
078B 0 C8E3                LDD     DSWAS                              30405820
078C 0 E0E6                AND     KEFFF                              30405830
078D 1 4C18 0793           BSC   L SELC,&-    BR IF DSW OK            30405840
078F 0 C0DF                LD      DSWAS                              30405850
0790 0 E0E3                AND     KCNSL                              30405860
0791 0 6101                LDX   1 1          ERROR - 1               30405870
0792 0 700B                MDX     SELC1      PRINT DSW ERROR         30405880
                     *                                              30405890
0793 0 0B0E          SELC  XIO   3 KEY        SELECT KEYBOARD         30405900
0794 0 0B0A                XIO   3 PTR        SENSE - RESET DSW       30405910
0795 0 D0DB                STO     DSWBS                              30405920
0796 0 F0DB                EOR     F0200                              30405930
0797 0 E0DB                AND     KEFFF                              30405940
0798 1 4C18 066C           BSC   L PRCON,&-   BR IF DSW OK            30405950
                     *                                              30405960
079A 0 C8D6                LDD     DSWBS      PRINT DSW ERROR         30405970
079B 0 E0D8                AND     KCNSL                              30405980
079C 0 E8D5                OR      F0200                              30405990
079D 0 6106                LDX   1 6          ERROR - 6               30406000
                     *                                              30406010
079E 0 18D0          SELC1 RTE     16                                 30406020
079F 1 4400 0833           BSI   L PRDSW      PRINT THE ERROR MSG     30406030
07A1 1 6400 0693           LDX   L EXEC7      TRY AGAIN - LATER       30406040
                     ********************************************     30406050
                     *                                              30406060
                     *              DECODE CHARACTER KEYED IN       30406070
                     *                                              30406080
                     *                                              30406090
07A3 0 0B10          KEYBD XIO   3 SEE        READ AND SAVE CHAR      30406100
07A4 0 0B0A                XIO   3 PTR        SENSE - RESET DSW       30406110
07A5 0 10A0                SLT     32                                 30406120
07A6 1 4C18 07AB           BSC   L WRDCT,&-                          30406130
```



```
07A8 0 6107                LDX   1 7          ERROR - 7               30406140
07A9 1 4400 0833           BSI   L PRDSW      PRINT DSW ERROR - 7     30406150
                     *                                              30406160
07AB 0 6600 0000     WRDCT LDX   L2 /0000                           30406170
07AD 0 61BF                LDX   1 -65        LOOK UP CHAR IN TABLE   30406180
07AE 1 C500 08B9     CNVRT LD    L1 KECOD&65                        30406190
07B0 0 F30E                EOR   3 KEY                              30406200
07B1 1 4C18 07D0           BSC   L CMPRE,&-   BR IF CHAR MATCHES     30406210
07B3 0 7101                MDX   1 1                                30406220
07B4 0 70F9                MDX     CNVRT                            30406230
                     *                                              30406240
07B5 0 C30E                LD    3 KEY                              30406250
07B6 0 F011                EOR     NCAP                             30406260
07B7 1 4C18 07C5           BSC   L NOCP,&-    BR IF NO CAP NEXT       30406270
                     *                                              30406280
07B9 0 C00F                LD      ERSLC                            30406290
07BA 0 F30E                EOR   3 KEY                              30406300
07BB 1 4C18 07F9           BSC   L ERSE,&-    BR IF ERASE LAST CHR    30406310
                     *                                              30406320
07BD 0 6201                LDX   2 1          SET MODIFIER WORD COUNT 30406330
07BE 1 6E00 0847           STX   L2 EMESG&2                         30406340
                     *                                              30406350
07C0 0 6105                LDX   1 5          ERROR 5                 30406360
07C1 0 C30E                LD    3 KEY        KB READ ERROR WORD      30406370
07C2 1 4400 0833           BSI   L PRDSW      PRINT THE ERROR MSG     30406380
07C4 0 70BC                MDX     SELC2                            30406390
                     *                                              30406400
07C5 0 6801          NOCP  STX   0 LOWER                            30406410
07C6 0 70BA                MDX     SELC2                            30406420
                     ********************************************     30406430
                     *                                              30406440
                     *                                              30406450
07C7 0 0000          LOWER DC      /0000      # 0 IF NEXT UPR CASE    30406460
07C8 0 0002          NCAP  DC      /0002      ERASE FIELD KEY CODE    30406470
07C9 0 0004          ERSLC DC      /0004      BACKSPACE KEY CODE      30406480
07CA 0 0000          SLTWD DC      /0000      KEYBOARD SHIFT WORD     30406490
07CB 0 FFE7          KFFE7 DC      -25                                30406500
07CC 0 0000          ERSEA DC      /0000                              30406510
07CD 0 1111          BSPSE DC      /1111      BACK SPACE              30406520
07CE 0 0008          K0008 DC      /0008                              30406530
07CF 0 F000          KF000 DC      /F000                              30406540
                     ********************************************     30406550
                     *                                              30406560
                     *              PLACE CHAR KEYED IN             30406570
                     *                    OUTPUT TABLE              30406580
                     *                                              30406590
07D0 1 C500 08FA     CMPRE LD    L1 TYCOD&65    FETCH PRINTER CHAR      30406600
07D2 1 7400 07C7           MDX   L LOWER,0      SKIP IF UPPER CASE      30406610
07D4 0 1808                SRA     8                                30406620
07D5 0 1008                SLA     8                                30406630
07D6 0 D303                STO   3 OUT          SAVE OUTPUT CHAR        30406640
                     *                                              30406650
07D7 0 6100                LDX   1 0            RESET LOWER CASE SW     30406660
07D8 0 69EE                STX   1 LOWER                            30406670
                     *                                              30406680
07D9 1 7400 07CA           MDX   L SLTWD,0      BR IF CHAR IS FIRST     30406690
07DB 0 7004                MDX     SFT        * TO BE PLACED IN WD    30406700
                     *                                              30406710
07DC 0 6121                LDX   1 /21                              30406720
07DD 0 7201                MDX   2 1            SKIP IF TABLE COMPLT    30406730
07DE 0 7006                MDX     TBLIS                            30406740
07DF 0 7009                MDX     EXIT                             30406750
                     *                                              30406760
07E0 0 6100          SFT   LDX   1 0                                30406770
07E1 0 1808                SRA     8                                30406780
07E2 0 7000                MDX     TBLIZ                            30406790
                     *                                              30406800
07E3 1 EE00 0874     TBLIZ OR    L2 ANY&27      PLACE CHAR IN OUTPUT    30406810
```

```
07E5 1 D600 0874    TBLIS STO  L2 ANY&27    * TABLE                          30406820
                    *                                                        30406830
07E7 0 69E2         TBLI  STX   1 SLTWD      SAVE TEST STATUS                 30406840
07E8 0 6AC3               STX   2 WRDCT&1                                    30406850
07E9 1 C400 0844    EXIT  LD   L  KE000                                      30406860
07EB 0 D302               STO   3 STS        UPDATE PRTR STATUS             30406870
07EC 1 6500 07E9          LDX  L1 EXIT                                       30406880
07EE 0 C480 0167          LD   I  LOGBY                                      30406890
07F0 1 4C20 0840          BSC  L  PDSWX,Z                                    30406900
07F2 1 6500 05E7          LDX  L1 COMIN                                      30406910
07F4 0 6D00 01BB          STX  L1 RQTY                                       30406920
07F6 0 0B08               XIO   3 WRT        PRINT ONE CHARACTER             30406930
07F7 1 4C00 066C          BSC  L  PRCON      CONTINUE TILL INTRPT            30406940
                    ********************************************           30406950
                    *                                                        30406960
                    *                ERASE LAST CHARACTER                    30406970
                    *                     KEYED IN                           30406980
                    *                                                        30406990
07F9 0 6AD2         ERSE  STX   2 ERSEA                                      30407000
07FA 0 C0D1               LD      ERSEA                                      30407010
07FB 0 F0CF               EOR     KFFE7                                      30407020
07FC 1 4C18 0781          BSC  L  SELC2,&-   BR IF TABLE EMPTY               30407030
                    *                                                        30407040
07FE 0 C0CB               LD      SLTWD                                      30407050
07FF 1 4C20 0809          BSC  L  ERSE1,Z    BR IF NOT SHIFTED               30407060
0801 0 6121               LDX   1 /0021      ERASE SHIFTED CHAR              30407070
0802 1 C600 0874          LD   L2 ANY&27                                     30407080
0804 0 1808               SRA     8                                          30407090
0805 0 1008               SLA     8                                          30407100
0806 1 D600 0874          STO  L2 ANY&27                                     30407110
0808 0 7006               MDX     ERSE2                                      30407120
                    *                                                        30407130
0809 0 1010         ERSE1 SLA     16                                         30407140
080A 0 6100               LDX   1 0                                          30407150
080B 0 72FF               MDX   2 -1                                         30407160
080C 0 1000               NOP                                              30407170
080D 1 D600 0875          STO  L2 ANY&28                                     30407180
080F 0 C0BD         ERSE2 LD      BSPSE      SET BACKSPACE CODE              30407190
0810 0 D303               STO   3 OUT        * IN OUTPUT WORD                30407200
0811 0 70D5               MDX     TBLI                                       30407210
                    ********************************************           30407220
                    *                                                        30407230
                    *                TERMINATE MESSAGE ROUTINE               30407240
                    *                                                        30407250
0812 0 0000         ENDM  DC      /0000                                      30407260
0813 0 C048               LD      ANY&3                                      30407270
0814 1 6680 07AC          LDX  I2 WRDCT&1                                    30407280
0816 1 4C18 0829          BSC  L  ENDM2,&-   BR IF TABLE EMPTY               30407290
0818 0 6102               LDX   1 2                                          30407300
0819 0 6941               STX   1 ANY&2                                      30407310
081A 0 C0AF               LD      SLTWD                                      30407320
081B 1 4C18 0821          BSC  L  ENDM1,&-   BR IF LAST SHIFTED              30407330
081D 1 EE00 0874          OR   L2 ANY&27                                     30407340
081F 1 D600 0874          STO  L2 ANY&27                                     30407350
                    *                                                        30407360
0821 1 C400 0909    ENDM1 LD   L  RED1       SET TABLE TERMINATOR            30407370
0823 1 D600 0875          STO  L2 ANY&28                                     30407380
0825 0 C032               LD      FUND                                       30407390
0826 1 D600 0876          STO  L2 ANY&29                                     30407400
0828 0 7002               MDX     ENDM3                                      30407410
                    *                                                        30407420
0829 0 C02E         ENDM2 LD      FUND       SET TABLE TERMINATOR            30407430
082A 0 D030               STO     ANY&2                                      30407440
                    *                                                        30407450
082B 0 C0A2         ENDM3 LD      K0008      RESTORE PTR RTN                 30407460
082C 1 D400 0A2A          STO  L  STS&PTRO                                   30407470
                    *                                                        30407480
082E 0 6200               LDX   2 0                                          30407490
```



```
082F 1 6E00 05E0          STX  L2 SW1                                        30407500
                    *                                                        30407510
0831 1 4C80 0812          BSC  I  ENDM       RETURN TO USER                  30407520
                    ********************************************           30407530
                    *                                                        30407540
                    *                PRINT ERROR ROUTINE                     30407550
                    *                                                        30407560
0833 0 0000         PRDSW DC      /0000                                      30407570
0834 0 D815               STD     EMESG&5    SAVE DATA MESSAGE               30407580
                    *                                                        30407590
0835 0 690F               STX   1 EMESG      SAVE MESSAGE ID NO              30407600
                    *                                                        30407610
                    ********************************************           30407620
0836 0 4480 0162          BSI  I  ERROR                          *           30407630
0838 1 0845               DC      EMESG      MESSAGE ADDR        *           30407640
0839 0 0000               DC                 LOOP ON ERR - NONE  *           30407650
                    ********************************************           30407660
083A 0 6303               LDX   3 3          RESET MODIFIER WORD CNT         30407670
083B 0 6B0B               STX   3 EMESG&2                                    30407680
083C 1 6700 0A28          LDX  L3 PTR0       RESTORE XR3                     30407690
083E 1 4C80 0833          BSC  I  PRDSW      RETURN TO USER                  30407700
                    *                                                        30407710
                    *                                                        30407720
0840 1 6D00 05E5    PDSWX STX  L1 MLSCF                                      30407730
0842 0 4480 0161          BSI  I  START                                      30407740
                    *                                                        30407750
0844    0000              BSS  E                                             30407760
0844 0 E000         KE000 DC      /E000      ERROR ID                        30407770
0845 0 0000         EMESG DC      /0000      MESSAGE ID NO                   30407780
0846 0 0000               DC      /0000      HEX     OUTPUT                  30407790
0847 0 0003               DC      /0003      DATA ID WORD                    30407800
0848 0 0000               DC      /0000      ALPHA ADDR                      30407810
0849 0 0000               DC      /0000      ALPHA ADDR                      30407820
084A 0 0000               DC      /0000      DSWAS                           30407830
084B 0 0000               DC      /0000      DSW S/B                         30407840
                    *                                                        30407850
                    *                                                        30407860
084C 0 0000         TIMEX DC      /0000      DELAY TIME  STORAGE             30407870
084D 0 000B         ELVEN DC      11                                         30407880
                    ********************************************           30407890
                    *                                                        30407900
                    *                PRINTER TEST SEQUENCE                   30407910
                    *                     CONTROL TABLE                      30407920
                    *                                                        30407930
084E 1 0859         FUNR  DC      ANY        KEYBOARD OPTION                 30407940
084F 1 08FA               DC      TACAR      TAB & CARRIER RETURN            30407950
0850 1 090B               DC      UCASE      UPPER CASE CHARS                30407960
0851 1 0927               DC      LCASE      LOWER CASE CHARS                30407970
0852 1 0943               DC      COLOR      COLOR SHIFT ROUTINE             30407980
0853 1 0959               DC      SPNDX      BACKSPACE AND INDEX             30407990
0854 1 0977               DC      AUCAR      AUTO CARRIER RETURN             30408000
0855 1 0992               DC      ROCK       TEST TILT                       30408010
0856 1 09C4               DC      ROLL       TEST ROTATE                     30408020
0857 1 09F6               DC      TWIST      TEST TILT AND ROTATE            30408030
0858 0 FFFF         FUND  DC      /FFFF                          *           30408040
                    ********************************************           30408050
                    *                                                        30408060
                    *                KEYBOARD OPTION TABLE                   30408070
                    *                                                        30408080
0859 0 0001         ANY   DC      1          ITCNT                           30408090
085A 0 05FF               DC      /05FF      BLACK                           30408100
085B 0 FFFF               DC      /FFFF      ITCNT                           30408110
085C 0 0000               DC      /0000                                      30408120
085D 0 0000               DC      /0000                                      30408130
085E 0 0000               DC      /0000                                      30408140
085F 0 0000               DC      /0000                                      30408150
0860 0 0000               DC      /0000                                      30408160
0861 0 0000               DC      /0000                                      30408170
```

```
0862 0 0000                DC      /0000                                30408180
0863 0 0000                DC      /0000                                30408190
0864 0 0000                DC      /0000                                30408200
0865 0 0000                DC      /0000                                30408210
0866 0 0000                DC      /0000                                30408220
0867 0 0000                DC      /0000                                30408230
0868 0 0000                DC      /0000                                30408240
0869 0 0000                DC      /0000                                30408250
086A 0 0000                DC      /0000                                30408260
086B 0 0000                DC      /0000                                30408270
086C 0 0000                DC      /0000                                30408280
086D 0 0000                DC      /0000                                30408290
086E 0 0000                DC      /0000                                30408300
086F 0 0000                DC      /0000                                30408310
0870 0 0000                DC      /0000                                30408320
0871 0 0000                DC      /0000                                30408330
0872 0 0000                DC      /0000                                30408340
0873 0 0000                DC      /0000                                30408350
0874 0 0000                DC      /0000                                30408360
0875 0 FFFF                DC      /FFFF                                30408370
                  ********************************************           30408380
                  *                                                    30408390
                  *                                                    30408400
                  *                END PROGRAM ROUTINE                 30408410
                  *                                                    30408420
                  ********************************************         30408430
0876 0 4480 0164  TYEND BSI  I  END                                    30408440
                  ********************************************         30408450
                  *                                                    30408460
                  *                                                    30408470
                  *                KEYBOARD CODE TABLE                 30408480
                  *                                                    30408490
0878 0 4220       KECOD DC      /4220     *                            30408500
0879 0 3000             DC      /3000     /                            30408510
087A 0 2000             DC      /2000     0                            30408520
087B 0 1000             DC      /1000     1                            30408530
087C 0 0800             DC      /0800     2                            30408540
087D 0 0400             DC      /0400     3                            30408550
087E 0 0200             DC      /0200     4                            30408560
087F 0 0100             DC      /0100     5                            30408570
0880 0 0080             DC      /0080     6                            30408580
0881 0 0040             DC      /0040     7                            30408590
0882 0 0020             DC      /0020     8                            30408600
0883 0 0010             DC      /0010     9                            30408610
0884 0 4420             DC      /4420     $                            30408620
0885 0 8420             DC      /8420     .                            30408630
0886 0 2420             DC      /2420     ,                            30408640
0887 0 00A0             DC      /00A0     #                            30408650
0888 0 0120             DC      /0120     @                            30408660
0889 0 8120             DC      /8120     %                            30408670
088A 0 4120             DC      /4120     ¤                            30408680
088B 0 80A0             DC      /80A0     &                            30408690
088C 0 4000             DC      /4000     -                            30408700
088D 0 8820             DC      /8820     CENT SIGN                    30408710
088E 0 8220             DC      /8220     LESS THAN                    30408720
088F 0 8060             DC      /8060     LOGICAL OR                   30408730
0890 0 8000             DC      /8000     AND                          30408740
0891 0 4820             DC      /4820     EXCLAIMATION                 30408750
0892 0 40A0             DC      /40A0     SEMI COLON                   30408760
0893 0 4060             DC      /4060     LOGICAL NOT                  30408770
0894 0 2220             DC      /2220     PER CENT                     30408780
0895 0 2120             DC      /2120     UNDERSCORE                   30408790
0896 0 20A0             DC      /20A0     GREATER THAN                 30408800
0897 0 2060             DC      /2060     QUESTION MARK                30408810
0898 0 0820             DC      /0820     COLON                        30408820
0899 0 0420             DC      /0420     NUMBERS                      30408830
089A 0 0220             DC      /0220     AT                           30408840
089B 0 0060             DC      /0060     QUOTE                        30408850
```



```
089C 0 9000       TYCOD DC      /9000     A                            30408860
089D 0 8800             DC      /8800     B                            30408870
089E 0 8400             DC      /8400     C                            30408880
089F 0 8200             DC      /8200     D                            30408890
08A0 0 8100             DC      /8100     E                            30408900
08A1 0 8080             DC      /8080     F                            30408910
08A2 0 8040             DC      /8040     G                            30408920
08A3 0 8020             DC      /8020     H                            30408930
08A4 0 8010             DC      /8010     I                            30408940
08A5 0 5000             DC      /5000     J                            30408950
08A6 0 4800             DC      /4800     K                            30408960
08A7 0 4400             DC      /4400     L                            30408970
08A8 0 4200             DC      /4200     M                            30408980
08A9 0 4100             DC      /4100     N                            30408990
08AA 0 4080             DC      /4080     O                            30409000
08AB 0 4040             DC      /4040     P                            30409010
08AC 0 4020             DC      /4020     Q                            30409020
08AD 0 4010             DC      /4010     R                            30409030
08AE 0 2800             DC      /2800     S                            30409040
08AF 0 2400             DC      /2400     T                            30409050
08B0 0 2200             DC      /2200     U                            30409060
08B1 0 2100             DC      /2100     V                            30409070
08B2 0 2080             DC      /2080     W                            30409080
08B3 0 2040             DC      /2040     X                            30409090
08B4 0 2020             DC      /2020     Y                            30409100
08B5 0 2010             DC      /2010     Z                            30409110
08B6 0 0000             DC      /0000     SPACE                        30409120
08B7 0 2820             DC      /2820     0 - 8 - 2                    30409130
08B8 0 0008             DC      /0008     EOF                          30409140
                                                                       30409150
                  *                                                    30409160
                  *                PRINTER CODE TABLE                  30409170
                  *                                                    30409180
08B9 0 D6D6       TYCOD DC      /D6D6     *                            30409190
08BA 0 BCBC             DC      /BCBC     /                            30409200
08BB 0 C4C4             DC      /C4C4     0                            30409210
08BC 0 FCFC             DC      /FCFC     1                            30409220
08BD 0 D8D8             DC      /D8D8     2                            30409230
08BE 0 DCDC             DC      /DCDC     3                            30409240
08BF 0 F0F0             DC      /F0F0     4                            30409250
08C0 0 F4F4             DC      /F4F4     5                            30409260
08C1 0 D0D0             DC      /D0D0     6                            30409270
08C2 0 D4D4             DC      /D4D4     7                            30409280
08C3 0 E4E4             DC      /E4E4     8                            30409290
08C4 0 E0E0             DC      /E0E0     9                            30409300
08C5 0 4040             DC      /4040     $                            30409310
08C6 0 0000             DC      /0000     .                            30409320
08C7 0 8080             DC      /8080     ,                            30409330
08C8 0 C2C2             DC      /C2C2     #                            30409340
08C9 0 E6E6             DC      /E6E6     @                            30409350
08CA 0 FEFE             DC      /FEFE     %                            30409360
08CB 0 F6F6             DC      /F6F6     ¤                            30409370
08CC 0 DADA             DC      /DADA     &                            30409380
08CD 0 8484             DC      /8484     -                            30409390
08CE 0 0202             DC      /0202     CENTS SIGN                   30409400
08CF 0 DEDE             DC      /DEDE     LESS THAN                    30409410
08D0 0 C6C6             DC      /C6C6     LOGICAL OR                   30409420
08D1 0 4444             DC      /4444     AND                          30409430
08D2 0 4242             DC      /4242     EXCLAIMATION                 30409440
08D3 0 D2D2             DC      /D2D2     SEMI COLON                   30409450
08D4 0 F2F2             DC      /F2F2     LOGICAL NOT                  30409460
08D5 0 0606             DC      /0606     PERCENT SIGN                 30409470
08D6 0 BEBE             DC      /BEBE     UNDERSCORE                   30409480
08D7 0 4646             DC      /4646     GREATER THAN                 30409490
08D8 0 8686             DC      /8686     QUESTION MARK                30409500
08D9 0 8282             DC      /8282     COLON                        30409510
08DA 0 C0C0             DC      /C0C0     NUMBERS                      30409520
08DB 0 0404             DC      /0404     AT                           30409530
08DC 0 E2E2             DC      /E2E2     QUOTE
```

```
08DD 0 3C3E          DC    /3C3E     A                    30409540
08DE 0 181A          DC    /181A     B                    30409550
08DF 0 1C1E          DC    /1C1E     C                    30409560
08E0 0 3032          DC    /3032     D                    30409570
08E1 0 3436          DC    /3436     E                    30409580
08E2 0 1012          DC    /1012     F                    30409590
08E3 0 1416          DC    /1416     G                    30409600
08E4 0 2426          DC    /2426     H                    30409610
08E5 0 2022          DC    /2022     I                    30409620
08E6 0 7C7E          DC    /7C7E     J                    30409630
08E7 0 585A          DC    /585A     K                    30409640
08E8 0 5C5E          DC    /5C5E     L                    30409650
08E9 0 7072          DC    /7072     M                    30409660
08EA 0 7476          DC    /7476     N                    30409670
08EB 0 5052          DC    /5052     O                    30409680
08EC 0 5456          DC    /5456     P                    30409690
08ED 0 6466          DC    /6466     Q                    30409700
08EE 0 6062          DC    /6062     R                    30409710
08EF 0 989A          DC    /989A     S                    30409720
08F0 0 9C9E          DC    /9C9E     T                    30409730
08F1 0 B0B2          DC    /B0B2     U                    30409740
08F2 0 B4B6          DC    /B4B6     V                    30409750
08F3 0 9092          DC    /9092     W                    30409760
08F4 0 9496          DC    /9496     X                    30409770
08F5 0 A4A6          DC    /A4A6     Y                    30409780
08F6 0 A0A2          DC    /A0A2     Z                    30409790
08F7 0 2121          DC    /2121     SPACE                30409800
08F8 0 0303          DC    /0303     LINE FEED            30409810
08F9 0 8181          DC    /8181     CR                   30409820
                     *                                    30409830
                     *                                    30409840
                     *          TAB AND CARRIER RETURN    30409850
                     *                                    30409860
08FA 0 0001          TACAR DC    1         ITCNT          30409870
08FB 0 85FF                DC    /85FF     BLACK          30409880
08FC 0 0002                DC    2         ITCNT          30409890
08FD 0 811E                DC    /811E     CR   C         30409900
08FE 0 3C60                DC    /3C60     A    R         30409910
08FF 0 6020                DC    /6020     R    I         30409920
0900 0 3460                DC    /3460     E    R         30409930
0901 0 2160                DC    /2160          R         30409940
0902 0 349C                DC    /349C     E    T         30409950
0903 0 B060                DC    /B060     U    R         30409960
0904 0 7441                DC    /7441     N    TAB       30409970
0905 0 9E3C                DC    /9E3C     T    A         30409980
0906 0 18B0                DC    /18B0     B    U         30409990
0907 0 5C3C                DC    /5C3C     L    A         30410000
0908 0 9C34                DC    /9C34     T    E         30410010
0909 0 09FF          RED1  DC    /09FF     RED            30410020
090A 0 FFFF                DC    /FFFF                    30410030
                     *                                    30410040
                     *                                    30410050
                     *          CHARACTER COMPLIMENT      30410060
                     *                                    30410070
                     *          UPPER CASE                30410080
                     *                                    30410090
                     *                                    30410100
090B 0 0001          UCASE DC    1         ITCNT          30410110
090C 0 85FF                DC    /85FF     BLACK          30410120
090D 0 0002                DC    2         ITCNT          30410130
090E 0 813E                DC    /813E     CR   A         30410140
090F 0 1A1E                DC    /1A1E     B    C         30410150
0910 0 3236                DC    /3236     D    E         30410160
0911 0 1216                DC    /1216     F    G         30410170
0912 0 2622                DC    /2622     H    I         30410180
0913 0 7E5A                DC    /7E5A     J    K         30410190
0914 0 5E72                DC    /5E72     L    M         30410200
0915 0 7652                DC    /7652     N    O         30410210
```



```
0916 0 5666          DC    /5666     &    Q               30410220
0917 0 629A          DC    /629A     R    S               30410230
0918 0 9EB2          DC    /9EB2     T    U               30410240
0919 0 B692          DC    /B692     V    W               30410250
091A 0 96A6          DC    /96A6     X    Y               30410260
091B 0 A221          DC    /A221     Z    SP              30410270
091C 0 FEDA          DC    /FEDA     %    &               30410280
091D 0 DEF2          DC    /DEF2     LES  INT             30410290
091E 0 F6D2          DC    /F6D2     ¤    SMI             30410300
091F 0 D6E6          DC    /D6E6     *    @               30410310
0920 0 E2C6          DC    /E2C6     QTE  LOR             30410320
0921 0 C2BE          DC    /C2BE     @    UDR             30410330
0922 0 8682          DC    /8682     QSN  CLN             30410340
0923 0 4642          DC    /4642     GTR  EXC             30410350
0924 0 0602          DC    /0602     PCT  CNT             30410360
0925 0 09FF          DC    /09FF     RED                  30410370
0926 0 FFFF          DC    /FFFF                          30410380
                     *                                    30410390
                     *                LOWER CASE          30410400
                     *                                    30410410
0927 0 0001          LCASE DC    1         ITCNT          30410420
0928 0 85FF                DC    /85FF     BLACK          30410430
0929 0 0002                DC    2         ITCNT          30410440
092A 0 813C                DC    /813C     CR   A         30410450
092B 0 181C                DC    /181C     B    C         30410460
092C 0 3034                DC    /3034     D    E         30410470
092D 0 1014                DC    /1014     F    G         30410480
092E 0 2420                DC    /2420     H    I         30410490
092F 0 7C58                DC    /7C58     J    K         30410500
0930 0 5C70                DC    /5C70     L    M         30410510
0931 0 7450                DC    /7450     N    O         30410520
0932 0 5464                DC    /5464     P    Q         30410530
0933 0 6098                DC    /6098     R    S         30410540
0934 0 9CB0                DC    /9CB0     T    U         30410550
0935 0 B490                DC    /B490     V    W         30410560
0936 0 94A4                DC    /94A4     X    Y         30410570
0937 0 A021                DC    /A021     Z    SP        30410580
0938 0 FCD8                DC    /FCD8     1    2         30410590
0939 0 DCF0                DC    /DCF0     3    4         30410600
093A 0 F4D0                DC    /F4D0     5    6         30410610
093B 0 D4E4                DC    /D4E4     7    8         30410620
093C 0 E0C4                DC    /E0C4     9    0         30410630
093D 0 C0BC                DC    /C0BC     NOS  /         30410640
093E 0 8480                DC    /8480     -    ,         30410650
093F 0 4440                DC    /4440     AND  $         30410660
0940 0 0400                DC    /0400     AT   .         30410670
0941 0 09FF                DC    /09FF     RED            30410680
0942 0 FFFF                DC    /FFFF                    30410690
                     *                                    30410700
                     *                                    30410710
                     *          COLOR SHIFT               30410720
                     *                                    30410730
0943 0 0002          COLOR DC    2         ITCNT          30410740
0944 0 81FF                DC    /81FF     CR             30410750
0945 0 0014                DC    20        ITCNT          30410760
0946 0 0952                DC    /0952     RED 0          30410770
0947 0 1105                DC    /1105     BSP  BLK       30410780
0948 0 DA21                DC    /DA21     +    SP        30410790
0949 0 21FF                DC    /21FF     SP             30410800
094A 0 003B                DC    59        ITCNT          30410810
094B 0 11FF                DC    /11FF     BSP            30410820
094C 0 0014                DC    20        ITCNT          30410830
094D 0 0952                DC    /0952     RED 0          30410840
094E 0 1105                DC    /1105     BSP  BLK       30410850
094F 0 DA21                DC    /DA21     +    SP        30410860
0950 0 21FF                DC    /21FF     SP             30410870
0951 0 003B                DC    59        ITCNT          30410880
0952 0 11FF                DC    /11FF     BSP            30410890
```

```
0953 0 0014          DC    20          ITCNT                30410900
0954 0 0952          DC    /0952       RED 0                30410910
0955 0 1105          DC    /1105       BSP BLK              30410920
0956 0 DA21          DC    /DA21       +   SP               30410930
0957 0 21FF          DC    /21FF       SP                   30410940
0958 0 FFFF          DC    /FFFF                            30410950
                     *                                      30410960
                     *                                      30410970
                     *          BACK SPACE AND INDEX        30410980
                     *                                      30410990
0959 0 0001    SPNDX DC    1           ITCNT                30411000
095A 0 8181          DC    /8181       CR  CR               30411010
095B 0 45FF          DC    /45FF       BLACK                30411020
095C 0 0002          DC    2           ITCNT                30411030
095D 0 3611          DC    /3611       E   *                30411040
095E 0 111E          DC    /111E       *   C                30411050
095F 0 1111          DC    /1111       *   *                30411060
0960 0 3E11          DC    /3E11       A   *                30411070
0961 0 1156          DC    /1156       *   P                30411080
0962 0 1111          DC    /1111       *   *                30411090
0963 0 9A11          DC    /9A11       S   *                30411100
0964 0 1111          DC    /1111       *   *                30411110
0965 0 5A11          DC    /5A11       K   *                30411120
0966 0 111E          DC    /111E       *   C                30411130
0967 0 1111          DC    /1111       *   *                30411140
0968 0 3E11          DC    /3E11       A   *                30411150
0969 0 111A          DC    /111A       *   B                30411160
096A 0 8141          DC    /8141       CR  TAB              30411170
096B 0 2203          DC    /2203       I   LF               30411180
096C 0 1176          DC    /1176       BS  N                30411190
096D 0 0311          DC    /0311       LF  BS               30411200
096E 0 3203          DC    /3203       D   LF               30411210
096F 0 1136          DC    /1136       BS  E                30411220
0970 0 0311          DC    /0311       LF  BS               30411230
0971 0 9603          DC    /9603       X   LF               30411240
0972 0 1103          DC    /1103       BS  LF               30411250
0973 0 09FF          DC    /09FF       RED                  30411260
0974 0 0002          DC    2           ITCNT                30411270
0975 0 85FF          DC    /85FF       CR                   30411280
0976 0 FFFF          DC    /FFFF                            30411290
                     *                                      30411300
                     *                                      30411310
                     * AUTOMATIC CARRIER RETURN *           30411320
                     *                                      30411330
0977 0 0001    AUCAR DC    /0001       ITCNT                30411340
0978 0 85FF          DC    /85FF       BLACK                30411350
0979 0 0001          DC    1           ITCNT                30411360
097A 0 1E3C          DC    /1E3C       C   A                30411370
097B 0 6060          DC    /6060       R   R                30411380
097C 0 2034          DC    /2034       I   E                30411390
097D 0 6021          DC    /6021       R                    30411400
097E 0 6034          DC    /6034       R   E                30411410
097F 0 9CB0          DC    /9CB0       T   U                30411420
0980 0 6074          DC    /6074       R   N                30411430
0981 0 21FF          DC    /21FF                            30411440
0982 0 0078          DC    120         ITCNT                30411450
0983 0 21FF          DC    /21FF       SPACE                30411460
0984 0 0001          DC    1           ITCNT                30411470
0985 0 09FF          DC    /09FF       RED                  30411480
0986 0 0001          DC    1           ITCNT                30411490
0987 0 1E3C          DC    /1E3C       C   A                30411500
0988 0 6060          DC    /6060       R   R                30411510
0989 0 2034          DC    /2034       I   E                30411520
098A 0 6021          DC    /6021       R                    30411530
098B 0 6034          DC    /6034       R   E                30411540
098C 0 9CB0          DC    /9CB0       T   U                30411550
098D 0 6074          DC    /6074       R   N                30411560
098E 0 21FF          DC    /21FF                            30411570
```



```
098F 0 0078          DC    120         ITCNT                30411580
0990 0 21FF          DC    /21FF       SPACE                30411590
0991 0 FFFF          DC    /FFFF                            30411600
                     *                                      30411610
                     *                                      30411620
0992 0 0001    ROCK  DC    1           ITCNT                30411630
0993 0 85FF          DC    /85FF       BLACK                30411640
0994 0 0002          DC    2           ITCNT                30411650
0995 0 81C0          DC    /81C0       CR  NOS              30411660
0996 0 8040          DC    /8040       ,   $                30411670
0997 0 0020          DC    /0020       .   I                30411680
0998 0 60A0          DC    /60A0       R   Z                30411690
0999 0 E0D0          DC    /E0D0       9   6                30411700
099A 0 9050          DC    /9050       W   O                30411710
099B 0 1030          DC    /1030       F   D                30411720
099C 0 70B0          DC    /70B0       M   U                30411730
099D 0 F0D8          DC    /F0D8       4   2                30411740
099E 0 9858          DC    /9858       S   K                30411750
099F 0 1804          DC    /1804       B   AT               30411760
09A0 0 4484          DC    /4484       AND -                30411770
09A1 0 C4E4          DC    /C4E4       0   8                30411780
09A2 0 A464          DC    /A464       Y   Q                30411790
09A3 0 2414          DC    /2414       H   G                30411800
09A4 0 5494          DC    /5494       P   X                30411810
09A5 0 D4F4          DC    /D4F4       7   5                30411820
09A6 0 B474          DC    /B474       V   N                30411830
09A7 0 341C          DC    /341C       E   C                30411840
09A8 0 5C9C          DC    /5C9C       L   T                30411850
09A9 0 DCFC          DC    /DCFC       3   1                30411860
09AA 0 BC7C          DC    /BC7C       /   J                30411870
09AB 0 3C21          DC    /3C21       A                    30411880
09AC 0 0242          DC    /0242       CNT ECX              30411890
09AD 0 82C2          DC    /82C2       CLN #                30411900
09AE 0 E2A2          DC    /E2A2       QTE Z                30411910
09AF 0 6222          DC    /6222       R   LOR              30411920
09B0 0 1252          DC    /1252       F   Q                30411930
09B1 0 92D2          DC    /92D2       W   SMI              30411940
09B2 0 F2B2          DC    /F2B2       I   U                30411950
09B3 0 7232          DC    /7232       M   D                30411960
09B4 0 1A5A          DC    /1A5A       B   K                30411970
09B5 0 9ADA          DC    /9ADA       S   T                30411980
09B6 0 C686          DC    /C686       LNT QSN              30411990
09B7 0 4606          DC    /4606       GTR PCT              30412000
09B8 0 2666          DC    /2666       H   Q                30412010
09B9 0 A6E6          DC    /A6E6       Y   @                30412020
09BA 0 D696          DC    /D696       *   X                30412030
09BB 0 5616          DC    /5616       P   G                30412040
09BC 0 3676          DC    /3676       E   N                30412050
09BD 0 B6F6          DC    /B6F6       V   ¤                30412060
09BE 0 DE9E          DC    /DE9E       LES T                30412070
09BF 0 5E1E          DC    /5E1E       L   C                30412080
09C0 0 3E7E          DC    /3E7E       A   J                30412090
09C1 0 BEFE          DC    /BEFE       UDR %                30412100
09C2 0 09FF          DC    /09FF       RED                  30412110
09C3 0 FFFF          DC    /FFFF                            30412120
                     *                                      30412130
                     *                                      30412140
09C4 0 0001    ROLL  DC    1           ITCNT                30412150
09C5 0 85FF          DC    /85FF       BLACK                30412160
09C6 0 0002          DC    2           ITCNT                30412170
09C7 0 81C0          DC    /81C0       CR  NOS              30412180
09C8 0 E0D0          DC    /E0D0       9   6                30412190
09C9 0 F0D8          DC    /F0D8       4   2                30412200
09CA 0 C4E4          DC    /C4E4       0   8                30412210
09CB 0 D4F4          DC    /D4F4       7   5                30412220
09CC 0 DCFC          DC    /DCFC       3   1                30412230
09CD 0 BC9C          DC    /BC9C       /   T                30412240
09CE 0 B494          DC    /B494       V   X                30412250
```

```
09CF 0 A484          DC      /A484       Y   -                30412260
09D0 0 98B0          DC      /98B0       S   U                30412270
09D1 0 90A0          DC      /90A0       W   Z                30412280
09D2 0 8040          DC      /8040       ,   $                30412290
09D3 0 6050          DC      /6050       R   O                30412300
09D4 0 7058          DC      /7058       M   K                30412310
09D5 0 4464          DC      /4464       AND Q                30412320
09D6 0 5474          DC      /5474       P   N                30412330
09D7 0 5C7C          DC      /5C7C       L   J                30412340
09D8 0 3C1C          DC      /3C1C       A   C                30412350
09D9 0 3414          DC      /3414       E   G                30412360
09DA 0 2404          DC      /2404       H   AT               30412370
09DB 0 1830          DC      /1830       B   D                30412380
09DC 0 1020          DC      /1020       F   I                30412390
09DD 0 0021          DC      /0021       .                    30412400
09DE 0 3E1E          DC      /3E1E       A   C                30412410
09DF 0 3616          DC      /3616       E   G                30412420
09E0 0 2606          DC      /2606       H   PCT              30412430
09E1 0 1A32          DC      /1A32       B   D                30412440
09E2 0 1222          DC      /1222       F   I                30412450
09E3 0 0242          DC      /0242       CNT EXC              30412460
09E4 0 6252          DC      /6252       R   O                30412470
09E5 0 725A          DC      /725A       M   K                30412480
09E6 0 4666          DC      /4666       GTR Q                30412490
09E7 0 5676          DC      /5676       P   N                30412500
09E8 0 5E7E          DC      /5E7E       L   J                30412510
09E9 0 BE9E          DC      /BE9E       UDR T                30412520
09EA 0 B696          DC      /B696       V   X                30412530
09EB 0 A686          DC      /A686       Y   QSN              30412540
09EC 0 9AB2          DC      /9AB2       S   U                30412550
09ED 0 92A2          DC      /92A2       W   Z                30412560
09EE 0 82C2          DC      /82C2       CLN #                30412570
09EF 0 E2D2          DC      /E2D2       QTE SMI              30412580
09F0 0 F2DA          DC      /F2DA       LNT &                30412590
09F1 0 C6E6          DC      /C6E6       LOR @                30412600
09F2 0 D6F6          DC      /D6F6       *   ¤                30412610
09F3 0 DEFE          DC      /DEFE       LES %                30412620
09F4 0 29FF          DC      /29FF       RED                  30412630
09F5 0 FFFF          DC      /FFFF                            30412640
                     *                                        30412650
                     *                                        30412660
09F6 0 0001  TWIST   DC      1           ITCNT                30412670
09F7 0 85FF          DC      /85FF       BLACK                30412680
09F8 0 0002          DC      2           ITCNT                30412690
09F9 0 81C0          DC      /81C0       CR  NOS              30412700
09FA 0 3E80          DC      /3E80       A   ,                30412710
09FB 0 7E40          DC      /7E40       J   $                30412720
09FC 0 BE00          DC      /BE00       UDR .                30412730
09FD 0 FE20          DC      /FE20       %   I                30412740
09FE 0 DE60          DC      /DE60       LES R                30412750
09FF 0 9EA0          DC      /9EA0       T   Z                30412760
0A00 0 5EE0          DC      /5EE0       L   9                30412770
0A01 0 1ED0          DC      /1ED0       C   6                30412780
0A02 0 3690          DC      /3690       E   W                30412790
0A03 0 7650          DC      /7650       N   O                30412800
0A04 0 B610          DC      /B610       V   F                30412810
0A05 0 F630          DC      /F630       ¤   D                30412820
0A06 0 D670          DC      /D670       *   M                30412830
0A07 0 96B0          DC      /96B0       X   U                30412840
0A08 0 56F0          DC      /56F0       P   4                30412850
0A09 0 16D8          DC      /16D8       G   2                30412860
0A0A 0 2698          DC      /2698       H   S                30412870
0A0B 0 6658          DC      /6658       Q   K                30412880
0A0C 0 A618          DC      /A618       Y   B                30412890
0A0D 0 E604          DC      /E604       @   AT               30412900
0A0E 0 C644          DC      /C644       LOR AND              30412910
0A0F 0 8684          DC      /8684       QSN -                30412920
0A10 0 46C4          DC      /46C4       GTR 0                30412930
```



```
0A11 0 06E4          DC      /06E4       PCT 8                30412940
0A12 0 1AA4          DC      /1AA4       B   Y                30412950
0A13 0 5A64          DC      /5A64       K   Q                30412960
0A14 0 9A24          DC      /9A24       S   H                30412970
0A15 0 DA14          DC      /DA14       &   G                30412980
0A16 0 F254          DC      /F254       LNT P                30412990
0A17 0 B294          DC      /B294       U   X                30413000
0A18 0 72D4          DC      /72D4       M   7                30413010
0A19 0 32F4          DC      /32F4       D   5                30413020
0A1A 0 12B4          DC      /12B4       F   V                30413030
0A1B 0 5274          DC      /5274       O   N                30413040
0A1C 0 9234          DC      /9234       W   E                30413050
0A1D 0 D21C          DC      /D21C       SMI C                30413060
0A1E 0 E25C          DC      /E25C       QTE L                30413070
0A1F 0 A29C          DC      /A29C       Z   T                30413080
0A20 0 62DC          DC      /62DC       R   3                30413090
0A21 0 22FC          DC      /22FC       I   1                30413100
0A22 0 02BC          DC      /02BC       CNT /                30413110
0A23 0 427C          DC      /427C       EXC J                30413120
0A24 0 823C          DC      /823C       CLN A                30413130
0A25 0 C225          DC      /C225       %  BLACK             30413140
0A26 0 29FF          DC      /29FF       RED                  30413150
0A27 0 FFFF          DC      /FFFF                            30413160
*********************************************                 30413170
*********************************************                 30413180
*                                                            30413190
*                    PRINTER OUTPUT STATUS                   30413200
*                         TABLES                             30413210
*                    PRINTER NO 0                            30413220
0A28   0000          BSS  E  0                          LABEL 30413230
0A28 1 08FA  PTRO    DC      TACAR       WORD POINTER    ADR   30413240
0A29 0 0002          DC      2           TEST POINTER    RTN   30413250
0A2A 0 8000          DC      /8000       PTR STATUS      STS   30413260
*                    /A000               SELECT KBD             30413270
*                    /C000               READ KBD NEXT          30413280
*                    /FC00-FFFE          COUNT FOR INTERRUPT    30413290
*                    /FFFF               LOST INT ERROR         30413300
*                    /E000               WAIT TYP READ INTERT   30413310
*                    /F000               WAIT KBD INT           30413320
*                    /8000               IGNORE                 30413330
0A2B 0 81FF          DC      /81FF       NEXT PTR OUTPUT WORD OUT 30413340
0A2C 0 0001          DC      1           ITERATION COUNT     ITR  30413350
0A2D 0 0001          DC      1           SHIFT WORD          SLT  30413360
0A2E 0 0000          DC                  WORDS PRINTED       NOS  30413370
0A2F 0 0000          DC                  LAST ITCNT ADDR PT  PAD  30413380
0A30 1 0A2B          DC      PTR0&OUT                        WRT  30413390
0A31 0 0900          DC      /0900       WRITE COMMAND           30413400
0A32 0 0000          DC      0                               PTR  30413410
0A33 0 0F01          DC      /0F01       SENSE DSW COMMAND       30413420
0A34 0 0000          DC                  SENSE - NO RESET    SNR  30413430
0A35 0 0F00          DC      /0F00                               30413440
0A36 0 0000          DC                                      KEY  30413450
0A37 0 0C00          DC      /0C00       SELECT KEYBOARD CMD     30413460
0A38 1 0A36          DC      PTR0&KEY                        SEE  30413470
0A39 0 0A00          DC      /0A00       READ KEYBOARD CMD       30413480
0A3A 0 0000          DC      /0000       ERROR DSW WAS       ERR  30413490
0A3B 0 0000          DC      /0000       DSW SHOULD HAVE BEEN    30413500
0A3C 1 0A3E  RDBS    DC      BITSW                               30413510
0A3D 0 3A00          DC      /3A00                               30413520
0A3E 0 0000  BITSW   DC      /0000                               30413530
*                                                                30413540
*                                                                30413550
*   KEYBOARD - CONSOLE SWITCH                                    30413560
*        STATUS ROUTINE                                          30413570
*                                                                30413580
*      THIS ROUTINE PRINTS ANY                                   30413590
*       CHANGE IN THE STATUS OF                                  30413600
*       OF THE CONSOLE/KEYBOARD                                  30413610
```

```
                        *                SWITCH.  IF NO CHANGE          30413620
                        *                IS MADE THEN NOTHING IS        30413630
                        *                PRINTED.                       30413640
                        *                                               30413650
0A3F 0 0000             SWSET DC                                        30413660
0A40 0 08F3                   XIO     SNR&PTR0   SENSE DEVICE STATUS    30413670
0A41 0 F03E                   EOR     LAST       CHECK SWITCH SETTING  30413680
0A42 1 E400 0A82              AND   L K1000                            30413690
0A44 0 E83C                   OR      FIRST                           30413700
0A45 1 4C98 0A3F              BSC   I SWSET,&-    RETURN IF NOT CNGED   30413710
                        *                                               30413720
0A47 0 08EC                   XIO     SNR&PTR0   SENSE DEVICE STATUS    30413730
0A48 1 E400 0A82              AND   L K1000                            30413740
0A4A 0 D035                   STO     LAST                            30413750
0A4B 1 4C20 0A58              BSC   L SWSC,Z     BR IF IN CONSOLE      30413760
                        *                                               30413770
0A4D 1 C400 0641              LD    L TWLVE      SET ROUTINE NO.       30413780
0A4F 1 D400 05DD              STO   L RID                             30413790
                        *                                               30413800
0A51 0 1010                   SLA     16                              30413810
0A52 1 D400 085C              STO   L ANY&3                           30413820
                        *                                               30413830
0A54 0 6500 A000              LDX   L1 /A000     SET TO SELECT KBD NEXT 30413840
0A56 0 C02C                   LD      KBMES      KEYBOARD MESSAGE      30413850
0A57 0 701A                   MDX     SWSP       GO PRINT THE SWS      30413860
                        *                                               30413870
0A58 1 4400 0812        SWSC  BSI   L ENDM       TERMINATE KBD ENTRY   30413880
0A5A 0 1810                   SRA     16                              30413890
0A5B 1 C400 05E0              LD    L SW1                             30413900
0A5D 0 18C1                   RTE     1                               30413910
0A5E 0 4820                   BSC     Z                               30413920
0A5F 0 1081                   SLT     1                               30413930
0A60 0 D001                   STO     *&1                             30413940
0A61 0 6500 0000              LDX   L1 /0000                          30413950
0A63 1 C400 085B              LD    L ANY&2      CHECK IF ANY KBD ENTRY 30413960
0A65 0 4810                   BSC     -          BR IF TABLE EMPTY     30413970
0A66 0 6101                   LDX   1 1          SET TO LOOP RTN 1     30413980
0A67 0 69C1             SWSD  STX   1 RTN&PTR0                        30413990
0A68 1 C500 084E              LD    L1 FUNR                           30414000
0A6A 0 D0BD                   STO     ADR&PTR0                        30414010
0A6B 1 C400 085A              LD    L ANY&1                           30414020
0A6D 0 D0BD                   STO     OUT&PTR0                        30414030
                        *                                               30414040
0A6E 1 6D00 05E0        SWSE  STX   L1 SW1         SET OR CLEAR LOOP RTN 30414050
0A70 0 08C7                   XIO     SEE&PTR0     DESELECT KEYBOARD     30414060
                        *                                               30414070
0A71 0 C018                   LD      CNMES        CONSOLE MESSAGE       30414080
                        *                                               30414090
0A72 0 D00C             SWSP  STO     LOGM&4       SAVE MESSAGE          30414100
0A73 0 69B6                   STX   1 STS&PTR0     SET PRINTER STATUS    30414110
0A74 0 1010                   SLA     16                              30414120
0A75 0 D00B                   STO     FIRST        RESET FIRST INDICATOR 30414130
                        ********************************************    30414140
0A76 0 4480 0163              BSI   I LOG                           *   30414150
0A78 1 0A7B                   DC      LOGM         ADRS OF MESS     *   30414160
                        ********************************************    30414170
0A79 1 4C00 065C              BSC   L GO3          RETURN TO MAINLINE    30414180
                        *                                               30414190
0A7B 0 0000             LOGM  DC      /0000                           30414200
0A7C 0 0000                   DC      /0000                           30414210
0A7D 0 0000                   DC      /0000                           30414220
0A7E 0 0000                   DC      /0000                           30414230
0A7F 0 0000                   DC      /0000                           30414240
                        *                                               30414250
                        *                                               30414260
0A80 0 0000             LAST  DC      /0000        LAST KBD/CNSL SW SET  30414270
0A81 1 0A81             FIRST DC      FIRST        PROG RESRT INDICATOR  30414280
0A82 0 1000             K1000 DC      /1000        CONSTANT              30414290
```



```
                        *                                               30414300
0A83 1 0A84             KBMES DC      KBMES&1                           30414310
0A84 0 5A36                   DC      /5A36        KEYBOARD             30414320
0A85 0 A61A                   DC      /A61A                             30414330
0A86 0 523E                   DC      /523E                             30414340
0A87 0 6232                   DC      /6232                             30414350
0A88 0 8100                   DC      /8100                             30414360
0A89 0 FFFF                   DC      /FFFF        TERMINATOR           30414370
                        *                                               30414380
0A8A 1 0A8B             CNMES DC      CNMES&1                           30414390
0A8B 0 1E52                   DC      /1E52        CONSOLE              30414400
0A8C 0 769A                   DC      /769A                             30414410
0A8D 0 525E                   DC      /525E                             30414420
0A8E 0 3600                   DC      /3600                             30414430
0A8F 0 FFFF                   DC      /FFFF        TERMINATOR           30414440
                        ********************************************    30414450
                        *                                               30414460
0A90   0643                   END     TYCUS                             30414470
 NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```

C R O S S R E F E R E N C E

NAME	VALUE	REFERENCES
ADR	0000	06DE,06E3,0A6A
ALL	0734	072E
ANY	0859	0615,061B,064B,065A,065E,07E3,07E5,0802,0806,080D,0813,0819,081D 081F,0823,0826,082A,084E,0A52,0A63,0A6B
AUCAR	0977	0854
BASIC	0735	072A
BEGIN	0160	0643
BITSW	0A3E	06B9,0A3C
BSPSE	07CD	080F
BSYOK	0755	075E
CMPRE	07D0	07B1
CNMES	0A8A	0A71,0A8A
CNVRT	07AE	07B4
COLOR	0943	0852
COMIN	05E7	0639,073A,0781,07F2
COMIX	0639	061D,0623,0630
COMI3	05FD	05F8
DSWAS	076F	0742,0746,0788,078B,078F
DSWBS	0771	0776,0777,0795,079A
DSWBY	076D	0752,0757
DSWIT	063D	05EA,05FF,0607,061F,0625,062C,0632
ELVEN	084D	06A4,06A8
EMESG	0845	07BE,0834,0835,0838,083B
END	0164	0876
ENDM	0812	0831,0A58
ENDM1	0821	081B
ENDM2	0829	0816
ENDM3	082B	0828
ERIND	0640	0618,0638,064D,066C,0760
ERLCK	0166	
ERR	0012	0637,0762,0768
ERROR	0162	0836
ERSE	07F9	07BB
ERSEA	07CC	07F9,07FA
ERSE1	0809	07FF
ERSE2	080F	0808
ERSLC	07C9	07B9
EXEC3	068D	0678
EXEC7	0693	07A1
EXEC9	0696	0687,068A,06CA,0714
EXIT	07E9	07DF,07EC
FIRST	0A81	0646,0A44,0A75,0A81
FUND	0858	0734,0825,0829
FUNR	084E	06D4,06D9,0734,0A68
F0200	0772	0796,079C
GO	0646	05DE,05E3,05E4
GO3	065C	0A79
I	069C	06BF,06C1,06E1,0704,070B,0717,071D
IL0	017A	
IL1	018A	
IL2	019A	
IL3	01AA	
IL4	01BA	
INERR	075F	066D
ITR	0004	0660,06D6,0716,0719,0723
KA000	063C	05FB,05FD,060A
KBDRQ	0603	05ED
KBDSV	062A	05F3
KBD2	060A	0604
KBE00	0642	0608
KBMES	0A83	0A56,0A83
KCNSL	0774	0600,0626,0633,0747,0758,0778,0790,079B
KC000	063F	062A
KECOD	0878	07AE
KEFFF	0773	0620,062E,0743,0753,078C,0797
KEY	000E	0793,07B0,07B5,07BA,07C1,0A38

KEYBD	07A3	0685
KEYER	0636	0602,0609,0629
KE000	0844	05F6,07E9
KFFE7	07C8	07FB
KFF00	0770	0713
KF000	07CF	05F1,0789
KF800	069E	068F
KOC00	076E	0754,0759
KO001	069F	0681,0684
KO008	07CE	082B
K1000	0A82	0A42,0A48
K4200	063B	062D,0635
K8000	063E	0622,0628,0779
LAST	0A80	0A41,0A4A
LCASE	0927	0851
LOG	0163	0A76
LOGBY	0167	0736,07EE
LOGM	0A7B	0A72,0A78
LOWER	07C7	07C5,07D2,07D8
MARK	06A0	0755
MARKE	0731	072D
MARKG	06E3	06A6,070E
MARKL	06E5	06D2
MARKN	0712	0709
MARKP	06FD	06E7,06EE,06FC
MARKQ	06FF	06E8
MARKR	0701	06E9
MARKS	070A	0706
MARKT	06B4	06AD
MARKU	06B5	06AC,0684
MARKZ	06FC	06F6
MARK1	06BB	06C4,06C9
MARK2	06CB	06DB
MARK3	06CD	072B,072F
MARK4	06CE	0733
MARK5	06D9	071A,0726
MLSCF	05E5	0698,06AE,06F8,0840
NCAP	07C8	07B6
NOCP	07C5	07B7
NOIN	0775	068B
NOS	0006	0663,06E0,070A,070C,071C,071F
OUT	0003	06C3,0712,07D6,0810,0A30,0A6D
PAD	0007	0664,06D8,06DD,0720,0721
PDSWX	0840	074E,07F0
PID	05DC	0645
PRCON	066C	066B,0696,0769,077F,0798,07F7
PRDSW	0833	074A,075C,0765,077D,079F,07A9,07C2,083E
PTR	000A	0741,0751,0775,0787,0794,07A4
PTRO	0A28	05E8,0648,065C,0674,0688,0694,06CE,06E3,06E5,06EA,06F0,073E,0762 082C,083C,0A30,0A38,0A40,0A47,0A67,0A6A,0A6D,0A70,0A73
RAD	05DE	
RDBS	0A3C	06B7
RDY2	074C	0738
READY	0736	0691,074C
RED1	0909	0821
RESTO	069D	0677,0693
RID	05DD	064F,066F,06AA,06D0,06EC,06F2,0A4F
RLCF	0168	
ROCK	0992	0855
ROLL	09C4	0856
RQKB	01BC	0783
RQTY	01BB	073C,07F4
RTN	0001	060E,06CE,06E5,06EA,06F0,0A67
RTNSW	0165	06B0,06F4
SEE	0010	060C,07A3,0A70
SELC	0793	078D
SELC1	079E	0792
SELC2	0781	0682,07C4,07C6,07FC

```
SFT     07E0  07D8
SLT     0005  0661,06E2,0703,0705
SLTWD   07CA  0613,0669,07D9,07E7,07FE,081A
SNR     000C  0A40,0A47
SPNDX   0959  0853
START   0161  069A,06B2,06FA,0842
STS     0002  05F0,05F5,05FE,060B,061E,062B,0648,0676,0688,0690,0694,078A,07EB
              082C,0A73
SVC     0688  067E
SVKB    01BD  0785
SWSC    0A58  0A4B
SWSD    0A67
SWSE    0A6E
SWSET   0A3F  0672,068D,0A45
SWSP    0A72  0A57
SW0     05DF
SW1     05E0  0651,0656,06A0,0728,082F,0A5B,0A6E
SW2     05E1
SW3     05E2
TACAR   08FA  084F,0A28
TBLI    07E7  0811
TBLIS   07E5  07DE
TBLIZ   07E3  07E2
TERM    05E6  0724
TIMEX   084C
TWIST   09F6  0857
TWLVE   0641  060D,0671,0A4D
TYCOD   08B9  07D0
TYCUS   0643  0A90
TYEND   0876  067B,06CB
TYPIT   0750  0744
TYPSV   061E  05FC
UCASE   090B  0850
WRDCT   07AB  0610,0666,07A6,07E8,0814
WRT     0008  0750,07F6

END OF ASSEMBLY
```

---------- LAST PAGE ----------

TABLE OF CONTENTS

1. PURPOSE

THE PURPOSE OF THE 1627 PLOTTER DIAGNOSTIC TEST IS TO EXECUTE THE DIFFERENT MOVEMENTS OF THE PLOTTER AND TO CHECK THE CABLES FOR CORRECT ADJUSTMENT.

2. PREREQUISITES

2.1*** PROGRAM PREREQUISITES

1130 DIAGNOSTIC MONITOR II.

2.2*** EQUIPMENT PREREQUISITES

1. 1131 CENTRAL PROCESSING UNIT (CPU) WITH PROGRAM LOAD FROM CARD READER OR PAPER TAPE.
2. 1627 PLOTTER MODEL 1 OR 2.
3. 1000 AVAILABLE CORE POSITIONS OF CORE STORAGE

3. OPERATING PROCEDURE

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION, REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
ON - TO HALT AFTER LOADING

IF HALT AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).

3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED OR ROUTINE SELECTION IS RESET.

1. TO SET ROUTINE SELECTION

   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN	DESCRIPTION	
1	PEN UP-PEN DOWN OCTAGON TEST.	NORMAL ROUTINES- THE PROGRAM STARTS WITH ROUTINE 1, RUNS EACH ROUTINE IN SEQUENCE THEN TERMINATES AFTER ROUTINE 4.
2	REGISTRATION TEST	
3	SWING TEST	
4.	STRESS TEST	
5. *	SELECTION COMMAND	OPTIONAL ROUTINES THESE ROUTINES RUN ONLY IF SELECTED.

* - REFER TO SECTION 3.2.2.3 FOR SPECIAL INSTRUCTION

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION, SET AS IF SELECTING ROUTINE ZERO.

**

3. PROGRAM OPTIONS

ROUTINE 5 - SELECTION COMMAND

AFTER SELECTION BY FUNCTION 1, THE CONTROL COMMAND DATA IS TAKEN FIRST FROM BITS 0-5 AND THEN FROM 8-13.

ACTION OR MOTION	BITS
LOWER PEN TO PAPER	0 OR 8
UP (PAPER MOVES DOWN)	1 9
DOWN (PAPER MOVES UP)	2 10
RIGHT	3 11
LEFT	4 12
RAISE PEN FROM PAPER	5 13

******

3.2.3 SPECIAL SELECTION - FUNCTION 2

1. SET SWITCHES 0-7 TO 81.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
15	LOCK OUT MONITOR. THIS WILL BYPASS MONITOR TO ALLOW THE PLOTTER TO RECEIVE COMMANDS FASTER AND TEST FOR SLOW OR BINDING TRANSPORT. ALL OVERLAP FUNCTIONS ARE BYPASSED WHILE MONITOR LOCK-OUT OPTION IS SELECTED.

3. PRESS INT REQ KEY ON CONSOLE. SWITCH SETTINGS MAY NOT BE LOGGED BECAUSE OF THE LOCK OUT TIMING.

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	PDISPLAY MODE-PRESS START RUN MODE-PRESS START

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 4. ROUTINE 5 WILL ONLY RUN IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN OORR AAAA                (MESSAGE)
OR
EPPNN OORR AAAA                (MESSAGE)
```

WHERE	A	IDENTIFIES STATUS MESSAGES
	E	IDENTIFIES ERROR MESSAGES
	PP	IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
		THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 0B FOR MESSAGES ORIGINATED BY THIS PROGRAM.
	NN	IS THE MESSAGE SEQUENCE NUMBER
	RR	IS THE ROUTINE NUMBER
	AAAA	IS ANY VARIABLE INFORMATION
	MESSAGE	IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

A0500 OORR AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A0505 OORR NRDY

PLOTTER POWER IS TURNED OFF.

A0508 OORR PROG HALT

INDICATES PROGRAM HAS BEEN HALTED BY BIT SWITCH 15 FUNCTION 00 BEING SET ON. SET BIT 15 OFF TO CONTINUE.

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE PLOTTER DSW

BIT	
0	PLOTTER RESPONSE
1	NOT USED
2	NOT USED
3	NOT USED
4	NOT USED
5	NOT USED
6	NOT USED
7	NOT USED
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	BUSY
15	NOT READY

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 000N XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSC. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0501 000R AAAA WAS S/B DSW
XXXX 0000

STATIC DSW ERROR. THIS DSW WAS SENSED BEFORE GIVING A CONTROL COMMAND TO THE 1627. ANY BITS ON INDICATE AN ERROR. IF BIT 15 IS ON (NOT READY), CHECK FOR 1627 POWER ON.

E0502 000R AAAA WAS S/B BUSY DSW
XXXX 0002

BUSY DSW ERROR. THIS DSW WAS SENSED IMMEDIATELY AFTER A CONTROL COMMAND WAS GIVEN TO THE 1627. IT SHOULD SHOW THE 1627 BUSY. NO OTHER BITS SHOULD BE ON.
IF THIS ERROR OCCURS DURING OVERLAP, SEE NOTE ON I/O TEST INDEX PAGE, P/N 2191291.

E0503 000R AAAA DSW NO INTRPT
XXXX

NO INTERRUPT WAS RECEIVED AFTER A CONTROL COMMAND TO THE 1627. THE DSW WAS SENSED AT LEAST 2 SECONDS AFTER THE 1627 COMMAND.
IF A BUSY DSW ERROR (E0502) IS ALSO INDICATED, THE CONTROL COMMAND WAS NOT RECEIVED BY THE 1627.

E0504 000R AAAA WAS S/B INTRPT DSW

INTERRUPT DSW ERROR. THIS DSW WAS SENSED IN INTERRUPT. IT SHOULD SHOW THE RESPONSE BIT ON AND ALL OTHER BITS OFF.

---

5. COMMENTS

5.1*** ROUTINE 1 (PEN UP-PEN DOWN OCTAGON TEST)

THE PURPOSE OF THIS ROUTINE IS TO TEST THE CAPABILITY OF THE PLOTTER TO EXECUTE THE PEN UP AND PEN DOWN PLOTTER COMMANDS. IN THIS ROUTINE, AS IN THE OTHER PLOTTER PATTERN GENERATING ROUTINES, AN ADDRESS TABLE IS USED TO SELECT THE CORRECT PLOTTER COMMANDS. THE ADDRESS TABLE, IN TURN, POINTS TO A PAIR OF COMPUTER WORDS. ONE WORD CONTAINS A NUMBER WHICH INDICATES THE NUMBER OF TIMES THE OTHER WORD (THE PLOTTER COMMAND) IS TO BE EXECUTED.

THE PATTERN PLOTTED IN THIS FUNCTION TEST CONTAINS TWO ADJACENT OCTAGONS, WHOSE SIDES ARE ONE AND ONE HALF INCHES IN LENGTH. OCTAGON NO. 1 (LEFTMOST OCTAGON) IS PLOTTED IN A CLOCKWISE DIRECTION. OCTAGON NO. 2 (RIGHTMOST OCTAGON) IS PLOTTED IN A COUNTER CLOCKWISE DIRECTION.

THIS ROUTINE IS DESIGNED SO THAT, IF A PEN UP COMMAND IS NOT EXECUTED AS IT SHOULD BE, A LINE WILL BE DRAWN IN THE INNER PORTION OF THE OCTAGON. IF A PEN DOWN COMMAND IS NOT EXECUTED, A SIDE OF THE OCTAGON WILL BE MISSING. FIGURE 1 SHOWS AN EXAMPLE OF THE OUTPUT OF THIS ROUTINE.

5.2*** ROUTINE 2 REGISTRATION TEST

THE FUNCTION OF THIS ROUTINE IS TO DETERMINE IF ANY ADJUSTMENTS ARE NEEDED IN THE PEN OR DRUM MOVEMENT MECHANISMS. FIGURE 2 SHOWS THE PATTERN GENERATED BY THIS ROUTINE. IF ANY OF THE LINES FAIL TO INTERSECT, MECHANICAL ADJUSTMENT OF THE PLOTTER IS NECESSARY.

5.3*** ROUTINE 3 SWING TEST

THE PURPOSE OF THIS ROUTINE IS TO TEST THE ABILITY OF THE PLOTTER TO PLOT LONG LINE SEGMENTS IN VARIOUS DIRECTIONS. THE PATTERN GENERATED BY THIS ROUTINE IS SO DESIGNED, THAT IF PLOTTER COMMANDS ARE NOT EXECUTED OR EXTRA COMMANDS ARE EXECUTED, THE CORNERS OF THE PATTERN WILL NOT JOIN. THIS TEST WILL ALSO SHOW UP ANY MALADJUSTMENT IN THE PEN OR DRUM MECHANISM.

THE METHOD USED IN GENERATING THE PATTERN IS AS FOLLOWS,

A. THE LEFT AND TOP SIDES OF A SERIES OF SQUARES ARE DRAWN AS A CONTINUOUS LINE, VARYING IN SIZE FROM 10 TO 2 INCHES.

B. THE RIGHT AND BOTTOM SIDES OF THE SERIES OF SQUARES ARE DRAWN IN ONE QUARTER INCH LINE SEGMENTS, JOINED TOGETHER, AND TOTALING THE LENGTH OF THE LEFT AND TOP SIDES.

C. ON COMPLETING THE PLOTTING OF THE SQUARES, LINES ARE DRAWN (BOTH SEGMENTED AND CONTINEOUS) THRU THE CORNERS OF THE SQUARES. ALL OF THESE DIAGONAL LINES SHOULD INTERSECT THE CORNERS OF THE SQUARES PERFECTLY.

FIGURE 3 SHOWS THE PLOTTER PATTERN GENERATED BY THIS ROUTINE.

5.4*** ROUTINE 4 STRESS TEST (WINDMILL PATTERN)

THE PURPOSE OF THIS ROUTINE IS TO EXERCISE ALL OF THE MECHANICAL FUNCTIONS OF THE PLOTTER. THIS OBJECTIVE IS ACCOMPLISHED BY PLOTTING A PATTERN OF TRIANGLES, ROUGHLY RESEMBELING A WINDMILL. EACH SIDE OF THE TRIANGLE CONSISTS OF A SERIES OF SHORT SAWTOOTH-LIKE SEGMENTS, WHICH TESTS THE ABILITY OF THE PLOTTER TO PLOT SHORT LINE SEGMENTS WITH ABRUPT CHANGES IN DIRECTION. A SET OF FIVE TRIANGLES IS PLOTTED, THE AXIS IS THEN ROTATED 90 DEGREES AND FIVE MORE TRIANGLES ARE PLOTTED IN THE SAME MANNER UNTIL, FINALLY, FOUR SETS OF TRIANGLES HAVE BEEN PLOTTED. WHEN THE TRIANGLES HAVE BEEN PLOTTED, A LINE IS DRAWN THRU THE INNERMOST POINTS OF THE TRIANGLES. THE RESULTANT PATTERN THEN APPEARS AS A WINDMILL WITH A DIAMOND SHAPED PATTERN CONNECTING THE INNER POINTS OF THE TRIANGLES. THE DIAMOND DESIGN SHOULD INTERSECT ALL OF THE INNER POINTS OF THE TRIANGLES IF THE PLOTTER IS ADJUSTED CORRECTLY. FIGURE 4 SHOWS THE PLOTTER PATTERN GENERATED BY THE ROUTINE.

5.5*** ROUTINE 5 SELECT COMMAND

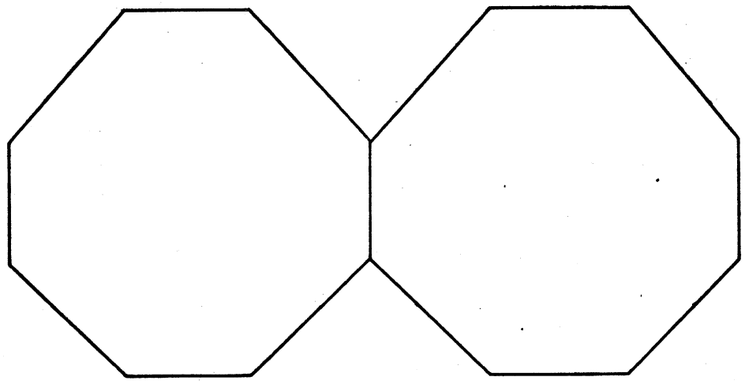
ROUTINE 5 WILL NOT RUN UNLESS SELECTED. THIS ROUTINE ALLOWS THE FIELD ENGINEER TO EXECUTE ANY DESIRED COMBINATION OF TWO PLOTTER COMMANDS. ONE COMMAND IS SET IN SWITCHES 0-5, THE OTHER IS SWITCHES 8-13. THE SWITCHES ARE READ DIRECTLY BY THIS ROUTINE. THUS ANY CHANGE IN SWITCH SETTING WILL RESULT IN AN IMMEDIATE CHANGE IN THE COMMAND. THE PROGRAM WILL RUN IN THIS ROUTINE UNTIL ANOTHER ROUTINE IS SELECTED.

6. APPENDIX

THE FOLLOWING PAGES CONTAIN THE PLOTTER OUTPUT PATTERNS.

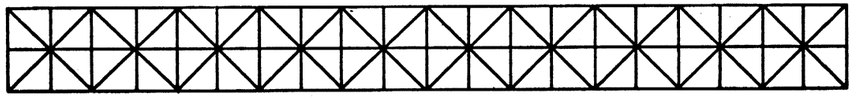
FIG. 1 PATTERN FOR PEN UP/PEN DOWN TEST
FIG. 2 PATTERN FOR REGISTRATION TEST
FIG. 3 SWING TEST PATTERN
FIG. 4 STRESS TEST WINDMILL PATTERN

FIGURE 1 PATTERN FOR PEN UP/PEN DOWN TEST



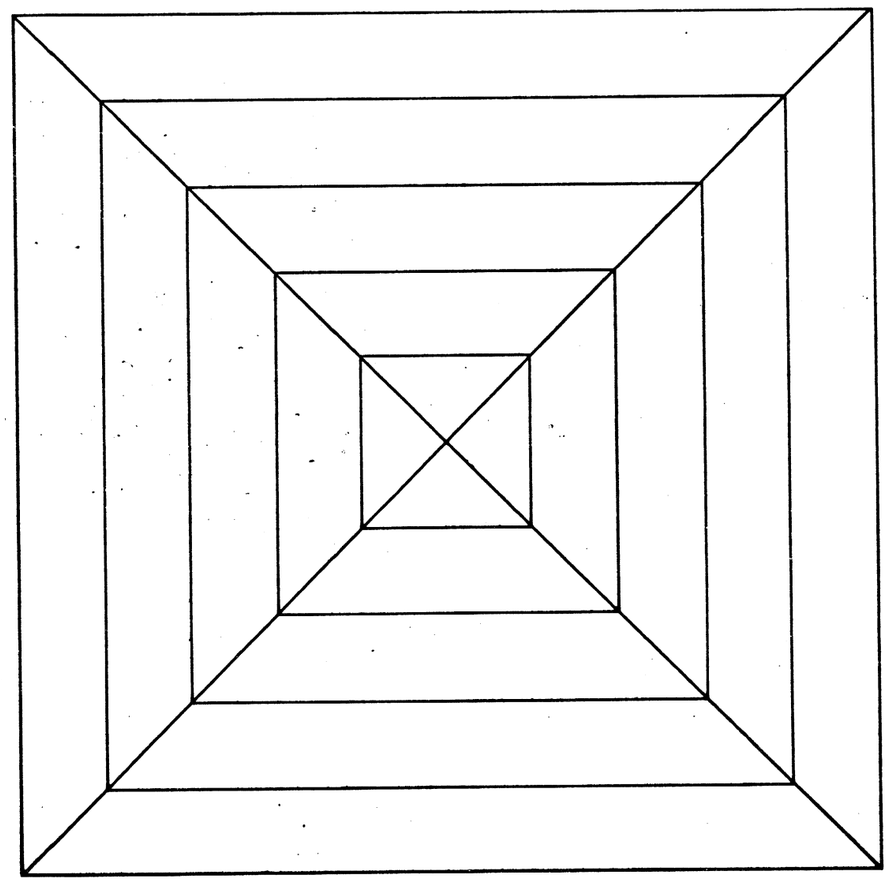
SCALE: 3/4 = 1

FIGURE 2 PATTERN FOR REGISTRATION TEST



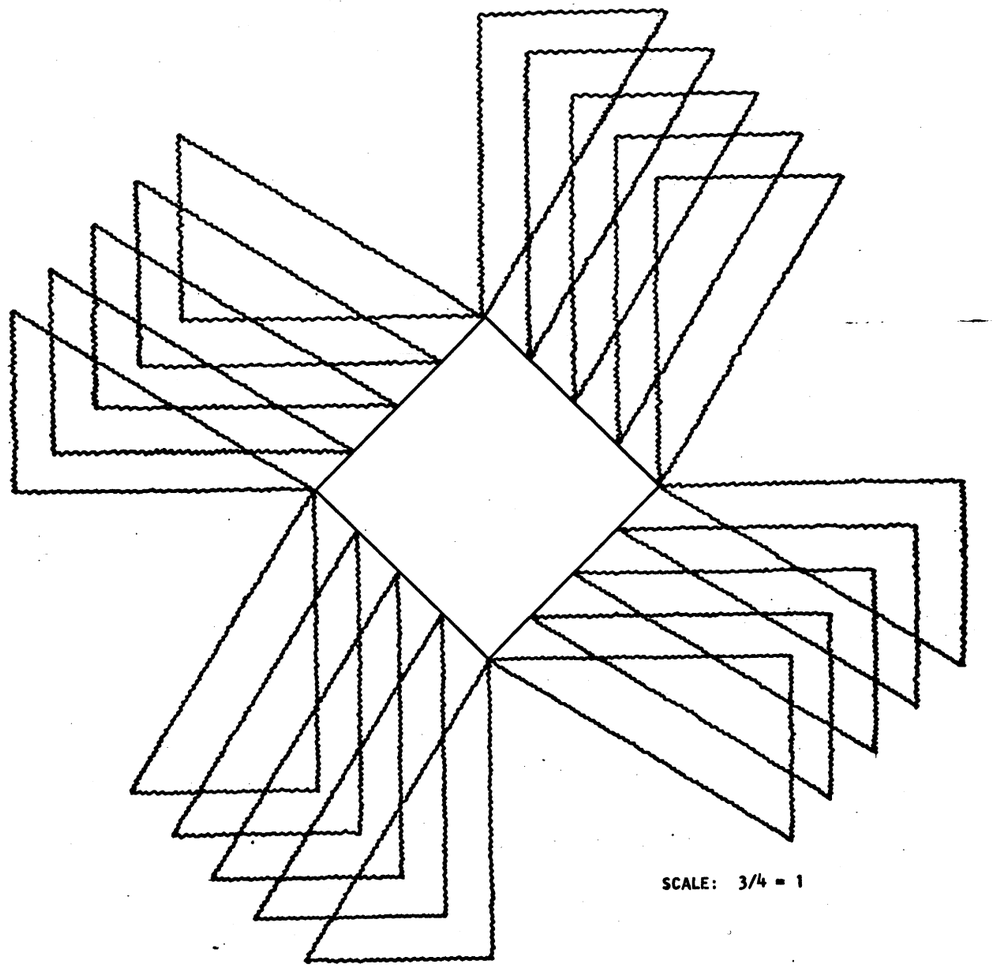
SCALE: 3/4 = 1

FIGURE 3 SWING TEST - PATTERN



SCALE: 3/4 = 1

FIGURE 4 STRESS TEST - WINDMILL PATTERN



SCALE: 3/4 = 1

```
                *****************************************************@***************** 30500020
                *                                                                      * 30500030
                *  THIS ENGINEERING CHANGE REFLECTS MAJOR                              * 30500040
                *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS                        * 30500050
                *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.                      * 30500060
                *                                                                      * 30500070
                *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.                      * 30500080
                *                                                                      * 30500090
                *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966                         * 30500100
                *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC                           * 30500110
                *  MONITOR II.                                                         * 30500120
                *                                                                      * 30500130
                ********************************************************************** 30500140
                          *-------------------------------------------                 30500150
                          *     1130 - 1627 PLOTTER FUNCTION TEST                       30500160
                          *-------------------------------------------                 30500170
                          *******************************************                 30500180
                          *              EQUATE TABLE                 *                 30500190
                          *******************************************                 30500200
                          *     THIS TABLE EQUATES TEST PROGRAM LABELS                  30500210
                          *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR                  30500220
                          *     ADDRESSES.                                              30500230
                          *                                                             30500240
                          *-------------------------------------------                 30500250
                          *     MONITOR ENTRY ADDRESSES                                 30500260
                          *-------------------------------------------                 30500270
0160 0                    BEGIN EQU     /160        BEGIN ROUTINE                     30500280
0161 0                    START EQU     BEGIN&1     SUPERVISOR ROUTINE                30500290
0162 0                    ERROR EQU     START&1     ERROR LOG ROUTINE                 30500300
0163 0                    LOG   EQU     ERROR&1     STATUS LOG ROUTINE                30500310
0164 0                    END   EQU     LOG&1       END ROUTINE                       30500320
                          *                                                             30500330
                          *-------------------------------------------                 30500340
                          *     MONITOR CONTROL WORD ADDRESSES                          30500350
                          *-------------------------------------------                 30500360
0165 0                    RTNSW EQU     END&1       ROUTINE START SW                  30500370
0166 0                    ERLCK EQU     END&2       LOCK ON ERROR CONTROL             30500380
0167 0                    LOGBY EQU     END&3       I/O BUSY SW ADDRS                 30500390
                          *                                                             30500400
                          *-------------------------------------------                 30500410
                          *     INTERRUPT TRANSFER VECTOR ADDRESSES                     30500420
                          *-------------------------------------------                 30500430
017A 0                    IL0   EQU     /17A        INTERRUPT LEVEL ZERO              30500440
018A 0                    IL1   EQU     IL0&16      INTERRUPT LEVEL ONE               30500450
019A 0                    IL2   EQU     IL1&16      INTERRUPT LEVEL TWO               30500460
01AA 0                    IL3   EQU     IL2&16      INTERRUPT LEVEL THREE             30500470
01BA 0                    IL4   EQU     IL3&16      INTERRUPT LEVEL FOUR              30500480
01BB 0                    RQTY  EQU     IL4&1       CONSOLE PRINTER REQUEST           30500490
01BC 0                    RQKB  EQU     RQTY&1      USE KEYBOARD REQUEST              30500500
01BD 0                    SVKB  EQU     RQKB&1      KB SERVICE REQUEST                30500510
                          *                                                             30500520
                          *******************************************                 30500530
05DC                            ORG     *&/05DC                                       30500540
                          *-------------------------------------------                 30500550
                          *     THE MONITOR USES CORE LOCATIONS 0-05DC.                 30500560
                          *     FOR CONTENTS OF THESE ADDRESSES REFER                   30500570
                          *     TO THE DIAGNOSTIC MONITOR LISTING.                      30500580
                          *-------------------------------------------                 30500590
                          *                                                             30500600
                          *******************************************                 30500610
                          *              PROGRAM CONTROL TABLE        *                 30500620
                          *******************************************                 30500630
                          *                                                             30500640
05DC 0 0305               PID   DC      /0305       PROGRAM ID                        30500650
05DD 0 0000               RID   DC      *-*         ROUTINE ID                        30500660
05DE 0 0000               RAD   DC      *-*         ROUTINE ADDRS                     30500670
05DF 0 0000               SW0   DC      *-*         PROGRAM CONTROL                   30500680
05E0 0 0000               SW1   DC      *-*         ROUTINE SELECTION                 30500690
```



```
05E1 0 0000               SW2   DC      *-*         LOCK-OUT MONITOR BIT 15           30500700
05E2 0 0000               SW3   DC      *-*                                           30500710
05E3 1 05ER                     DC      STRT                                          30500720
05E4 1 05EB                     DC      STRT        RESTART ADDRESS                   30500730
05E5 0 0000               MLSCF DC      *-*         SET BY WAIT RTN AND MON           30500740
05E6 0 0000                     DC      *-*         SET BY CNTRL AND INRTPT           30500750
05E7 0 FFFF                     DC      /FFFF       TERMINATOR                        30500760
                          *                                                           30500770
                          *******************************************               30500780
                          *              TEST INITIALIZATION          *               30500790
                          *******************************************               30500800
                          *                                                           30500810
05E8 0 4480 0160          BGIN  BSI   I   BEGIN                                       30500820
05EA 1 05DC                     DC      PID         PCT ADDRESS                       30500830
                          *                                                           30500840
                          *-------------------------------------------               30500850
                          *  START OF TEST AND SINGLE PASS INITIALIZATION             30500860
                          *-------------------------------------------               30500870
                          *                                                           30500880
05EB 0 6100               STRT  LDX     1 0         SET TO START WITH                 30500890
05EC 0 69F0                     STX     1 RID        FIRST ROUTINE                    30500900
05ED 1 6500 083A                LDX   L1 RECEV                                      30500910
05EF 0 6D00 01AA                STX   L1 IL3                                        30500920
05F1 0 4000                     BSI     CNTRL                                       30500930
                          *                                                           30500940
                          *******************************************               30500950
                          *              SEQUENCE CONTROL ROUTINE     *               30500960
                          *******************************************               30500970
                          *     THIS ROUTINE CHECKS SW1 AND CONTROLS                30500980
                          *     THE SEQUENCE IN WHICH TEST ROUTINES                 30500990
                          *     ARE RUN.                                            30501000
                          *-------------------------------------------               30501010
                          *                                                           30501020
05F2 0 0000               CNTRL DC      *-*                                         30501030
05F3 0 C0EC                     LD      SW1                                         30501040
05F4 1 4C08 05FD                BSC   L CN20,&      BR IF NO RTN SELECTD            30501050
                          *                                                           30501060
05F6 0 D0E6               CN10  STO     RID         SAVE NEW RTN NUMBER             30501070
05F7 0 9017                     S       RIDCK                                       30501080
05F8 1 4C08 0603                BSC   L CN30,&      BR IF VALID RTN                 30501090
05FA 0 1810                     SRA     16                                          30501100
05FB 0 D0E4                     STO     SW1         IF INVALID RTN GO               30501110
05FC 0 D0E0                     STO     RID          TO RTN ONE                     30501120
                          *                                                           30501130
05FD 1 7401 05DD          CN20  MDX   L RID,1       ADV TO NEXT RTN                 30501140
05FF 0 C0DD                     LD      RID         CHECK FOR END OF                30501150
0600 0 900F                     S       RTNOM        NORMAL SEQUENCE      *1        30501160
0601 0 44B0 0164                BSI   I END,-Z      END OF PROGRAM                  30501170
                          *                                                           30501180
0603 1 6580 05DD          CN30  LDX   I1 RID        XR1#NEW ROUTINE NUMBER          30501190
0605 1 C500 0610                LD    L1 RTTBL-1    FETCH RETURN ADRS               30501200
0607 0 D0D6                     STO     RAD         STORE NEW RTN ADDRS             30501210
0608 0 D0DD                     STO     MLSCF&1     SET MLSCF FOR RETURN            30501220
0609 0 D400 0165                STO   L RTNSW       SET RTN START SW                30501230
060B 1 4400 07FE                BSI   L CKLK        CHECK LOCK-OUT                  30501240
060D 1 4C80 05E6                BSC   I MLSCF&1     CONTINUE WITHOUT MONITOR        30501250
                          *                                                           30501260
060F 0 0005               RIDCK DC      LRTN-RTTBL&1                                30501270
0610 0 0004               RTNOM DC      NRTN-RTTBL&1                      *2        30501280
                          *-------------------------------------------               30501290
                          *     ROUTINE ADDRESS TABLE                               30501300
                          *-------------------------------------------               30501310
0611 1 0616               RTTBL DC      RT1         PEN UP-DOWN OCTAGON             30501320
0612 1 062A                     DC      RT2         REGISTRATION TEST               30501330
0613 1 067B                     DC      RT3         SWING TEST                      30501340
0614 1 06F3               NRTN  DC      RT4         WINDMILL TEST                   30501350
0615 1 0763               LRTN  DC      RT5         MANUAL CMD SELECTION            30501360
                          *                                                           30501370
```

```
                     ******************************************
                     *****        ROUTINE 1- OCTAGON PEN UP-DOWN
                     ******************************************
                     *
0616 1 4400 07DF     RT1   BSI  L  READY                              SC
0618 1 C400 0871           LD   L  K0150     CONSTANT OF 150
061A 0 62F1                LDX   2 -15       INSTR CT EQ 1.5 INCH
061B 1 D600 085D     OCTGN STO  L2 NN&15     STORE MOVE COUNT
061D 0 7202                MDX   2 2
061E 0 70FC                MDX     OCTGN     FINISH STORING COUNT
061F 1 6500 0877           LDX  L1 RT1ST
0621 1 6D00 0874           STX  L1 LOOK
0623 1 4400 0792           BSI  L  DISP      CALL DISPATCH RTNE   SC
                     *
0625 1 7401 0874           MDX  L  LOOK,1    BUMP INSTR ADDR PNTR
0627 1 4400 0792           BSI  L  DISP      CALL DISPATCH RTNE   SC
0629 0 40C8                BSI     CNTRL     RETURN TO CONTROL RTN
                     *
                     ******************************************
                     *****        ROUTINE 2- REGISTRATION TEST **
                     ******************************************
                     *
062A 1 4400 07DF     RT2   BSI  L  READY                          SC
                     *
062C 0 6700 0064           LDX  L3 100       INITIALIZE INSTR CTRS
062E 1 6F00 085C           STX  L3 NW        TO 100, EQUAL TO
0630 1 6F00 085A           STX  L3 SW        1 INCH OF PLTR O/P.
0632 1 6F00 084E           STX  L3 NN
0634 1 6F00 0850           STX  L3 S
0636 1 6F00 0856           STX  L3 NE
0638 1 6F00 0858           STX  L3 SE
063A 0 6700 0032           LDX  L3 50        INITIALIZE INSTR CTRS
063C 1 6F00 0852           STX  L3 EE        TO 50, EQUAL TO
063E 1 6F00 0854           STX  L3 WW        0.5 INCH OF PLTR O/P.
                     *
0640 1 6500 08CA           LDX  L1 RT2ST     STRING ADDR
0642 1 6D00 0874           STX  L1 LOOK      RT TWO STRING
0644 0 63FB                LDX   3 -5
0645 1 6F00 086D           STX  L3 EXTRA     CTR STG
0647 1 4400 0792           BSI  L  DISP      CALL DISPATCH RTNE   SC
0649 1 7401 0874           MDX  L  LOOK,1    BUMP INSTR ADDR PNTR
064B 0 6700 03E8           LDX  L3 1000      LOAD 10 INCH PLOT
064D 1 6F00 0852           STX  L3 EE        MOVEMENT TO EAST
064F 1 4400 0792     REG01 BSI  L  DISP      CALL DISPATCH RTNE   SC
                     *
0651 1 74FE 0874           MDX  L  LOOK,-2   BACK UP ADDR POINTER
0653 1 7401 086D           MDX  L  EXTRA,1
0655 0 70F9                MDX     REG01
0656 1 7403 0874           MDX  L  LOOK,3
0658 0 63FB                LDX   3 -5
0659 1 6F00 086D           STX  L3 EXTRA
                     *
065B 1 4400 0792     REG02 BSI  L  DISP      CALL DISPATCH RTNE   SC
065D 1 74FE 0874           MDX  L  LOOK,-2   BACK UP ADDR POINTER
065F 1 7401 086D           MDX  L  EXTRA,1
0661 0 70F9                MDX     REG02
                     *
0662 0 63F6                LDX   3 -10       LOAD XR 3
0663 1 6F00 086D           STX  L3 EXTRA
0665 1 7403 0874           MDX  L  LOOK,3
                     *
0667 1 4400 0792     REG03 BSI  L  DISP      CALL DISPATCH RTNE   SC
0669 1 74F8 0874           MDX  L  LOOK,-8   BACK UP ADDR POINTER
066B 1 7401 086D           MDX  L  EXTRA,1
066D 0 70F9                MDX     REG03
                     *
066E 1 7409 0874           MDX  L  LOOK,9    BUMP ADDR POINTER
0670 0 6332                LDX   3 50
```



```
0671 1 6F00 0850           STX  L3 S
0673 0 6700 03E8           LDX  L3 1000
0675 1 6F00 0854           STX  L3 WW
0677 1 4400 0792           BSI  L  DISP      CALL DISPATCH RTNE   SC
                     *
0679 1 4400 05F2           BSI  L  CNTRL     RETURN TO CONTROL RTN
                     *
                     ******************************************
                     *****        ROUTINE 3- SWING TEST *********
                     ******************************************
                     *
067B 1 4400 07DF     RT3   BSI  L  READY                          SC
067D 0 6328                LDX   3 40
067E 0 6B2C                STX   3 SWNG2&1   LINE LENGTH MODIFIED PR01
067F 0 6700 00C8           LDX  L3 200
0681 1 6F00 084E           STX  L3 NN
0683 0 6364                LDX   3 100
0684 1 6F00 0856           STX  L3 NE
0686 0 6332                LDX   3 50
0687 1 6F00 0852           STX  L3 EE
0689 1 6500 08E9           LDX  L1 RT3ST     LOAD ADDR STRING ADDR
068B 1 6D00 0874           STX  L1 LOOK      STO IN POINTER CTL WD
068D 1 4400 0792           BSI  L  DISP                           SC
068F 1 7401 0874           MDX  L  LOOK,1    BUMP INSTR ADDR PNTR
0691 0 6700 01F4           LDX  L3 500
0693 1 6F00 085C           STX  L3 NW
0695 1 6F00 0858           STX  L3 SE
0697 1 6F00 085A           STX  L3 SW
0699 0 6319                LDX   3 25
069A 1 6F00 0850           STX  L3 S
069C 1 6F00 0854           STX  L3 WW
069E 0 6700 03E8           LDX  L3 1000
06A0 1 6F00 084E           STX  L3 NN
06A2 1 6F00 0852           STX  L3 EE
06A4 0 6305                LDX   3 5
06A5 1 6F00 0875           STX  L3 SQRCT     INITIALIZE SQUARE CTR
                     *
06A7 0 6302          SWNG1 LDX   3 2
06A8 1 6F00 0876           STX  L3 TRICT
06AA 0 6700 0028     SWNG2 LDX  L3 40        LINE LENGTH CTL      PM01
06AC 1 6F00 086D           STX  L3 EXTRA
06AE 1 4400 0792     SWNG3 BSI  L  DISP      CALL DISPATCH RTNE   SC
06B0 1 74FF 0874           MDX  L  LOOK,-1   BACK UP ADDR POINTER
06B2 1 74FF 086D           MDX  L  EXTRA,-1
06B4 0 70F9                MDX     SWNG3     PLT NXT LINE SEGMENT
06B5 1 7402 0874           MDX  L  LOOK,2
06B7 1 74FF 0876           MDX  L  TRICT,-1
06B9 0 70F0                MDX     SWNG2
06BA 1 749C 084E           MDX  L  NN,-100
06BC 1 749C 084E           MDX  L  NN,-100
06BE 0 1000                NOP
06BF 1 749C 0852           MDX  L  EE,-100
06C1 1 749C 0852           MDX  L  EE,-100
06C3 0 1000                NOP
06C4 1 74F8 06AB           MDX  L  SWNG2&1,-8 ADJUST LINE LENGTH
06C6 0 1000          KEEP  NOP               MDX WILL HOP THIS
06C7 1 4400 0792           BSI  L  DISP      CALL DISPATCH RTNE   SC
06C9 1 74F7 0874           MDX  L  LOOK,-9
06CB 1 74FF 0875           MDX  L  SQRCT,-1  REDUCE SQUARE CTR
06CD 0 70D9                MDX     SWNG1     RE-INITIALIZE
06CE 1 740A 0874           MDX  L  LOOK,10   BUMP INSTR ADDR PNTR
06D0 0 6700 03E8           LDX  L3 1000
06D2 1 6F00 084E           STX  L3 NN
06D4 1 6F00 0850           STX  L3 S
06D6 1 4400 0792           BSI  L  DISP      CALL DISPATCH RTNE   SC
06D8 1 7401 0874           MDX  L  LOOK,1    BUMP INSTR ADDR PNTR
06DA 0 6302                LDX   3 2
06DB 1 6F00 0876           STX  L3 TRICT
```

```
06DD 0 6319          LDX   3 25                                    30502740
06DE 1 6F00 085C     STX   L3 NW                                   30502750
06E0 1 6F00 0856     STX   L3 NE                                   30502760
06E2 0 6314    OLD   LDX   3 20                                    30502770
06E3 1 6F00 086D     STX   L3 EXTRA                                30502780
06E5 1 4400 0792 SWNG4 BSI   L   DISP       CALL DISPATCH RTNE   SC 30502790
06E7 1 74FF 0874     MDX   L   LOOK,-1                            30502800
06E9 1 74FF 086D     MDX   L   EXTRA,-1                           30502810
06EB 0 70F9          MDX       SWNG4                               30502820
                     *                                             30502830
06EC 1 7402 0874     MDX   L   LOOK,2                            30502840
06EE 1 74FF 0876     MDX   L   TRICT,-1                          30502850
06F0 0 70F1          MDX       OLD                                 30502860
                     *                                             30502870
06F1 1 4400 05F2     BSI   L   CNTRL      RETURN TO CONTROL RTN   30502880
                     *                                             30502890
                     ********************************************  30502900
                     *****          ROUTINE 4- WINDMILL DESIGN **** 30502910
                     ********************************************  30502920
                     *                                             30502930
06F3 1 4400 07DF RT4 BSI   L   READY      CHECK STATUS         SC 30502940
06F5 0 6700 015F     LDX   L3 351         SET COUNT               30502950
06F7 1 6F00 0856     STX   L3 NE                                   30502960
06F9 1 6F00 084E     STX   L3 NN                                   30502970
06FB 1 6700 0906     LDX   L3 RT4ST       LD RT4 CMD STRNG ADDR   30502980
06FD 1 6F00 0874     STX   L3 LOOK                                 30502990
06FF 1 4400 0792     BSI   L   DISP       CALL DISPATCH RTNE   SC 30503000
0701 1 7401 0874     MDX   L   LOOK,1     BUMP INSTR ADDR PNTR    30503010
0703 0 62F1          LDX   2 -15                                   30503020
0704 1 C400 086F     LD    L   K0002      MOVE COUNT              30503030
0706 1 D600 085D WMIL1 STO   L2 NN&15      STORE MOVE COUNT        30503040
0708 0 7202          MDX   2 2                                     30503050
0709 0 70FC          MDX       WMIL1      FINISH LOADING COUNT    30503060
070A 1 6700 0856     LDX   L3 NE                                   30503070
070C 0 4019          BSI       TCNTL                               30503080
                     *                                             30503090
070D 1 6700 0858     LDX   L3 SE                                   30503100
070F 0 4016          BSI       TCNTL                               30503110
                     *                                             30503120
0710 1 6700 085A     LDX   L3 SW                                   30503130
0712 0 4013          BSI       TCNTL                               30503140
                     *                                             30503150
0713 1 6700 085C     LDX   L3 NW                                   30503160
0715 0 4010          BSI       TCNTL                               30503170
                     *                                             30503180
0716 0 6700 00C8     LDX   L3 200                                  30503190
0718 1 6F00 085C     STX   L3 NW                                   30503200
071A 1 6F00 0856     STX   L3 NE                                   30503210
071C 1 6F00 0858     STX   L3 SE                                   30503220
071E 1 6F00 085A     STX   L3 SW                                   30503230
0720 1 7401 0874     MDX   L   LOOK,1     BUMP INSTR ADDR PNTR    30503240
                     *                                             30503250
0722 1 4400 0792     BSI   L   DISP       DRAW SQUARE          SC 30503260
0724 1 4400 05F2     BSI   L   CNTRL      RETURN TO CONTROL RTN   30503270
                     *                                             30503280
                     *-------------------------------------------  30503290
                     *****          TRIANGLE CONTROL **************30503300
                     *-------------------------------------------  30503310
                     *                                             30503320
0726 0 0000    TCNTL DC        *-*                               SE 30503330
0727 0 6B29          STX   3 CHG1&1                                30503340
0728 0 6B2F          STX   3 CHG2&1                                30503350
0729 0 6B35          STX   3 CHG3&1                                30503360
072A 0 6305          LDX   3 5            START TRIANGLE ONE      30503370
072B 1 6F00 0876     STX   L3 TRICT       TRIANGLE COUNT          30503380
                     *                                             30503390
072D 0 6700 0056 RUN LDX   L3 86          START TRIANGLE          30503400
072F 1 6F00 086D     STX   L3 EXTRA                                30503410
```



```
                     *                                             30503420
0731 1 4400 0792 SIDE1 BSI   L   DISP       PLOT SIDE ONE        SC 30503430
0733 1 74FE 0874     MDX   L   LOOK,-2                            30503440
0735 1 74FF 086D     MDX   L   EXTRA,-1                           30503450
0737 0 70F9          MDX       SIDE1                               30503460
                     *                                             30503470
0738 1 7403 0874     MDX   L   LOOK,3                            30503480
073A 0 6700 002B     LDX   L3 43                                   30503490
073C 1 6F00 086D     STX   L3 EXTRA                                30503500
                     *                                             30503510
073E 0 4053    SIDE2 BSI       DISP       PLOT SIDE TWO        SC 30503520
073F 1 74FE 0874     MDX   L   LOOK,-2                            30503530
0741 1 74FF 086D     MDX   L   EXTRA,-1                           30503540
0743 0 70FA          MDX       SIDE2                               30503550
                     *                                             30503560
0744 1 7403 0874     MDX   L   LOOK,3                            30503570
0746 0 6700 0056     LDX   L3 86                                   30503580
0748 1 6F00 086D     STX   L3 EXTRA                                30503590
                     *                                             30503600
074A 0 4047    SIDE3 BSI       DISP       PLOT SIDE THREE      SC 30503610
074B 1 74FD 0874     MDX   L   LOOK,-3                            30503620
074D 1 74FF 086D     MDX   L   EXTRA,-1                           30503630
074F 0 70FA          MDX       SIDE3                               30503640
                     *                                             30503650
0750 1 7430 0856 CHG1 MDX   L   NE,48                             30503660
0752 1 7404 0874     MDX   L   LOOK,4                            30503670
0754 1 74FF 0876     MDX   L   TRICT,-1   TRIANGLE COUNT          30503680
0756 0 7006          MDX       TOP                                 30503690
                     *                                             30503700
0757 1 74D0 0856 CHG2 MDX   L   NE,-48                            30503710
0759 1 7403 0874     MDX   L   LOOK,3                            30503720
075B 1 4C80 0726     BSC   I   TCNTL                           SX 30503730
                     *                                             30503740
075D 0 4034    TOP   BSI       DISP                              SC 30503750
075E 1 74D0 0856 CHG3 MDX   L   NE,-48                            30503760
0760 1 74F3 0874     MDX   L   LOOK,-13                          30503770
0762 0 70CA          MDX       RUN        DO ANOTHER TRIANGLE     30503780
                     *                                             30503790
                     ********************************************  30503800
                     *****          ROUTINE 5- MANUAL CONTROL      30503810
                     ********************************************  30503820
                     *                                             30503830
0763 0 4480 0163 RT5  BSI   I   LOG        TYPE SET SWS MSG        30503840
0765 1 078D          DC        SWMSG      TABLE ADDRESS           30503850
0766 1 6700 094B RT5E LDX   L3 RT5ST       PLACE CNTR ADDR IN      30503860
0768 1 6F00 0874     STX   L3 LOOK        O/P ROUTINE             30503870
076A 1 7400 078C     MDX   L   RT5SW,0    SKIP IF FIRST ENTRY     30503880
076C 0 7013          MDX       RT5C       BR IF 2ND ENTRY         30503890
                     *                                             30503900
076D 0 081C    RT5A  XIO       SWCOM      READ CONS SWS           30503910
076E 0 C01D          LD        RT5SW                              30503920
076F 0 1801          SRA       1          CHECK BIT 14            30503930
0770 0 4804          BSC       E          SKIP IF NOT ON          30503940
0771 0 7001          MDX       RT5B       BR IF SW 14 ON          30503950
0772 0 7007          MDX       RT5D       BR IF NOT ON            30503960
                     *                                             30503970
0773 0 1809    RT5B  SRA       9          CLEAR LOWER COMND       30503980
0774 0 100A          SLA       10         SHIFT COMND TO HIGH ORDER 30503990
0775 1 D400 0865     STO   L   SBSW2       STORE COMND             30504000
0777 1 4420 0792     BSI   L   DISP,Z      GO TO DISPATCH          30504010
0779 0 70EC          MDX       RT5E                               30504020
                     *                                             30504030
077A 1 6700 076D RT5D LDX   L3 RT5A        RETURN POINT            30504040
077C 1 6F00 05E6     STX   L3 MLSCF&1                             30504050
077E 1 4C00 0789     BSC   L   WAIT4      CHK SW1 AND GO TO MON   30504060
                     *                                             30504070
0780 0 C00B    RT5C  LD        RT5SW      LOAD SW ENTRY           30504080
0781 0 1802          SRA       2          CLEAR BITS 14 AND 15    30504090
```

```
0782 0 100A              SLA      10          SHIFT COMND TO HIGH ORDER   30504100
0783 1 D400 0865         STO   L  SBSW2       STORE COMND                 30504110
0785 0 6300              LDX    3 0                                       30504120
0786 0 6B05              STX    3 RT5SW       CLEAR SW FOR NEXT ENTRY     30504130
0787 1 4420 0792         BSI   L  DISP,Z      GO TO DISPATCH              30504140
0789 0 70DC              MDX      RT5E                                    30504150
                   *                                                      30504160
078A   0000              BSS   E  0                                       30504170
078A 1 078C        SWCOM DC       RT5SW       READ CONS SW IOCC           30504180
078B 0 3A00              DC       /3A00                                   30504190
078C 0 0000        RT5SW DC       *-*         SWITCH SETTING              30504200
078D 0 0001        SWMSG DC       1           MSG NO                      30504210
078E 0 0000              DC       0                                       30504220
078F 0 0000              DC       0                                       30504230
0790 1 0967              DC       ASETS       ALPHA MESSAGE ADDR          30504240
0791 0 0000              DC       0                                       30504250
                   *                                                      30504260
                   ********************************************           30504270
                   *****          DISPATCH CONTROL   ************         30504280
                   **********************************************         30504290
                   *                                                      30504300
0792 0 0000        DISP  DC       *-*         RETURN ADDR          SE     30504310
0793 1 6580 0874   NEXT  LDX   I1 LOOK        RESTORE XR 1                30504320
0795 0 CD80 0000         LDD   I1 0           GET COUNT & DIRECTION       30504330
0797 1 DC00 086A         STD   L  COUNT                                   30504340
                   *                                                      30504350
0799 1 4C98 0792         BSC   I  DISP,&-     RETRN TO PROG ON ZERO  SX   30504360
079B 0 4043        PLOT  BSI      READY                                   30504370
079C 1 0C00 0868         XIO   L  MARK        MOVE COMMAND                30504380
079E 1 0C00 0866         XIO   L  SENSE       SENSE DSW                   30504390
07A0 1 D400 0836         STO   L  BDSW        SAVE ERROR DSW              30504400
                   *                                                      30504410
                   ********************************************           30504420
                   *              INTERRUPT WAIT ROUTINE                  30504430
                   ********************************************           30504440
                   *      THIS SUBROUTINE WAITS FOR INTERRUPT.            30504450
                   *      WHEN THE INTERRUPT IS RECEIVED IT WILL          30504460
                   *      CHECK THE ROUTINE SELECTION SWITCH.             30504470
                   *      IF A NEW ROUTINE HAS BEEN SELECTED IT           30504480
                   *      WILL BRANCH TO THE CONTROL ROUTINE.             30504490
                   *-------------------------------------------           30504500
                   *                                                      30504510
07A2 0 6500 1000   WAIT  LDX   L1 /1000       SET INTERRUPT               30504520
07A4 0 6939              STX    1 WCNT         WAIT CNT                   30504530
                   *                                                      30504540
07A5 1 6500 07AE   WAIT1 LDX   L1 WAIT3                                   30504550
07A7 1 7400 05E6         MDX   L  MLSCF&1,0   CHECK FOR INTR              30504560
07A9 0 700F              MDX      WAIT4       BR IF INTERRUPT OCCURED     30504570
                   *                                                      30504580
07AA 1 6D00 05E5   WAIT2 STX   L1 MLSCF       SET RETURN ADDRESS          30504590
07AC 1 4400 07FE         BSI   L  CKLK        CHECK LOCK-OUT              30504600
                   *                                                      30504610
07AE 1 74FF 07DE   WAIT3 MDX   L  WCNT,-1     DECREMENT WAIT CNT          30504620
07B0 0 70F4              MDX      WAIT1                                   30504630
                   *                                                      30504640
07B1 1 C400 0836         LD    L  BDSW        CK BUSY DSW                 30504650
07B3 1 F400 0837         EOR   L  BDSW&1      CHECK AGAINST EXPECTED      30504660
07B5 1 4420 0813         BSI   L  ERR2,Z                                  30504670
                   *                                                      30504680
07B7 1 4C00 081A         BSC   L  ERR3        PRINT NO INTRPT MSG         30504690
                   *                                                      30504700
07B9 1 C400 05E0   WAIT4 LD    L  SW1                                     30504710
07BB 1 4C08 07C1         BSC   L  WAIT5,&     BCH NO RTN SELECTED         30504720
07BD 1 9400 05DD         S     L  RID         CK FOR NEW ROUTINE          30504730
07BF 1 4420 05F2         BSI   L  CNTRL,Z     BR IF NEW RTN               30504740
07C1 1 4400 07FE   WAIT5 BSI   L  CKLK        CHECK LOCK-OUT              30504750
07C3 1 4C80 05E6         BSC   I  MLSCF&1     CONTINUE WITHOUT MONITOR    30504760
                   *                                                      30504770
```



```
07C5 0 C070        CONT  LD       BDSW        CK BUSY DSW                 30504780
07C6 0 F070              EOR      BDSW&1                                  30504790
07C7 1 4420 0813         BSI   L  ERR2,Z                                  30504800
                   *                                                      30504810
07C9 0 C06E              LD       IDSW        CK INTERRUPT DSW            30504820
07CA 0 F06E              EOR      IDSW&1                                  30504830
07CB 1 4C20 081E         BSC   L  ERR4,Z                                  30504840
                   *                                                      30504850
07CD 1 6580 05DD   CONT1 LDX   I1 RID         CK FOR RTN 5                30504860
07CF 0 71FC              MDX    1 -4                                      30504870
07D0 0 7095              MDX      RT5E        BR IF RTN 5                 30504880
                   *                                                      30504890
07D1 1 C400 05DF   CONT2 LD    L  SWO         LD SWO                      30504900
07D3 0 EC80 0166         OR    I  ERLCK       COMB WITH MONITOR SWO       30504910
07D5 0 100A              SLA      10          CHECH LOCK SW               30504920
07D6 1 4C28 079B         BSC   L  PLOT,&Z     LOOP ON FUNC IF BR          30504930
                   *                                                      30504940
07D8 1 74FF 086A         MDX   L  COUNT,-1    REDUCE COUNT                30504950
07DA 0 70C0              MDX      PLOT                                    30504960
07DB 1 7401 0874         MDX   L  LOOK,1      BUMP INSTR ADDR PNTR        30504970
07DD 0 70B5              MDX      NEXT                                    30504980
                   *                                                      30504990
                   *                                                      30505000
07DE 0 0000        WCNT  DC       *-*         WAIT COUNT STORED HERE      30505010
                   *                                                      30505020
                   ********************************************           30505030
                   *****          CHECK READY  *****************          30505040
                   ********************************************           30505050
                   *                                                      30505060
07DF 0 0000        READY DC       *-*         RETURN ADDR          SE     30505070
07E0 1 0C00 0866         XIO   L  SENSE       SENSE DSW                   30505080
07E2 0 D051              STO      DSW         SAVE DSW                    30505090
07E3 1 4C98 07DF         BSC   I  READY,&-    RETURN IF READY             30505100
07E5 1 7400 0812         MDX   L  LKSW,0      IS LOCK-OUT MON SW SET      30505110
07E7 0 70F8              MDX      READY&1     * YES                       30505120
07E8 0 C85D              LDD      MSG1                                    30505130
07E9 0 6101              LDX    1 1                                       30505140
07EA 0 6203              LDX    2 3                                       30505150
07EB 0 4037              BSI      ELOG        PRINT ERROR MSG             30505160
                   *                                                      30505170
07EC 0 6500 7000         LDX   L1 /7000                                   30505180
07EE 0 69EF              STX    1 WCNT                                    30505190
                   *                                                      30505200
07EF 1 0C00 0866   NOT   XIO   L  SENSE       SENSE DSW                   30505210
07F1 1 4C98 07DF         BSC   I  READY,&-    RETURN TO PROG ON 0  SX     30505220
07F3 1 6500 07EF         LDX   L1 NOT         GET MLSCF                   30505230
                   *                                                      30505240
07F5 1 74FF 07DE         MDX   L  WCNT,-1                                 30505250
07F7 0 7001              MDX      NOT1                                    30505260
07F8 0 70E7              MDX      READY&1     REPRINT MSG                 30505270
                   *                                                      30505280
07F9 1 6D00 05E6   NOT1  STX   L1 MLSCF&1     SET MLSCF                   30505290
07FB 1 4400 07FE         BSI   L  CKLK        CHECK LOCK-OUT              30505300
07FD 0 70F1              MDX      NOT                                     30505310
                   ********************************************           30505320
                   *                                                      30505330
                   *              CHECK LOCK-OUT OF MONITOR               30505340
                   *                                                      30505350
                   *              IF BIT 15 OF FUNCTION 2 IS SET          30505360
                   *              MONITOR WILL BE BYPASSED TO CAUSE THE   30505370
                   *              PROGRAM TO ISSUE XIO COMMANDS AS        30505380
                   *              FAST AS POSSIBLE TO FIND A SLOW OR      30505390
                   *              BINDING PLOTTER                         30505400
                   *                                                      30505410
                   ********************************************           30505420
07FE 0 0000        CKLK  DC       *-*         RTN ENTRY                   30505430
07FF 1 7400 0812         MDX   L  LKSW,0      IS LOCK-OUT SW SET          30505440
0801 0 7009              MDX      CKLK4       * YES                       30505450
```

```
0802 1 C400 05E1          LD    L  SW2          GET FUNCTION 2 AND CHECK    30505460
0804 0 4804               BSC      E            IS LOCK-OUT SET             30505470
0805 0 7002               MDX      CKLK2        * YES                       30505480
0806 0 4480 0161    CKLK1 BSI   I  START        * NO, GO TO MONITOR         30505490
                    *                                                       30505500
0808 0 6809         CKLK2 STX      LKSW         SET LOCK-OUT SWITCH         30505510
0809 1 4C80 07FE    CKLK3 BSC   I  CKLK         RTN EXIT TO PROGRAM         30505520
                    *                                                       30505530
080B 1 C400 05E1    CKLK4 LD    L  SW2          GET FUNCTION 2 TO CHECK     30505540
080D 0 4804               BSC      E            IS LOCK-OUT SW OFF          30505550
080E 0 70FA               MDX      CKLK3        * NO                        30505560
080F 0 1010               SLA      16           CLEAR ACC AND               30505570
0810 0 D001               STD      LKSW         * LOCK SWITCH               30505580
0811 0 70F4               MDX      CKLK1        * YES                       30505590
                    *                                                       30505600
0812 0 0000         LKSW  DC       *-*          NON-ZERO, LOCK OUT MON      30505610
                    *                                                       30505620
                    *********************************************           30505630
                    *****          ERROR MESSAGE SETUP  *********           30505640
                    *********************************************           30505650
                    *                                                       30505660
0813 0 0000         ERR2  DC       *-*          SET UP BUSY DSW ERR MSG     30505670
0814 0 6102               LDX    1 2                                        30505680
0815 0 620C               LDX    2 /000C                                    30505690
0816 0 C831               LDD      MSG2                                     30505700
0817 0 400B               BSI      ELOG                                     30505710
0818 1 4C80 0813          BSC   I  ERR2                                     30505720
                    *                                                       30505730
081A 0 6103         ERR3  LDX    1 3          SET UP NO INTRPT ER MSG     30505740
081B 0 6201               LDX    2 /0001                                    30505750
081C 0 C82D               LDD      MSG3                                     30505760
081D 0 7003               MDX      ERRX                                     30505770
                    *                                                       30505780
081E 0 6104         ERR4  LDX    1 4          SET UP INTRPT DSW ER MSG    30505790
081F 0 6230               LDX    2 /0030                                    30505800
0820 0 C82B               LDD      MSG4                                     30505810
0821 0 4001         ERRX  BSI      ELOG                                     30505820
0822 0 70AA               MDX      CONT1                                    30505830
                    *                                                       30505840
                    *                                                       30505850
                    *********************************************           30505860
                    *          ERROR MESSAGE ROUTINE                        30505870
                    *********************************************           30505880
                    *     THIS ROUTINE PRINTS ALL THE ERROR MESSAGES.       30505890
                    *     UPON ENTRY THE MSG NO. MUST BE SET IN XR1,        30505900
                    *     THE DATA ID IN XR2, AND THE ALPHA ADDRS IN        30505910
                    *     THE ACCUM AND EXT.                                30505920
                    *-------------------------------------------            30505930
                    *                                                       30505940
0823 0 0000         ELOG  DC       *-*                                      30505950
0824 0 690A               STX    1 EMSG       SET MSG NUMBER              30505960
0825 0 6A0B               STX    2 EMSG&2     SET DATA ID                 30505970
0826 0 D80B               STD      EMSG&3     SET ALPHA ADDRS             30505980
0827 0 4480 0162          BSI   I  ERROR      PRINT ERROR MSG             30505990
0829 1 082F               DC       EMSG                                     30506000
082A 1 079B         LOOP  DC       PLOT         LOOP ADDRS                  30506010
082B 1 4C80 0823          BSC   I  ELOG         RETURN                      30506020
                    *                                                       30506030
                    *     ERROR MESSAGE TABLE                               30506040
082E    0001              BSS   E  1                                        30506050
082F 0 0000         EMSG  DC       *-*          MESSAGE NUMBER              30506060
0830 0 0000               DC       /0000        HEX/DEC SW                  30506070
0831 0 0000               DC       *-*          DATA I/D                    30506080
0832 0 0000               DC       *-*          ALPHA ADDRS1                30506090
0833 0 0000               DC       *-*          ALPHA ADDRS2                30506100
                    *                                                       30506110
0834 0 0000         DSW   DC       *-*          DSW WAS                     30506120
0835 0 0000               DC       /0000        DSW S/B                     30506130
```



```
0836 0 0000         BDSW  DC       *-*          BUSY DSW WAS                30506140
0837 0 0002               DC       /0002        BUSY DSW S/B                30506150
0838 0 0000         IDSW  DC       *-*          INTERRUPT DSW WAS           30506160
0839 0 8000               DC       /8000        INTERRUPT DSW S/B           30506170
                    *                                                       30506180
                    *********************************************           30506190
                    *****          INTERRUPT ROUTINE ************           30506200
                    *********************************************           30506210
                    *                                                       30506220
083A 0 0000         RECEV DC       *-*          RETURN ADDR             SE  30506230
083B 1 0C00 0866          XIO   L  SENSE        SENSE DSW                   30506240
083D 0 1000               NOP                   USE FOR TRAP                30506250
083E 0 D0F9               STO      IDSW         SAVE DSW ERROR BITS         30506260
083F 1 6700 07C5          LDX   L3 CONT                                     30506270
0841 1 6F00 05E6          STX   L3 MLSCF&1                                  30506280
0843 1 4C80 083A          BSC   I  RECEV        RETURN TO MONITOR       SX  30506290
                    *                                                       30506300
                    *********************************************           30506310
                    *****          STORAGE AREA *****************           30506320
                    *********************************************           30506330
                    *                                                       30506340
0846    0000              BSS   E  0                                        30506350
0846 1 094D         MSG1  DC       AWSB                                     30506360
0847 1 0953               DC       ADSW                                     30506370
0848 1 094D         MSG2  DC       AWSB                                     30506380
0849 1 0962               DC       ABDSW                                    30506390
084A 1 0953         MSG3  DC       ADSW                                     30506400
084B 1 0956               DC       ANINT                                    30506410
084C 1 094D         MSG4  DC       AWSB                                     30506420
084D 1 095C               DC       AIDSW                                    30506430
084E 0 0000         NN    DC       /0000        MOVE COUNT                  30506440
084F 0 4000               DC       /4000        DIRECTION                   30506450
0850 0 0000         S     DC       /0000                                    30506460
0851 0 2000               DC       /2000                                    30506470
0852 0 0000         EE    DC       /0000                                    30506480
0853 0 1000               DC       /1000                                    30506490
0854 0 0000         WW    DC       /0000                                    30506500
0855 0 0800               DC       /0800                                    30506510
0856 0 0000         NE    DC       /0000                                    30506520
0857 0 5000               DC       /5000                                    30506530
0858 0 0000         SE    DC       /0000                                    30506540
0859 0 3000               DC       /3000                                    30506550
085A 0 0000         SW    DC       /0000                                    30506560
085B 0 2800               DC       /2800                                    30506570
085C 0 0000         NW    DC       /0000                                    30506580
085D 0 4800               DC       /4800                                    30506590
085E 0 0001         PENUP DC       /0001                                    30506600
085F 0 0400               DC       /0400                                    30506610
0860 0 0001         PENDW DC       /0001                                    30506620
0861 0 8000               DC       /8000                                    30506630
0862 0 044C         LEFT  DC       1100                                     30506640
0863 0 0800               DC       /0800                                    30506650
0864 0 1100         BSWCT DC       /1100        CMD EXECUTE CNTR            30506660
0865 0 0000         SBSW2 DC       *-*          PLOT CMD STORAGE.           30506670
0866 0 0000         SENSE DC       /0000        SENSE DSW & RESET           30506680
0867 0 2F01               DC       /2F01                                    30506690
                    *                                                       30506700
0868 1 086B         MARK  DC       COMAD        DIRECTION COMMAND           30506710
0869 0 2900               DC       /2900                                    30506720
086A 0 0000         COUNT DC       /0000                                    30506730
086B 0 0000         COMAD DC       /0000                                    30506740
086C 0 0000         CONST DC       /0000                                    30506750
086D 0 0000         EXTRA DC       /0000                                    30506760
086E 0 0000         K0000 DC       /0000        ZERO CONSTANT               30506770
086F 0 0002         K0002 DC       /0002                                    30506780
0870 0 0007         K0007 DC       /0007                                    30506790
0871 0 0096         K0150 DC       150          CONSTANT                    30506800
0872 0 BFFC         K4003 DC       /BFFC        CONSTANT                    30506810
```

```
0873 0 8000     K8000 DC    /8000                          30506820
0874 0 0000     LOOK  DC    /0000     START OF STRING      30506830
0875 0 0000     SQRCT DC    /0000                          30506840
0876 0 0000     TRICT DC    /000      TRIANGLE COUNT       30506850
                *                                        30506860
                *                                        30506870
0877 1 085E     RT1ST DC    PENUP                          30506880
0878 1 0862           DC    LEFT                           30506890
0879 1 0856           DC    NE                             30506900
087A 1 0860           DC    PENDW     START OCTAGON NO. 1  30506910
087B 1 084E           DC    NN        1A                   30506920
087C 1 085E           DC    PENUP                          30506930
087D 1 0852           DC    EE                             30506940
087E 1 0856           DC    NE                             30506950
087F 1 0860           DC    PENDW                          30506960
0880 1 0858           DC    SE        2A                   30506970
0881 1 085E           DC    PENUP                          30506980
0882 1 085A           DC    SW                             30506990
0883 1 0850           DC    S                              30507000
0884 1 0860           DC    PENDW                          30507010
0885 1 0854           DC    WW        3A                   30507020
0886 1 085E           DC    PENUP                          30507030
0887 1 084E           DC    NN                             30507040
0888 1 085C           DC    NW                             30507050
0889 1 0860           DC    PENDW                          30507060
088A 1 0856           DC    NE        4A                   30507070
088B 1 085E           DC    PENUP                          30507080
088C 1 0858           DC    SE                             30507090
088D 1 0852           DC    EE                             30507100
088E 1 0860           DC    PENDW                          30507110
088F 1 0850           DC    S         5A                   30507120
0890 1 085E           DC    PENUP                          30507130
0891 1 0854           DC    WW                             30507140
0892 1 085A           DC    SW                             30507150
0893 1 0860           DC    PENDW                          30507160
0894 1 085C           DC    NW        6A                   30507170
0895 1 085E           DC    PENUP                          30507180
0896 1 0856           DC    NE                             30507190
0897 1 084E           DC    NN                             30507200
0898 1 0860           DC    PENDW                          30507210
0899 1 0852           DC    EE        7A                   30507220
089A 1 085E           DC    PENUP                          30507230
089B 1 0850           DC    S                              30507240
089C 1 0858           DC    SE                             30507250
089D 1 0860           DC    PENDW                          30507260
089E 1 085A           DC    SW        8A                   30507270
089F 1 085E           DC    PENUP                          30507280
08A0 1 0852           DC    EE                             30507290
08A1 1 086E           DC    K0000                          30507300
08A2 1 0852           DC    EE                             30507310
08A3 1 0860           DC    PENDW     START OCTAGON NO. 2  30507320
08A4 1 0852           DC    EE        1B                   30507330
08A5 1 085E           DC    PENUP                          30507340
08A6 1 084E           DC    NN                             30507350
08A7 1 0856           DC    NE                             30507360
08A8 1 0860           DC    PENDW     2B                   30507370
08A9 1 085C           DC    NW                             30507380
08AA 1 085E           DC    PENUP                          30507390
08AB 1 085A           DC    SW                             30507400
08AC 1 0854           DC    WW                             30507410
08AD 1 0860           DC    PENDW     3B                   30507420
08AE 1 0850           DC    S                              30507430
08AF 1 085E           DC    PENUP                          30507440
08B0 1 0852           DC    EE                             30507450
08B1 1 0858           DC    SE                             30507460
08B2 1 0860           DC    PENDW     4B                   30507470
08B3 1 0856           DC    NE                             30507480
08B4 1 085E           DC    PENUP                          30507490
```



```
08B5 1 085C           DC    NW                             30507500
08B6 1 084E           DC    NN                             30507510
08B7 1 0860           DC    PENDW     5B                   30507520
08B8 1 0854           DC    WW                             30507530
08B9 1 085E           DC    PENUP                          30507540
08BA 1 0850           DC    S                              30507550
08BB 1 085A           DC    SW                             30507560
08BC 1 0860           DC    PENDW     6B                   30507570
08BD 1 0858           DC    SE                             30507580
08BE 1 085E           DC    PENUP                          30507590
08BF 1 0856           DC    NE                             30507600
08C0 1 0852           DC    EE                             30507610
08C1 1 0860           DC    PENDW     7B                   30507620
08C2 1 084E           DC    NN                             30507630
08C3 1 085E           DC    PENUP                          30507640
08C4 1 0854           DC    WW                             30507650
08C5 1 085C           DC    NW                             30507660
08C6 1 0860           DC    PENDW     8B                   30507670
08C7 1 085A           DC    SW                             30507680
08C8 1 085E           DC    PENUP                          30507690
08C9 1 086E           DC    K0000     END OF ROUTINE       30507700
                *                                        30507710
08CA 1 085E     RT2ST DC    PENUP                          30507720
08CB 1 0862           DC    LEFT      PUT PEN AT LEFT MARGIN 30507730
08CC 1 0856           DC    NE        POSITION PEN FOR START 30507740
08CD 1 084E           DC    NN                             30507750
08CE 1 0854           DC    WW                             30507760
08CF 1 086E           DC    K0000                          30507770
08D0 1 0860           DC    PENDW                          30507780
08D1 1 0852           DC    EE        MOVE 10 INCHES EAST  30507790
08D2 1 085C           DC    NW        PLOT SAWTOOTH PATTERN 30507800
08D3 1 085A           DC    SW        FROM EAST TO WEST    30507810
08D4 1 086E           DC    K0000     REPEAT FIVE TIMES    30507820
08D5 1 084E           DC    NN                             30507830
08D6 1 0858           DC    SE        PLOT SAWTOOTH PATTERN 30507840
08D7 1 0856           DC    NE        FROM WEST TO EAST    30507850
08D8 1 086E           DC    K0000                          30507860
08D9 1 0850           DC    S         PLOT PERPENDICULAR   30507870
08DA 1 085E           DC    PENUP      LINES, JOINING THE  30507880
08DB 1 0854           DC    WW          POINTS OF EACH     30507890
08DC 1 0860           DC    PENDW        SAWTOOTH.        30507900
08DD 1 084E           DC    NN                             30507910
08DE 1 085E           DC    PENUP                          30507920
08DF 1 0854           DC    WW                             30507930
08E0 1 0860           DC    PENDW                          30507940
08E1 1 086E           DC    K0000     RPT ABOVE SEQ 10 TIMES 30507950
08E2 1 0852           DC    EE        PLOT TOP OF PATTERN  30507960
08E3 1 085E           DC    PENUP                          30507970
08E4 1 0850           DC    S                              30507980
08E5 1 0860           DC    PENDW                          30507990
08E6 1 0854           DC    WW        PLOT LINE THRU CENTER 30508000
08E7 1 085E           DC    PENUP     OF PATTERN           30508010
08E8 1 086E           DC    K0000     END OF ROUTINE       30508020
                *                                        30508030
08E9 1 085E     RT3ST DC    PENUP     RAISE PEN            30508040
08EA 1 0862           DC    LEFT      PUT PEN AT LEFT MARGIN 30508050
08EB 1 0852           DC    EE        POSITION PEN TO START 30508060
08EC 1 084E           DC    NN        SWING TEST PATTERN.  30508070
08ED 1 086E           DC    K0000                          30508080
08EE 1 0860           DC    PENDW                          30508090
08EF 1 084E           DC    NN        PLOT LEFT SIDE OF SQ. 30508100
08F0 1 0852           DC    EE        PLOT TOP OF SQUARE.  30508110
08F1 1 0850           DC    S         PLOT 1/4 INCH SEGMENT 30508120
08F2 1 086E           DC    K0000                          30508130
08F3 1 0854           DC    WW        PLOT 1/4 INCH SEGMENT 30508140
08F4 1 086E           DC    K0000                          30508150
08F5 1 085E           DC    PENUP     POSITION PEN FOR NEXT 30508160
08F6 1 0856           DC    NE        SMALLER SQUARE.      30508170
```

```
08F7 1 086E          DC     K0000                          30508180
08F8 1 0860          DC     PENDW     PLOT DIAGONAL LINES  30508190
08F9 1 0858          DC     SE        THRU THE SET OF      30508200
08FA 1 085E          DC     PENUP     SQUARES AND FINISH   30508210
08FB 1 084E          DC     NN        THE SWING TEST.      30508220
08FC 1 0860          DC     PENDW                          30508230
08FD 1 085A          DC     SW                             30508240
08FE 1 086E          DC     K0000                          30508250
08FF 1 085C          DC     NW                             30508260
0900 1 086E          DC     K0000                          30508270
0901 1 085E          DC     PENUP                          30508280
0902 1 0850          DC     S                              30508290
0903 1 0860          DC     PENDW                          30508300
0904 1 0856          DC     NE                             30508310
0905 1 086E          DC     K0000     END OF ROUTINE 3.    30508320
                     *                                     30508330
0906 1 085E          RT4ST  DC     PENUP     PICK UP PEN AND PUT  30508340
0907 1 0862          DC     LEFT      IT AT LEFT MARGIN.   30508350
0908 1 0856          DC     NE                             30508360
0909 1 084E          DC     NN        POSITION PEN TO START 30508370
090A 1 084F          DC     NN        WINDMILL PATTERN     30508380
090B 1 086E          DC     K0000                          30508390
090C 1 0860          DC     PENDW                          30508400
090D 1 085A          DC     SW        SIDE 1 TRI 1         30508410
090E 1 085C          DC     NW                             30508420
090F 1 086E          DC     K0000                          30508430
0910 1 085C          DC     NW        SIDE 2 TRI 1         30508440
0911 1 0856          DC     NE                             30508450
0912 1 086E          DC     K0000                          30508460
0913 1 084E          DC     NN        SIDE 3 TRI 1         30508470
0914 1 0858          DC     SE                             30508480
0915 1 0858          DC     SE                             30508490
0916 1 086E          DC     K0000                          30508500
0917 1 085E          DC     PENUP     MOVE TO NEW LOCATION 30508510
0918 1 0856          DC     NE                             30508520
0919 1 086E          DC     K0000                          30508530
091A 1 0860          DC     PENDW                          30508540
091B 1 085C          DC     NW        SIDE 1 TRI 2         30508550
091C 1 0856          DC     NE                             30508560
091D 1 086E          DC     K0000                          30508570
091E 1 0856          DC     NE        SIDE 2 TRI 2         30508580
091F 1 0858          DC     SE                             30508590
0920 1 086E          DC     K0000                          30508600
0921 1 0852          DC     EE        SIDE 3 TRI 2         30508610
0922 1 085A          DC     SW                             30508620
0923 1 085A          DC     SW                             30508630
0924 1 086E          DC     K0000                          30508640
0925 1 085E          DC     PENUP                          30508650
0926 1 0858          DC     SE                             30508660
0927 1 086E          DC     K0000                          30508670
0928 1 0860          DC     PENDW                          30508680
0929 1 0856          DC     NE        SIDE 1 TRI 3         30508690
092A 1 0858          DC     SE                             30508700
092B 1 086E          DC     K0000                          30508710
092C 1 0858          DC     SE        SIDE 2 TRI 3         30508720
092D 1 085A          DC     SW                             30508730
092E 1 086E          DC     K0000                          30508740
092F 1 0850          DC     S         SIDE 3 TRI 3         30508750
0930 1 085C          DC     NW                             30508760
0931 1 085C          DC     NW                             30508770
0932 1 086E          DC     K0000                          30508780
0933 1 085E          DC     PENUP                          30508790
0934 1 085A          DC     SW                             30508800
0935 1 086E          DC     K0000                          30508810
0936 1 0860          DC     PENDW                          30508820
0937 1 0858          DC     SE        SIDE 1 TRI 4         30508830
0938 1 085A          DC     SW                             30508840
0939 1 086E          DC     K0000                          30508850
```



```
093A 1 085A          DC     SW        SIDE 2 TRI 4         30508860
093B 1 085C          DC     NW                             30508870
093C 1 086E          DC     K0000                          30508880
093D 1 0854          DC     WW        SIDE 3 TRI 4         30508890
093E 1 0856          DC     NE                             30508900
093F 1 0856          DC     NE                             30508910
0940 1 086E          DC     K0000                          30508920
0941 1 085E          DC     PENUP                          30508930
0942 1 085C          DC     NW                             30508940
0943 1 086E          DC     K0000                          30508950
0944 1 0860          DC     PENDW                          30508960
0945 1 0856          DC     NE                             30508970
0946 1 0858          DC     SE                             30508980
0947 1 085A          DC     SW                             30508990
0948 1 085C          DC     NW                             30509000
0949 1 085E          DC     PENUP                          30509010
094A 1 086E          DC     K0000                          30509020
                     *                                     30509030
094B 1 0864          RT5ST  DC     BSWCT                  30509040
094C 1 086E          DC     K0000                          30509050
                     *                                     30509060
                     *                                     30509070
                     *********************************************  30509080
                     *          ALPHA MESSAGES             *  30509090
                     *********************************************  30509100
                     *                                     30509110
094D 0 923E          AWSB   DC     /923E     WAS  S/B     30509120
094E 0 9A21          DC     /9A21                          30509130
094F 0 219A          DC     /219A                          30509140
0950 0 BC1A          DC     /BC1A                          30509150
0951 0 2121          DC     /2121                          30509160
0952 0 FFFF          DC     /FFFF                          30509170
0953 0 329A          ADSW   DC     /329A     DSW          30509180
0954 0 9221          DC     /9221                          30509190
0955 0 FFFF          DC     /FFFF                          30509200
0956 0 7652          ANINT  DC     /7652     NO INTRPT    30509210
0957 0 2100          DC     /2100                          30509220
0958 0 2276          DC     /2276                          30509230
0959 0 9E62          DC     /9E62                          30509240
095A 0 569E          DC     /569E                          30509250
095B 0 FFFF          DC     /FFFF                          30509260
095C 0 2276          AIDSW  DC     /2276     INTRPT DSW   30509270
095D 0 9E62          DC     /9E62                          30509280
095E 0 569E          DC     /569E                          30509290
095F 0 2132          DC     /2132                          30509300
0960 0 9A92          DC     /9A92                          30509310
0961 0 FFFF          DC     /FFFF                          30509320
0962 0 1AB2          ABDSW  DC     /1AB2     BUSY DSW     30509330
0963 0 9AA6          DC     /9AA6                          30509340
0964 0 2132          DC     /2132                          30509350
0965 0 9A92          DC     /9A92                          30509360
0966 0 FFFF          DC     /FFFF                          30509370
0967 0 9A36          ASETS  DC     /9A36     SET COMMANDS IN SW 0-5  30509380
0968 0 9E21          DC     /9E21     T                    30509390
0969 0 1E52          DC     /1E52     CO                   30509400
096A 0 7272          DC     /7272     MM                   30509410
096B 0 3E76          DC     /3E76     AN                   30509420
096C 0 329A          DC     /329A     DS                   30509430
096D 0 2122          DC     /2122      I                   30509440
096E 0 7621          DC     /7621     N                    30509450
096F 0 9A92          DC     /9A92     SW                   30509460
0970 0 21C4          DC     /21C4      0                   30509470
0971 0 84F4          DC     /84F4     -5                   30509480
0972 0 213E          DC     /213E     AND 8-13             30509490
0973 0 7632          DC     /7632     ND                   30509500
0974 0 21E4          DC     /21E4      8                   30509510
0975 0 84FC          DC     /84FC     -1                   30509520
0976 0 DC21          DC     /DC21     3                    30509530
```

```
0977 0 8141                DC      /8141       *CR-TAB*                30509540
0978 0 9E26                DC      /9E26       THEN TN SW 14           30509550
0979 0 3676                DC      /3676       EN                      30509560
097A 0 219E                DC      /219E        T                      30509570
097B 0 7621                DC      /7621       N                       30509580
097C 0 9A92                DC      /9A92       SW                      30509590
097D 0 21FC                DC      /21FC        1                      30509600
097E 0 F021                DC      /F021       4                       30509610
097F 0 FFFF                DC      /FFFF                               30509620
                      *                                                30509630
0980   05E8                END     BGIN                                30509640
  NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```

```
MARK    0868  079C
MLSCF   05E5  0608 060D 077C 07A7 07AA 07C3 07F9 0841
MSG1    0846  07E8
MSG2    0848  0816
MSG3    084A  081C
MSG4    084C  0820
NE      0856  0636 0684 06E0 06F7 070A 071A 0750 0757 075E 0879 087E 088A 0896
              08A7 08B3 08BF 08CC 08D7 08F6 0904 0908 0911 0918 091C 091E 0929
              093E 093F 0945
NEXT    0793  07DD
NN      084E  061B 0632 0681 06A0 06BA 06BC 06D2 06F9 0706 087B 0887 0897 08A6
              08B6 08C2 08CD 08D5 08DD 08EC 08EF 08FB 0909 090A 0913
NOT     07EF  07F3 07FD
NOT1    07F9  07F7
NRTN    0614  0610
NW      085C  062E 0693 06DE 0713 0718 0888 0894 08A9 08B5 08C5 08D2 08FF 090E
              0910 091B 0930 0931 093B 0942 0948
OCTGN   061B  061E
OLD     06E2  06F0
PENDW   0860  087A 087F 0884 0889 088E 0893 0898 089D 08A3 08A8 08AD 08B2 08B7
              08BC 08C1 08C6 08D0 08DC 08E0 08E5 08EE 08F8 08FC 0903 090C 091A
              0928 0936 0944
PENUP   085E  0877 087C 0881 0886 088B 0890 0895 089A 089F 08A5 08AA 08AF 08B4
              08B9 08BE 08C3 08C8 08CA 08DA 08DE 08E3 08E7 08E9 08F5 08FA 0901
              0906 0917 0925 0933 0941 0949
PID     05DC  05EA
PLOT    079B  07D6 07DA 082A
RAD     05DE  0607
READY   07DF  0616 062A 067B 06F3 079B 07E3 07E7 07F1 07F8
RECEV   083A  05ED 0843
REG01   064F  0655
REG02   065B  0661
REG03   0667  066D
RID     05DD  05EC 05F6 05FC 05FD 05FF 0603 07BD 07CD
RIDCK   060F  05F7
RQKB    01BC
RQTY    01BB
RTNOM   0610  0600
RTNSW   0165  0609
RTTBL   0611  0605 060F 0610
RT1     0616  0611
RT1ST   0877  061F
RT2     062A  0612
RT2ST   08CA  0640
RT3     067B  0613
RT3ST   08E9  0689
RT4     06F3  0614
RT4ST   0906  06FB
RT5     0763  0615
RT5A    076D  077A
RT5B    0773  0771
RT5C    0780  076C
RT5D    077A  0772
RT5E    0766  0779 0789 07D0
RT5ST   0948  0766
RT5SW   078C  076A 076E 0780 0786 078A
RUN     072D  0762
S       0850  0634 0671 069A 06D4 0883 088F 089B 08AE 08BA 08D9 08E4 08F1 0902
              092F
SBSW2   0865  0775 0783
SE      0858  0638 0695 070D 071C 0880 088C 089C 08B1 08BD 08D6 08F9 0914 0915
              091F 0926 092A 092C 0937 0946
SENSE   0866  079E 07E0 07EF 083B
SIDE1   0731  0737
SIDE2   073E  0743
SIDE3   074A  074F
SQRCT   0875  06A5 06CB
START   0161  0806
```



```
STRT    05EB  05E3 05E4
SVKB    01BD
SW      085A  0630 0697 0710 071F 0882 0892 089E 08AB 08BB 08C7 08D3 08FD 090D
              0922 0923 092D 0934 0938 093A 0947
SWCOM   078A  076D
SWMSG   078D  0765
SWNG1   06A7  06CD
SWNG2   06AA  067F 06B9 06C4
SWNG3   06AE  06B4
SWNG4   06E5  06EB
SW0     05DF  07D1
SW1     05E0  05F3 05FB 07B9
SW2     05E1  0802 080B
SW3     05E2
TCNTL   0726  070C 070F 0712 0715 075B
TOP     075D  0756
TRICT   0876  06A8 06B7 06DB 06EE 072B 0754
WAIT    07A2
WAIT1   07A5  07B0
WAIT2   07AA
WAIT3   07AE  07A5
WAIT4   07B9  077E 07A9
WAIT5   07C1  078B
WCNT    07DE  07A4 07AE 07EE 07F5
WMIL1   0706  0709
WW      0854  063E 0675 069C 0885 0891 08AC 08B8 08C4 08CE 08DB 08DF 08E6 08F3
              093D
END OF ASSEMBLY
```

---------- LAST PAGE ----------

TABLE OF CONTENTS

1. PURPOSE

THE FUNCTION TEST IS DESIGNED (1) TO TEST FOR PROPER OPERATION OF THE PAPER-TAPE STATUS INDICATORS AND (2) TO TEST FOR ACCURATE DATA HANDLING BY THE PAPER-TAPE READER AND PAPER-TAPE PUNCH WHEN OVERLAPPED WITH OTHER ELEMENTS OF THE 1130 SYSTEM. THIS TEST MAY ALSO BE USED TO REPRODUCE TAPES.

2. PREREQUISITES

2.1*** PROGRAM PREREQUISITES

1130 DIAGNOSTIC MONITOR II

2.2*** EQUIPMENT PREREQUISITES

1. 1131 CPU WITH PROGRAM LOAD FROM EITHER CARD OR PAPER TAPE READER
2. 1134 PAPER TAPE READER AND/OR 1055 PAPER TAPE PUNCH.
3. AT LEAST 750 WORDS OF AVAILABLE CORE STORAGE.

3. OPERATING PROCEDURE

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION, REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

3.1*** PROGRAM LOADING

FOR THE CONVENIENCE OF 'READER ONLY' SYSTEMS, THE TEST PATTERN HAS BEEN INCLUDED ON THE END OF THE PAPER TAPE PROGRAM TAPE AND MAY BE IDENTIFIED BY COMPARING WITH THE SAMPLE TAPE. SECTION 6.1.

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO HALT AFTER LOADING

   IF HALT AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).
3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED OR ROUTINE SELECTION IS RESET.

1. TO SET ROUTINE SELECTION

   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN		DESCRIPTION	
1		PUNCH PATTERN	NORMAL ROUTINES- THE PROGRAM STARTS WITH ROUTINE 1, RUNS EACH ROUTINE IN SEQUENCE THEN TERMINATES AFTER ROUTINE 3.
2		READ PATTERN	
3		PUNCH AND READ PATTERN	
4	*	REPRODUCE TAPE	OPTIONAL ROUTINES THESE ROUTINES RUN ONLY IF SELECTED.
5	*	PUNCH BIT SWITCH SETTING	

   * = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION, SET AS IF SELECTING ROUTINE ZERO

**

3.2.3 PROGRAM OPTIONS

1. PUNCH FROM BIT SWITCHES

   ROUTINE 5 PUNCHES ALTERNATELY FROM SWITCHES 0-7 AND SWITCHES 8-15. AFTER THE ROUTINE IS SELECTED, SET THE DESIRED PATTERN IN THESE SWITCHES.

2. RE ALIGN PAPER TAPE

   TO REALIGN THE PAPER TAPE AT ANY TIME DURING RUNNING OF THE PROGRAM -
   A. SET SWITCHES TO 8180
   B. PRESS INT REG. KEY.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE PRESS START. RUN MODE - PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS. START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 3. ROUTINE 4 AND 5 WILL ONLY RUN IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN OORR AAAA (MESSAGE)
OR
EPPNN OORR AAAA (MESSAGE)

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE THIS WILL BE EITHER OO FOR MESSAGES ORIGINATED BY THE MONITOR OR OB FOR MESSAGES ORIGINATED BY THIS PROGRAM.
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

AOBOO OORR AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

AOBO1 OORR AAAA TAPE ALIGNED

THE PAPER TAPE TEST RECORD IS ASSUMED TO BE PROPERLY ALIGNED IN THE READER AT THIS TIME. THIS MESSAGE IS RECEIVED ONLY AFTER OPERATOR SPECIFICATION OF REALIGN TAPE OPTION.

******

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE PAPER TAPE DSW

BIT	
0	PARITY ERROR
1	READER SERVICE
2	NOT USED
3	PUNCH SERVICE
4	READER BUSY
5	READER NOT READY
6	PUNCH BUSY
7	PUNCH NOT READY
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	NOT USED
15	NOT USED

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 000N XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0B01 00RR AAAA XXXX 0X00

DSW ERROR AFTER READER-CONTROL COMMAND

E0B02 00RR AAAA XXXX 0X00

DSW ERROR AFTER PUNCH COMMAND

E0B03 00RR AAAA XXXX 0F00

DSW ERROR AFTER READER-CONTROL AND PUNCH COMMANDS

E0B04 00RR AAAA XXXX 0X00

DSW ERROR WHEN CHECKING FOR READER-READY

E0B05 00RR AAAA XXXX 0X00

DSW ERROR WHEN CHECKING FOR PUNCH-READY

E0B06 00RR AAAA XXXX 4000

READER SERVICE-REQUEST DSW ERROR

E0B07 00RR AAAA XXXX 1000

PUNCH SERVICE-REQUEST DSW ERROR

E0B08 00RR AAAA XXXX 5000

DSW ERROR WHEN PUNCH AND READER INTERRUPTS RECEIVED AT SAME TIME

E0B09 00RR AAAA XXXX X000

DSW ERROR WHEN FIRST INTERRUPT WAS RECEIVED. AT THIS TIME BOTH THE READER AND THE PUNCH ARE BEING RUN UNDER RACE CONDITIONS. THE DSW FOR THE DEVICE THAT INTERRUPTS FIRST IS ANALIZED FIRST. ANY ERROR WILL BE PRINTED AS AN E0B09. SIMILARLY FOR THE SECOND INTERRUPT, AN ERROR WILL BE PRINTED AS E0B10.

E0B10 00RR AAAA XXXX X000

DSW ERROR WHEN FIRST INTERRUPT WAS RECEIVED. AT THIS TIME BOTH THE READER AND THE PUNCH ARE BEING RUN UNDER RACE CONDITIONS. THE DSW FOR THE DEVICE THAT INTERRUPTS FIRST IS ANALIZED FIRST. ANY ERROR WILL BE PRINTED AS AN E0B09. SIMILARLY FOR THE SECOND INTERRUPT, AN ERROR WILL BE PRINTED AS E0B10.

E0B11 00RR AAAA XXXX 0X00

NO READER INTERRUPT RECEIVED. (XXXX IS THE LAST DSW SENSED IMMEDIATELY AFTER THE READER-CONTROL COMMAND.

E0B12 00RR AAAA XXXX 0X00

NO PUNCH INTERRUPT RECEIVED (XXXX IS THE LAST DSW SENSED IMMEDIATELY AFTER THE READER-CONTROL COMMAND)

E0B13 00RR AAAA XXXX 0F00

NO PUNCH OR READER INTERRUPT (XXXX IS THE LAST DSW SENSED IMMEDIATELY AFTER THE READER-CONTROL AND PUNC COMMANDS)

E0B14 00RR AAAA DATA ERR
XX00 XX00

READ/COMPARE ERROR (RDR BUFFER CHANGED)
DATA (XX00) PRINTED AS ENTERED IN CORE - CHANNELS 8-1 RESPECTIVELY

E0B15 00RR AAAA DATA ERR
XX00 XX00

READ/COMPARE ERROR (RDR BUFFER UNCHANGED)
DATA (XX00) PRINTED AS ENTERED IN CORE - CHANNELS 8-1 RESPECTIVELY

E0B16 00RR AAAA XXXX 0000 XX00

READER-DSW READ ERROR WHEN REPRODUCING TAPES. IF TAPE STOPPED, THE FIRST CHARACTER BEYOND THE READ STATION WAS PERHAPS IMPROPERLY READ. THIS CHARACTER HAS NOT AS YET BEEN PUNCHED. BACK THE READER UP ONE CHARACTER AND PRESS START ON THE P-C.
DATA (XX00) PRINTED AS ENTERED IN CORE - CHANNELS 8-0 RESPECTIVELY.

READ READ
1ST 2ND
E0B18 00RR AAAA XX00 XX00

CONSECUTIVE READ ERROR DATA (XX00) SHOULD AGREE.

E0B19 00RR AAAA XX00 YY00

THE PROGRAM COULD NOT ALIGN THE TAPE IN THE READER IN THE LAST 500 CHARACTERS.

THE PROBLEM IS,

A. OPEN DATA CHANNEL(S). XX00 SHOULD BE FF00, WHICH IS THE CHARACTER THAT WOULD BE PLACED IN CORE BY READING AN ALL-BITS CHARACTER. ANY MISSING BIT(S) INDICATE THE OPEN DATA CHANNEL(S).

B. SHORTED DATA CHANNEL(S). YY00 SHOULD BE 0000, WHICH IS THE CHARACTER THAT WOULD BE PLACED IN CORE BY READING A NO-BITS CHARACTER. ANY BIT(S) PRESENT INDICATE THE SHORTED CHANNEL(S).

C. IF BOTH XX00 AND YY00 ARE CORRECT,

1. THE TAPE IS NOT IN THE READER CORRECTLY, OR
2. THE READER CANNOT READ THE FIRST 8 CHARACTERS PROPERLY. IF SO, TRY ONE OF THESE,

A. TRY RUNNING THE REPRODUCE TAPE ROUTINE (ROUTINE 4).
B. TRY MANUALLY ALIGNING THE TAPE IN THE READER. THEN SPECIFY THE MANUAL TAPE ALIGNMENT OPTION (TABLE O) AND RESTART THE PROGRAM.

E0B20 00RR AAAA XXXX

A SPURIOUS OR NON-RESETABLE INTERRUPT HAS BEEN RECEIVED.

---

5. COMMENTS

THE FUNCTION TEST CONSISTS OF THREE NORMAL ROUTINES AND TWO OPTIONAL ROUTINES. NORMALLY, ROUTINES ONE THROUGH THREE ARE RUN IN ORDER. ALL ROUTINES ARE DESCRIBED IN PARAGRAPHS 5.1 THROUGH 5.5.
THE FUNCTION TEST,

A. CHECKS DSW FOR PROPER BITS BEFORE ISSUING WRITE (PUNCH) OR CONTROL (READER) COMMANDS.

B. CHECKS DSW FOR CORRECTNESS AFTER XIO INSTRUCTION.

C. CHECKS FOR INTERRUPT FROM DEVICE WITHIN SPECIFIED TIME LIMIT.

D. CHECKS DSW AFTER INTERRUPT IS RECEIVED.

5.1*** ROUTINE NO. 1 (PUNCH TEST)

TEST NO. 1 CHECKS THE OPERATION OF THE PAPER-TAPE PUNCH WHILE PUNCHING TWO TEST RECORDS. THE RECORD INCLUDES A RIPPLE PATTERN AND AN ALL-CHARACTER PATTERN. (REFER FIGURE 1).

5.2*** ROUTINE NO. 2 (READER TEST)

THIS TEST CHECKS THE OPERATION OF THE PAPER TAPE READER WHILE READING ONE RECORD PRODUCED BY THE PUNCH TEST. THE TAPE IS NORMALLY AUTOMATICALLY ALIGNED IN THE READER BY READING EIGHT CONSECUTIVE CHARACTERS CORRECTLY. A MESSAGE IS PRINTED WHEN THE TAPE IS PROPERLY ALIGNED. IF DESIRED, THE OPERATOR CAN MANUALLY PLACE THE TAPE IN THE THE READER ON THE FIRST CHARACTER OF THE RIPPLE PATTERN AND SPECIFY THE MANUAL ALIGNMENT OPTION AS IN TABLE O. THE TAPE MAY ALSO BE REALIGNED IN THE READER AT ANY TIME.

EACH CHARACTER READ IS COMPARED WITH A WORD IN STORAGE. AN UNEQUAL COMPARE WILL CAUSE AN ERROR TYPEOUT. SEE 4.2. THERE WILL BE BE ONE ERROR TYPEOUT FOR EACH READ/COMPARE ERROR.

THESE ERROR PRINTOUTS MAY INDICATE THE TAPE IS NOT IN THE PROPER POSITION IN THE READER. THE TAPE MAY BE MANUALLY ADJUSTED IN THE READER OR THE OPERATOR MAY SELECT REALIGN TAPE. (TABLE O)

5.3*** ROUTINE NO. 3 (PUNCH/READ/COMPARE TEST)

THIS TEST CHECKS THE FUNCTION AND RELIABILITY OF THE PAPER TAPE READER AND PUNCH WHEN OPERATED TOGETHER. BOTH DEVICES ARE OPERATED AT THE SAME SPEED. THE DATA READ IS COMPARED WITH THE DATA PUNCHED IN A NEW TAPE. THIS TEST ALSO HAS THE TAPE ALIGNMENT FEATURE OF TEST NO. 2. THE TEST IS COMPLETE AFTER ONE RECORD HAS BEEN PROCESSED.

5.4*** ROUTINE NO. 4 (REPRODUCE-TAPES TEST)

THE OPERATOR HAS THE OPTION OF REPRODUCING ANY TAPE. THE OPERATOR MUST SPECIFY HALT ON ERROR OPTION IN MONITOR CONTROL TABLE O. AGAIN, ALL DEVICE STATUS CHECKING DONE IN TESTS NOS. 1 AND 2 IS INCLUDED IN THIS TEST. ALSO, A DSW ERROR WHEN READING THE TAPE WILL CAUSE A DELAY OF THE PROGRAM UNTIL THE OPERATOR CAN INTERVENE.
OTHER THAN E016 IS PRINTED PRESS START AND THEN VERIFY THAT THE PROPER PUNCHES ARE OBTAINED. SEE SPECIFIC ERROR MESSAGE FOR AID IN INSTRUCTIONS.

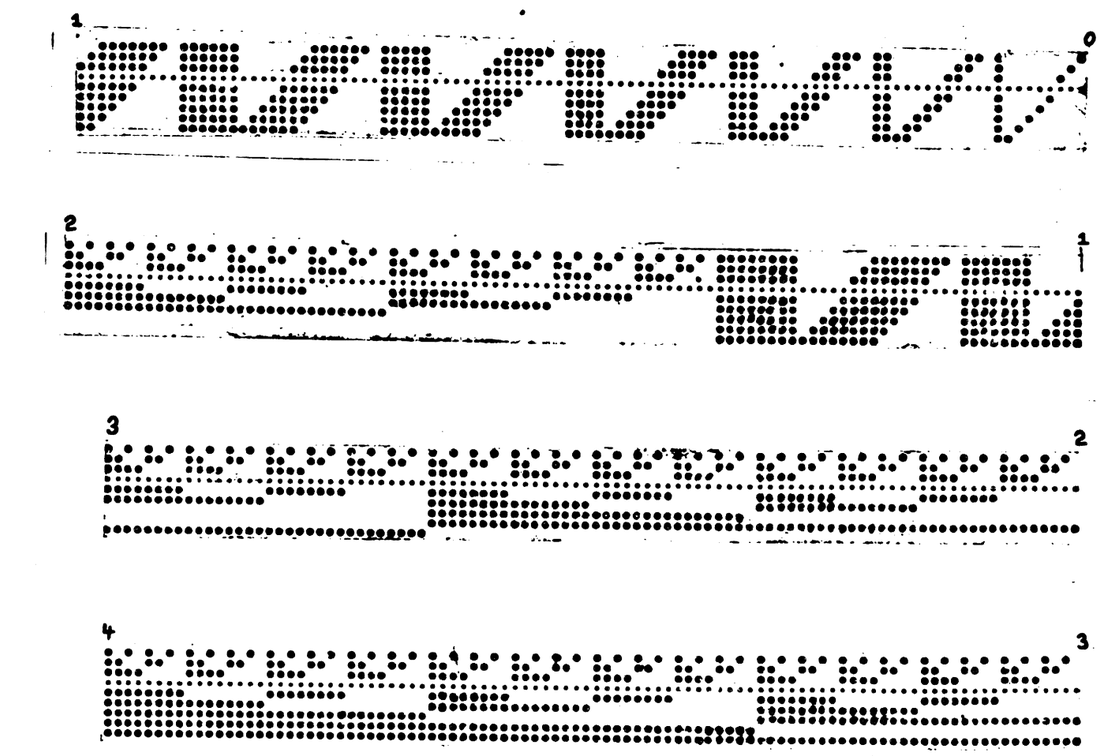
5.5*** ROUTINE NO. 5 (PUNCH BIT SWITCH IMAGE)

THIS ROUTINE PUNCHES THE DATA ENTERED IN THE BIT SWITCHES.
THE ROUTINE WILL ALTERNATELY PUNCH FROM SWITCHES 0-7 THEN SWITCHES 8-15.

6. APPENDIX

6.1 SAMPLE TAPE

FIGURE 1 SHOWS EXAMPLE OF PAPER TAPE RECORD.



LAST PAGE

```
                         ************************************************* 30B00020
                         *             EQUATE TABLE                      * 30B00030
                         ************************************************* 30B00040
                         *     THIS TABLE EQUATES TEST PROGRAM LABELS      30B00050
                         *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR      30B00060
                         *     ADDRESSES.                                  30B00070
                         *                                                 30B00080
0160                     BEGIN EQU     /160       BEGIN ROUTINE          30B00090
0161                     START EQU     BEGIN&1    SUPERVISOR ROUTINE     30B00100
0162                     ERROR EQU     START&1    ERROR LOG ROUTINE      30B00110
0163                     LOG   EQU     ERROR&1    STATUS LOG ROUTINE     30B00120
0164                     END   EQU     LOG&1      END ROUTINE            30B00130
                         *-------------------------------------------------30B00140
                         *     MONITOR CONTROL WORD ADDRESSES              30B00150
                         *                                                 30B00160
0165                     RTNSW EQU     END&1      ROUTINE START SWITCH   30B00170
0166                     ERLCK EQU     END&2      LOCK ON ERROR CONTROL  30B00180
0167                     LOGBY EQU     END&3      I/O BUSY SW ADR        30B00190
0168                     RLCF  EQU     END&4      RELOCATION FACTOR ADR  30B00200
                         *-------------------------------------------------30B00210
                         *     INTERRUPT TRANSFER VECTOR ADDRESSES         30B00220
                         *                                                 30B00230
017A                     IL0   EQU     /17A       INTERRUPT LEVEL ZERO   30B00240
018A                     IL1   EQU     IL0&16     INTERRUPT LEVEL ONE    30B00250
019A                     IL2   EQU     IL1&16     INTERRUPT LEVEL TWO    30B00260
01AA                     IL3   EQU     IL2&16     INTERRUPT LEVEL THREE  30B00270
01BA                     IL4   EQU     IL3&16     INTERRUPT LEVEL FOUR   30B00280
01BB                     RQTY  EQU     IL4&1      TYPR SVC REQUEST INTERPT 30B00290
01BC                     RQKB  EQU     RQTY&1     KEYBOARD REQUEST INTERPT 30B00300
01BD                     SVKB  EQU     RQKB&1     KEYBOARD SERVICE INTERPT 30B00310
                         ************************************************* 30B00320
0000                           ORG     *&1500                             30B00330
                         *                                                 30B00340
                         ************************************************* 30B00350
                         *                  DIAGNOSTIC MONITOR           * 30B00360
                         *                     CONTROLLED                * 30B00370
                         *                  1130 PAPER TAPE TEST         * 30B00380
                         ************************************************* 30B00390
                         *                                                 30B00400
                         *                  PROGRAM STATUS TABLE           30B00410
                         *                                                 30B00420
050C 0 030B              PID   DC      /030B      PROGRAM ID NUMBER      30B00430
050D 0 0000              RID   DC      /0000      ROUTINE NUMBER         30B00440
050E 0 0000              RAD   DC      /0000      ROUTINE ADDRESS        30B00450
050F 0 0000              SW0   DC      /0000      FCN 0 - CONTROL        30B00460
05E0 0 0000              SW1   DC      /0000      FCN 1 - INITIAL RTN    30B00470
05E1 0 0000              SW2   DC                 NOT USED               30B00480
05E2 0 0000              SW3   DC      /0000      PUNCH SWS WORD         30B00490
05E3 1 0647                    DC      LOOP       LOOP PROGRAM ADDRESS   30B00500
05E4 1 0634                    DC      RESRT      INITIALIZATION ADDR    30B00510
05E5 0 0000              MLSCF DC      /0000      MAIN LINE SEQ CNTL     30B00520
05E6 1 0634                    DC      RESRT                             30B00530
05E7 0 0000                    DC      /0000      COUNTER ENTRY          30B00540
05E8 0 FFFF              TERM  DC      /FFFF      TERMINATOR             30B00550
                         ************************************************* 30B00560
                         *                                                 30B00570
                         *                                                 30B00580
                         *                  INTERRUPT ROUTINE              30B00590
                         *                                                 30B00600
                         *                                                 30B00610
05E9 0 0000              POINT DC      /0000                              30B00620
05EA 1 0C00 0740               XIO   L  XIOSD      SENSE DSW              30B00630
05EC 0 D036                    STO     DSWIT                             30B00640
05ED 1 6780 062E               LDX   I3 INTEX                            30B00650
05EF 1 4F80 0625               BSC   I3 HANDL-1    BR TO PROPER CHECK     30B00660
                         *                                                 30B00670
05F1 1 F700 062B         SINT  EOR   L3 INTEX-3    CHECK SINGLE INTRPT    30B00680
                                                                           30B00690
```



```
05F3 1 E780 062E               AND   I3 INTEX                            30B00700
05F5 1 4C18 061C               BSC   L  PINT3,&-   BR IF DSW OK          30B00710
05F7 1 6700 075F               LDX   L3 NIPES      SVC REQ ERROR          30B00720
05F9 0 7024                    MDX      PINT1                            30B00730
                         *                                                 30B00740
05FA 0 F030              DINT  EOR      INTED       CK DSW FOR 2 SVC REQ   30B00750
05FB 0 4C00 0000               BSC   L  /0000       BR IF 2ND DOUBLE INT   30B00760
05FD 0 D02B              DINT1 STO      DSWDI       CK FIRST INTERPT DSW   30B00770
05FE 0 E02C                    AND      INTED                             30B00780
05FF 0 D02A                    STO      DSWID                             30B00790
0600 1 4C20 0610               BSC   L  DINT4,Z     EXIT IF ONLY ONE REC   30B00800
0602 0 C026                    LD       DSWDI                             30B00810
0603 1 4C18 061C               BSC   L  PINT3,&-    BR IF DSW OK           30B00820
0605 1 6700 0769               LDX   L3 DINE1       PRINT DSW ERROR NEXT   30B00830
0607 0 7016                    MDX      PINT1                            30B00840
                         *                                                 30B00850
0608 0 E821              DINT2 OR       DSWID       CHECK SECOND INTRPT DSW 30B00860
0609 0 D019                    STO      DSWIT                             30B00870
060A 0 F020                    EOR      INTED                             30B00880
                         *                                                 30B00890
060B 1 4C18 061C               BSC   L  PINT3,&-    BR IF DSW OK           30B00900
060D 1 6700 076E               LDX   L3 DINE2                            30B00910
060F 0 700E                    MDX      PINT1                            30B00920
                         *                                                 30B00930
                         *                                                 30B00940
0610 0 1340              DINT4 SLCA   3  0                                 30B00950
0611 0 1001                    SLA      1                                 30B00960
0612 0 D011                    STO      BUMRQ       ZERO IF NO IEQ BIT     30B00970
0613 1 6700 0608               LDX   L3 DINT2       SET SECOND INT SW      30B00980
0615 0 6BE6                    STX      3 DINT1-1                         30B00990
0616 0 700A                    MDX      XIT                               30B01000
                         *                                                 30B01010
0617 1 6700 0755         EINT  LDX   L3 SPUR        SPURRIOUS OR NON-      30B01020
0619 1 6F00 05E5               STX   L3 MLSCF        RESETABLE INTERRUPT    30B01030
061B 0 7005                    MDX      XIT                               30B01040
                         *                                                 30B01050
061C 1 6700 077D         PINT3 LDX   L3 DINE6       DSW OK - RET TO MLINE  30B01060
061E 0 6BC7              PINT1 STX      3 MLSCF&1                         30B01070
                         *                                                 30B01080
061F 0 6300                    LDX      3 0         RESET INTRPT EXPECTED  30B01090
0620 0 6B0D                    STX      3 INTEX                           30B01100
                         *                                                 30B01110
0621 1 4C80 05E9         XIT   BSC   I  POINT       BUG OUT                30B01120
                         ************************************************* 30B01130
                         *                                                 30B01140
0623 0 0000              DSWIT DC       /0000       LAST INTERRUPT DSW     30B01150
0624 0 0000              BUMRQ DC       /0000                              30B01160
0625 1 0617                    DC       EINT                              30B01170
                         *                          INTERRUPT BR ADRS      30B01180
0626 1 05F1              HANDL DC       SINT        PUNCH INTR CK ADRS     30B01190
0627 1 05F1                    DC       SINT        RDR INTER CK ADRS      30B01200
0628 1 05FA                    DC       DINT        RDR-PUNCH INT CK       30B01210
0629 0 0000              DSWDI DC       /0000                              30B01220
062A 0 0000              DSWID DC       /0000       IDENTIFY INT YET EXP   30B01230
                         *                                                 30B01240
062B 0 5000              INTED DC       /5000       RDR-PCH SVC REQ EXP    30B01250
062C 0 4000                    DC       /4000       RDR SVC REQ            30B01260
062D 0 1000                    DC       /1000       PCH SVC REQ            30B01270
062E 0 0000              INTEX DC       /0000       INTERRUPT EXPECTED     30B01280
                         *                           1 # READER            30B01290
                         *                           2 # PUNCH             30B01300
                         *                           3 # BOTH              30B01310
062F 1 0748                    DC       RMASK       READER                 30B01320
0630 1 0749                    DC       XMASK       PUNCH                  30B01330
                         ************************************************* 30B01340
                         *                                                 30B01350
                         ************************************************* 30B01360
0631 0 4480 0160         PTBGN BSI   I  BEGIN       CALL MONITOR         * 30B01370
```

```
0633 1 05DC                DC      PID         ADDR OF PID NO     *     30B01380
                           ********************************************** 30B01390
                           *                                              30B01400
                           *       INITIAL PROGRAM ENTRY POINT            30B01410
                           *                                              30B01420
0634 0 62F8                RESRT LDX   2 -8          RESET TAPE ALIGN WORDS 30B01430
0635 1 6E00 07E7                 STX   L2 CORCT                           30B01440
0637 1 C400 05E1                 LD    L  SW2                             30B01450
0639 0 1810                      SRA     16                               30B01460
063A 1 D400 07E8                 STO   L  N1ST                            30B01470
                           *                                              30B01480
063C 0 6103                      LDX    1 3          RESTORE ERROR WD CNT 30B01490
063D 1 6D00 0819                 STX   L1 EMESG&2                         30B01500
                           *                                              30B01510
063F 0 6500 030E                 LDX   L1 782        RESTORE FOR 2 PU RCDS 30B01520
0641 1 6D00 0685                 STX   L1 RTN1I&1                         30B01530
0643 1 6500 05E9                 LDX   L1 POINT      SET INTERRUPT  TRAP  30B01540
0645 0 6D00 01BA                 STX   L1 IL4         VECTOR              30B01550
                           ********************************************** 30B01560
                           *                                              30B01570
                           *                                              30B01580
                           *       ROUTINE CONTROLLER                     30B01590
                           *                                              30B01600
                           *                                              30B01610
                           *  THIS ROUTINE CHECKS SWITCHES AND CONTROLS    30B01620
                           *  SEQUENCE IN WHICH TEST ROUTINES ARE RUN.    30B01630
                           *                                              30B01640
0647 0 1010                LOOP  SLA     16          RESET ROUTINE NUMBER 30B01650
0648 0 D094                      STO     RID                              30B01660
                           *                                              30B01670
0649 1 C400 05E0           CNTRL LD    L   SW1                            30B01680
064B 0 D037                      STO     SWCMP                            30B01690
064C 1 4C08 0658                 BSC   L  CN20,&     BR IF NO RTN SELECTD 30B01700
                           *                                              30B01710
064E 1 D400 05DD           CN10  STO   L  RID        SAVE NEW RTN NUMBER  30B01720
0650 0 902C                      S       RIDCK                            30B01730
0651 1 4C08 065F                 BSC   L  CN25,&     BR IF VALID RTN      30B01740
0653 0 1810                      SRA     16                               30B01750
0654 1 D400 05E0                 STO   L  SW1        IF INVALID RTN GO    30B01760
0656 1 D400 05DD                 STO   L  RID                             30B01770
                           *                                              30B01780
0658 1 7401 05DD           CN20  MDX   L  RID,1      ADV TO NEXT RTN      30B01790
065A 0 C021                      LD      RTNOM                            30B01800
065B 1 9400 05DD                 S     L  RID                             30B01810
                           *                                              30B01820
                           *                                              30B01830
065D 0 4488 0164                 BSI   I  END,&      END PROGRAM          30B01840
                           *                                              30B01850
065F 1 6580 05DD           CN25  LDX   I1 RID                             30B01860
0661 1 C500 067D                 LD    L1 RTTBL-1    SET ROUTINE ADDRESS  30B01870
                           *                                              30B01880
0663 1 D400 05DE                 STO   L  RAD                             30B01890
0665 1 6700 066E                 LDX   L3 CN30       SET MLSCF ENTRY      30B01900
0667 1 6F00 05E5                 STX   L3 MLSCF      *                    30B01910
0669 0 6F00 0165                 STX   L3 RTNSW      SET RTN SWITCH       30B01920
066B 0 6903                      STX    1 CN30&1     SAVE IX 1            30B01930
066C 0 4480 0161                 BSI   I  START      GO TO MONITOR        30B01940
066E 0 6500 0000           CN30  LDX   L1 0          RESTORE IX 1         30B01950
0670 0 6300                      LDX    3 0          RESTORE CHAR RTN     30B01960
0671 1 6F00 0847                 STX   L3 DULP&1                          30B01970
0673 0 6301                      LDX    3 1                               30B01980
0674 1 6F00 0845                 STX   L3 DULP-1                          30B01990
                           *                                              30B02000
0676 0 6700 0187                 LDX   L3 391        SET RECORD LENGTH    30B02010
0678 1 6F00 06A3                 STX   L3 WRECK                           30B02020
                           *                                              30B02030
067A 1 4D80 067D                 BSC   I1 RTTBL-1    BR TO ROUTINE        30B02040
                           ********************************************** 30B02050
```



```
                           *                                              30B02060
                           *                                              30B02070
067C 0 0004                RTNOM DC      NRTN-RTTBL&2                     30B02080
067D 0 0005                RTDCK DC      LRTN-RTTBL&1                     30B02090
                           *                                              30B02100
                           *      ROUTINE ADDRESS TABLE                   30B02110
                           *                                              30B02120
                           *          NORMAL ROUTINES                     30B02130
                           *                                              30B02140
                           *                                              30B02150
067E 1 0684                RTTBL DC      RTN1I       PUNCH ROUTINE        30B02160
067F 1 0691                      DC      RTN2        READER RTN           30B02170
0680 1 0699                NRTN  DC      RTN3        PCH & RDR CHECK      30B02180
                           *                                              30B02190
                           *      OPTIONAL ROUTINES                       30B02200
                           *                                              30B02210
0681 1 06A4                      DC      RTN4I       REPRODUCE TAPE       30B02220
0682 1 06C2                LRTN  DC      RTN5A       PCH BIT SW DATA RTN  30B02230
                           *                                              30B02240
0683 0 0000                SWCMP DC      /0000       SW1 COMPARE WORD     30B02250
                           ********************************************** 30B02260
                           *                                              30B02270
                           *                                              30B02280
                           *                MAINLINE ROUTINES             30B02290
                           *                                              30B02300
                           *                                              30B02310
                           *             ROUTINE  1 - PUNCH TEST          30B02320
                           *                                              30B02330
0684 0 6500 030E           RTN1I LDX   L1 782        SET FOR 2 RECORDS    30B02340
0686 0 691C                      STX    1 WRECK                           30B02350
0687 0 6500 0187                 LDX   L1 391        ONE RECORD NEXT TIME 30B02360
0689 0 69FB                      STX    1 RTN1I&1                         30B02370
068A 1 4400 083F           RTN1  BSI   L  MARK       BUILD NEXT CHARACTER 30B02380
068C 0 4053                      BSI     XKRDY       PUNCH READY          30B02390
068D 1 4C00 072F                 BSC   L  PUNH       PUNCH ONE CHARACTER  30B02400
                           ********************************************** 30B02410
068F 0 4048                RTN1A BSI       CRASH      CK IF END ROUTINE    30B02420
                           ********************************************** 30B02430
0690 0 70F9                      MDX       RTN1       NO - RETURN          30B02440
                           *                                              30B02450
                           *             ROUTINE  2 - READER TEST         30B02460
                           *                                              30B02470
0691 1 4400 083F           RTN2  BSI   L  MARK       BUILD NEXT CHARACTER 30B02480
0693 0 4062                      BSI     RRDY        READER READY         30B02490
0694 0 7077                      MDX     FEED        CONTROL READER       30B02500
0695 1 4400 079B           RTN2A BSI   L  RDIT       READ AND COMPARE     30B02510
0697 0 4040                      BSI     CRASH      CK IF END ROUTINE    30B02520
0698 0 70F8                      MDX       RTN2       NO - RETURN          30B02530
                           *                                              30B02540
                           *                                              30B02550
                           *             ROUTINE  3 - PCH-RD & COMPARE    30B02560
                           *                                              30B02570
0699 1 4400 083F           RTN3  BSI   L  MARK       BUILD NEXT CHARACTER 30B02580
069B 0 4044                      BSI     XKRDY       PUNCH READY          30B02590
069C 0 4059                      BSI     RRDY        READER READY         30B02600
069D 1 4C00 071B                 BSC   L  XFEED      PUNCH & CONTROL RDR  30B02610
069F 1 4400 079B           RTN3A BSI   L  RDIT       READ AND COMPARE     30B02620
06A1 0 4036                      BSI     CRASH      CK IF END OF ROUTINE 30B02630
06A2 0 70F6                      MDX       RTN3       NO - RETURN          30B02640
                           *                                              30B02650
06A3 0 0000                WRECK DC      /0000       RECORD LENGTH COUNTER 30B02660
                           ********************************************** 30B02670
                           *                                              30B02680
                           *              ROUTINE 4 - REPRO PAPER TAPE    30B02690
                           *                                              30B02700
06A4 0 4051                RTN4I BSI       RRDY                           30B02710
06A5 0 7066                      MDX       FEED                           30B02720
                           *                                              30B02730
```

```
06A6 1 C400 05E0    RTN4  LD   L  SW1                              30B02740
06A8 0 F0DA               EOR     SWCMP                           30B02750
06A9 1 4C20 0647          BSC  L  LOOP,Z      BR IF END THIS RTN  30B02760
06AB 0 4034               BSI     XKRDY       PUNCH READY         30B02770
06AC 0 4049               BSI     RRDY        READER READY        30B02780
06AD 1 4C00 071B          BSC  L  XFEED       PUNCH & CONTROL RDR 30B02790
                     *                                            30B02800
06AF 1 0C00 0744    RTN4A XIO  L  XIORR       READ RDR BUFFER     30B02810
06B1 1 C400 081E          LD   L  CARED       PLACE CHAR READ IN  30B02820
06B3 1 D400 081F          STO  L  XCHAR        OUTPUT AREA        30B02830
06B5 0 10A0               SLT     32                              30B02840
06B6 1 0C00 0740          XIO  L  XIOSD       SENSE DSW           30B02850
06B8 1 4C10 06A6          BSC  L  RTN4,-      BR IF NO DSW ERRORS 30B02860
                     *                                            30B02870
06BA 0 6116               LDX     1 /0016     PRINT RDR ERROR     30B02880
06BB 0 6207               LDX     2 7                             30B02890
06BC 1 4400 0809          BSI  L  PRDSW       PRINT THE ERROR     30B02900
06BE 1 6E00 0819          STX  L2 EMESG&2                         30B02910
                     *                                            30B02920
06C0 0 4035               BSI     RRDY        READER READY        30B02930
06C1 0 704A               MDX     FEED        CONTROL READER      30B02940
                     *    MDX     RTN4                            30B02950
                     ********************************************* 30B02960
                     *                                            30B02970
                     *                                            30B02980
                     *          ROUTINE 5 - PUNCH FROM BIT SWITCHES 30B02990
                     *                                            30B03000
                     *                                            30B03010
06C2 0 6700 0000    RTN5A LDX  L3 /0000                           30B03020
06C4 1 0C00 0746    RTN5B XIO  L  RDBS        READ THE BIT SWITCHES 30B03030
06C6 1 C400 0754          LD   L  BITSW                           30B03040
06C8 0 1300               SLA     3 0                             30B03050
06C9 1 D400 081F          STO  L  XCHAR       SAVE NEXT PCH CHAR  30B03060
06CB 0 C0F7               LD      RTN5A&1                         30B03070
06CC 0 4830               BSC     -Z                              30B03080
06CD 0 6300               LDX     3 0                             30B03090
06CE 0 4808               BSC     &                               30B03100
06CF 0 6308               LDX     3 8                             30B03110
06D0 0 6BF2         RTN5D STX     3 RTN5A&1                       30B03120
06D1 1 C400 05E0          LD   L  SW1                             30B03130
06D3 0 F0AF               EOR     SWCMP                           30B03140
06D4 1 4C20 0647          BSC  L  LOOP,Z      BR IF END THIS RTN  30B03150
06D6 0 4009               BSI     XKRDY       CHECK PUNCH READY   30B03160
06D7 0 7057               MDX     PUNH        PUNCH THE CHARACTER 30B03170
                     *    MDX     RTN5A                           30B03180
                     ********************************************* 30B03190
                     *                                            30B03200
                     *                                            30B03210
                     *                                            30B03220
                     *              COUNT CHARACTERS SUBROUTINE   30B03230
                     *                                            30B03240
06D8 0 0000         CRASH DC      /0000       IS RTN COMPLETE     30B03250
06D9 1 74FF 06A3          MDX  L  WRECK,-1    DECREMENT CHSR CNTR 30B03260
06DB 0 7002               MDX     RASH                            30B03270
                     *                                            30B03280
06DC 1 4C00 0649          BSC  L  CNTRL       BR - END OF RECORD  30B03290
                     *                                            30B03300
06DE 1 4C80 06D8    RASH  BSC  I  CRASH       RET IF RCD NOT CMPLT 30B03310
                     *                                            30B03320
                     ********************************************* 30B03330
                     *                                            30B03340
                     *                                            30B03350
                     *              PUNCH READY SUBROUTINE        30B03360
                     *                                            30B03370
06E0 0 0000         XKRDY DC      /0000                           30B03380
06E1 0 085E               XIO     XIOSD       SENSE AND SAVE DSW  30B03390
06E2 0 D070               STO     DSWAS                           30B03400
                     *                                            30B03410
```



```
06E3 0 E065               AND     XMASK       REMOVE RDR NRDY BIT 30B03420
                     *                                            30B03430
06E4 1 4C98 06E0          BSC  I  XKRDY,&-    BR IF DSW OKAY      30B03440
                     *                                            30B03450
06E6 0 1007               SLA     7           DSW ERROR           30B03460
06E7 1 4C10 06ED          BSC  L  XKRD2,-     BR IF PUNCH READY   30B03470
06E9 1 CC00 0888          LDD  L  PNRDY       SET PUNCH NOT READY 30B03480
06EB 1 DC00 081A          STD  L  EMESG&3                         30B03490
                     *                                            30B03500
06ED 0 6105         XKRD2 LDX     1 5         ERROR - 5           30B03510
06EE 0 C864               LDD     DSWAS                           30B03520
06EF 0 E05F               AND     POFF                            30B03530
06F0 0 18D0               RTE     16                              30B03540
06F1 1 4400 0809          BSI  L  PRDSW       PRINT THE ERROR     30B03550
                     *                                            30B03560
06F3 1 4400 0830          BSI  L  TIME        PAUSE BEFORE RECHECK 30B03570
06F5 0 70EB               MDX     XKRDY&1                         30B03580
                     ********************************************* 30B03590
                     *                                            30B03600
                     *                                            30B03610
                     *              READER READY SUBROUTINE       30B03620
                     *                                            30B03630
06F6 0 0000         RRDY  DC      /0000                           30B03640
06F7 0 0848               XIO     XIOSD       SENSE AND SAVE DSW  30B03650
06F8 0 D05A               STO     DSWAS                           30B03660
                     *                                            30B03670
06F9 0 E04E               AND     RMASK       REMOVE PCH NRDY BIT 30B03680
                     *                                            30B03690
06FA 1 4C98 06F6          BSC  I  RRDY,&-     BR IF DSW OKAY      30B03700
                     *                                            30B03710
06FC 0 1005               SLA     5           DSW ERROR           30B03720
06FD 1 4C10 0703          BSC  L  RRDY2,-     BR IF READER READY  30B03730
06FF 1 CC00 0886          LDD  L  RNRDY       SET NOT READY MSG   30B03740
0701 1 DC00 081A          STD  L  EMESG&3                         30B03750
0703 0 6104         RRDY2 LDX     1 4         ERROR - 4           30B03760
0704 0 C84E               LDD     DSWAS                           30B03770
0705 0 E048               AND     ROFF                            30B03780
0706 0 18D0               RTE     16                              30B03790
0707 1 4400 0809          BSI  L  PRDSW       PRINT THE ERROR     30B03800
                     *                                            30B03810
0709 1 4400 0830          BSI  L  TIME        PAUSE BEFORE RECHECK 30B03820
070B 0 70EB               MDX     RRDY&1                          30B03830
                     ********************************************* 30B03840
                     *                                            30B03850
                     *              CONTROL READER SUBROUTINE     30B03860
                     *                                            30B03870
070C 0 6101         FEED  LDX     1 1         SET READER INTRPT   30B03880
070D 1 6D00 062E          STX  L1 INTEX        EXPECTED           30B03890
                     *                                            30B03900
070F 0 0832               XIO     XIOFD       FEED READER         30B03910
                     *                                            30B03920
0710 0 082F               XIO     XIOSD       SAVE BUSY DSW       30B03930
0711 0 D03F               STO     DSWBY                           30B03940
0712 1 4400 0788          BSI  L  BSYES       CHECK BUSY DSW      30B03950
                     *                                            30B03960
0714 1 4400 0830          BSI  L  TIME        PAUSE FOR INTRPT    30B03970
                     *                        NO READ INTERPT     30B03980
0716 0 6111               LDX     1 /0011     ERROR - 11          30B03990
0717 0 C839               LDD     DSWBY                           30B04000
0718 0 E035               AND     ROFF                            30B04010
0719 0 E831               OR      DSWR2                           30B04020
071A 0 705F               MDX     DINE5       GO PRINT THE ERROR  30B04030
                     ********************************************* 30B04040
                     *                                            30B04050
                     *              PUNCH AND CONTROL READER      30B04060
                     *                   SUBROUTINE               30B04070
                     *                                            30B04080
071B 1 6500 05FD    XFEED LDX  L1 DINT1       RESTURE DOUBLE INT  30B04090
```

```
071D 1 6D00 05FC          STX  L1 DINT1-1     SWITCH                    30B04100
                      *                                                 30B04110
071F 0 6103               LDX   1 3           SET DOUBLE INTRPT         30B04120
0720 1 6D00 062E          STX  L1 INTEX        EXPECTED                 30B04130
                      *                                                 30B04140
0722 0 081B               XIO     XIOXX       FEED AND PUNCH            30B04150
0723 0 081E               XIO     XIOFD                                 30B04160
                      *                                                 30B04170
0724 0 081B               XIO     XIOSD       SAVE BUSY DSW             30B04180
0725 0 D02B               STO     DSWBY                                 30B04190
0726 1 4400 0788          BSI  L  BSYES      CHECK BUST DSW             30B04200
                      *                                                 30B04210
0728 1 4400 0830          BSI  L  TIME        PAUSE FOR INTERRUPT       30B04220
                      *                                                 30B04230
072A 0 C026               LD      DSWBY       LOST INTERPT              30B04240
072B 0 6113               LDX   1 /0013       ERROR - 13                30B04250
072C 0 18D0               RTE     16                                    30B04260
072D 0 C01F               LD      DSWRX                                 30B04270
072E 0 704B               MDX     DINE5       GO PRINT THE ERROR        30B04280
                      ********************************************      30B04290
                      *                                                 30B04300
                      *                PUNCH SUBROUTINE                 30B04310
                      *                                                 30B04320
072F 0 6102           PUNH LDX   1 2          SET PUNCH INTRPT          30B04330
0730 1 6D00 062E          STX  L1 INTEX        EXPECTED                 30B04340
                      *                                                 30B04350
0732 0 080B               XIO     XIOXX       PUNCH CHARACTER           30B04360
                      *                                                 30B04370
0733 0 080C               XIO     XIOSD       SAVE BUSY DSW             30B04380
0734 0 D01C               STO     DSWBY                                 30B04390
0735 1 4400 0788          BSI  L  BSYES       CHECK BUSY DSW            30B04400
                      *                                                 30B04410
0737 1 4400 0830          BSI  L  TIME        PAUSE FOR INTERRUPT       30B04420
                      *                                                 30B04430
0739 0 C817               LDD     DSWBY       NO PUNCH INTERPT          30B04440
073A 0 6112               LDX   1 /0012       ERROR - 12                30B04450
073B 0 E013               AND     POFF                                  30B04460
073C 0 E80F               OR      DSWX2                                 30B04470
073D 0 703C               MDX     DINE5                                 30B04480
                      ********************************************      30B04490
                      *                                                 30B04500
                      *                                                 30B04510
073E   0000               BSS  E                                        30B04520
073E 1 081F           XIOXX DC        XCHAR       PUNCH IOCC            30B04530
073F 0 1900               DC      /1900                                 30B04540
0740 0 0000           XIOSD DC        /0000       SENSE DSW IOCC        30B04550
0741 0 1F01               DC      /1F01                                 30B04560
0742 0 0000           XIOFD DC        /0000       FEED IOCC             30B04570
0743 0 1C10               DC      /1C10                                 30B04580
0744 1 081E           XIORR DC        CARED       READ IOCC             30B04590
0745 0 1A00               DC      /1A00                                 30B04600
0746 1 0754           RDBS  DC        BITSW       READ BIT SWITCHES     30B04610
0747 0 3A00               DC      /3A00                                 30B04620
0748 0 FEFF           RMASK DC        /FEFF       READER MASK           30B04630
0749 0 FBFF           XMASK DC        /FBFF       PUNCH MASK            30B04640
074A 0 FFFF               DC      /FFFF       MINUS ONE                 30B04650
074B 0 0C00           DSWR2 DC        /0C00       RDR BUSY EXP DSW      30B04660
074C 0 0300           DSWX2 DC        /0300       PCH BUSY EXP DSW      30B04670
074D 0 0F00           DSWRX DC        /0F00       DOUBLE BUSY DSW EXP   30B04680
074E 0 0100           ROFF  DC        /0100                             30B04690
074F 0 0400           POFF  DC        /0400                             30B04700
0750 0 0000               DC      /0000                                 30B04710
0751 0 0000           DSWBY DC        /0000       LAST BUSY DSW         30B04720
0752 0 0000               DC      /0000       NOT USED                  30B04730
0753 0 0000           DSWAS DC        /0000       LAST DSWER PRINTED    30B04740
0754 0 0000           BITSW DC                                          30B04750
                      ********************************************      30B04760
                      *                                                 30B04770
```



```
                      *                                                 30B04780
0755 0 6101           SPUR  LDX   1 1                                   30B04790
0756 1 6D00 0819            STX  L1 EMESG&2                             30B04800
0758 0 6120                 LDX   1 /20         ERROR - 20              30B04810
0759 1 C400 0623            LD   L  DSWIT                               30B04820
075B 1 4400 0809            BSI  L  PRDSW       PRINT DSW ERROR         30B04830
                      *                          SPURRIOUS OR NON-      30B04840
                      *                          RESETABLE INTERRUPT    30B04850
075D 0 4480 0161            BSI  I  START                               30B04860
                      ********************************************      30B04870
                      *                                                 30B04880
                      *                PRINT DSW ERRORS DETECTED        30B04890
                      *                DURING INTERRUPT                 30B04900
                      *                                                 30B04910
075F 0 6500 0000      NIPES LDX  L1 /0000       PRINT DSW ERROR         30B04920
                      *                          DETECTED WHILE         30B04930
                      *                          RUNNING RTN 1 OR       30B04940
                      *                          RTN 2                  30B04950
0761 1 CC00 0623            LDD  L  DSWIT                               30B04960
0763 1 E500 074D            AND  L1 ROFF-1                              30B04970
0765 1 ED00 062B            OR   L1 INTEX-3                             30B04980
0767 0 7105                 MDX   1 5           ERROR - 6 OR 7          30B04990
0768 0 7011                 MDX     DINE5                               30B05000
                      *                                                 30B05010
                      *                                                 30B05020
0769 1 C400 0623      DINE1 LD   L  DSWIT       PRINT DSW ERROR         30B05030
                      *                          DETECTED WHILE         30B05040
                      *                          RUNNING RTN 3 OR       30B05050
                      *                          RTN 4                  30B05060
076B 0 18D0                 RTE     16                                  30B05070
076C 0 6108                 LDX   1 8           ERROR - 8               30B05080
076D 0 700A                 MDX     DINE4                               30B05090
                      *                                                 30B05100
076E 1 C400 0623      DINE2 LD   L  DSWIT       SEQ SVC REQ ERROR       30B05110
0770 0 18D0                 RTE     16                                  30B05120
0771 1 C400 0624            LD   L  BUMRQ                               30B05130
0773 1 4C20 0777            BSC  L  DINE3,Z     BR IF 1ST SVC REQ OK    30B05140
0775 0 6109                 LDX   1 9           ERROR - 9               30B05150
0776 0 7001                 MDX     DINE4                               30B05160
                      *                                                 30B05170
0777 0 6110           DINE3 LDX   1 /0010       ERROR - 10              30B05180
0778 1 C400 062B      DINE4 LD   L  INTED                               30B05190
077A 0 18D0           DINE5 RTE     16                                  30B05200
077B 1 4400 0809            BSI  L  PRDSW       PRINT THE ERROR         30B05210
                      *                                                 30B05220
077D 0 1010           DINE6 SLA     16          INTRPT RECEIVED         30B05230
077E 1 D400 05E7            STO  L  MLSCF&2      BLOCK TIMER RETURN     30B05240
0780 1 6580 05DD            LDX  I1 RID         RET TO MAINLINE RTN     30B05250
0782 0 C063                 LD      ERRET                               30B05260
0783 1 4D98 087E            BSC  I1 SORTS-1,&-  BR IF NO ERROR LAST     30B05270
                      *                                                 30B05280
0785 0 1810                 SRA     16          RETURN TO FINISH        30B05290
0786 0 D05F                 STO     ERRET        ALIGNING TAPE          30B05300
0787 0 7014                 MDX     READ         IN READER              30B05310
                      ********************************************      30B05320
                      *                                                 30B05330
                      *                CHECK BUSY DSW                   30B05340
                      *                                                 30B05350
0788 0 0000           BSYES DC        /0000                             30B05360
0789 1 6D00 0760            STX  L1 NIPES&1     FETCH LAST DSW SENSED   30B05370
078B 0 C0C5                 LD      DSWBY       AFTER I/O COMMAND       30B05380
078C 1 E500 0747            AND  L1 RMASK-1                             30B05390
078E 1 F500 074A            EOR  L1 DSWR2-1                             30B05400
0790 1 4C98 0788            BSC  I  BSYES,&-    BR IF DSW OK            30B05410
                      *                                                 30B05420
0792 0 C8BE                 LDD     DSWBY       PRINT DSW ERROR         30B05430
0793 1 E500 074D            AND  L1 ROFF-1                              30B05440
0795 1 ED00 074A            OR   L1 DSWR2-1     ERROR - 1 OR 2 OR 3     30B05450
```

```
0797 0 18D0                RTE     16                                  30B05460
0798 0 4070                BSI     PRDSW       PRINT THE ERROR         30B05470
                       *                                               30B05480
                       *                                               30B05490
0799 1 4C80 0788   XBSYX BSC   I   BSYES       EXIT TO USER            30B05500
                       *                                               30B05510
                       *                                               30B05520
                       ***********************************************30B05530
                       *                                               30B05540
                       *                                               30B05550
                       *          READ AND COMPARE SUBROUTINE          30B05560
                       *                                               30B05570
                       *  THIS ROUTINE READS THE READER BUFFER TWICE    30B05580
                       *  TO ENSURE THE SAME DATA IS READ.  THEN IT     30B05590
                       *  COMPARES THE DATA READ WITH WHAT SHOULD HAVE  30B05600
                       *  BEEN READ.  IF AN ERROR IS FOUND THIS ROUTINE 30B05610
                       *  WILL REALIGN THE TAPE IN THE READER BEFORE    30B05620
                       *  RETURNING TO MAINLINE ROUTINE IF THAT OPTION  30B05630
                       *  WAS SPECIFIED.  OTHERWISE ONE ERROR IS PRINTED30B05640
                       *  FOR EACH NON-COMPARE.                         30B05650
                       *                                               30B05660
                       *  AN ERROR WILL ALSO BE PRINTED IF THE ROUTINE  30B05670
                       *  CANNOT REALIGN THE TAPE IN 100 CHARACTERS.    30B05680
                       *                                               30B05690
                       *                                               30B05700
079B 0 0000        RDIT    DC      /0000                               30B05710
079C 1 C400 081E   READ    LD   L  CARED       SAVE LAST CHAR READ     30B05720
079E 1 D400 0821           STO  L  LREAD                               30B05730
07A0 0 08A3                XIO     XIORR       READ CHARACTER          30B05740
                       *                                               30B05750
07A1 1 C400 081E           LD   L  CARED       SAVE CHARACTER READ     30B05760
07A3 0 D045                STO     SAVIT                               30B05770
                       *                                               30B05780
07A4 0 089F                XIO     XIORR       READ                    30B05790
07A5 0 C043                LD      SAVIT       CHECK IF SAME CHAR      30B05800
07A6 0 F077                EOR     CARED                               30B05810
07A7 1 4C20 07C5           BSC  L  RDIT1,Z     BR IF ERR IN READ       30B05820
                       *                                               30B05830
                       *                                               30B05840
07A9 1 C400 081F   RDITO   LD   L  XCHAR       DO CHARACTERS           30B05850
07AB 0 F072                EOR     CARED         COMPARE               30B05860
07AC 0 1808                SRA     8                                   30B05870
07AD 1 4C20 07CC           BSC  L  RDIT2,Z     BR IF NON COMPARE       30B05880
07AF 1 7401 07E7           MDX  L  CORCT,1                             30B05890
07B1 0 7055                MDX     RDITE       EXIT                    30B05900
                       *                                               30B05910
07B2 0 6835                STX   0 N1ST                                30B05920
07B3 0 6500 A001           LDX   1 /A001       PRINT TAPE ALIGNED      30B05930
07B5 1 CC00 088A           LDD  L  TEAL                                30B05940
07B7 0 406A                BSI     PTLOG       PRINT THE MESSAGE       30B05950
07B8 1 C400 05E1           LD   L  SW2         TURN OFF REALIGN SW     30B05960
07BA 0 1009                SLA     9                                   30B05970
07BB 0 1809                SRA     9                                   30B05980
07BC 1 D400 05E1           STO  L  SW2                                 30B05990
07BE 0 1810        RDITD   SRA     16          RESET BITLINE CHECK     30B06000
07BF 0 D02B                STO     BTLNE                               30B06010
07C0 0 C02C                LD      KFF00                               30B06020
07C1 0 D028                STO     NOLNE                               30B06030
07C2 0 6164                LDX   1 100                                 30B06040
07C3 0 6928                STX   1 TRIAL                               30B06050
07C4 0 7042                MDX     RDITE       EXIT                    30B06060
                       *                                               30B06070
07C5 0 C023        RDIT1   LD      SAVIT       CONSECUTIVE READ ERROR  30B06080
07C6 0 18D0                RTE     16                                  30B06090
07C7 0 C056                LD      CARED                               30B06100
07C8 0 6118                LDX   1 /18         ERROR - 18              30B06110
07C9 1 4400 0809           BSI  L  PRDSW       PRINT THE ERROR         30B06120
07CB 0 70DD                MDX     RDITO                               30B06130
```



```
                       *                                               30B06140
07CC 0 C01B        RDIT2   LD      N1ST                                30B06150
07CD 1 4C20 07EE           BSC  L  RDIT4,Z     BR IF TAPE ALIGNED      30B06160
                       *                                               30B06170
07CF 0 C01B                LD      BTLNE       BIT LINE OPEN CK        30B06180
07D0 0 E84D                OR      CARED                               30B06190
07D1 0 D019                STO     BTLNE                               30B06200
                       *                                               30B06210
07D2 0 C017                LD      NOLNE       BIT LINE SHORT CK       30B06220
07D3 0 E04A                AND     CARED                               30B06230
07D4 0 D015                STO     NOLNE                               30B06240
                       *                                               30B06250
07D5 1 74FF 07EC           MDX  L  TRIAL,-1    COUNT DOWN 100 MAX      30B06260
07D7 0 7007                MDX     RDIT3                               30B06270
                       *                                               30B06280
07D8 0 C011                LD      NOLNE       NO ALIGNMENT ERROR      30B06290
07D9 0 6119                LDX   1 /0019       ERROR - 19              30B06300
07DA 0 18D0                RTE     16                                  30B06310
07DB 0 C00F                LD      BTLNE                               30B06320
07DC 1 4400 0809           BSI  L  PRDSW       PRINT THE ERROR         30B06330
                       *                                               30B06340
07DE 0 70DF                MDX     RDITD                               30B06350
                       *                                               30B06360
07DF 0 61F8        RDIT3   LDX   1 -8                                  30B06370
07E0 0 6906                STX   1 CORCT                               30B06380
07E1 1 4400 06F6           BSI  L  RRDY        READER READY            30B06390
07E3 0 6802                STX   0 ERRET                               30B06400
07E4 1 4C00 070C           BSC  L  FEED        CONTROL READER          30B06410
                       *                                               30B06420
07E6 0 0000        ERRET   DC      /0000       RET TO CMPRE IF SET     30B06430
07E7 0 0000        CORCT   DC      /0000       TAPE ALIGNMENT          30B06440
07E8 0 0000        N1ST    DC      /0000        WORK AREAS             30B06450
07E9 0 0000        SAVIT   DC      /0000       SAVED CHARACTER         30B06460
07EA 0 FF00        NOLNE   DC      /FF00       SOLID LINE CHECK        30B06470
07EB 0 0000        BTLNE   DC      /0000       OPEN LINE CHECK         30B06480
07EC 0 0064        TRIAL   DC      100         100 TRIALS MAXIMUM      30B06490
07ED 0 FF00        KFF00   DC      /FF00                               30B06500
                       *                                               30B06510
07EE 1 C400 05E1   RDIT4   LD   L  SW2                                 30B06520
07F0 0 1008                SLA     8                                   30B06530
07F1 1 4C10 07F6           BSC  L  RDIT6,-     BR IF NO REALIGN        30B06540
07F3 0 1008                SLA     8                                   30B06550
07F4 0 D0F3                STO     N1ST                                30B06560
07F5 0 70E9                MDX     RDIT3                               30B06570
                       *                                               30B06580
07F6 0 6114        RDIT6   LDX   1 /0014       DATA READ ERROR         30B06590
07F7 1 CC00 0884           LDD  L  WASSB       SET ALPHA MESSAGE       30B06600
07F9 0 D820                STD     EMESG&3                             30B06610
07FA 0 C025                LD      LCHAR                               30B06620
07FB 0 F023                EOR     XCHAR                               30B06630
07FC 1 4C18 0802           BSC  L  RDIT5,&-    BR IF BUF S/NB CNGD     30B06640
07FE 0 C01F                LD      CARED                               30B06650
07FF 0 F021                EOR     LREAD                               30B06660
0800 0 4818                BSC     &-          BR IF RDR BUF CNGED     30B06670
0801 0 6115                LDX   1 /0015                               30B06680
0802 0 C01C        RDIT5   LD      XCHAR       BUILD ERROR MESSAGE     30B06690
0803 0 1898                SRT     24                                  30B06700
0804 0 1088                SLT     8           ERROR - 14 OR 15        30B06710
0805 0 C018                LD      CARED                               30B06720
0806 0 4002                BSI     PRDSW       PRINT THE ERROR         30B06730
                       *                                               30B06740
0807 1 4C80 079B   RDITE   BSC   I  RDIT                                30B06750
                       ***********************************************30B06760
                       *                                               30B06770
                       *                                               30B06780
                       *                PRINT ERROR SUBROUTINE         30B06790
                       *                                               30B06800
0809 0 0000        PRDSW   DC      /0000       PRINT ERROR RTN         30B06810
```

```
                        *                                                       30B06820
080A 0 D811             STD     EMESG&5     SAVE DATA WAS & S/B                 30B06830
                        *                                                       30B06840
080B 0 690B             STX   1 EMESG       SAVE MESSAGE ID NO                  30B06850
                        ********************************************          30B06860
080C 0 4480 0162        BSI   I ERROR                                 *         30B06870
080E 1 0817             DC      EMESG       MESSAGE ADDR            *         30B06880
080F 0 0000             DC                  LOOP ON ERR ADDR        *         30B06890
                        ********************************************          30B06900
0810 0 6203             LDX   2 3                                             30B06910
0811 0 6A07             STX   2 EMESG&2                                       30B06920
0812 0 10A0             SLT     32          CLEAR ALPHA MESS                    30B06930
0813 0 D806             STD     EMESG&3                                       30B06940
0814 1 6480 0809        LDX   IO PRDSW      NORMAL & LOOP RETS                  30B06950
                        *                                                       30B06960
0816   0000             BSS   E                                               30B06970
0816 0 1000             TIMEX DC      /1000     COUNTER                       30B06980
0817 0 0000             EMESG DC      /0000     MESSAGE ID                    30B06990
0818 0 0000             DC            /0000     HEX      OUTPUT               30B07000
0819 0 0003             DC            /0003     WORD COUNT                    30B07010
081A 0 0000             DC            /0000     ALPHA ADRS                    30B07020
081B 0 0000             DC            /0000     ALPHA ADRS                    30B07030
081C 0 0000             DC            /0000     DSWAS                         30B07040
081D 0 0000             DC            /0000     DSW S/B                       30B07050
                        *                                                       30B07060
                        *                                                       30B07070
081E 0 0000             CARED DC      /0000     CHARACTER READ                30B07080
081F 0 0000             XCHAR DC      /0000     PUNCH OUTPUT CHAR             30B07090
0820 0 0000             LCHAR DC      /0000     PREVIOUS OUTPUT CHAR          30B07100
0821 0 0000             LREAD DC      /0000     PREVIOUS CHAR READ            30B07110
                        ********************************************          30B07120
                        *                                                       30B07130
                        *                                                       30B07140
                        *                 LOG MESSAGE SUBROUTINE                30B07150
                        *                                                       30B07160
0822 0 0000             PTLOG DC      /0000                                   30B07170
0823 0 6907             STX   1 LGMS        SAVE MESSAGE ID                     30B07180
                        *                                                       30B07190
0824 0 D809             STD     LGMS&3      SAVE MODIFIERS                      30B07200
                        ********************************************          30B07210
0825 0 4480 0163        BSI   I LOG                                 *         30B07220
0827 1 082B             DC      LGMS        ADDR OF MESSAGE         *         30B07230
                        ********************************************          30B07240
0828 1 6480 0822        LDX   IO PTLOG      NORMAL RETURN                       30B07250
                        *                                                       30B07260
082A   0001             BSS   E 1                                             30B07270
082B 0 0001             LGMS  DC      1           MSG ID                      30B07280
082C 0 0000             DC            /0000       HEX OUTPUT                  30B07290
082D 0 0000             DC            /0000       DATA ID                     30B07300
082E 0 0000             DC            /0000                                   30B07310
082F 0 0000             DC            /0000                                   30B07320
                        ********************************************          30B07330
                        *                                                       30B07340
                        *                 TIMED DELAY SUBROUTINE                30B07350
                        *                                                       30B07360
0830 0 0000             TIME  DC      /0000                                   30B07370
0831 0 6500 1000        LDX   L1 /1000      SET UP COUNTER                      30B07380
0833 0 69E2             STX     1 TIMEX                                       30B07390
0834 1 74FF 0816        MDX   L TIMEX,-1    DECREMENT COUNTER                   30B07400
0836 0 7002             MDX     TIME1                                         30B07410
0837 1 4C80 0830        BSC   I TIME        EXIT TIME UP                        30B07420
                        *                                                       30B07430
0839 1 6500 0834        TIME1 LDX   L1 TIME&4     SET FOR REENTRY               30B07440
083B 1 6D00 05E7        PDSWX STX   L1 MLSCF&2                                  30B07450
083D 0 4480 0161        BSI   I START                                           30B07460
                        ********************************************          30B07470
                        *                                                       30B07480
                        *                 BUILD NEXT CHARACTER                  30B07490
```



```
                        *                 SUBROUTINE                            30B07500
                        *                                                       30B07510
083F 0 0000             MARK  DC      /0000                                   30B07520
0840 0 C0DE             LD      XCHAR       SAVE LAST CHARACTER                 30B07530
0841 0 1808             SRA     8                                               30B07540
0842 0 1008             SLA     8                                               30B07550
0843 0 D0DC             STO     LCHAR                                           30B07560
                        *                                                       30B07570
0844 0 6500 0001        LDX   L1 1          INIT TEST XR1                       30B07580
0846 0 6600 0000        DULP  LDX   L2 0                XR2                     30B07590
0848 1 4E80 0870        BSC   I2 WHAT       GO BUILD CHARACTER                  30B07600
                        *                                                       30B07610
084A 1 C500 0874        NRIPX LD    L1 BITSX        START NEW RIPPLE            30B07620
084C 0 D0D2             STO       XCHAR       PATTERN                           30B07630
084D 0 6201             LDX     2 1                                           30B07640
084E 0 701D             MDX       EXITX                                         30B07650
                        *                                                       30B07660
084F 0 C0CF             SRIPX LD      XCHAR       SHIFT RIPPLE PATTERN          30B07670
0850 0 1001             SLA     1                                               30B07680
0851 0 D0CD             STO       XCHAR                                         30B07690
0852 0 4820             BSC       Z           SKIP NEXT CH NO BITS              30B07700
0853 0 7018             MDX       EXITX                                         30B07710
0854 0 6202             LDX     2 2                                           30B07720
0855 0 C01E             LD        BITSX       PLACE ALL BIT CHAR                30B07730
0856 0 D0C8             STO       XCHAR                                         30B07740
0857 0 6925             STX     1 COUNX                                         30B07750
                        *                                                       30B07760
0858 1 74FF 087D        BARX  MDX   L COUNX,-1      SKIP WHEN COUNX GO 0        30B07770
085A 0 7011             MDX       EXITX                                         30B07780
085B 0 6200             LDX     2 0                                           30B07790
085C 0 7101             MDX     1 1                                           30B07800
085D 0 6920             STX     1 KOUNX                                       30B07810
085E 1 74F8 087E        MDX   L KOUNX,-8    SKIP EXCEPT END RIPPE               30B07820
0860 0 7001             MDX       ENRIX       BR TO END RIPPLE ROUT             30B07830
0861 0 700A             MDX       EXITX       BR TO EXIT                        30B07840
                        *                                                       30B07850
0862 0 6203             ENRIX LDX     2 3         END RIPPLE PATTERN            30B07860
0863 0 7008             MDX       EXITX                                         30B07870
                        *                                                       30B07880
0864 0 C018             ALLBX LD      COUNX       ALL CHARS PATTERN             30B07890
0865 0 D0B9             STO       XCHAR                                         30B07900
0866 0 800E             A         ONEEX       ADD ONE I. E. 0100                30B07910
0867 0 D015             STO       COUNX                                         30B07920
0868 1 4C20 086C        BSC   L   EXITX,Z                                       30B07930
                        *                                                       30B07940
                        *                                                       30B07950
086A 0 6101             LDX     1 1         REINITIALIZE                      30B07960
086B 0 6200             LDX     2 0                                           30B07970
086C 0 69D8             EXITX STX     1 DULP-1                                  30B07980
086D 0 6AD9             STX     2 DULP&1                                      30B07990
086E 1 4C80 083F        BSC   I MARK        EXIT                              30B08000
                        *                                                       30B08010
                        ********************************************          30B08020
                        *                                                       30B08030
0870 1 084A             WHAT  DC      NRIPX       RECORD CONTROL ADRS           30B08040
0871 1 084F             DC        SRIPX                                         30B08050
0872 1 0858             DC        BARX                                          30B08060
0873 1 0864             DC        ALLBX                                         30B08070
                        *                                                       30B08080
                        *                                                       30B08090
0874 0 FF00             BITSX DC      /FF00       CHARACTER PATTERN             30B08100
0875 0 0100             ONEEX DC      /0100       CONSTANTS                     30B08110
0876 0 00C0             DC        /00C0                                         30B08120
0877 0 00E0             DC        /00E0                                         30B08130
0878 0 00F0             DC        /00F0                                         30B08140
0879 0 00F8             DC        /00F8                                         30B08150
087A 0 00FC             DC        /00FC                                         30B08160
087B 0 00FE             DC        /00FE                                         30B08170
```

```
087C 0 00FF              DC      /00FF
                         *
087D 0 0000              COUNX DC        /0000       WORK AREAS
087E 0 0000              KOUNX DC        /0000
                         ********************************************
                         *
                         *
                         *                   ADDRESSES FOR RETURN TO
                         *                     MAINLINE AFTER INTRPT
                         *
087F 1 068F              SORTS DC        RTN1A       ROUTINE 1
0880 1 0695                    DC        RTN2A       ROUTINE 2
0881 1 069F                    DC        RTN3A       ROUTINE 3
0882 1 06AF                    DC        RTN4A       ROUTINE 4
0883 1 06C2                    DC        RTN5A       ROUTINE 5
                         ********************************************
                         *
                         *                   ALPHABETIC MESSAGE
                         *                    STORAGE AREAS
                         *
0884   0000                    BSS  E
0884 1 0899              WASSB DC        AWAS
0885 1 089C                    DC        ASB
0886 1 088C              RNRDY DC        ARDR
0887 1 08A5                    DC        ANRDY
0888 1 088F              PNRDY DC        APCH
0889 1 08A5                    DC        ANRDY
088A 0 0000              TEAL  DC        0
088B 1 0892                    DC        ATAPE
                         *
088C 0 6232              ARDR  DC        /6232       RDR ERROR
088D 0 6200                    DC        /6200
088E 0 FFFF                    DC        /FFFF
                         *
088F 0 561E              APCH  DC        /561E       PCH
0890 0 2600                    DC        /2600
0891 0 FFFF                    DC        /FFFF
                         *
0892 0 9C3C              ATAPE DC        /9C3C       TAPE ALIGNED
0893 0 5434                    DC        /5434
0894 0 213C                    DC        /213C
0895 0 5C20                    DC        /5C20
0896 0 1474                    DC        /1474
0897 0 3430                    DC        /3430
0898 0 FFFF                    DC        /FFFF
                         *
0899 0 923E              AWAS  DC        /923E       WAS
089A 0 9A00                    DC        /9A00
089B 0 FFFF                    DC        /FFFF
                         *
089C 0 219A              ASB   DC        /219A       S/B - DATA ERROR
089D 0 BC1A                    DC        /BC1A
089E 0 2184                    DC        /2184
089F 0 2132                    DC        /2132
08A0 0 3E9E                    DC        /3E9E
08A1 0 3E21                    DC        /3E21
08A2 0 3662                    DC        /3662
08A3 0 6200                    DC        /6200
08A4 0 FFFF                    DC        /FFFF
08A5 0 7662              ANRDY DC        /7662       NRDY
08A6 0 32A6                    DC        /32A6
08A7 0 FFFF                    DC        /FFFF
                         *
08A8   0631                    END     PTBGN
 NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```

```
30B08180
30B08190
30B08200
30B08210
30B08220
30B08230
30B08240
30B08250
30B08260
30B08270
30B08280
30B08290
30B08300
30B08310
30B08320
30B08330
30B08340
30B08350
30B08360
30B08370
30B08380
30B08390
30B08400
30B08410
30B08420
30B08430
30B08440
30B08450
30B08460
30B08470
30B08480
30B08490
30B08500
30B08510
30B08520
30B08530
30B08540
30B08550
30B08560
30B08570
30B08580
30B08590
30B08600
30B08610
30B08620
30B08630
30B08640
30B08650
30B08660
30B08670
30B08680
30B08690
30B08700
30B08710
30B08720
30B08730
30B08740
30B08750
30B08760
30B08770
30B08780
30B08790
30B08800
30B08810
```


C R O S S R E F E R E N C E

NAME	VALUE	REFERENCES
ALLBX	0864	0873
ANRDY	08A5	0887,0889
APCH	088F	0888
ARDR	088C	0886
ASB	089C	0885
ATAPE	0892	088B
AWAS	0899	0884
BARX	0858	0872
BEGIN	0160	0631
BITSW	0754	06C6,0746
BITSX	0874	084A,0855
BSYES	0788	0712,0726,0735,0790,0799
BTLNE	07EB	07BF,07CF,07D1,07DB
BUMRQ	0624	0612,0771
CARED	081E	06B1,0744,079C,07A1,07A6,07AB,07C7,07D0,07D3,07FE,0805
CNTRL	0649	06DC
CN10	064E	
CN20	0658	064C
CN25	065F	0651
CN30	066E	0665,066B
CORCT	07E7	0635,07AF,07E0
COUNX	087D	0857,0858,0864,0867
CRASH	06D8	068F,0697,06A1,06DE
DINE1	0769	0605
DINE2	076E	060D
DINE3	0777	0773
DINE4	0778	076D,0776
DINE5	077A	071A,072E,073D,0768
DINE6	077D	061C
DINT	05FA	0628
DINT1	05FD	0615,071B,071D
DINT2	0608	0613
DINT4	0610	0600
DSWAS	0753	06E2,06EE,06F8,0704
DSWBY	0751	0711,0717,0725,072A,0734,0739,078B,0792
DSWDI	0629	05FD,0602
DSWID	062A	05FF,0608
DSWIT	0623	05EC,0609,0759,0761,0769,076E
DSWRX	074D	072D
DSWR2	074B	0719,078E,0795
DSWX2	074C	073C
DULP	0846	0671,0674,086C,086D
EINT	0617	0625
EMESG	0817	063D,06BE,06EB,0701,0756,07F9,080A,080B,080E,0811,0813
END	0164	065D
ENRIX	0862	0860
ERLCK	0166	
ERRET	07E6	0782,0786,07E3
ERROR	0162	080C
EXITX	086C	084E,0853,085A,0861,0863,0868
FEED	070C	0694,06A5,06C1,07E4
HANDL	0626	05EF
IL0	017A	
IL1	018A	
IL2	019A	
IL3	01AA	
IL4	01BA	0645
INTED	062B	05FA,05FE,060A,0778
INTEX	062E	05ED,05F1,05F3,0620,070D,0720,0730,0765
KFFOO	07ED	07C0
KOUNX	087E	085D,085E
LCHAR	0820	07FA,0843
LGMS	082B	0823,0824,0827
LOG	0163	0825
LOGBY	0167	
LOOP	0647	05E3,06A9,06D4

```
LREAD   0821  079E,07FF
LRTN    0682  067D
MARK    083F  068A,0691,0699,086E
MLSCF   05E5  0619,061E,0667,077E,083B
NIPES   075F  05F7,0789
NOLNE   07EA  07C1,07D2,07D4,07D8
NRIPX   084A  0870
NRTN    0680  067C
NIST    07E8  063A,07B2,07CC,07F4
ONEEX   0875  0866
PDSWX   083B
PID     05DC  0633
PINT1   061E  05F9,0607,060F
PINT3   061C  05F5,0603,060B
PNRDY   0888  06E9
POFF    074F  06EF,073B
POINT   05E9  0621,0643
PRDSW   0809  06BC,06F1,0707,075B,077B,0798,07C9,07DC,0806,0814
PTBGN   0631  08A8
PTLOG   0822  07B7,0828
PUNH    072F  068D,06D7
RAD     05DE  0663
RASH    06DE  06DB
RDBS    0746  06C4
RDIT    079B  0695,069F,0807
RDITD   07BE  07DE
RDITE   0807  07B1,07C4
RDITO   07A9  07CB
RDIT1   07C5  07A7
RDIT2   07CC  07AD
RDIT3   07DF  07D7,07F5
RDIT4   07EE  07CD
RDIT5   0802  07FC
RDIT6   07F6  07F1
READ    079C  0787
RESRT   0634  05E4,05E6
RID     05DD  0648,064E,0656,0658,065B,065F,0780
RIDCK   067D  0650
RLCF    0168
RMASK   0748  062F,06F9,078C
RNRDY   0886  06FF
ROFF    074E  0705,0718,0763,0793
RQKB    01BC
RQTY    01BB
RRDY    06F6  0693,069C,06A4,06AC,06C0,06FA,070B,07E1
RRDY2   0703  06FD
RTNOM   067C  065A
RTNSW   0165  0669
RTN1    068A  0690
RTN1A   068F  087F
RTN1I   0684  0641,067E,0689
RTN2    0691  067F,0698
RTN2A   0695  0880
RTN3    0699  0680,06A2
RTN3A   069F  0881
RTN4    06A6  06B8
RTN4A   06AF  0882
RTN4I   06A4  0681
RTN5A   06C2  0682,06CB,06D0,0883
RTN5B   06C4
RTN5D   06D0
RTTBL   067E  0661,067A,067C,067D
SAVIT   07E9  07A3,07A5,07C5
SINT    05F1  0626,0627
SORTS   087F  0783
SPUR    0755  0617
SRIPX   084F  0871
START   0161  066C,075D,083D
```



```
SVKB    01BD
SWCMP   0683  064B,06A8,06D3
SWO     05DF
SW1     05E0  0649,0654,06A6,06D1
SW2     05E1  0637,07B8,07BC,07EE
SW3     05E2
TEAL    088A  07B5
TERM    05E8
TIME    0830  06F3,0709,0714,0728,0737,0837,0839
TIMEX   0816  0833,0834
TIME1   0839  0836
TRIAL   07EC  07C3,07D5
WASSB   0884  07F7
WHAT    0870  0848
WRECK   06A3  0678,0686,06D9
XBSYX   0799
XCHAR   081F  06B3,06C9,073E,07A9,07FB,0802,0840,084C,084F,0851,0856,0865
XFEED   071B  069D,06AD
XIOFD   0742  070F,0723
XIORR   0744  06AF,07A0,07A4
XIOSD   0740  05EA,06B6,06E1,06F7,0710,0724,0733
XIOXX   073E  0722,0732
XIT     0621  0616,061B
XKRDY   06E0  068C,069B,06AB,06D6,06E4,06F5
XKRD2   06ED  06E7
XMASK   0749  0630,06E3

END OF ASSEMBLY
```

---------- LAST PAGE ----------

TABLE OF CONTENTS

1. PURPOSE

THE 1132 FUNCTION TEST IS DESIGNED TO CHECK THE OPERATING PERFORMANCE OF THE 1132 PRINTER AND TO AID IN ITS PROPER ADJUSTMENT.

2. PREREQUISITES

2.1*** PROGRAM PREREQUISITES

DIAGNOSTIC MONITOR II

2.2*** EQUIPMENT PREREQUISITES

1. 1131 CPU WITH PROGRAM LOAD FROM CARDS OR PAPER TAPE.
2. 1132 PRINTER WITH EC 419621.
3. AT LEAST 2000 WORDS OF AVAILABLE CORE STORAGE.
4. ANY CARRIAGE TAPE. SEE SECTION 5.3.2.8.
   A TAPE 66 SPACES LONG, PUNCHED WITH CHANNEL 1,2,3,4,5,6,9, AND 12 SIX SPACES APART, MAY BE USED.
   ****

3. OPERATING PROCEDURE

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO HALT AFTER LOADING

   IF HALTED AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SEC 3.5)
3. LOAD DIAGNOSTIC MONITOR, AND 1132 FUNCTION TEST.
   ******

3.2*** PROGRAM OPERATION.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 FOR DESIRED FUNCTION.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS EFROR PRINTOUT AND 1132 PRINT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.
   **

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED.

1. TO SET ROUTINE SELECTION
   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN		DESCRIPTION		
1		EMIT SEQUENCE	.	NORMAL ROUTINES-
2		PRINT SCAN CHECK INDICATOR	.	THE PROGRAM STARTS WITH
3		SPACE WITH PRINTER OFF	.	ROUTINE 1, RUNS EACH
4		SPACE WITH PRINTER ON	.	ROUTINE IN SEQUENCE
5		RIPPLE PRINT	.	THEN TERMINATES AFTER
6		PRINT ALL CHARACTERS	.	ROUTINE A.
7		STRESS TEST	.	
8		CHANNEL IDENTIFICATION	.	
9	*	SKIP WITH PRINTER OFF	.	
A	*	SKIP WITH PRINTER ON	.	
B	*	BIT SWITCH CONTROL	.	OPTIONAL ROUTINES - RUN ONLY IF SELECTED

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION SET AS IF SELECTING ROUTINE ZERO.

**

3.2.3 OPTIONAL CONTROL

1. PRINT ANY CHARACTER

   TEST ROUTINE B ALLOWS THE C.E. TO SPECIFY THROUGH THE BIT SWITCHES THE CHARACTER HE DESIRES TO PRINT AND THE COLUMN IN WHICH IT WILL BE PRINTED. ONLY ONE CHARACTER WILL BE PRINTED ON EACH LINE.

   TO SPECIFY THE CHARACTER AFTER SELECTING ROUTINE B

   A. SET COLUMN NUMBER (IN BINARY) IN SWITCHES 1-7.
   B. SET THE CHARACTER CODE IN SWITCHES 8-15.
   C. TURN ON SWITCH 0.

2. MODIFY SPACE IDLE TIME

   IN ALL ROUTINES THE PROGRAM WILL NORMALLY TAKE 16 IDLES BEFORE SPACING AFTER PRINT. THIS IDLE TIME CAN BE INCREASED OR DECREASED AS FOLLOWS.

   A. SET SWITCHES 0-7 TO C1.
   B. SET SWITCHES 8-15 TO DESIRED NUMBER OF IDLES (IN BINARY)
   C. PRESS INT REG KEY.

3. SPECIFY CHANNEL TO SKIP TO

   IN ROUTINES 9 AND A, A CHANNEL CAN BE SELECTED BY A FUNCTION 2 SWITCH ENTRY. THE ROUTINE WILL THEN SKIP TO THAT CHANNEL ONLY. AFTER ENTERING THE ROUTINE, THE CHANNEL IS SPECIFIED BY SETTING THE BIT SWITCHES TO 81XXX WHERE XX EQUALS THE DSW BIT CODE FOR THE DESIRED CHANNEL.

CHARACTER	EMIT CODE	CHARACTER	EMIT CODE
1	F1	J	D1
2	F2	K	D2
3	F3	L	D3
4	F4	M	D4
5	F5	N	D5
6	F6	O	D6
7	F7	P	D7
8	F8	Q	D8
9	F9	R	D9
0	F0	E	C5
=	7E	G	C7
$	5B	W	E6
.	4B	X	E7
'	7D	Y	E8
,	6B	Z	E9
)	5D	A	C1
-	60	B	C2
(	4D	C	C3
+	4E	D	C4
/	61	F	C6
*	5C	H	C8
&	5D	I	C9
		S	E2
		T	E3
		U	E4
		V	E5

NOTE - THIS TABLE GIVES THE CHARACTERS IN THE NORMAL EMIT CODE SEQUENCE.

**

3.2.4 LOCK ON FUNCTION CONTROL

41XX

LOCK ON FUNCTION WILL LOOP ON THE PRIMARY FUNCTION IN EACH ROUTINE AS FOLLOWS.

RTN	FUNCTION
1	IDLE TO CHECK EMIT SEQUENCE
2	IDLE WITH SCAN CHECK
3	LOCK ON 1,2,3,9 OR 39 SPACES
4	SAME AS RTN 3
5	PRINT RIPPLE WITHOUT ADVANCING PATTERN
6	PRINT WITHOUT ADVANCING DATA.
7	LOOP ON PRINT
8	LOCK ON SPACE TO CHANNEL OR LOCK ON SKIP TO CHANNEL
9	LOCK ON SKIP TO SAME CHANNEL.
A	SAME AS RTN 9

NOTE - IN ROUTINE 3 OR 4, THE 39 SPACES EQUALS ONE REVOLUTION OF THE PLATTEN WHEN THE CARRIAGE IS SET TO 6 LINES PER INCH.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE-PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE A. ROUTINE B WILL RUN ONLY IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN OORR AAAA                (MESSAGE)
OR
EPPNN OORR AAAA                (MESSAGE)
```

WHERE	A	IDENTIFIES STATUS MESSAGES
	E	IDENTIFIES ERROR MESSAGES
	PP	IS THE ID OF THE PROGRAM CAUSING THE MESSAGE
		THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 0C FOR MESSAGES ORIGINATED BY THIS PROGRAM.
	NN	IS THE MESSAGE SEQUENCE NUMBER
	RR	IS THE ROUTINE NUMBER
	AAAA	IS THE ADDRESS OF THE ROUTINE
	MESSAGE	IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR). THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

A0C00 000R AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A0C01 000R AAAA NRDY
1132

THE 1132 IS NOT READY.

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE 1132 DSW

BIT	
0	READ EMITTER RESPONSE
1	SKIP RESPONSE
2	SPACE RESPONSE
3	CARRIAGE BUSY
4	PRINT SCAN CHECK
5	PRINTER NOT READY
6	PRINTER BUSY
7	NOT USED
8	CHANNEL 1
9	CHANNEL 2
10	CHANNEL 3
11	CHANNEL 4
12	CHANNEL 5
13	CHANNEL 6
14	CHANNEL 9
15	CHANNEL 12

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING THE PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 OOON XXXX

THIS ERROR WILL OCCUR IF AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0C01 000R AAAA WAS S/B - STATIC DSW ERR
XXXX 0000

SOME BIT OTHER THAN NOT READY OR A CHANNEL BIT WAS ON WHEN THE DSW WAS SENSED BEFORE GIVING AN 1132 CONTROL COMMAND. USE THE ABOVE DSW TABLE TO IDENTIFY THE BIT, THEN TAKE APPROPRIATE CORRECTIVE ACTION.

E0C02 000R AAAA LAST OP - CCCC
WAS S/B - BUSY DSW ERR
XXXX XXXX

THIS DSW WAS SENSED IMMEDIATELY AFTER THE 1132 CONTROL COMMAND IDENTIFIED BY CCCC WAS GIVEN. IF THE COMMAND WAS START PRINTER THE PRINTER BUSY BIT (6) SHOULD BE ON. IF THE LAST OP WAS SPACE OR SKIP THE CARRIAGE BUSY BIT (3) SHOULD BE ON. THE EXPECTED DSW IS IDENTIFIED BY S/B.

E0C03 000R AAAA LAST OP - CCCC
DSW - NO INTRPT
XXXX

NO INTERRUPT WAS RECEIVED FOLLOWING THE LAST 1132 CONTROL COMMAND IDENTIFIED BY CCCC. THE DSW WAS SENSED AFTER A TWO SECOND DELAY. IF THE COMMAND WAS NOT RECEIVED, A BUSY ERROR (E0C02) WILL ALSO BE PRINTED.

E0C04 000R AAAA LAST OP - CCCC
DSW - PRINTER STOPPED
XXXX

THE PRINTER WAS TURNED ON, SOME EMIT INTERRUPTS WERE DETECTED, THE PRINTER STOPPED. NO PRINTER STOP COMMAND WAS GIVEN. THE DSW XXXX WAS SENSED 2 SECONDS AFTER THE LAST INTERRUPT OCCURRED.

E0C05 000R AAAA LAST OP - CCCC
WAS S/B - LEVI DSW ERR
XXXX YYYY

THIS DSW (XXXX) WAS SENSED IN INTERRUPT FOLLOWING THE 1132 CONTROL COMMAND IDENTIFIED BY CCCC. YYYY IS THE EXPECTED DSW.

E0C06 000R AAAA EMIT BIT FAILURE
XX00 YY00

THIS ERROR WILL OCCUR IF ANY EMIT BIT IS ALWAYS MISSING (OPEN) OR ALWAYS ON (SHORT). XX WILL BE EQUAL TO FF IF NO BITS ARE MISSING. ANY OPEN BIT WILL BE IDENTIFIED BY A ZERO IN THAT BIT POSITION. YY SHOULD BE 00... ANY SHORTED BIT WILL BE IDENTIFIED BY A 1 IN THAT BIT POSITION.

E0C07 000R AAAA EMIT INVALD
XXXX

THE FIRST EMIT CHARACTER AFTER A START PRINTER WAS NOT VALID. THE XXXX EQUALS THE EMIT CHARACTER READ.

IF THIS ERROR PERSISTS, BYPASS THE ERROR TYPE OUT (SWITCH 13). THE PRINTER WILL THEN PRINT, AND IN ROUTINES 4 AND 5, ANY LINE BEGINNING WITH AN INVALID CHARACTER WILL BE SKIPPED.

E0C08 000R AAAA WAS S/B - EMIT SEQ ERR
XXXX YY00

THE LAST EMIT CODE WAS EITHER INVALID OR OCCURRED IN THE WRONG SEQUENCE. YY IDENTIFIES THE EXPECTED EMIT CODE. SECTION 5.4 CONTAINS A TABLE OF EMIT CODES.

E0C09 000R AAAA PRINTER DID NOT TURN OFF

A STOP COMMAND WAS GIVEN TO THE PRINTER BUT THE PRINTER DID NOT GO OFF.

E0C10 000R AAAA MULT SPACE INTERRUPTS

MORE THAN ONE SPACE INTERRUPT OCCURRED AFTER A SPACE COMMAND, OR AN UNEXPECTED SPACE INTERRUPT OCCURRED.

E0C11 000R AAAA MULT SKIP INTERRUPTS

AN UNEXPECTED SKIP INTERRUPT OCCURRED.

E0C12 000R AAAA MISSING CHANNEL
XXXXX

ROUTINE 8 SPACES TO A CHANNEL PUNCH IN THE CARRIAGE TAPE, IDENTIFIES THAT CHANNEL, THEN GOES TO THE NEXT CHANNEL. THIS IS REPEATED UNTIL 16 CHANNELS HAVE BEEN IDENTIFIED. IF ANY OF THE 8 CHANNELS IS NOT SENSED, THIS MESSAGE WILL IDENTIFY THAT CHANNEL. CHECK THE TAPE TO DETERMINE IF THAT CHANNEL WAS PUNCHED. FURTHER ANALYSIS OF THE CARRIAGE CONTROL (RTNS 9 & A) WILL ASSUME THAT THE CHANNEL WAS NOT PUNCHED IN THE CARRIAGE TAPE.

E0C13 0008 AAAA CHANNEL SEQ ER

ROUTINE 8 SPACES TO A CHANNEL PUNCH IN THE CARRIAGE TAPE, IDENTIFIES THAT CHANNEL THEN GOES TO THE NEXT CHANNEL AFTER 16 CHANNELS HAVE BEEN IDENTIFIED, THE PROCESS IS REPEATED WITH SKIPS. THE CARRIAGE IS STOPPED AFTER EACH SKIP INTERRUPT AND THE CHANNEL COMPARED WITH SEQUENCE DETECTED WHEN SPACING. THIS MESSAGE IS PRINTED WHEN ANY DIFFERENCE IN SEQUENCE IS DETECTED (USUALLY DUE TO A MISSED CHANNEL INTERRUPT OR A CHANNEL NOT DETECTED WHEN SPACING). THE CHANNEL SEQUENCE CAN BE DETERMINED FROM THE 1132 PRINTOUT.

E0C14 000R AAAA MULT CHANNEL BITS
XXXX

MORE THAN ONE CHANNEL BIT WAS ON IN THE DSW (XXXX).

E0C15 000R AAAA CHANNEL SENSE ER
XXXX YYYY

CHANNEL BITS SENSED IN INTERRUPT AFTER A SPACE RESPONSE (XXXX) ARE NOT EQUAL TO CHANNEL BITS SENSED APPROXIMATELY 1 MILLISEC LATER IN MAINLINE (YYYY). SINCE NO CARRIAGE COMMAND HAS BEEN GIVEN, THE CHANNEL BITS SHOULD BE THE SAME.

E0C16 000R AAAA CHANNEL SENSE ER
XXXX YYYY

THE CHANNEL BITS SENSED 1 MILLISECOND AFTER A SPACE RESPONSE (XXXX), ARE NOT EQUAL TO THE CHANNEL BITS SENSED IMMEDIATELY BEFORE THE NEXT EXECUTION OF SPACE COMMAND.

E0C17 000R AAAA CARRIAGE BSY

THE CARRIAGE WAS FOUND BUSY BEFORE GIVING A START PRINTER. THE START PRINTER COMMAND WAS NOT GIVEN. THE PROGRAM WILL WAIT IN A LOOP UNTIL THE CARRIAGE GOES NOT BUSY. THE NRDY MESSAGE (A0C01) WILL BE PRINTED EACH 10 SECONDS. IF THE LAST COMMAND WAS SKIP, THE CARRIAGE DID NOT STOP ON A STOP CARRIAGE COMMAND.

---

5. COMMENTS

5.1*** TYPICAL PROGRAM PASS

IF NO OPTIONS ARE SELECTED, THE 1132 FUNCTION TEST WILL RUN ROUTINES 1 THROUGH A THEN TERMINATE.

5.2*** TEST PROCEDURE

5.2.1 TEST ORGANIZATION

TESTS ARE ORGANIZED AS FOLLOWS

1. INITIALIZE THE TEST ROUTINE
   - A. CLEAR THE BUFFER
   - B. STOP THE PRINTER
   - C. CHECK FOR READY
   - D. PRINT HEADER ON 1132
   - E. SET ROUTINE TERMINATION CONTROL
2. INITIALIZE FOR THIS PASS THROUGH THE ROUTINE.
3. EXECUTE CONTROL COMMAND
4. CHECK FOR ERRORS
   - A. CHECK DSW FOR BUSY
   - B. WAIT FOR TIMED PERIOD - TIME OUT IF NO INTERRUPT.
   - C. CHECK EMITS FOR VALIDITY AND PROPER SEQUENCE.
   - D. CHECK INTERRUPT DSW
   - E. CHECK CHANNEL BITS
5. ANALYZE ERROR DATA AND PRINT ERROR MESSAGES.
6. GO TO 2 ABOVE IF LOCK ON FUNCTION.
7. ADVANCE FOR NEXT PASS THROUGH THE TEST ROUTINE.
8. GO REPEAT THE ROUTINE IF NOT END OF ROUTINE.

5.2.2 ERROR CHECKING

ALL TEST ROUTINES CONTAIN THE FOLLOWING ERROR CHECKING

1. DEVICE STATUS CHECK - THE DEVICE STATUS IS READ AND CHECKED AS FOLLOWS (THIS ANALYSIS IGNORES THE CHANNEL BITS - SEE 5.2.2-3).
   - A. BEFORE A TEST ROUTINE IS STARTED. THE DSW SHOULD BE ZERO. ANY BITS ON OTHER THAN NOT READY OR A CHANNEL BIT WILL BE IDENTIFIED BY A MESSAGE (E0C01). IF NOT READY, THE NRDY MESSAGE (A0C01) WILL BE PRINTED.
   - B. IMMEDIATELY AFTER ANY OPERATION. THE DSW SHOULD SHOW THE PRINTER BUSY AFTER A START PRINTER OR THE CARRIAGE BUSY AFTER A SPACE OR START SKIP. ALL OTHER BITS SHOULD BE OFF. THIS DSW IS SAVED AND CHECKED FOR ERRORS AFTER THE OPERATION IS COMPLETED. A MESSAGE (E0C02) WILL IDENTIFY ANY ERRORS.
   - C. IN INTERRUPT. THIS DSW IS COMPARED WITH THE EXPECTED DSW AND AN ERROR BIT SET IDENTIFYING ANY DIFFERENCES. THE MESSAGE (E0C05) IDENTIFYING ANY ERROR IS PRINTED IN MAINLINE. IF THE INTERRUPT IS EMITTER RESPONSE, THE DSW SHOULD SHOW PRINTER BUSY. IF CARRIAGE RESPONSE, THE DSW SHOULD SHOW CARRIAGE BUSY. IF SPACE RESPONSE, NO BUSY SHOULD BE ON UNLESS THE SPACE WAS GIVEN WITH THE PRINTER ON (ROUTINE4).
   - D. BEFORE A START PRINTER COMMAND TO ASSURE THAT THE CARRIAGE IS NOT BUSY. START PRINTER IS IGNORED IF THE CARRIAGE IS BUSY AND AN ERROR MESSAGE (E0C17) IS PRINTED AND THE PROGRAM WILL WAIT IN A LOOP, PRINTING THE NRDY MESSAGE (A0C01) EVERY 10 SECONDS.
2. EMIT CHECK

   WHEN THE PRINTER IS ON AN EMIT RESPONSE OCCURS EVERY 11 MILLISECONDS. THE EMIT CODE FOR THE FIRST RESPONSE AFTER INTERRUPT IS CHECKED FOR A VALID CODE. ALL SUBSEQUENT EMITS ARE CHECKED FOR VALID CODE AND FOR PROPER SEQUENCE.

   THE FIRST 100 EMITS AFTER THE FIRST START PRINTER ARE ALSO CHECKED FOR OPEN OR SHORTED EMIT BITS.
3. CHANNEL BIT CHECK

   THE CHANNEL CODE SHOULD NOT CHANGE FROM THE END OF ONE CARRIAGE COMMAND TO THE START OF THE NEXT. THE CHANNEL CODE IS SENSED IN INTERRUPT, ON RETURN TO MAINLINE FOLLOWING A SPACE RESPONSE INTERRUPT, AND BEFORE THE NEXT SPACE COMMAND. IF ANY CHANGE IN THE CHANNEL CODE IS DETECTED, AN ERROR MESSAGE WILL BE PRINTED (E0C15 OR E0C18).
4. INTERRUPT CHECK
   - A. FOLLOWING ANY CONTROL COMMAND, THE PROGRAM WILL WAIT IN A TIMED LOOP FOR THE INTERRUPT. EACH TIME AN INTERRUPT OCCURS, THE TIMER IS RESET. THE NUMBER OF INTERRUPTS FOR ANY ONE CONTROL COMMAND IS COUNTED IN INTERRUPT. THE COMPLETION OF ALL OPERATIONS IS DETERMINED IN INTERRUPT.

     IF ANY CONTROL COMMAND SHOULD FAIL TO CAUSE AN INTERRUPT RESPONSE, THE INTERRUPT WAIT ROUTINE WILL TIME OUT AND AN ERROR MESSAGE WILL BE PRINTED. IF ANY OPERATION ENDS ABNORMALLY (PRINTER GOES OFF, CARRIAGE STOPS) AN ERROR MESSAGE WILL BE PRINTED.

B. THE FOLLOWING FAILURES TO GET INTERRUPT ARE DETECTED

(1) NO RESPONSE AFTER A CONTROL COMMAND.

(2) PRINTER STOPPED BUT A PRINTER STOP COMMAND WAS NOT GIVEN.

(3) CARRIAGE STOPPED BUT A CARRIAGE STOP COMMAND WAS NOT GIVEN.

C. THE FOLLOWING EXTRA INTERRUPT WILL BE DETECTED

(1) MORE THAN ONE SPACE RESPONSE AFTER A SPACE COMMAND.

(2) EMIT RESPONSE AFTER A PRINTER STOP COMMAND.

(3) SKIP RESPONSE AFTER A CARRIAGE STOP COMMAND.

5.3*** ROUTINE DESCRIPTION

THIS SECTION CONTAINS A DESCRIPTION OF THE PROGRAM ROUTINES AND SUBROUTINES IN APPROXIMATELY THE ORDER IN WHICH THEY APPEAR IN THE PROGRAM AS FOLLOWS -

1. TEST SEQUENCE CONTROL ROUTINE
2. NORMAL TEST ROUTINES
3. OPTIONAL TEST ROUTINES
4. TEST SUBROUTINES
5. ERROR CONTROL RGUTINES
6. INTERRUPT ROUTINES

5.3.1 TEST SEQUENCE CONTROL ROUTINE - CNTRL

THIS ROUTINE CHECKS THE ROUTINE SELECTION SWITCH (SWI IN THE PROGRAM CONTROL TABLE) AND DETERMINES WHICH TEST ROUTINE IS TO BE RUN NEXT. IF A TEST ROUTINE HAS BEEN SELECTED IT ESTABLISHES A TRANSFER TO THAT ROUTINE. IF NO ROUTINE IS SELECTED A TRANSFER IS ESTABLISHED TO THE NEXT TEST ROUTINE IN SEQUENCE.

THE ROUTINE ADDRESS TABLE (RTTBC) WHICH IS PART OF CNTRL, CONTAINS THE ROUTINE ADDRESS FOR ALL TEST ROUTINES IN THE SEQUENCE IN WHICH THEY ARE TO BE RUN.

THE LAST TEST ROUTINE IN THE NORMAL SEQUENCE IS IDENTIFIED BY THE LABLE NRTN. AFTER THIS ROUTINE IS RUN CNTRL WILL TRANSFER TO MONITOR END AND TERMINATE THE PROGRAM. ROUTINES FOLLOWING THE LABLE NRTN ARE CALLED OPTIONAL TEST ROUTINES AND WILL ONLY BE RUN IF SELECTED.

5.3.2 NORMAL TEST ROUTINES

IF NO TEST ROUTINE IS SELECTED, THESE ELEVEN TEST ROUTINES WILL RUN IN SEQUENCE THEN THE PROGRAM WILL TERMINATE.

1. TEST ROUTINE 1 - EMIT SEQUENCE TEST.

   THIS TEST ROUTINE IDLES THE PRINTER FOR 200 READ EMITTER RESPONSE INTERRUPTS. IT CHECKS THAT NO EMIT BITS ARE OPEN OR SHORTED, AND THAT ALL EMITS CODES ARE VALID AND IN THE PROPER SEQUENCE.

2. TEST ROUTINE 2 - PRINT SCAN CHECK INDICATOR TEST.

   THIS TEST ROUTINE IDLES FOR THE PRINTER FOR 100 READ EMITTER RESPONSE INTERRUPTS, WITH THE SCAN CHECK BIT (BIT 15 IN CORE LOCATION /0027) SET TO ZERO. THIS WILL FORCE A PRINT SCAN CHECK ERROR. IF NO SCAN CHECK OCCURS AN EOC05 ERROR WILL PRINT.

3. TEST ROUTINE 3 - SPACE WITH PRINTER OFF.

   THIS TEST ROUTINE CHECKS FOR PROPER SPACE RESPONSE FOR BOTH SINGLE AND MULTIPLE SPACES. THE PROGRAM WAITS FOR THE SPACE INTERRUPT AND TURNS OFF THE PRINTER BEFORE GIVING THE NEXT SPACE COMMAND. LOCK ON FUNCTION WILL LOOP ANY SINGLE GROUP OF SPACES.

4. TEST ROUTINE 4 - SPACE WITH PRINTER ON.

   SAME AS ROUTINE 3 EXCEPT THAT THE PRINTER IS TURNED ON BEFORE THE SPACE COMMAND IS GIVEN.

5. TEST ROUTINE 5 - RIPPLE TEST

   THIS TEST ROUTINE PRINTS A RIPPLE PATTERN OF ALL CHARACTERS IN EMIT SEQUENCE. THE PATTERN IS PRINTED BY FLOATING A 'ONE' BIT ACROSS THE PRINT BUFFER (CORE ADDRESSES /0020-/0027). THIS CAUSES ONLY ONE CHARACTER TO BE PRINTED FOR EACH EMIT RESPONSE. TO PRINT ONE LINE 120 EMIT RESPONSES ARE REQUIRED. THE PROGRAM WILL THEN IDLE FOR 16 EMITS BEFORE THE SPACE COMMAND IS GIVEN (THIS SPACE IDLE TIME CAN BE CHANGED BY A FUNCTION 3 SWITCH SETTING). AFTER EACH LINE THE PATTERN IS ROTATED, THUS ALL CHARACTERS WILL BE PRINTED IN EVERY POSITION. EACH LINE REQUIRES 144 EMIT CYCLES. THIS RESULTS IN AN AVERAGE PRINT SPEED OF APPROXIMATELY 37 LINES PER MINUTE.

6. TEST ROUTINE 6 - PRINT ALL CHARACTERS

   THIS TEST ROUTINE PRINTS LINES OF ALL ONE CHARACTER. ALL CHARACTERS ARE PRINTED AT THE SAME TIME. THE PROGRAM WILL IDLE 16 EMITS BEFORE THE SPACE COMMAND IS GIVEN (THIS SPACE IDLE TIME CAN BE CHANGED BY A FUNCTION 3 SWITCH SETTING). SINCE CHARACTERS ARE PRINTED IN EMIT SEQUENCE, 48 EMIT CYCLES ARE REQUIRED FOR EACH LINE. THIS RESULTS IN AN AVERAGE PRINT SPEED OF ABOUT 110 LINES PER MINUTE FOR THIS ROUTINE.

7. TEST ROUTINE 7 - STRESS TEST

   THIS ROUTINE PRINTS LINES OF ONE CHARACTER WITH A MINIMUM OF TIME BETWEEN LINES. THE ROUTINE SETS THE BUFF TO ONES AND PRINTS WITH NO DATA CONTROL. AFTER EACH LINE THE ROUTINE WILL IDLE FOR 16 EMIT CYCLES, SPACE, THEN IDLE AN ADDITIONAL 16 EMIT CYCLES BEFORE PRINTING THE NEXT LINE. THIS RESULTS IN AN AVERAGE SPEED OF APPROXIMATELY 150 LINES PER MINUTE. FAILURES SHOWN BY THIS TEST ARE USUALLY THE RESULT OF LOADING OF THE POWER SUPPLY.

8. TEST ROUTINE 8 - CHANNEL IDENTIFICATION

THIS TEST ROUTINE CHECKS FOR PROPER DETECTION OF THE PUNCHES IN THE CHANNEL TAPE BOTH WHEN SPACING AND SKIPPING. THE CARRIAGE CONTROL TAPE MAY BE OF ANY LENGTH WITH ANY SEQUENCE OF PUNCHES SO LONG AS THE TOTAL NUMBER OF PUNCHES DOES NOT EXCEED 16.

THE ROUTINE FIRST SPACES TO EACH CHANNEL PUNCHED IN THE CARRIAGE TAPE, IDENTIFIES THAT CHANNEL BY A MESSAGE PRINTED ON THE 1132, THEN RECORDS THE SEQUENCE IN WHICH THE CHANNELS OCCUR.

AFTER SPACING TO 16 CHANNELS, THE ROUTINE WILL SKIP TO EACH OF THESE CHANNELS. THE CARRIAGE IS STOPPED AFTER EACH CHANNEL RESPONSE INTERRUPT, THE CHANNEL IS IDENTIFIED BY A MESSAGE PRINTED ON THE 1132, THEN THE SEQUENCE OF THE CHANNEL RESPONSE IS COMPARED TO THE SEQUENCE SEEN WHEN SPACING. IF THESE SEQUENCES DO NOT AGREE AN ERROR MESSAGE IS PRINTED.

9. TEST ROUTINE 9 - SKIP WITH PRINTER OFF.

THIS ROUTINE CHECKS SKIP TO A SPECIFIC CHANNEL. A START SKIP COMMAND IS GIVEN AND EACH CHANNEL RESPONSE CHECKED FOR THE DESIRED CHANNEL. WHEN A MATCH IS FOUND A STOP CARRIAGE IS GIVEN AND THE CHANNEL IDENTIFIED BY AN 1132 MESSAGE. THE CARRIAGE WILL ALSO BE STOPPED AFTER 16 CHANNEL RESPONSES WITHOUT A MATCH.

10. TEST ROUTINE A - SKIP WITH PRINTER ON.

THIS ROUTINE IS THE SAME AS TEST ROUTINE 9 WITH THE EXCEPTION THAT THE PRINTER IS TURNED ON BEFORE THIS SKIP COMMAND IS GIVEN AND KEPT ON WHILE SKIPPING. THIS TESTS FOR INTERACTION BETWEEN READ EMITTER AND SKIP RESPONSES.

5.3.3 OPTIONAL TEST ROUTINE -

TEST ROUTINE B - BIT SWITCH CONTROL

THIS TEST ROUTINE ALLOWS THE CE TO SPECIFY THROUGH THE BIT SWITCHES THE CHARACTER HE DESIRES TO PRINT AND THE COLUMN IN WHICH HE WILL PRINT THAT CHARACTER. ONLY ONE CHARACTER WILL BE PRINTED ON EACH LINE.

THE COLUMN NUMBER MUST BE ENTERED IN SWITCHES 1-7, AND THE CHARACTER CODE IN SWITCHES 8-15. PRINTING WILL START WHEN SWITCH 0 IS TURNED ON.

5.3.4 TEST SUBROUTINES

THE FOLLOWING FUNCTIONS ARE PERFORMED BY SUBROUTINES IN THE PROGRAM.

1. INITIALIZE - CLEAR THE BUFFER, STOP THE PRINTER, CHECK FOR READY, AND PRINT THE ROUTINE HEADING ON THE 1132.

2. PRINT - CHECK FOR CARRIAGE BUSY, SET THE SCAN COUNT, START THE PRINTER, CHECK THE BUSY DSW, THEN WAIT FOR THE SCAN COUNT TO GO TO ZERO.

3. IDLE - SET THE IDLE COUNT, CHECK FOR CARRIAGE BUSY, START THE PRINTER, CHECK THE BUSY DSW, THEN WAIT FOR THE IDLE COUNT TO GO TO ZERO.

4. SPACE - STOP THE PRINTER, CHECK FOR CHANGE IN CHANNEL CODE, START SPACE, CHECK THE BUSY DSW, THEN WAIT FOR THE SPACE INTERRUPT.

5. SKIP - SET DESIRED CHANNEL CODE, START SKIP, CHECK BUSY DSW, THEN WAIT UNTIL A CARRIAGE STOP IS GIVEN IN INTERRUPT.

6. STOP THE PRINTER - STOP THE PRINTER AND RESET ALL PRINTER TEST CONTROL WORDS.

7. PRINT 1132 MESSAGE - SET UP THE MESSAGE BUFFER USING A MESSAGE CODE IN THE CALLING SEQUENCE. THIS MESSAGE CODE IDENTIFIES THE PHRASES CONTAINED IN THE MESSAGE TABLE WHICH ARE TO BE USED IN THE MESSAGE.

8. RIPPLE PATTERN - IDLE UNTIL MATCH BETWEEN EMIT AND FIRST CHARACTER IN NEXT LINE. WHEN MATCH FOUND SET FIRST BIT IN BUFFER, INITIALIZE FOR PRINT RIPPLE, THEN GO TO PRINT SUBROUTINE.

9. CLEAR BUFFER - CLEARS BOTH THE 1132 MESSAGE BUFFER AND THE PRINT BUFFER-CORE LOCATIONS /0020-/0027. ALSO SETS THE SCAN COMPLETE BIT - BIT 15 IN CORE LOCATION /0027.

10. SET BUFFER TO ONES - SETS ALL BITS ON IN CORE LOCATIONS /0020 TO /0027.

11. READY - CHECKS 1132 FOR READY. PRINTS AN ERROR MESSAGE IF ANY BIT OTHER THAN NOT READY ON. PRINTS NRDY IF NOT READY BIT ON.

12. FORM CHECK - CHECKS FOR FORMS CHECK AFTER SPACE OR SKIP. PRINTS NRDY IF FORM CHECK.

5.3.5 ERROR CONTROL ROUTINES

1. INTERRUPT WAIT ROUTINE

ALL SUBROUTINES COME HERE AFTER THE START OF AN I/O OPERATION FROM WHICH AN INTERRUPT IS EXPECTED. THIS ROUTINE RESETS ALL ERROR CONTROL WORDS, SENSES AND STORES THE BUSY DSW, THEN WAITS IN A TIMED LOOP (AT LEAST 2 SECONDS) FOR THE OP COMPLETE INTERRUPT.

IF NO OP COMPLETE INTERRUPT IS RECEIVED THE FOLLOWING

```
SET DATE=07/01/68
// JOB DOC
// EXEC DOCUMENT
./ OPTION MASTER,UPDATE,RESEQ
./ DELETE $30C
./ XFER $309
./ MERGE CARDS
```

ERROR MESSAGES ARE PRINTED.

A. E0C02 IF BUSY DSW ERROR

B. E0C03 IF NO INTERRUPT

IF AN INTERRUPT IS RECEIVED THIS ROUTINE WILL CHECK FOR PROPER PERFORMANCE OF THE OPERATION. THE FOLLOWING CHECKS ARE MADE AND ERROR MESSAGES PRINTED IF APPROPRIATE

A. E0C02 IF BUSY DSW ERROR

B. E0C05 IF INTERRUPT DSW ERROR

C. E0C06, E0C07 OR E0C08 IF EMIT ERROR

D. E0C15, IF CHANNEL CODE CHANGED AFTER SPACE RESPONSE.

THE ROUTINE WILL THEN CHECK FOR NOT READY (USUALLY DUE TO FORM CHECK). IF NOT READY, NRDY IS PRINTED. IF READY, THE ROUTINE WILL RETURN TO THE I/O SUBROUTINE FROM WHICH IT WAS ENTERED.

2. PRINT ERROR MESSAGES

THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. IF THE MESSAGE IS THE FIRST ERROR MESSAGE FOLLOWING AN I/O CONTROL COMMAND A LAST OP MESSAGE WILL PRECEED THE ERROR MESSAGE. THIS LAST OP MESSAGE WILL IDENTIFY THE LAST I/O CONTROL OPERATION EXECUTED. THE ERROR MESSAGE FOLLOWING REFERS TO ERRORS DETECTED IN THAT OPERATION.

5.3.6 INTERRUPT ROUTINE

ALL INTERRUPTS ARE HANDLED BY A COMMON INTERRUPT ROUTINE. THIS ROUTINE SENSES AND STORES THE DSW, SERVICES THE APPROPRIATE RESPONSE, CHECKS THE DSW FOR EXPECTED BITS, THEN RETURNS TO THE MONITOR INTERRUPT ROUTINE.

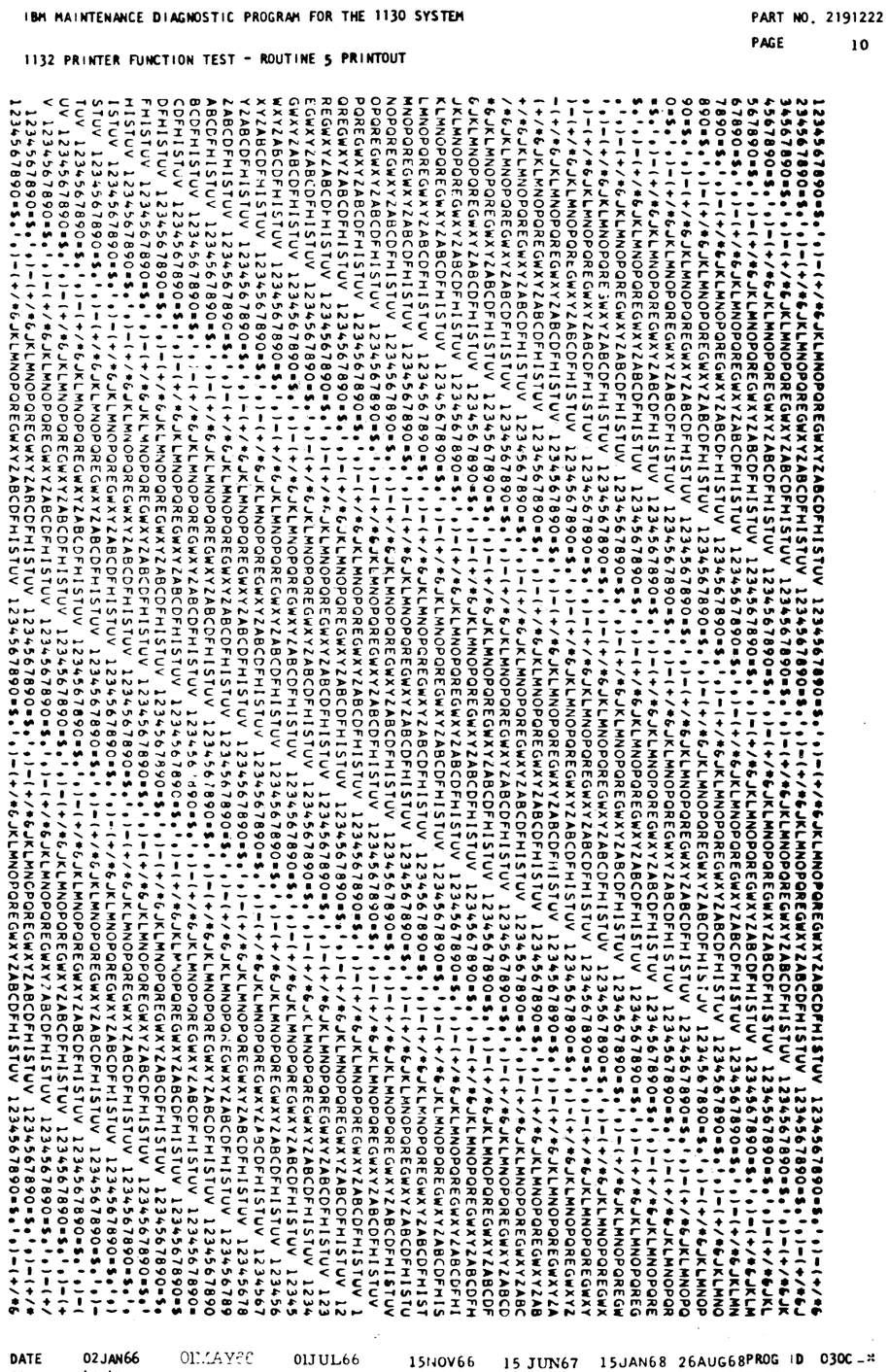
1. READ EMIT RESPONSE

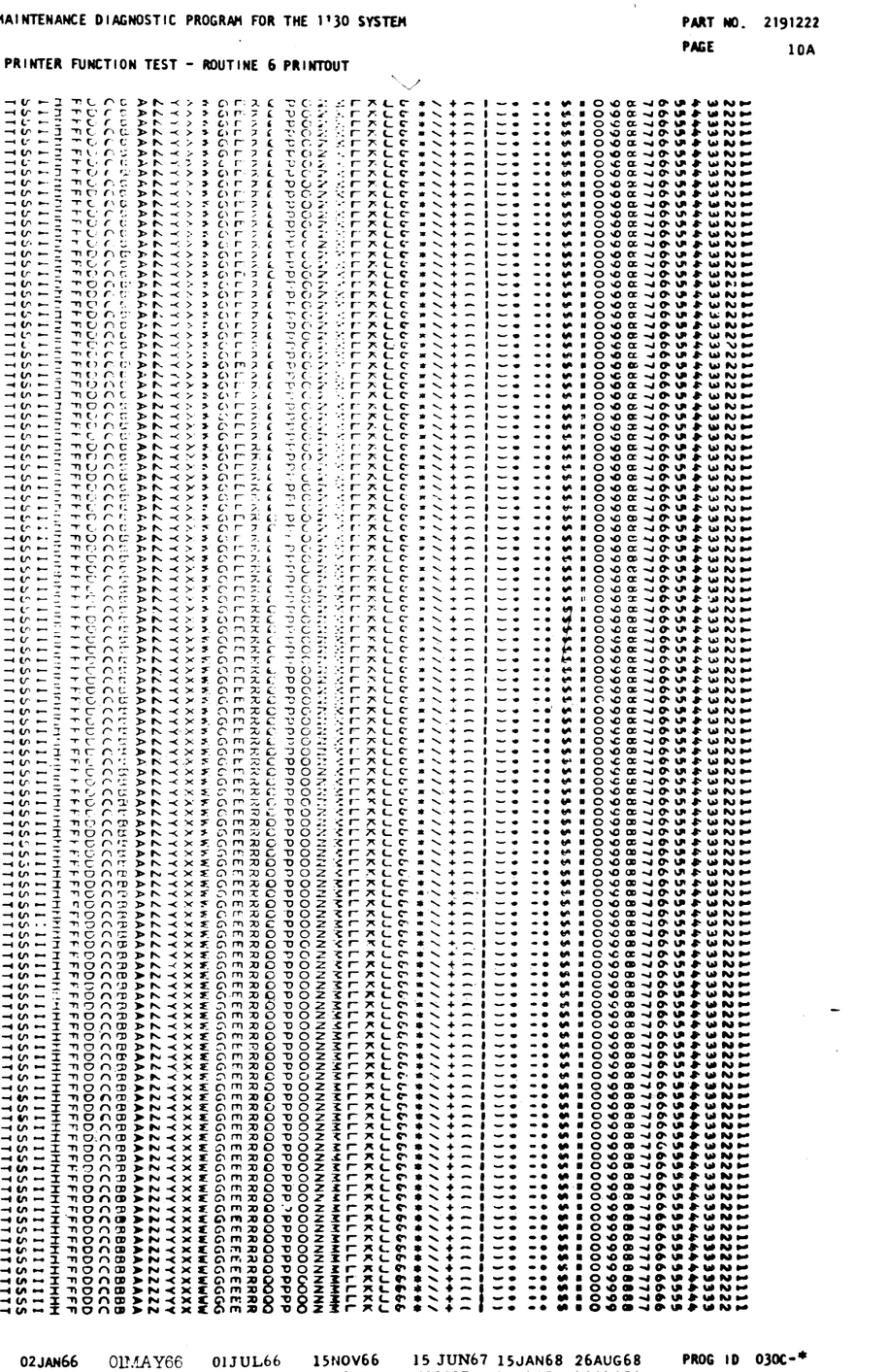
ALL EMIT CODES ARE CHECKED FOR VALIDITY AND FOR PROPER SEQUENCE. THE PRINT BUFFER IS THEN SET UP UNDER CONTROL OF THREE CODE WORDS AS FOLLOWS.

LABEL	DESCRIPTION	FUNCTION
SCNCT	SCAN COUNT	PRINT IF GREATER THAN 1
		CLEAR BUFFER IF =1
		IDLE IF = 0
MSGSW	MESSAGE SWITCH	PRINT MESSAGE IF ON AND SCNCT GREATER THAN 1
IDLCT	IDLE COUNT	IDLE IF GREATER THAN 0. STOP PRINTER AND RETURN TO MAINLINE IF = 0

2. SKIP RESPONSE

SKIP IS CONTROLLED BY THE SKIP TO SWITCH (SKPTO). IF THIS SWITCH IS ZERO, THE SKIP RESPONSE ROUTINE WILL STOP THE CARRIAGE AFTER EACH SKIP RESPONSE. IF SKPTO IS NOT ZERO, IT CONTAINS THE CHANNEL CODE OF THE DESIRED CHANNEL. THE CARRIAGE IS STOPPED WHEN A MATCH IS FOUND. IF AFTER 16 SKIP RESPONSES NO MATCH IS FOUND, THE CARRIAGE WILL BE STOPPED.





1132 PRINTER FUNCTION TEST

```
*****************************************************************  30C00030
*                                                                    30C00040
*  THIS ENGINEERING CHANGE REFLECTS MAJOR                            30C00050
*  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS                      30C00060
*  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.                    30C00070
*                                                                    30C00080
*  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.                    30C00090
*                                                                    30C00100
*  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966                       30C00110
*  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC                         30C00120
*  MONITOR II.                                                       30C00130
*                                                                    30C00140
*****************************************************************  30C00150
                  ************************************************  30C00160
                  *----------------------------------------------  30C00170
                  *     1130 - 1132 PRINTER FUNCTION TEST          30C00180
                  *----------------------------------------------  30C00190
                  ************************************************  30C00200
                  *                                                 30C00210
                  *                                                 30C00220
                  *                                                 30C00230
                  ************************************************  30C00240
                  *           EQUATE TABLE                          30C00250
                  ************************************************  30C00260
                  *     THIS TABLE EQUATES TEST PROGRAM LABLES      30C00270
                  *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR      30C00280
                  *     ADDRESSES.                                  30C00290
                  *                                                 30C00300
                  *----------------------------------------------  30C00310
                  *     MONITOR ENTRY ADDRESSES                     30C00320
                  *----------------------------------------------  30C00330
0160              BEGIN EQU     /160      BEGIN ROUTINE           30C00340
0161              START EQU     BEGIN+1   SUPERVISOR ROUTINE      30C00350
0162              ERROR EQU     START+1   ERROR LOG ROUTINE       30C00360
0163              LOG   EQU     ERROR+1   STATUS LOG ROUTINE      30C00370
0164              END   EQU     LOG+1     END ROUTINE             30C00380
                  *                                               30C00390
                  *----------------------------------------------  30C00400
                  *     MONITOR CONTROL WORD ADDRESSES            30C00410
                  *----------------------------------------------  30C00420
0165              RTNSW EQU     END+1     ROUTINE START SW        30C00430
0166              ERLCK EQU     END+2     LOCK ON ERROR CONTROL   30C00440
0167              LOGBY EQU     END+3     I/O BUSY SW ADDRS       30C00450
                  *                                               30C00460
                  *----------------------------------------------  30C00470
                  *     INTERRUPT TRANSFER VECTOR ADDRESSES       30C00480
                  *----------------------------------------------  30C00490
017A              IL0   EQU     /17A      INTERRUPT LEVEL ZERO    30C00500
018A              IL1   EQU     IL0+16    INTERRUPT LEVEL ONE     30C00510
019A              IL2   EQU     IL1+16    INTERRUPT LEVEL TWO     30C00520
01AA              IL3   EQU     IL2+16    INTERRUPT LEVEL THREE   30C00530
01BA              IL4   EQU     IL3+16    INTERRUPT LEVEL FOUR    30C00540
01BB              RQTY  EQU     IL4+1     CONSOLE PRINTER REQUEST 30C00550
01BC              RQKB  EQU     RQTY+1    USE KEYBOARD REQUEST    30C00560
01BD              SVKB  EQU     RQKB+1    KB SERVICE REQUEST      30C00570
                  *                                               30C00580
                  ************************************************  30C00590
0000                    ORG     *+/05DC                           30C00600
                  *                                               30C00610
                  *----------------------------------------------  30C00620
                  *     THE MONITOR USES CORE LOCATIONS 0-05DC.   30C00630
                  *     FOR CONTENTS OF THESE ADDRESSES REFER     30C00640
                  *     TO THE DIAGNOSTIC MONITOR LISTING.        30C00650
                  *----------------------------------------------  30C00660
                  *                                               30C00670
                  *                                               30C00680
                  *                                               30C00690
                  *                                               30C00700
```


1132 PRINTER FUNCTION TEST

```
                  ************************************************  30C00710
                  *           PROGRAM CONTROL TABLE               30C00720
                  ************************************************  30C00730
                  *                                               30C00740
05DC 0  030C      PID   DC      /030C     PROGRAM ID              30C00750
05DD 0  0000      RID   DC      *-*       ROUTINE ID              30C00760
05DE 0  0000      RAD   DC      *-*       ROUTINE ADDRS           30C00770
05DF 0  0000      SW0   DC      *-*       PROGRAM CONTROL         30C00780
05E0 0  0000      SW1   DC      *-*       ROUTINE SELECTION       30C00790
05E1 0  0000      SW2   DC      *-*       SCAN START CHARACTER    30C008D0
05E2 0  0012      SW3   DC      18        SPACE AFTER PRINT DLY   30C00810
05E3 1  05EB            DC      STRT                              30C00820
05E4 1  05EB            DC      STRT      RESTART ADDRESS         30C00830
                  *                                               30C00840
05E5 0  0000      MLSCF DC      *-*       SET BY WAIT RTN AND MON 30C00850
05E6 0  0000            DC      *-*       SET BY CNTRL AND INRTPT 30C00860
05E7 0  FFFF            DC      /FFFF     TERMINATOR              30C00870
                  *                                               30C00880
                  ************************************************  30C00890
                  *           TEST INITIALIZATION                 30C00900
                  ************************************************  30C00910
                  *                                               30C00920
05E8 00 44800160  BGIN  BSI   I  BEGIN                            30C00930
05EA 1  05DC            DC      PID       PCT ADDRESS             30C00940
                  *                                               30C00950
                  *----------------------------------------------  30C00960
                  *  START OF TEST AND SINGLE PASS INITIALIZATION 30C00970
                  *----------------------------------------------  30C00980
                  *                                               30C00990
05EB 0  6100      STRT  LDX     1 0       SET TO START WITH       30C01000
05EC 0  69F0            STX     1 RID      FIRST ROUTINE          30C01010
05ED 0  69F3            STX     1 SW2     RESET CHAR SELECT       30C01020
05EE 01 6D000AE6        STX   L1 WAIT                             30C01030
05F0 01 6D00077F        STX   L1 SW89A                            30C01040
05F2 0  6164            LDX     1 100                             30C01050
05F3 01 6D000C08        STX   L1 EMTCT    SET EMIT CHECK CNT      30C01060
05F5 01 CC000BF8        LDD   L  ANDOR                            30C01070
05F7 01 DC000BF6        STD   L  ANDEM    SET EMIT CK CONSTANT    30C01080
05F9 0  6112            LDX     1 18                              30C01090
05FA 0  69E7            STX     1 SW3     RESET SPACE DELAY       30C01100
05FB 01 65000870        LDX   L1 PIRT                             30C01110
05FD 00 6D00018A        STX   L1 IL1      SET INTERRUPT ADRS      30C01120
05FF 0  4000            BSI     CNTRL     GO TO CONTROL RTN       30C01130
                  *                                               30C01140
                  ************************************************  30C01150
                  *           SEQUENCE CONTROL ROUTINE            30C01160
                  ************************************************  30C01170
                  * THIS ROUTINE CHECKS SWITCHES AND CONTROLS      30C01180
                  * SEQUENCE IN WHICH TEST ROUTINES ARE RUN.       30C01190
                  *----------------------------------------------  30C01200
                  *                                               30C01210
0600 0  0000      CNTRL DC      *-*                               30C01220
0601 0  C0DE            LD      SW1                               30C01230
0602 01 4C080608        BSC   L CN20,+    BR IF NO RTN SELECTD    30C01240
                  *                                               30C01250
0604 0  D008      CN10  STO     RID       SAVE NEW RTN NUMBER     30C01260
0605 0  9015            S       RIDCK                             30C01270
0606 01 4C080611        BSC   L CN30,+    BR IF VALID RTN         30C01280
0608 0  1810            SRA     16                                30C01290
0609 0  D0D6            STO     SW1       IF INVALID RTN GO       30C01300
060A 0  D0D2            STO     RID        TO RTN ONE             30C01310
                  *                                               30C01320
060B 01 740105DD  CN20  MDX   L RID,1     ADV TO NEXT RTN         30C01330
060D 0  C0CF            LD      RID       CHECK FOR END OF        30C01340
060E 0  900D            S       RTNOM      NORMAL SEQUENCE        30C01350
060F 00 44B00164        BSI   I END,-Z    END OF PROGRAM          30C01360
                  *                                               30C01370
0611 01 658005DD  CN30  LDX   I1 RID                              30C01380
```

```
0613 01 C500061C          LD   L1 RTTBL-1    FETCH RETURN ADRS          30C01390
0615 0  D0C8              STO      RAD                                  30C01400
0616 00 D4000165          STO  L   RTNSW      SET RTN START SW           30C01410
0618 0  D0CD              STO      MLSCF+1    SET MLSCF FOR RETURN       30C01420
0619 00 44800161          BSI  I   START      GO TO MONITOR              30C01430
                          *                                              30C01440
0618 0  0008    RIDCK DC      LRTN-RTTBL+1                               30C01450
061C 0  000A    RTNOM DC      NRTN-RTTBL+1                               30C01460
                          *                                              30C01470
                          *-------------------------------------------   30C01480
                          * ROUTINE ADDRESS TABLE                        30C01490
                          *-------------------------------------------   30C01500
061D 1  0628    RTTBL DC      TST1         EMIT SEQUENCE TEST            30C01510
061E 1  063C          DC      TST2         SCAN CHECK TEST               30C01520
061F 1  0652          DC      TST3         SPACE TEST                    30C01530
0620 1  0688          DC      TST4         SKIP TEST                     30C01540
0621 1  0680          DC      TST5         ROTATING PAT TEST             30C01550
0622 1  06CA          DC      TST6         ALL CHARACTERS TEST           30C01560
0623 1  06F5          DC      TST7         FAST PRINT TEST               30C01570
0624 1  0780          DC      TST8         CHANNEL SEQUENCE TEST         30C01580
0625 1  07F7          DC      TST9         SKIP- PRINTER OFF             30C01590
0626 1  0825    NRTN  DC      TSTA         SKIP- PRINTER ON              30C01600
0627 1  085D    LRTN  DC      TSTB         MANUAL CONTROL                30C01610
                          *                                              30C01620
                          ********************************************   30C01630
                          *            TEST ROUTINE 1                    30C01640
                          ********************************************   30C01650
                          * CHECK EMIT SEQUENCE AND NORMAL PRINT DSW     30C01660
                          *-------------------------------------------   30C01670
                          *                                              30C01680
0628 01 440008AD    TST1  BSI  L   INTLZ      GO INITIALIZE ROUTINE      30C01690
062A 0  0048              DC       /0048      EMIT TEST                  30C01700
062B 0  6164              LDX    1 100                                  30C01710
062C 01 6D0006C8          STX  L1 LPCNT      SET LOOP COUNT             30C01720
                          *                                              30C01730
062E 01 6C000ACB          STX  L   LOOP      SET LOOP ADDRS             30C01740
0630 00 66008200    T01A  LDX  L2 /8200                                  30C01750
0632 0  6101              LDX    1 1         SET IDLE CNT               30C01760
0633 01 440008D1          BSI  L   IDLE                                  30C01770
0635 01 440009EF          BSI  L   LOCK      CK FOR LOCK ON FUNCTION    30C01780
0637 01 74FF06C8          MDX  L   LPCNT,-1  ADV LOOP CNT               30C01790
0639 0  70F6              MDX      T01A                                  30C01800
063A 01 44000600          BSI  L   CNTRL     GO TO CONTROL RTN          30C01810
                          *                                              30C01820
                          ********************************************   30C01830
                          *            TEST ROUTINE 2                    30C01840
                          ********************************************   30C01850
                          * CHECK PRINT SCAN CHECK INDICATOR             30C01860
                          *-------------------------------------------   30C01870
                          *                                              30C01880
063C 01 440008AD    TST2  BSI  L   INTLZ      GO INITIALIZE ROUTINE      30C01890
063E 0  0088              DC       /0088      SCAN CHECK TEST            30C01900
063F 0  6164              LDX    1 100                                  30C01910
0640 01 6D0006C8          STX  L1 LPCNT      SET LOOP COUNT             30C01920
                          *                                              30C01930
0642 01 6C000ACB          STX  L   LOOP      SET LOOP ADDRS             30C01940
0644 0  1810        T02A  SRA      16                                    30C01950
0645 00 D4000027          STO  L   39        CLEAR BIT 15 LOC 39        30C01960
0647 00 66008A00          LDX  L2 /8A00      SET TO CK FOR SCAN CK      30C01970
0649 0  6101              LDX    1 1         SET IDLE CNT               30C01980
064A 01 440008D1          BSI  L   IDLE                                  30C01990
064C 01 440009EF          BSI  L   LOCK      CK FOR LOCK ON FUNCTION    30C02000
064E 01 74FF06C8          MDX  L   LPCNT,-1  ADV LOOP CNT               30C02010
0650 0  70F3              MDX      T02A                                  30C02020
0651 0  40AE              BSI      CNTRL     GO TO CONTROL RTN          30C02030
                          *                                              30C02040
                          *                                              30C02050
                          ********************************************   30C02060
```



```
                          *            TEST ROUTINE 3                    30C02070
                          ********************************************   30C02080
                          * THIS ROUTINE CHECKS FOR SPACE RESPONSES      30C02090
                          * AND CHECKS THE DSW                           30C02100
                          *-------------------------------------------   30C02110
                          *                                              30C02120
0652 01 440008AD    TST3  BSI  L   INTLZ      GO INITIALIZE ROUTINE      30C02130
0654 0  011D              DC       /011D      SPACE TEST -PRINTER OFF    30C02140
0655 0  63F4              LDX    3 -12                                  30C02150
0656 0  6B22              STX    3 T3CTL      SET TEST CONTROL           30C02160
                          *                                              30C02170
0657 01 6C000ACB          STX  L   LOOP      SET LOOP ADDRS             30C02180
0659 01 67800679    T03A  LDX  I3 T3CTL      LD CONTROL                 30C02190
065B 01 C7000686          LD   L3 T3CTL+13   LD MSG CONTROL             30C02200
065D 0  D011              STO      T03B                                  30C02210
065E 01 C7000687          LD   L3 T3CTL+14   LD NO. OF LOOPS + SPACES    30C02220
0660 0  1888              SRT      8                                     30C02230
0661 01 D40006C8          STO  L   LPCNT                                 30C02240
0663 0  1090              SLT      16                                    30C02250
0664 0  1808              SRA      8                                     30C02260
0665 0  D021              STO      SAVE3      SAVE NUMBER OF SPACES      30C02270
                          *                                              30C02280
0666 0  C020    T03A1 LD      SAVE3      LD NUMBER OF SPACES            30C02290
0667 0  D01E              STO      SCNT                                  30C02300
                          *                                              30C02310
                          *                                              30C02320
0668 01 440008F7    T03C  BSI  L   SPACE                                 30C02330
                          *                                              30C02340
066A 01 74FF0686          MDX  L   SCNT,-1   CNT SPACES                  30C02350
066C 0  70FB              MDX      T03C                                  30C02360
066D 01 44000946          BSI  L   PMSG      PRINT 1132 MSG              30C02370
066F 0  0000        T03B  DC       *-*                                   30C02380
0670 01 440009EF          BSI  L   LOCK      CK FOR LOCK ON FUNCTION     30C02390
                          *                                              30C02400
0672 01 74FF06C8          MDX  L   LPCNT,-1                              30C02410
0674 0  70F1              MDX      T03A1                                 30C02420
                          *                                              30C02430
0675 01 74020679          MDX  L   T3CTL,2   ADV CONTROL                 30C02440
0677 0  70E1              MDX      T03A                                  30C02450
0678 0  4087              BSI      CNTRL     GO TO CONTROL RTN           30C02460
                          *                                              30C02470
0679 0  0000    T3CTL DC      *-*          TEST 3 AND 4 CONTROL          30C02480
067A 0  9002          DC      /9002        SPACE 1                       30C02490
067B 0  0501          DC      /0501                                      30C02500
067C 0  9004          DC      /9004        SPACE 2                       30C02510
067D 0  0502          DC      /0502                                      30C02520
067E 0  9008          DC      /9008        SPACE 3                       30C02530
067F 0  0303          DC      /0303                                      30C02540
0680 0  9010          DC      /9010        SPACE 4                       30C02550
0681 0  0304          DC      /0304                                      30C02560
0682 0  9080          DC      /9080        SPACE 9                       30C02570
0683 0  0109          DC      /0109                                      30C02580
0684 0  9200          DC      /9200        SPACE 39                      30C02590
0685 0  0127          DC      /0127                                      30C02600
0686 0  0000    SCNT  DC      *-*                                        30C02610
0687 0  0000    SAVE3 DC      *-*                                        30C02620
                          *                                              30C02630
                          ********************************************   30C02640
                          *            TEST ROUTINE 4                    30C02650
                          ********************************************   30C02660
                          *  THIS ROUTINE EXECUTES SPACE COMMANDS IN     30C02670
                          *  INTERRUPT WITH THE PRINTER ON. CHECK IS MADE 30C02680
                          *  FOR SPACE RESPONSE AND FOR PROPER DSW       30C02690
                          ********************************************   30C02700
                          *                                              30C02710
0688 01 440008AD    TST4  BSI  L   INTLZ      GO INITIALIZE ROUTINE      30C02720
068A 0  021E              DC       /021E      SPACE TEST -PRINTER ON     30C02730
                          *                                              30C02740
```

```
0688 0  63F4          LDX   3 -12                                  30C02750
068C 0  6BEC          STX   3 T3CTL       SET TEST CONTROL         30C02760
                      *                                            30C02770
068D 01 6C000ACB      STX   L LOOP        SET LOOP ADDRS           30C02780
068F 01 67800679 T04A LDX   I3 T3CTL      LD CONTROL               30C02790
0691 01 C7000686      LD    L3 T3CTL+13   LD MSG CONTROL            30C02800
0693 0  D011          STO     T04B                                 30C02810
0694 01 C7000687      LD    L3 T3CTL+14   LD NO. OF LOOPS + SPACES  30C02820
0696 0  1888          SRT     8                                    30C02830
0697 0  D030          STO     LPCNT                                30C02840
0698 0  1090          SLT     16                                   30C02850
0699 0  1808          SRA     8                                    30C02860
069A 0  D0EC          STO     SAVE3       SAVE NUMBER OF SPACES    30C02870
                      *                                            30C02880
0698 0  C0E8 T04A1 LD         SAVE3       LD NUMBER OF SPACES      30C02890
069C 01 D4000C03      STO   L SPCSX       SET TO SPACE IN INT      30C02900
069E 0  6101          LDX   1 1                                    30C02910
069F 00 66008200      LDX   L2 /8200                               30C02920
06A1 01 440008D1      BSI   L IDLE                                 30C02930
                      *                                            30C02940
06A3 01 44000946      BSI   L PMSG        PRINT 1132 MSG           30C02950
06A5 0  0000    T04B  DC      *-*                                  30C02960
                      *                                            30C02970
06A6 01 440009EF      BSI   L LOCK        CK FOR LOCK ON FUNCTION  30C02980
                      *                                            30C02990
06A8 01 74FF06C8      MDX   L LPCNT,-1                             30C03000
06AA 0  70F0          MDX     T04A1                                30C03010
                      *                                            30C03020
06AB 01 74020679      MDX   L T3CTL,2     ADV CONTROL              30C03030
06AD 0  70E1          MDX     T04A                                 30C03040
06AE 01 44000600      BSI   L CNTRL       GO TO CONTROL RTN        30C03050
                      *                                            30C03060
                      ********************************************** 30C03070
                      *           TEST ROUTINE 5                   30C03080
                      ********************************************** 30C03090
                      * THIS ROUTINE PRINTS A ROTATING PATTERN. THE  30C03100
                      * PATTERN IS GENERATED BY FLOATING A BIT ACROSS 30C03110
                      * THE PRINT BUFFER.                           30C03120
                      *------------------------------------------- 30C03130
                      *                                            30C03140
0680 01 440008AD TST5  BSI   L INTLZ      GO INITIALIZE ROUTINE    30C03150
0682 0  0408          DC      /0408       RIPPLE PATTERN TEST      30C03160
                      *                                            30C03170
0683 0  61CF          LDX   1 -49                                  30C03180
0684 01 6D00098C      STX   L1 RIPL3+1    SET EMIT CHAR CNT        30C03190
                      *                                            30C03200
0686 0  6132    T05A  LDX   1 50          SET LINE COUNT           30C03210
0687 0  690E          STX   1 LINES                                30C03220
                      *                                            30C03230
0688 01 6C000ACB      STX   L LOOP        SET LOOP ADDRS           30C03240
                      *                                            30C03250
                      *                                            30C03260
068A 01 44000982 T05C BSI   L RIPL        GO PRINT ONE RIPPLE LINE 30C03270
068C 01 440009EF      BSI   L LOCK        CK FOR LOCK ON FUNCTION  30C03280
                      *                                            30C03290
068E 01 7401098C T05D MDX   L RIPL3+1,1   ADV CHAR FOR NXT SCAN    30C03300
06C0 0  1000          NOP                 SAFETY NOP               30C03310
06C1 01 74FF06C6      MDX   L LINES,-1    ADV LINE CNT             30C03320
06C3 0  70F6          MDX     T05C                                 30C03330
                      *                                            30C03340
06C4 01 44000600      BSI   L CNTRL       GO TO CONTROL RTN        30C03350
                      *                                            30C03360
06C6 0  0000    LINES DC      0           LINE COUNT               30C03370
06C7 0  0031    N049  DC      49                                   30C03380
06C8 0  0000    LPCNT DC      0           LOOP COUNT               30C03390
06C9 0  0032    N050  DC      50                                   30C03400
                      *                                            30C03410
                      *                                            30C03420
```



```
                      ********************************************** 30C03430
                      *           TEST ROUTINE 6                   30C03440
                      ********************************************** 30C03450
                      *                                            30C03460
                      * THIS ROUTINE PRINTS LINES OF ONE CHAR       30C03470
                      * UNTIL ALL 48 CHARACTERS HAVE BEEN PRINTED   30C03480
                      *------------------------------------------- 30C03490
                      *                                            30C03500
06CA 01 440008AD TST6 BSI   L INTLZ       GO INITIALIZE ROUTINE    30C03510
06CC 0  0808          DC      /0808       ALL CHARACTERS           30C03520
                      *                                            30C03530
06CD 0  61D0    T06A  LDX   1 -48                                  30C03540
06CE 0  690A          STX   1 T06D+1      SET CHAR CNT             30C03550
06CF 01 6C000ACB      STX   L LOOP        SET LOOP ADDRS           30C03560
                      *                                            30C03570
06D1 0  6132    T06B  LDX   1 50          SET EMIT LOOP CNT        30C03580
06D2 0  69F5          STX   1 LPCNT                                30C03590
                      *                                            30C03600
06D3 00 66008200 T06C LDX   L2 /8200      SET DSW S/B              30C03610
06D5 0  6101          LDX   1 1           SET IDLE CNT             30C03620
06D6 01 440008D1      BSI   L IDLE                                 30C03630
                      *                                            30C03640
06D8 00 65000000 T06D LDX   L1 *-*        XR1=EMIT TABLE POSITION  30C03650
06DA 01 C4000C0A      LD    L EMIT        CHECK IF CHARACTER IS    30C03660
06DC 01 D40009EE      STO   L A1EM        STORE EMIT               30C03670
06DE 01 95000CEA      S     L1 CHAR+48    TO BE PRINTED            30C03680
06E0 01 4C1806E9      BSC   L T06E,+-     YES IF BRANCH            30C03690
                      *                                            30C03700
06E2 01 74FF081A      MDX   L ICNT,-1     SKIP IF INTRPT CNT=1     30C03710
06E4 0  70EC          MDX     T06B                                 30C03720
06E5 01 74FF06C8      MDX   L LPCNT,-1    AFTER 50 CONSECUTIVE     30C03730
06E7 0  70EB          MDX     T06C        EMITS - SPACE            30C03740
06E8 0  7002          MDX     T06E+2      THEN CONTINUE            30C03750
                      *                                            30C03760
06E9 01 440009CF T06E BSI   L A1          SET PRINT BUFR TO ONES   30C03770
06EB 0  6101          LDX   1 1           SET SCAN CNT             30C03780
06EC 01 440008C6      BSI   L PRINT                                30C03790
06EE 01 440009EF      BSI   L LOCK        CK FOR LOCK ON FUNCTION  30C03800
                      *                                            30C03810
06F0 01 74010609      MDX   L T06D+1,1    ADV TO NXT CHAR          30C03820
06F2 0  70DE          MDX     T06B                                 30C03830
06F3 01 44000600      BSI   L CNTRL       GO TO CONTROL RTN        30C03840
                      *                                            30C03850
                      *                                            30C03860
                      ********************************************** 30C03870
                      *           TEST ROUTINE 7                   30C03880
                      ********************************************** 30C03890
                      * THIS ROUTINE PRINTS LINES OF ALL ONE CHARACTER 30C03900
                      *------------------------------------------- 30C03910
                      *                                            30C03920
06F5 01 440008AD TST7 BSI   L INTLZ       GO INITIALIZE ROUTINE    30C03930
06F7 0  8021          DC      /8021       STRESS TEST              30C03940
                      *                                            30C03950
06F8 0  6164          LDX   1 100         SET LINE COUNT           30C03960
06F9 0  69CC          STX   1 LINES                                30C03970
                      *                                            30C03980
06FA 01 6C000ACB      STX   L LOOP        SET LOOP ADDRS           30C03990
06FC 01 440009CF T07A BSI   L A1          SET PRINT AREA TO ONES   30C04000
06FE 0  6101          LDX   1 1           SET SCAN CNT             30C04010
06FF 01 440008C6      BSI   L PRINT       GO PRINT                 30C04020
0701 0  6110          LDX   1 16          SET FOR 16 IDLES         30C04030
0702 00 66008200      LDX   L2 /8200      SET DSW S/B              30C04040
0704 01 440008D1      BSI   L IDLE                                 30C04050
0706 01 C4000C0A      LD    L EMIT                                 30C04060
0708 01 D40009EE      STO   L A1EM                                 30C04070
                      *                                            30C04080
070A 01 440009EF      BSI   L LOCK        CK FOR LOCK ON FUNCTION  30C04090
                      *                                            30C04100
```

```
070C 01 74FF06C6          MDX  L  LINES,-1    UPDATE LINE COUNT          30C04110
070E 0  70ED              MDX     T07A                                   30C04120
070F 01 44000600          BSI  L  CNTRL       GO TO CONTROL RTN          30C04130
                          *                                              30C04140
                          *********************************************  30C04150
                          * INITIALIZATION FOR ROUTINES 8,9, AND A      30C04160
                          *********************************************  30C04170
                          * THIS ROUTINE IDENTIFIES THE SEQUENCE OF PUNCHES 30C04180
                          * IN THE CHANNEL CONTROL TAPE.                 30C04190
                          *-------------------------------------------   30C04200
                          *                                              30C04210
0711 0  0000              IN89A DC       *-*                             30C04220
0712 0  C06C                    LD       SW89A                           30C04230
0713 01 4C200775                BSC  L   I89AX,Z     BR IF INITIALIZED  30C04240
0715 0  6869                    STX      SW89A                           30C04250
0716 01 440008AD                BSI  L   INTLZ       GO INITIALIZE ROUTINE 30C04260
0718 0  7000                    DC       /7000                           30C04270
                          *                                              30C04280
0719 00 6500C0B0                LDX  L1  176         SET FOR 176 SPACES 30C04290
071B 0  69AC                    STX   1  LPCNT                          30C04300
071C 0  1810                    SRA      16                             30C04310
071D 0  610F                    LDX   1  15                             30C04320
071E 01 D50007BE                STO  L1  CH12S-1                        30C04330
0720 0  71FF                    MDX   1  -1                             30C04340
0721 0  70FC                    MDX      *-4                            30C04350
0722 0  6101                    LDX   1  1                              30C04360
0723 0  6945                    STX   1  T08D+1                         30C04370
0724 01 6D0007CA                STX  L1  SHIFT                          30C04380
0726 01 6D0007CB                STX  L1  SHFT2                          30C04390
0728 01 C40009B4                LD   L   KB000                          30C04400
072A 01 D40007C7                STO  L   SEQSW       SET SEQ SW         30C04410
                          *                                              30C04420
                          *-------------------------------------------   30C04430
                          *  SPACE TO CHANNELS                           30C04440
                          *-------------------------------------------   30C04450
                          *                                              30C04460
072C 01 44000946                BSI  L   PMSG        MSG- SPACE TO CHANNEL 30C04470
072E 0  9C00                    DC       /9C00       MSG CONTROL        30C04480
                          *                                              30C04490
072F 01 6C000ACB          T08A  STX  L   LOOP        SET LOOP ADDRS     30C04500
0731 01 4400093A                BSI  L   STOP        STOP THE PRINTER   30C04510
0733 01 440008F7                BSI  L   SPACE                          30C04520
0735 01 0C00081A                XIO  L   SENSE-1     RECORD CHANL PUNCH IF 30C04530
0737 01 EC000BEE                OR   L   WAS          DETEC IN INTRPT    30C04540
                          *                            OR MAINLINE     30C04550
0739 0  1008                    SLA      8                              30C04560
073A 01 4C18075C                BSC  L   T08B,+-     BR IF CHANL BIT OFF 30C04570
                          *                                              30C04580
073C 01 440007CE                BSI  L   CHMSG       PRINT CHANL ID MSG 30C04590
073E 0  8500                    DC       /8500                          30C04600
                          *                                              30C04610
073F 01 EC0007CD                OR   L   VCHNL       RECORD EACH CHANNEL 30C04620
0741 01 D40007CD                STO  L   VCHNL        DETECTED          30C04630
0743 01 C40007C7                LD   L   SEQSW                          30C04640
0745 0  1001                    SLA      1                              30C04650
0746 01 4C08075C                BSC  L   T08B,+                         30C04660
                          *                                              30C04670
                          *  AFTER SECOND CHANNEL, CHECK FIRST 16 CHANNELS 30C04680
                          *  FOR REPEAT OF CHANNEL SEQUENCE.             30C04690
                          *                                              30C04700
0748 01 668007CA          T08A1 LDX  I2  SHIFT       XR 2=CHAN BEFORE REPEAT 30C04710
074A 01 C40007CC                LD   L   LTSEQ       LOAD LAST SEQUENCE 30C04720
074C 0  1200                    SLA   2  0            CHECK FOR REPEAT  30C04730
074D 01 E40007CC                AND  L   LTSEQ       ZERO IF NOT REPEAT 30C04740
074F 01 4C20075A                BSC  L   T08A2,Z     BR IF REPEAT       30C04750
0751 01 668007CB                LDX  I2  SHFT2                          30C04760
0753 0  C077                    LD       SHFT2                          30C04770
0754 0  F075                    EOR      SHIFT                          30C04780
```



```
0755 0  6A74                    STX   2  SHIFT                          30C04790
0756 01 4C200748                BSC  L   T08A1,Z     BR FOR 2ND CHECK   30C04800
0758 01 740107CA                MDX  L   SHIFT,1                        30C04810
075A 01 740107CB          T08A2 MDX  L   SHFT2,1                       30C04820
                          *                                              30C04830
075C 01 440009EF          T08B  BSI  L   LOCK        CK LOCK SW         30C04840
075E 0  C068                    LD       SEQSW                          30C04850
075F 01 4C180764                BSC  L   T08C,+-                        30C04860
0761 01 74FF06C8                MDX  L   LPCNT,-1    DEC LOOP CNT       30C04870
0763 0  70CB                    MDX      T08A                           30C04880
                          *                                              30C04890
0764 0  C068              T08C  LD       VCHNL                          30C04900
0765 01 F40008FF                EOR  L   KFF00                          30C04910
0767 0  D060                    STO      TEMP8                          30C04920
                          *                                              30C04930
0768 00 65000000          T08D  LDX  L1  *-*          XR1=CHANNEL NUMBER 30C04940
076A 01 44280A5B                BSI  L   ERR12,+Z    PRINT MISSING CHAN MSG 30C04950
076C 01 74010769                MDX  L   T08D+1,1    ADV TO CK NEXT CHAN 30C04960
076E 0  C059                    LD       TEMP8                          30C04970
076F 0  1001                    SLA      1           SHIFT TO NEXT CHAN 30C04980
0770 0  D057                    STO      TEMP8                          30C04990
0771 01 4C200768                BSC  L   T08D,Z      BR IF MORE ERRORS  30C05000
                          *                                              30C05010
                          *                                              30C05020
0773 0  1810                    SRA      16                             30C05030
0774 0  D052                    STO      SEQSW                          30C05040
                          *                                              30C05050
0775 01 440008F7          I89AX BSI  L   SPACE       ADVANCE TO THE NEXT 30C05060
0777 01 0C00081A                XIO  L   SENSE-1      CHANNEL PUNCH BEFORE 30C05070
0779 01 EC000BEE                OR   L   WAS          STARTING TEST ROUTINE 30C05080
077B 0  1008                    SLA      8                              30C05090
077C 01 4CA00711                BSC  I   IN89A,Z                        30C05100
077E 0  70F6                    MDX      I89AX                          30C05110
                          *                                              30C05120
077F 0  0000              SW89A DC       *-*                            30C05130
                          *                                              30C05140
                          *********************************************  30C05150
                          *              TEST ROUTINE 8                 30C05160
                          *********************************************  30C05170
                          * THIS TEST CHECKS THAT EACH CHANNEL           30C05180
                          * PUNCH WILL GENERATE A SKIP INTERRUPT.        30C05190
                          *-------------------------------------------   30C05200
                          *                                              30C05210
0780 01 440008AD           TST8  BSI  L   INTLZ                          30C05220
0782 0  E401                    DC       /E401                          30C05230
0783 0  408D                    BSI      IN89A       INITIALIZE         30C05240
0784 0  6202                    LDX   2  2                              30C05250
0785 01 6E0006C8                STX  L2  LPCNT                          30C05260
0787 01 440008F7                BSI  L   SPACE                          30C05270
0789 01 44000946                BSI  L   PMSG                           30C05280
078B 0  AC00                    DC       /AC00                          30C05290
078C 0  62FF                    LDX   2  -1                             30C05300
078D 0  6A3A                    STX   2  TEMP8       SET TEMP8 TO ALL BITS 30C05310
                          *                                              30C05320
078E 01 6C000ACB                STX  L   LOOP        SET LOOP ADDRS     30C05330
0790 01 658007CA          T08E  LDX  I1  SHIFT       LD SHIFT FACTOR    30C05340
                          *                                              30C05350
0792 0  6908              T08F  STX   1  T08X1+1     STO XR1            30C05360
                          *                                              30C05370
0793 01 4400093A                BSI  L   STOP        STOP THE PRINTER   30C05380
0795 0  1810                    SRA      16          SET SKIP TO SW     30C05390
0796 00 66005000                LDX  L2  /5000       SET BUSY DSW S/B   30C05400
0798 01 44000919                BSI  L   SKIP                           30C05410
                          *                                              30C05420
079A 00 65000000          T08X1 LDX  L1  *-*         RESTORE XR1        30C05430
079C 01 668007CA                LDX  I2  SHIFT                          30C05440
079E 01 C40008EE                LD   L   WAS         LD DSW             30C05450
07A0 0  1008                    SLA      8                              30C05460
```

```
07A1 0  6308          LDX   3 8                                  30C05470
07A2 0  1340          SLCA  3 0          IDENTIFY CODE           30C05480
07A3 0  10A0          SLT     32                                 30C05490
07A4 01 C700078E      LD    L3 CH12S-1   LD SEQUENCE FOR THIS CHAN 30C05500
07A6 0  1AC0          RTE   2 0                                  30C05510
07A7 01 EF0007BE      GR    L3 CH12S-1                           30C05520
07A9 0  19C0          RTE   1 0          RTE BY SHIFT FACTOR     30C05530
07AA 0  1280          SLT   2 0                                  30C05540
07AB 0  E01C          AND     TEMP8      CK FOR PROPER SEQ       30C05550
07AC 01 44180A6D      BSI   L ERR13,+-   BR IF SEQ ERR           30C05560
07AE 0  D019          STO     TEMP8                              30C05570
                    *                                            30C05580
07AF 01 C40008EE      LD    L WAS        LD DSW                  30C05590
07B1 0  1008          SLA     8                                  30C05600
07B2 0  4018          BSI     CHMSG      MSG- CHANNEL X          30C05610
07B3 0  8500          DC      /8500                              30C05620
07B4 01 6580079B      LDX   I1 T08X1+1                           30C05630
                    *                                            30C05640
07B6 0  71FF          MDX   1 -1                                 30C05650
07B7 0  70DA          MDX     T08F                               30C05660
                    *                                            30C05670
07B8 01 440009EF      BSI   L LOCK       CK FOR LOCK ON FUNCTION 30C05680
07BA 01 74FF06C8      MDX   L LPCNT,-1   DEC LOOP COUNT          30C05690
07BC 0  70D3          MDX     T08E       BR IF NOT FINISHED      30C05700
                    *                                            30C05710
07BC 01 44000600      BSI   L CNTRL                              30C05720
                    *                                            30C05730
                    *-------------------------------------       30C05740
                    *          CHANNEL SEQUENCE TABLE            30C05750
                    *-------------------------------------       30C05760
                    *                                            30C05770
07BF 0  0000        CH12S DC      *-*                            30C05780
07C0 0  0000        CH9SQ DC      *-*                            30C05790
07C1 0  0000        CH6SQ DC      *-*                            30C05800
07C2 0  0000        CH5SQ DC      *-*                            30C05810
07C3 0  0000        CH4SQ DC      *-*                            30C05820
07C4 0  0000        CH3SQ DC      *-*                            30C05830
07C5 0  0000        CH2SQ DC      *-*                            30C05840
07C6 0  0000        CH1SQ DC      *-*                            30C05850
07C7 0  0000        SEQSW DC      *-*        SEQ SW              30C05860
07C8 0  0000        TEMP8 DC      *-*                            30C05870
07C9 0  0000              DC      *-*                            30C05880
07CA 0  0000        SHIFT DC      *-*                            30C05890
07CB 0  0000        SHFT2 DC      *-*                            30C05900
07CC 0  0000        LTSEQ DC      *-*                            30C05910
07CD 0  0000        VCHNL DC      *-*        BIT SET FOR EACH CHAN DET 30C05920
                    *                                            30C05930
                    *-------------------------------------       30C05940
                    *          PRINT CHANNEL MESSAGE             30C05950
                    *-------------------------------------       30C05960
                    *                                            30C05970
07CE 0  0000        CHMSG DC      *-*                            30C05980
07CF 01 4C1807EB        BSC   L CHM2,+-                          30C05990
07D1 0  D0F7            STO     TEMP8+1    SAVE CHANNEL CODE     30C06000
07D2 0  6107            LDX   1 7                                30C06010
07D3 0  1140            SLCA  1 0          IDENTIFY BIT          30C06020
07D4 0  1001            SLA     1                                30C06030
07D5 01 4C200A76        BSC   L ERR14,Z    ERR IF MORE THAN 1 BIT 30C06040
                      *                                          30C06050
07D7 0  C0EF            LD      SEQSW      LD SEQ SW             30C06060
07D8 01 ED0078F         OR    L1 CH12S                           30C06070
07DA 01 D50078F         STO   L1 CH12S                           30C06080
07DC 0  D0EF            STO     LTSEQ                            30C06090
07DD 0  C0E9            LD      SEQSW      LD SEQ SW             30C06100
07DE 0  1801            SRA     1          ADV SEQ               30C06110
07DF 0  D0E7            STO     SEQSW                            30C06120
                      *                                          30C06130
07E0 01 C50007EF        LD    L1 CHTBL     LD MSG                30C06140
```



```
07E2 01 D4000E57        STO   L PMG26                            30C06150
07E4 01 C48007CE        LD    I CHMSG                            30C06160
07E6 0  D002            STO     CHM1                             30C06170
07E7 01 44000946        BSI   L PMSG       PRINT 1132 MSG        30C06180
07E9 0  0000        CHM1 DC       *-*      MSG CONTROL           30C06190
                    *                                            30C06200
07EA 0  C0DE            LD      TEMP8+1                          30C06210
07E8 01 740107CE    CHM2 MDX   L CHMSG,1                         30C06220
07EC 01 4C8007CE        BSC   I CHMSG                            30C06230
                    *                                            30C06240
07EF 0  F1F2        CHTBL DC      /F1F2      12                  30C06250
07F0 0  F900              DC      /F900       9                  30C06260
07F1 0  F600              DC      /F600       6                  30C06270
07F2 0  F500              DC      /F500       5                  30C06280
07F3 0  F400              DC      /F400       4                  30C06290
07F4 0  F300              DC      /F300       3                  30C06300
07F5 0  F200              DC      /F200       2                  30C06310
07F6 0  F100              DC      /F100       1                  30C06320
                    *                                            30C06330
                    ********************************************** 30C06340
                    *          TEST ROUTINE 9                    * 30C06350
                    ********************************************** 30C06360
                    *  THIS ROUTINE WILL SKIP TO EACH CHANNEL IN  * 30C06370
                    *  ORDER, STARTING WITH CHANNEL ONE. PRINTER IS 30C06380
                    *  OFF DURING THE SKIP OPERATION.             * 30C06390
                    *-------------------------------------------- 30C06400
                    *                                            30C06410
07F7 01 440008AD    TST9  BSI   L INTLZ      GO INITIALIZE ROUTINE 30C06420
07F9 0  202D              DC      /202D      MSG CONTROL           30C06430
07FA 0  202D              DC      /202D      MSG CONTROL           30C06440
07FB 01 44000711        BSI   L IN89A                            30C06450
                    *                                            30C06460
07FD 01 C40009B4        LD    L K8000                            30C06470
07FF 0  D0C8            STO     TEMP8                            30C06480
                    *                                            30C06490
0800 01 6C000ACB        STX   L LOOP       SET LOOP ADDRS        30C06500
0802 01 440008F7    T09A BSI   L SPACE                           30C06510
0804 01 C40005E1        LD    L SW2        LD SELECT CHANNEL SWS 30C06520
0806 0  1008            SLA     8                                30C06530
0807 01 4C20080D        BSC   L T09B,Z     BR IF SW ENTRY        30C06540
                    *                                            30C06550
0809 0  C0BE            LD      TEMP8      LD SKIP SEQ SW        30C06560
080A 0  E0C2            AND     VCHNL      CHECK FOR VALID CHNL  30C06570
080B 01 4C180810        BSC   L T09C,+-                          30C06580
                    *                                            30C06590
080D 0  40C0        T09B  BSI     CHMSG      MSG- SKIP TO X      30C06600
080E 0  AD00              DC      /AD00      MSG CONTROL           30C06610
080F 01 4400093A        BSI   L STOP       STOP THE PRINTER      30C06620
                    *                                            30C06630
0811 0  C0B7            LD      TEMP8+1    LD SKIP SEQ SW        30C06640
0812 00 66005000        LDX   L2 /5000     SET BUSY DSW S/B      30C06650
0814 01 44000919        BSI   L SKIP                             30C06660
                    *                                            30C06670
                    *                                            30C06680
0816 01 C40008EE        LD    L WAS        LD DSW                30C06690
0818 0  1008            SLA     8          LOOK AT CHANNEL BITS  30C06700
0819 0  4084            BSI     CHMSG      MSG- CHANNEL X        30C06710
081A 0  8500            DC      /8500      MSG CONTROL           30C06720
081B 01 440009EF        BSI   L LOCK       CK FOR LOCK ON FUNCTION 30C06730
                    *                                            30C06740
081D 0  C0AA        T09C  LD      TEMP8      LD SKIP SEQ SW        30C06750
081E 0  1801            SRA     1          SHIFT FOR NEXT CHANNEL 30C06760
081F 0  D0A8            STO     TEMP8                            30C06770
0820 0  1808            SRA     8                                30C06780
0821 01 4C200802        BSC   L T09A,Z     LOOP IF NOT ZERO      30C06790
0823 01 44000600        BSI   L CNTRL                            30C06800
                    *                                            30C06810
                    ********************************************** 30C06820
```

```
                *              TEST ROUTINE A                          30C06830
                ****************************************               30C06840
                *  THIS ROUTINE WILL SKIP TO EACH CHANNEL IN           30C06850
                *  ORDER, STARTING WITH CHANNEL ONE. PRINTER IS        30C06860
                *  ON DURING THE SKIP OPERATION.                       30C06870
                *-------------------------------------               30C06880
                *                                                     30C06890
0825 01 440008AD TSTA  BSI  L  INTLZ     GO INITIALIZE ROUTINE       30C06900
0827 0  102E          DC      /102E     MSG CONTROL                 30C06910
0828 01 44000711      BSI  L  IN89A                                 30C06920
                *                                                     30C06930
082A 01 C4000984      LD   L  K8000                                 30C06940
082C 0  D09B          STO     TEMP8                                 30C06950
                *                                                     30C06960
082D 01 6C000ACB      STX  L  LOOP      SET LOOP ADDRS              30C06970
082F 01 440008F7 TOAA BSI  L  SPACE                                 30C06980
0831 01 C40005E1      LD   L  SW2       LD SELECT CHANNEL SWS       30C06990
0833 0  1008          SLA     8                                     30C07000
0834 01 4C20083A      BSC  L  TOAB,Z    BR IF SW ENTRY              30C07010
                *                                                     30C07020
0836 0  C091          LD      TEMP8     LD SKIP SEQ SW              30C07030
0837 0  E095          AND     VCHNL     CHECK FOR VALID CHNL        30C07040
0838 01 4C180853      BSC  L  TOAC,+-                               30C07050
                *                                                     30C07060
083A 0  4093    TOAB  BSI     CHMSG     MSG- SKIP TO X              30C07070
083B 0  AD00          DC      /AD00     MSG CONTROL                 30C07080
                *                                                     30C07090
083C 0  6101          LDX     1 1                                   30C07100
083D 00 66008200      LDX     L2 /8200                              30C07110
083F 01 440008D1      BSI  L  IDLE      GO START THE PRINTER        30C07120
                *                                                     30C07130
0841 00 650003E8      LDX  L1 1000      SET IDLCT TO KEEP           30C07140
0843 01 6D0008FD      STX  L1 IDLCT      PRINTER GOING              30C07150
                *                                                     30C07160
0845 01 C40007C9      LD   L  TEMP8+1   LD SKIP SEQ SW              30C07170
0847 00 66005200      LDX  L2 /5200     SET BUSY DSW S/B            30C07180
0849 01 44000919      BSI  L  SKIP                                  30C07190
                *                                                     30C07200
084B 01 C40008EE      LD   L  WAS       LD DSW                      30C07210
084D 0  1008          SLA     8         LOOK AT CHANNEL BITS        30C07220
084E 01 440007CE      BSI  L  CHMSG     MSG- CHANNEL X              30C07230
0850 0  8500          DC      /8500     MSG CONTROL                 30C07240
0851 01 440009EF      BSI  L  LOCK      CK FOR LOCK ON FUNCTION     30C07250
                *                                                     30C07260
0853 01 C40007C8 TOAC LD   L  TEMP8     LD SKIP SEQ SW              30C07270
0855 0  1801          SRA     1         SHIFT FOR NEXT CHANNEL      30C07280
0856 01 D40007C8      STO  L  TEMP8                                 30C07290
0858 0  1808          SRA     8                                     30C07300
0859 01 4C20082F      BSC  L  TOAA,Z    LOOP IF NOT ZERO            30C07310
085B 01 44000600      BSI  L  CNTRL                                 30C07320
                *                                                     30C07330
                ****************************************            30C07340
                *              TEST ROUTINE B                       30C07350
                ****************************************            30C07360
                *  THIS ROUTINE ENABLES BIT SWITCH CONTROL OF THE     30C07370
                *  CHARACTER AND THE COLUMN TO BE PRINTED. ONLY       30C07380
                *  ONE CHARACTER WILL BE PRINTED ON EACH LINE.        30C07390
                *  THE COLUMN NUMBER MUST BE ENTERED IN SWITCHES      30C07400
                *  1-7, AND THE CHARACTER ID IN SWITCHES 8-15.        30C07410
                *  PRINTING WILL START WHEN SWITCH 0 IS TURNED ON.    30C07420
                *-------------------------------------------------  30C07430
                *                                                     30C07440
085D 01 440008AD TSTB  BSI  L  INTLZ     GO INITIALIZE ROUTINE       30C07450
085F 0  0000          DC      /0000                                 30C07460
                *                                                     30C07470
0860 00 44800163      BSI  I  LOG       PRINT SET UP MSG            30C07480
0862 1  08A8          DC      SETUP                                 30C07490
                *                                                     30C07500
```



```
0863 0  093C    TOBA  XIO     RBSWS     READ THE BIT SWS            30C07510
0864 0  C03F          LD      BSWS                                  30C07520
0865 01 4C200860      BSC  L  TOBB,+Z   USE SWS IF SW ZERO ON       30C07530
                *                                                     30C07540
0867 01 67000863      LDX  L3 TOBA      LOOP UNTIL SW ZERO ON       30C07550
0869 01 6F0005E6      STX  L3 MLSCF+1                               30C07560
086B 01 4C000B10      BSC  L  WAIT4                                 30C07570
                *                                                     30C07580
086D 0  1001    TOBB  SLA     1         REMOVE SW ZERO              30C07590
086E 0  1801          SRA     1                                     30C07600
086F 0  1888          SRT     8         PUT 8-15 IN EXT             30C07610
0870 0  D034          STO     PCOLM     STO COLUMN NO. SWS 1-7      30C07620
0871 0  1888          SRT     8                                     30C07630
0872 0  1098          SLT     24                                    30C07640
0873 0  D035          STO     CHID      STO CHAR ID                 30C07650
0874 01 4C18089A      BSC  L  TOBF,+-   BYPASS PRINT UNLESS A       30C07660
                *                        VALID CHARACTER ID         30C07670
                *                                                     30C07680
0876 01 6C000ACB      STX  L  LOOP      SET LOOP ADDRS              30C07690
0878 0  6132          LDX     1 50      SET EMIT LOOP CNT           30C07700
0879 01 6D0006C8      STX  L1 LPCNT                                 30C07710
                *                                                     30C07720
087B 00 66008200 TOBC LDX  L2 /8200     SET DSW S/B                 30C07730
087D 0  6101          LDX     1 1       SET IDLE CNT                30C07740
087E 01 440008D1      BSI  L  IDLE                                  30C07750
                *                                                     30C07760
0880 01 C4000C0A TOBD LD   L  EMIT      CHECK IF CHARACTER IS       30C07770
0882 0  9026          S       CHID       TO BE PRINTED              30C07780
0883 01 4C18088C      BSC  L  TOBE,+-   YES IF BRANCH               30C07790
                *                                                     30C07800
0885 01 74FF0B1A      MDX  L  ICNT,-1   SKIP IF INTRPT CNT=1        30C07810
0887 0  70DB          MDX     TOBA      BR IF MISSED AN EMIT        30C07820
0888 01 74FF06C8      MDX  L  LPCNT,-1  LOOP FOR 50 SEQUENTIAL      30C07830
088A 0  70F0          MDX     TOBC       EMITS                      30C07840
088B 0  700E          MDX     TOBF      SPACE IF NO MATCH           30C07850
                *                                                     30C07860
088C 0  C018    TOBE  LD      PCOLM     LD COL NO.                  30C07870
088D 0  1890          SRT     16                                    30C07880
088E 0  A817          D       X16                                   30C07890
088F 01 DC0008A2      STD  L  TEMPB                                 30C07900
0891 01 658008A3      LDX  I1 TEMPB+1   XR1=BUF WORD BIT POSITION  30C07910
0893 01 668008A2      LDX  I2 TEMPB     XR2=BUF WORD NUMBER         30C07920
                *                                                     30C07930
0895 01 C4000984      LD   L  K8000                                 30C07940
0897 0  1900          SRA     1 0                                   30C07950
0898 0  EA20          OR      2 32                                  30C07960
0899 0  D220          STO     2 32      SET BIT IN BUFFER           30C07970
                *                                                     30C07980
089A 0  6101    TOBF  LDX     1 1       SET SCAN CNT                30C07990
089B 01 440008C6      BSI  L  PRINT                                 30C08000
089D 01 440009EF      BSI  L  LOCK      CK FOR LOCK ON FUNCTION     30C08010
                *                                                     30C08020
089F 0  70C3          MDX     TOBA                                  30C08030
                *                                                     30C08040
08A0    0000          BSS  E  0                                     30C08050
08A0 1  08A4    RBSWS DC      BSWS                                  30C08060
08A1 0  3A00          DC      /3A00     IOCC TO READ BIT SWS        30C08070
08A2 0  0000    TEMPB DC      *-*                                   30C08080
08A3 0  0000          DC      *-*                                   30C08090
08A4 0  0000    BSWS  DC      *-*                                   30C08100
08A5 0  0000    PCOLM DC      *-*       PRINT COL STORED HERE       30C08110
08A6 0  0010    X16   DC      16                                    30C08120
08A7 0  0030    K0030 DC      /0030                                 30C08130
08A8 0  0002    SETUP DC      2                                     30C08140
08A9 0  0000    CHID  DC      *-*                                   30C08150
08AA 0  0000          DC      0                                     30C08160
08AB 1  0D88          DC      ABSW                                  30C08170
08AC 0  0000          DC      0                                     30C08180
```

```
                        *                                                30C08190
                        ********************************************     30C08200
                        *          INITIALIZE SUBROUTINE           *     30C08210
                        ********************************************     30C08220
                        *                                                30C08230
08AD 0  0000            INTLZ DC     *-*                                 30C08240
08AE 01 4400093A             BSI  L  STOP       STOP THE PRINTER         30C08250
                        *                                                30C08260
08B0 01 4400098A             BSI  L  CLEAR      SET PRINT BUF TO ZERO    30C08270
08B2 01 D4000ACB             STO  L  LOOP       RESET LOOP ADDRS         30C08280
                        *                                                30C08290
08B4 01 44000839             BSI  L  READY      CK FOR READY             30C08300
                        *                                                30C08310
08B6 0  4040                 BSI     SPACE                               30C08320
08B7 0  403F                 BSI     SPACE                               30C08330
                        *                                                30C08340
08B8 01 C48008AD             LD   I  INTLZ      LD MSG CONTROL           30C08350
08BA 01 4C1808C2             BSC  L  INT2,+-    BR IF MSG CONTROL=ZERO   30C08360
                        *                                                30C08370
08BC 0  D002                 STO     INT1       SET CONTROL              30C08380
08BD 01 44000946             BSI  L  PMSG       PRINT 1132 MSG           30C08390
08BF 0  0000            INT1 DC     *-*         MSG CONTROL              30C08400
                        *                                                30C08410
08C0 0  4036                 BSI     SPACE                               30C08420
08C1 0  4035                 BSI     SPACE                               30C08430
                        *                                                30C08440
08C2 01 740108AD        INT2 MDX  L  INTLZ,1                             30C08450
08C4 01 4C8008AD             BSC  I  INTLZ      RETURN                   30C08460
                        *                                                30C08470
                        ********************************************     30C08480
                        *          PRINT SUBROUTINE                *     30C08490
                        ********************************************     30C08500
                        *                                                30C08510
08C6 0  0000            PRINT DC     *-*                                 30C08520
08C7 01 C40005E2             LD   L  SW3                                 30C08530
08C9 01 D4000BFD             STO  L  IDLCT      SET FOR PRINT            30C08540
08CB 00 66008200             LDX  L2 /8200      SET FOR PRINT DSW        30C08550
08CD 0  400A                 BSI     PRCOM                               30C08560
08CE 0  4028                 BSI     SPACE                               30C08570
08CF 01 4C8008C6             BSC  I  PRINT                               30C08580
                        *                                                30C08590
                        ********************************************     30C08600
                        *          IDLE SUBROUTINE                 *     30C08610
                        ********************************************     30C08620
                        *                                                30C08630
08D1 0  0000            IDLE DC     *-*                                 30C08640
08D2 01 6D0008FD             STX  L1 IDLCT      SET IDLE CNT             30C08650
08D4 0  6100                 LDX     1 0                                 30C08660
08D5 0  4002                 BSI     PRCOM                               30C08670
08D6 01 4C8008D1             BSC  I  IDLE                                30C08680
                        *                                                30C08690
                        *-------------------------------------------     30C08700
                        *          PRINT COMMON                    *     30C08710
                        *-------------------------------------------     30C08720
                        *                                                30C08730
08D8 0  0000            PRCOM DC     *-*                                 30C08740
08D9 01 6D0008F0             STX  L1 SCNCT      SET SCNCT FOR IDLE       30C08750
08DB 01 6E0008FA             STX  L2 EXPCT                               30C08760
                        *                                                30C08770
08DD 01 0C00081A        PRC1 XIO  L  SENSE-1    SENSE DSW                30C08780
08DF 01 D4000ADD             STO  L  DSWW       STO IN MSG               30C08790
08E1 0  1003                 SLA     3                                   30C08800
08E2 01 4C1008E7             BSC  L  PRC2,-     BR IF CARG NOT BUSY      30C08810
08E4 01 44000A92             BSI  L  ERR17      PRINT ERR MSG            30C08820
08E6 0  70F6                 MDX     PRC1                                30C08830
                        *                                                30C08840
08E7 01 44000853        PRC2 BSI  L  FORMS                               30C08850
08E9 01 6600005E             LDX  L2 APRT                                30C08860
```



```
08EB 01 6E000AD0             STX  L2 OPSW       SET LAST OP SW           30C08870
08ED 00 67000200             LDX  L3 /0200      BUSY DSW S/B             30C08880
08EF 01 6F000B1C             STX  L3 TBDSW      SAVE BUSY DSW S/B        30C08890
08F1 01 0C0009B2             XIO  L  STPRT-1    START THE PRINTER        30C08900
08F3 01 44000AE6             BSI  L  WAIT       WAIT FOR INTERRUPT       30C08910
08F5 01 4C8008D8             BSC  I  PRCOM                               30C08920
                        *                                                30C08930
                        ********************************************     30C08940
                        *          SPACE SUBROUTINE                *     30C08950
                        ********************************************     30C08960
                        *                                                30C08970
08F7 0  0000            SPACE DC     *-*                                 30C08980
08F8 0  4041                 BSI     STOP       STOP THE PRINTER         30C08990
08F9 01 C4000AE6             LD   L  WAIT                                30C09000
08FB 01 4C180909             BSC  L  SPC1,+-    BR ON FIRST SPACE        30C09010
08FD 0  6116                 LDX     1 /16      ERROR NUMBER             30C09020
08FE 01 0C00081A             XIO  L  SENSE-1    SENSE DSW                30C09030
0900 01 D4000AE4             STO  L  CHWAS+1                             30C09040
0902 01 F4000AE3             EOR  L  CHWAS      CHECK FOR CHANGE         30C09050
0904 0  1008                 SLA     8           IN CHANNEL BITS         30C09060
0905 01 44200A8B             BSI  L  ERR16,Z    ERROR IF CHANGE          30C09070
0907 01 44000853             BSI  L  FORMS                               30C09080
                        *                                                30C09090
0909 00 66002000        SPC1 LDX  L2 /2000                               30C09100
090B 01 6E0008FB             STX  L2 EXPCT+1    SET EXPCT FOR SPACE      30C09110
090D 01 66000D54             LDX  L2 ASPC                                30C09120
090F 01 6E000AD0             STX  L2 OPSW       SET LAST OP SW           30C09130
0911 01 0C0008F4             XIO  L  STSPA-1    START SPACE              30C09140
0913 01 C4000989             LD   L  K1000      LD CARRIAGE BUSY BIT     30C09150
0915 01 44000AE6             BSI  L  WAIT       WAIT FOR INTERRUPT       30C09160
                        *                                                30C09170
0917 01 4C8008F7             BSC  I  SPACE      RETURN                   30C09180
                        *                                                30C09190
                        ********************************************     30C09200
                        *          SKIP                            *     30C09210
                        ********************************************     30C09220
                        *                                                30C09230
0919 0  0000            SKIP DC     *-*                                 30C09240
091A 0  D01D                 STO     SKPTO      SET CHANNEL CODE IN SKPTO 30C09250
091B 01 6E0008FB             STX  L2 EXPCT+1    SET FOR SKIP INTRPT      30C09260
091D 01 44000B53             BSI  L  FORMS                               30C09270
091F 0  6210                 LDX     2 16                                30C09280
0920 0  6A18                 STX     2 SKCNT    SET FOR MAX OF 16 SKIPS  30C09290
0921 01 C4000989             LD   L  K1000                               30C09300
0923 01 EC000BFA             OR   L  EXPCT      SET FOR SKIP WITH        30C09310
0925 01 D4000BFA             STO  L  EXPCT       PRINTER ON              30C09320
0927 01 66000D5B             LDX  L2 ASKP       SET LAST OP SW           30C09330
0929 01 6E000AD0             STX  L2 OPSW        FOR SKIP                30C09340
092B 01 0C000984             XIO  L  STCAR-1    START SKIP               30C09350
092D 01 C4000989             LD   L  K1000      LD CARRIAGE BUSY BIT     30C09360
092F 01 44000AE6             BSI  L  WAIT                                30C09370
                        *                                                30C09380
0931 0  4008                 BSI     STOP                                30C09390
0932 01 0C000B1A        SKP1 XIO  L  SENSE-1    SENSE DSW                30C09400
0934 0  1003                 SLA     3          LOOP HERE UNTIL          30C09410
0935 01 4C900919             BSC  I  SKIP,-      CARRIAGE BUSY GOES OFF  30C09420
0937 0  70FA                 MDX     SKP1                                30C09430
                        *                                                30C09440
0938 0  0000            SKPTO DC     *-*        SKIP TO CONTROL          30C09450
0939 0  0000            SKCNT DC     *-*        SKIP COUNT               30C09460
                        *                                                30C09470
                        ********************************************     30C09480
                        *          STOP THE PRINTER                *     30C09490
                        ********************************************     30C09500
                        *                                                30C09510
093A 0  0000            STOP DC     *-*                                 30C09520
093B 01 0C000BEC             XIO  L  STPPT-1    STOP PRINTER             30C09530
093D 0  1810                 SRA     16                                  30C09540
```

1132 PRINTER FUNCTION TEST

```
093E 01 D40008F4          STO  L  EMTSW     RESET 1ST EMIT SW          30C09550
0940 01 D40008FA          STO  L  EXPCT                                30C09560
0942 01 D40008IC          STO  L  TBDSW                                30C09570
0944 01 4C80093A          BSC  I  STOP      RETURN                     30C09580
                          *                                            30C09590
                          ********************************************* 30C09600
                          *          PRINT 1132 MESSAGE SUBROUTINE      30C09610
                          ********************************************* 30C09620
                          *                                            30C09630
0946 0  0000      PMSG    DC       *-*                                 30C09640
0947 01 C40005DF          LD   L   SW0       DO NOT PRINT IF            30C09650
0949 0  100D              SLA      13         BYPASS MESSAGE SWITCH      30C09660
094A 01 4C280974          BSC  L   PMS4,+Z    IS ON                      30C09670
                          *                                            30C09680
094C 0  40ED              BSI      STOP                                30C09690
                          *                                            30C09700
094D 0  10A0              SLT      32                                  30C09710
094E 01 C4800946          LD   I   PMSG      LD MESSAGE CONTROL         30C09720
0950 0  610E              LDX   1  14                                  30C09730
0951 0  4828              BSC      +Z        CK FOR EXTENDED TABLE      30C09740
0952 0  710F              MDX   1  15                                  30C09750
0953 0  1001              SLA      1                                   30C09760
0954 0  D05D              STO      SAVE                                30C09770
0955 01 67000DAE          LDX  L3  BUF       XR3=BUFFER ADDRS           30C09780
0957 0  7001              MDX      PMS1+1                              30C09790
                          *                                            30C09800
0958 0  7301      PMS1    MDX   3  1         PUT SPACE IN MSG           30C09810
0959 0  C058              LD       SAVE      LD MESSAGE CONTROL*        30C09820
095A 0  1140              SLCA  1  0         SCAN CONTROL               30C09830
095B 01 4C180974          BSC  L   PMS4,←    BR IF CONTROL ZERO         30C09840
095D 0  F056              EOR      K8000                               30C09850
095E 0  D053              STO      SAVE      SAVE CONTROL FOR NXT SCAN  30C09860
095F 01 C5000DCE          LD   L1  PNTAB     LD MSG ADDRS               30C09870
0961 0  D001              STO      *+1                                 30C09880
                          *                                            30C09890
0962 00 C4000000  PMS2    LD   L   *-*       LD MSG CHAR                30C09900
0964 0  F052              EOR      TERM      CK FOR TERMINATOR          30C09910
0965 01 4C180958          BSC  L   PMS1,←    BR IF TERM                 30C09920
                          *                                            30C09930
0967 0  F04F              EOR      TERM      RESTORE CHAR               30C09940
0968 0  18C8              RTE      8         SHIFT OUT 2ND CHAR         30C09950
0969 0  1008              SLA      8                                    30C09960
096A 0  D300              STO   3  0         STO CHAR IN BUF            30C09970
                          *                                            30C09980
096B 0  1090              SLT      16        BRING IN 2ND CHAR          30C09990
096C 01 4C180970          BSC  L   PMS3,←    BR IF ZERO                 30C10000
096E 0  7301              MDX   3  1         ADV BUF ADDRS              30C10010
096F 0  D300              STO   3  0         STO CHAR IN BUF            30C10020
                          *                                            30C10030
0970 0  7301      PMS3    MDX   3  1                                   30C10040
0971 01 74010963          MDX  L   PMS2+1,1  ADV MSG ADDRS              30C10050
0973 0  70EE              MDX      PMS2                                30C10060
                          *                                            30C10070
0974 0  6131      PMS4    LDX   1  49        LD SCAN CNT                30C10080
0975 00 66008200          LDX  L2  /8200     LD EXPECTED INTRPT DSW     30C10090
0977 0  6310              LDX   3  16        SET FOR 16 IDLES           30C10100
0978 01 6F0008FD          STX  L3  IDLCT      BEFORE SPACE              30C10110
097A 01 6C000988          STX  L   MSGSW     SET MSG SW                 30C10120
097C 01 440008D8          BSI  L   PRCON     GO PRINT MSG               30C10130
                          *                                            30C10140
097E 01 74010946  PMS5    MDX  L   PMSG,1                              30C10150
0980 01 4C800946          BSC  I   PMSG      RETURN                     30C10160
                          *                                            30C10170
                          ********************************************* 30C10180
                          *          RIPPLE PATTERN SUBROUTINE          30C10190
                          ********************************************* 30C10200
                          *                                            30C10210
0982 0  0000      RIPL    DC       *-*                                 30C10220
```


1132 PRINTER FUNCTION TEST

```
0983 0  6132      RIPL1 LDX   1 50          SET EMIT LOOP CNT          30C10230
0984 01 6D0006C8        STX  L1 LPCNT                                  30C10240
                        *                                              30C10250
0986 00 66008200  RIPL2 LDX  L2 /8200       SET DSW S/B                30C10260
0988 0  6101            LDX   1 1           SET IDLE CNT               30C10270
0989 01 440008D1        BSI  L  IDLE                                   30C10280
                        *                                              30C10290
098B 00 67000000  RIPL3 LDX  L3 *-*         COMPARE START SCAN         30C10300
098D 01 C7000CEB        LD   L3 CHAR+49       CHAR WITH LAST           30C10310
098F 01 94000C0A        S    L  EMIT          EMIT CHAR                30C10320
0991 01 4C180998        BSC  L  RIPL4,←     LOOP IF NOT EQUAL          30C10330
0993 01 74FF0B1A        MDX  L  ICNT,-1     SKIP IF INTRPT CNT=1       30C10340
0995 0  70ED            MDX     RIPL1                                  30C10350
                        *                                              30C10360
0996 01 74FF06C8        MDX  L  LPCNT,-1    IF AFTER 50 CONSECUTIVE    30C10370
0998 0  70ED            MDX     RIPL2         EMITS A MATCH IS NOT     30C10380
0999 0  1810            SRA     16            FOUND, LEAVE SPACE       30C10390
099A 0  7001            MDX     RIPL4+1       THEN CONTINUE            30C10400
                        *                                              30C10410
099B 0  C018      RIPL4 LD      K8000         SET BUFFER WITH FIRST BIT  30C10420
099C 0  61F0            LDX   1 -16           SET SHIFT REGISTER         30C10430
099D 0  62F8            LDX   2 -8            SET STORAGE REGISTER       30C10440
099E 0  7301            MDX   3 1                                        30C10450
099F 0  7005            MDX     RIPL5                                    30C10460
09A0 0  63CE            LDX   3 -50                                      30C10470
09A1 0  6BEA            STX   3 RIPL3+1       RESET EMIT CHAR CNT        30C10480
09A2 0  1801            SRA     1             SHIFT LAST LINE            30C10490
09A3 0  7101            MDX   1 1               IN PATTERN               30C10500
09A4 0  7302            MDX   3 2                                        30C10510
                        *                                              30C10520
09A5 01 6F0008EC  RIPL5 STX  L3 BLANK       SET FOR PATTERN SPACE      30C10530
09A7 01 6D0008D0        STX  L1 PI5+1                                    30C10540
09A9 01 6E0008D2        STX  L2 PI6+1                                    30C10550
09AB 0  6176            LDX   1 118         SET SCAN COUNT             30C10560
09AC 00 D4000020        STO  L  32          SET 1ST BUFR WORD          30C10570
09AE 01 440008C6        BSI  L  PRINT       GO PRINT                   30C10580
09B0 01 4C80098Z        BSC  I  RIPL                                   30C10590
                        *                                              30C10600
09B2      0000          BSS  E                                         30C10610
09B2 0  0000      SAVE  DC      *-*                                    30C10620
09B3 0  3480      STPRT DC      /3480         START PRINTER            30C10630
09B4 0  8000      K8000 DC      /8000                                  30C10640
09B5 0  3404      STCAR DC      /3404         START CARRIAGE           30C10650
09B6 0  FFFF      ONES  DC      /FFFF                                  30C10660
09B7 0  FFFF      TERM  DC      /FFFF                                  30C10670
09B8 0  0000      MSGSW DC      *-*           PRINTER MSG SW           30C10680
09B9 0  1000      K1000 DC      /1000                                  30C10690
                  *                                                    30C10700
                  ********************************************         30C10710
                  *          CLEAR BUFFER SUBROUTINE                   30C10720
                  ********************************************         30C10730
                  *  THIS SUBROUTINE CLEARS 32-39 AND                  30C10740
                  *  SETS BIT 15, LOC 39.                              30C10750
                  *-----------------------------------------          30C10760
                  *                                                    30C10770
09BA 0  0000      CLEAR DC      0                                      30C10780
09BB 0  63F8            LDX   3 -8            PRINT AREA               30C10790
09BC 0  10A0            SLT     32                                     30C10800
09BD 01 D4000C03        STO  L  SPCSX         CLEAR SPACE SW           30C10810
09BF 00 DF000028  CL10  STO  L3 40                                     30C10820
09C1 0  7302            MDX   3 2                                      30C10830
09C2 0  70FC            MDX     CL10                                   30C10840
09C3 0  6301            LDX   3 1             SET SCAN COMP BIT        30C10850
09C4 00 6F000027        STX  L3 39                                     30C10860
09C6 01 D4000988        STO  L  MSGSW         RESET MSG SW             30C10870
09C8 0  63E0            LDX   3 -32                                    30C10880
09C9 01 D7000DCE  CL20  STO  L3 BUF+32                                 30C10890
09CB 0  7301            MDX   3 1                                      30C10900
```

```
09CC 0  70FC          MDX     CL20                                    30C10910
09CD 01 4C8009BA      BSC  I  CLEAR                                   30C10920
                      *                                               30C10930
                      *****************************************       30C10940
                      *          SET PRINT BUFFER TO ONES     *       30C10950
                      *****************************************       30C10960
                      *                                               30C10970
09CF 0  0000          A1      DC      0                               30C10980
09D0 01 C4000B1A              LD   L  ICNT                            30C10990
09D2 0  D01A                  STO     A1SW                            30C11000
09D3 0  63F8                  LDX   3 -8                              30C11010
09D4 01 CC0009B6              LDD  L  ONES      SET PRINT             30C11020
09D6 00 DF000028      A110    STD  L3 40        AREA TO ALL ONES      30C11030
09D8 0  7302                  MDX   3 2                               30C11040
09D9 0  70FC                  MDX     A110                            30C11050
09DA 01 C4000B1A              LD   L  ICNT                            30C11060
09DC 0  F010                  EOR     A1SW                            30C11070
09DD 01 4C2009E1              BSC  L  A120,Z    BR IF INT OCCURRED    30C11080
09DF 01 4C8009CF              BSC  I  A1        LEAVE                 30C11090
09E1 0  4008          A120    BSI     CLEAR     CLEAR BUFFER          30C11100
09E2 00 66008200      A130    LDX  L2 /8200                           30C11110
09E4 0  6101                  LDX   1 1                               30C11120
09E5 01 440008D1              BSI  L  IDLE                            30C11130
09E7 01 C4000C0A              LD   L  EMIT                            30C11140
09E9 0  F004                  EOR     A1EM                            30C11150
09EA 0  4820                  BSC     Z         SKIP IF PROPER EMIT   30C11160
09EB 0  70F6                  MDX     A130      LOOP IF NOT           30C11170
09EC 0  70E3                  MDX     A1+1      REPEAT LINE           30C11180
                      *                                               30C11190
09ED 0  0000          A1SW    DC      *-*       INT COUNT SW          30C11200
09EE 0  0000          A1EM    DC      *-*       EMIT SAVE             30C11210
                      *                                               30C11220
                      *****************************************       30C11230
                      *          LOCK ON FUNCTION ROUTINE     *       30C11240
                      *****************************************       30C11250
                      *                                               30C11260
09EF 0  0000          LOCK    DC      *-*                             30C11270
09F0 01 C40005DF              LD   L  SWO       LD SWO                30C11280
09F2 00 EC800166              OR   I  ERLCK     COMB WITH MONITOR SWO 30C11290
09F4 0  100A                  SLA     10        CK LOCK ON FNC SW     30C11300
09F5 01 4C9009EF              BSC  I  LOCK,-    BR IF NOT LOCK ON FNC 30C11310
09F7 01 4C800AC8              BSC  I  LOOP      LOOP ON LAST FUNCTION 30C11320
                      *                                               30C11330
                      *****************************************       30C11340
                      *          ERROR MESSAGE SETUP          *       30C11350
                      *****************************************       30C11360
                      *                                               30C11370
09F9 0  0000          ERR1    DC      *-*       STATIC DSW ERR        30C11380
09FA 0  6101                  LDX   1 1         SET MSG NO.           30C11390
09FB 0  6260                  LDX   2 /0060     SET DATA CONTROL      30C11400
09FC 01 CC000A9A              LDD  L  MSG1      LD ALPHA MSG          30C11410
09FE 01 44000ABA              BSI  L  ETYPE     GO PRINT MSG          30C11420
0A00 01 4C8009F9              BSC  I  ERR1      RETURN                30C11430
                      *                                               30C11440
0A02 0  0000          ERR2    DC      *-*       BUSY DSW ERR          30C11450
0A03 0  6102                  LDX   1 2         SET MSG NO.           30C11460
0A04 00 66000180              LDX  L2 /0180     SET DATA CONTROL      30C11470
0A06 01 CC000A9C              LDD  L  MSG2      LD ALPHA MSG          30C11480
0A08 01 44000ABA              BSI  L  ETYPE     GO PRINT MSG          30C11490
0A0A 01 4C800A02              BSC  I  ERR2      RETURN                30C11500
                      *                                               30C11510
0A0C 0  6103          ERR3    LDX   1 3         NO INTRPT             30C11520
0A0D 0  6220                  LDX   2 /0020     SET DATA CONTROL      30C11530
0A0E 01 CC000A9E              LDD  L  MSG3      LD ALPHA MSG          30C11540
                      *                                               30C11550
0A10 01 740008FB              MDX  L  EXPCT+1   CK FOR EXPCT SPACE/SKIP 30C11560
0A12 0  7003                  MDX     ERR3X     BR IF SPACE/SKIP      30C11570
0A13 01 74000B1A              MDX  L  ICNT      CK FOR SOME INTRPTS   30C11580
```



```
0A15 0  7004                  MDX     ERR4      BR IF SOME            30C11590
                      *                                               30C11600
0A16 01 44000ABA      ERR3X   BSI  L  ETYPE     GO PRINT MSG          30C11610
0A18 01 4C800AE6              BSC  I  WAIT      RETURN                30C11620
                      *                                               30C11630
0A1A 0  6104          ERR4    LDX   1 4         PRINTER STOPPED       30C11640
0A1B 01 CC000AA0              LDD  L  MSG4      LD ALPHA MSG          30C11650
0A1D 0  70F8                  MDX     ERR3X                           30C11660
                      *                                               30C11670
0A1E 0  0000          ERR5    DC      *-*       LEVEL 1 DSW ERR       30C11680
0A1F 0  6105                  LDX   1 5         SET MSG NO.           30C11690
0A20 00 66000600              LDX  L2 /0600     SET DATA CONTROL      30C11700
0A22 0  C87F                  LDD     MSG5      LD ALPHA MSG          30C11710
0A23 01 44000ABA              BSI  L  ETYPE     GO PRINT MSG          30C11720
                      *                                               30C11730
0A25 01 74FF081A              MDX  L  ICNT,-1   CK FOR MULT INTRPTS    30C11740
0A27 0  7001                  MDX     *+1       30C11750
0A28 0  700A                  MDX     ERR5X     30C11760
                      *                                               30C11770
0A29 01 C4000B1D              LD   L  EBITS     LD DSW ERROR BITS     30C11780
0A2B 01 4C280A4C              BSC  L  ERR9,+Z   BR IF PRINT RESPONSE ON 30C11790
0A2D 0  1001                  SLA     1         30C11800
0A2E 01 4C280A56              BSC  L  ERR11,+Z  BR IF SKIP RESPONSE ON 30C11810
0A30 0  1001                  SLA     1         30C11820
0A31 01 4C280A51              BSC  L  ERR10,+Z  BR IF SPACE RESPONSE ON 30C11830
                      *                                               30C11840
0A33 01 4C800A1E      ERR5X   BSC  I  ERR5      RETURN                30C11850
                      *                                               30C11860
0A35 0  0000          ERR6    DC      *-*       EMIT BIT FAILURE      30C11870
0A36 0  6106                  LDX   1 6         SET MSG NO.           30C11880
0A37 0  6203                  LDX   2 /0003     SET DATA CONTROL      30C11890
0A38 0  C86B                  LDD     MSG6      LD ALPHA MSG          30C11900
0A39 01 44000ABA              BSI  L  ETYPE     GO PRINT MSG          30C11910
0A3B 01 4C800A35              BSC  I  ERR6      RETURN                30C11920
                      *                                               30C11930
0A3D 0  0000          ERR7    DC      *-*       EMIT INVALID          30C11940
0A3E 0  6107                  LDX   1 7         SET MSG NO.           30C11950
0A3F 0  6208                  LDX   2 /0008     SET DATA CONTROL      30C11960
0A40 0  C865                  LDD     MSG7      LD ALPHA MSG          30C11970
0A41 01 44000ABA              BSI  L  ETYPE     GO PRINT MSG          30C11980
0A43 01 4C800A3D              BSC  I  ERR7      RETURN                30C11990
                      *                                               30C12000
0A45 0  0000          ERR8    DC      *-*       EMIT SEQ ERR          30C12010
0A46 0  6108                  LDX   1 8         SET MSG NO.           30C12020
0A47 0  6218                  LDX   2 /0018     SET DATA CONTROL      30C12030
0A48 0  C85F                  LDD     MSG8      LD ALPHA MSG          30C12040
0A49 0  4070                  BSI     ETYPE     GO PRINT MSG          30C12050
0A4A 01 4C800A45              BSC  I  ERR8      RETURN                30C12060
                      *                                               30C12070
0A4C 0  6109          ERR9    LDX   1 9         PRINTER DID NOT TURN OFF 30C12080
0A4D 0  6200                  LDX   2 0         SET FOR NO DATA       30C12090
0A4E 0  C85B                  LDD     MSG9      LD ALPHA MSG          30C12100
0A4F 0  406A                  BSI     ETYPE     GO PRINT MSG          30C12110
0A50 0  70E2                  MDX     ERR5X     30C12120
                      *                                               30C12130
0A51 0  6110          ERR10   LDX   1 /10       MULT SPACE INTRPTS    30C12140
0A52 0  6200                  LDX   2 0         SET FOR NO DATA       30C12150
0A53 0  C858                  LDD     MSG10     LD ALPHA MSG          30C12160
0A54 0  4065                  BSI     ETYPE     GO PRINT MSG          30C12170
0A55 0  70DD                  MDX     ERR5X     30C12180
                      *                                               30C12190
0A56 0  6111          ERR11   LDX   1 /11       MULT SKIP INTRPTS     30C12200
0A57 0  6200                  LDX   2 0         SET FOR NO DATA       30C12210
0A58 0  C855                  LDD     MSG11     LD ALPHA MSG          30C12220
0A59 0  4060                  BSI     ETYPE     GO PRINT MSG          30C12230
0A5A 0  70D8                  MDX     ERR5X     30C12240
                      *                                               30C12250
0A5B 0  0000          ERR12   DC      *-*       MISSING CHANNEL       30C12260
```

1132 PRINTER FUNCTION TEST

```
0A5C 01 C5000A64          LD    L1 CHNUM-1    LD CHANNEL NO.              30C12270
0A5E 0  D07B              STO      CHANL      SET IN MSG                  30C12280
0A5F 0  6112              LDX    1 /12        SET MSG NO.                 30C12290
0A60 0  6204              LDX    2 /0004      SET DATA CONTROL            30C12300
0A61 0  C84E              LDD      MSG12      LD ALPHA MSG                30C12310
0A62 0  4057              BSI      ETYPE      GO PRINT MSG                30C12320
0A63 01 4C800A58          BSC   I  ERR12      RETURN                      30C12330
                          *                                              30C12340
0A65 0  0001        CHNUM DC       1                                     30C12350
0A66 0  0002              DC       2                                     30C12360
0A67 0  0003              DC       3                                     30C12370
0A68 0  0004              DC       4                                     30C12380
0A69 0  0005              DC       5                                     30C12390
0A6A 0  0006              DC       6                                     30C12400
0A6B 0  0009              DC       9                                     30C12410
0A6C 0  000C              DC       12                                    30C12420
                          *                                              30C12430
0A6D 0  0000        ERR13 DC       *-*         CHANNEL SEQ ERR           30C12440
0A6E 0  6113              LDX    1 /13        SET MSG NO.                 30C12450
0A6F 0  6200              LDX    2 0          SET DATA CONTROL            30C12460
0A70 0  C841              LDD      MSG13      LD ALPHA MSG                30C12470
0A71 0  4048              BSI      ETYPE      GO PRINT MSG                30C12480
0A72 01 C4000986          LD    L  ONES                                  30C12490
0A74 01 4C800A6D          BSC   I  ERR13      RETURN                      30C12500
                          *                                              30C12510
0A76 0  6114        ERR14 LDX    1 /14        MULT CHANNEL BITS           30C12520
0A77 0  6220              LDX    2 /0020                                  30C12530
0A78 01 C40007C9          LD    L  TEMP8+1    LD INVALID CHANNEL CODE     30C12540
0A7A 0  1808              SRA      8                                      30C12550
0A7B 0  D061              STO      DSWW                                   30C12560
0A7C 0  C837              LDD      MSG14      LD ALPHA MSG                30C12570
0A7D 0  403C              BSI      ETYPE      GO PRINT MSG                30C12580
0A7E 01 4C0007EB          BSC   L  CHN2       RETURN                      30C12590
                          *                                              30C12600
0A80 0  0000        ERR15 DC       *-*         CHANNEL SENSE ERR         30C12610
0A81 00 66000801          LDX   L2 /0801       SET DATA CONTROL            30C12620
0A83 01 C4000BEE          LD    L  WAS         LD INTRPT DSW               30C12630
0A85 0  E05F              AND      K00FF      MASK ALL BUT CHAN BITS      30C12640
0A86 0  D051              STO      ERM4       STO IN MSG                  30C12650
0A87 0  C82E              LDD      MSG15      LD ALPHA MSG                30C12660
0A88 0  4031              BSI      ETYPE      GO PRINT MSG                30C12670
0A89 01 4C800A80          BSC   I  ERR15      RETURN                      30C12680
0A8B 0  0000        ERR16 DC       *-*                                   30C12690
0A8C 00 66001800          LDX   L2 /1800                                 30C12700
0A8E 0  C827              LDD      MSG15                                 30C12710
0A8F 0  402A              BSI      ETYPE                                 30C12720
0A90 01 4C800A8B          BSC   I  ERR16                                 30C12730
                          *                                              30C12740
0A92 0  0000        ERR17 DC       *-*                                   30C12750
0A93 0  6117              LDX    1 /17                                   30C12760
0A94 0  6220              LDX    2 /0020                                 30C12770
0A95 0  C822              LDD      MSG17                                 30C12780
0A96 0  4023              BSI      ETYPE                                 30C12790
0A97 01 4C800A92          BSC   I  ERR17                                 30C12800
                          *                                              30C12810
0A9A    0000              BSS   E  0                                     30C12820
0A9A 1  0CEB        MSG1  DC       AWAS        WAS S/B                   30C12830
0A9B 1  0CF1              DC       ASDSW       STATIC DSW                30C12840
0A9C 1  0CEB        MSG2  DC       AWAS        WAS S/B                   30C12850
0A9D 1  0CFA              DC       ABDSW       BUSY DSW ERR              30C12860
0A9E 1  0D0A        MSG3  DC       ADSW        DSW                       30C12870
0A9F 1  0D0D              DC       ANINT       NO INTRPT                 30C12880
0AA0 1  0D14        MSG4  DC       ADPR        DSW PRINTER               30C12890
0AA1 1  0D18              DC       ASTPD       STOPPED                   30C12900
0AA2 1  0CEB        MSG5  DC       AWAS        WAS S/B                   30C12910
0AA3 1  0D02              DC       ADSW1       LEV1 DSW ERR              30C12920
0AA4 1  0D29        MSG6  DC       AEBF        EMIT BIT FAILURE          30C12930
0AA5 0  0000              DC       /0000                                 30C12940
```


1132 PRINTER FUNCTION TEST

```
0AA6 1  0D38        MSG7  DC       AEMT        EMIT INVALD               30C12950
0AA7 0  0000              DC       /0000                                 30C12960
0AA8 1  0CEB        MSG8  DC       AWAS        WAS S/B                   30C12970
0AA9 1  0D3F              DC       AESER       EMIT SEQ ERR              30C12980
0AAA 1  0D17        MSG9  DC       APRTR       PRINTER                   30C12990
0AAB 1  0D20              DC       ADNTO       DID NOT TURN OFF          30C13000
0AAC 1  0D51        MSG10 DC       AMSP        MULT SPACE                30C13010
0AAD 1  0D10              DC       AINT        INTRPT                    30C13020
0AAE 1  0D58        MSG11 DC       AMSK        MULT SKIP                 30C13030
0AAF 1  0D10              DC       AINT        INTRPT                    30C13040
0AB0 1  0D48        MSG12 DC       AMC         MISSING CHANNEL           30C13050
0AB1 0  0000              DC       /0000                                 30C13060
0AB2 1  0D4C        MSG13 DC       ACHAN       CHANNEL                   30C13070
0AB3 1  0D43              DC       ASER        SEQ ERR                   30C13080
0AB4 1  0D71        MSG14 DC       AINVC       INVALD CHANNEL CODE       30C13090
0AB5 0  0000              DC       /0000                                 30C13100
0AB6 1  0D4C        MSG15 DC       ACHAN       CHANNEL                   30C13110
0AB7 1  0D6B              DC       ASNER       SENSE ERR                 30C13120
0AB8 1  0D0A        MSG17 DC       ADSW                                  30C13130
0AB9 1  0DA6              DC       ACBSY                                 30C13140
                          *                                              30C13150
                          ********************************************   30C13160
                          *          PRINT ERROR MESSAGES            *   30C13170
                          ********************************************   30C13180
                          *                                              30C13190
0ABA 0  0000        ETYPE DC       *-*                                   30C13200
0ABB 0  6917              STX    1 TABLE      SET ID IN MESSAGE TABLE     30C13210
0ABC 0  6A18              STX    2 TABLE+2    STO DATA WORD CNTRL         30C13220
0ABD 0  D818              STD      ALPHA                                 30C13230
0ABE 01 4400093A          BSI   L  STOP       STOP THE PRINTER            30C13240
                          *                                              30C13250
0AC0 01 74000AC6          MDX   L  OPMSW                                 30C13260
0AC2 0  7005              MDX      ETYP1                                 30C13270
0AC3 00 44800162          BSI   I  ERROR      PRINT LAST OP               30C13280
0AC5 1  0ACC              DC       ETYP2                                 30C13290
0AC6 0  0000        OPMSW DC       *-*         MUST BE ZERO FOR OP MSG   30C13300
0AC7 0  68FE              STX      OPMSW                                 30C13310
                          *                                              30C13320
0AC8 00 44800162    ETYP1 BSI   I  ERROR                                 30C13330
0ACA 1  0AD3              DC       TABLE                                 30C13340
0ACB 0  0000        LOOP  DC       0           LOOP ON ERROR             30C13350
                          *                                              30C13360
0ACC 01 4C800A8A    ETYP2 BSC   I  ETYPE      RETURN                      30C13370
0ACE 0  8000              DC       /8000                                 30C13380
0ACF 1  0D7F              DC       ALOP                                  30C13390
0AD0 0  0000        OPSW  DC       *-*                                   30C13400
                          *                                              30C13410
                          *-----------------------------------------     30C13420
                          *  ERROR MESSAGE TABLE                         30C13430
                          *-----------------------------------------     30C13440
                          *                                              30C13450
0AD2    0001              BSS   E  1                                     30C13460
0AD3 0  0000        TABLE DC       *-*         MESSAGE NUMBER            30C13470
0AD4 0  0004              DC       /0004       HEX/DECIMAL SW            30C13480
0AD5 0  0000              DC       *-*         DATA WORD ID              30C13490
0AD6 0  0000        ALPHA DC       *-*         1ST ALPHA MESSAGE ADDRESS 30C13500
0AD7 0  0000        ERM3  DC       *-*         2ND ALPHA MESSAGE ADDRESS 30C13510
                          *                                              30C13520
0AD8 0  0000        ERM4  DC       *-*         MODIFIERS                 30C13530
0AD9 0  0000              DC       *-*                                   30C13540
0ADA 0  0000        CHANL DC       *-*         STORE ERR CHANNEL         30C13550
0ADB 0  0000        EMTWS DC       *-*         STORE EMIT WAS            30C13560
0ADC 0  0000        EMTSB DC       *-*         STORE EMIT S/B            30C13570
0ADD 0  0000        DSWW  DC       *-*         STORE DSW WAS             30C13580
0ADE 0  0000        DSWSB DC       /0000       STORE DSW S/B             30C13590
0ADF 0  0000        BDSW  DC       *-*         BUSY DSW WAS              30C13600
0AE0 0  0000              DC       *-*         BUSY DSW S/B              30C13610
0AE1 0  0000        IDSW  DC       *-*         INTRPT DSW WAS            30C13620
```

```
0AE2 0  0000          DC      *-*         INTRPT DSW S/B              30C13630
0AE3 0  0000     CHWAS DC     *-*         CHANNEL DSW WAS             30C13640
0AE4 0  0000          DC      *-*                                     30C13650
0AE5 0  00FF     K00FF DC     /00FF                                   30C13660
                 *                                                    30C13670
                 ********************************************          30C13680
                 *          INTERRUPT WAIT ROUTINE          *          30C13690
                 ********************************************          30C13700
                 *                                                    30C13710
0AE6 0  0000     WAIT  DC     *-*                                     30C13720
0AE7 0  E834           OR     TBDSW       BUILD BUSY DSW S/B          30C13730
0AE8 0  00F7           STO    BDSW+1      SET IN S/B                  30C13740
0AE9 01 C4000C03       LD   L SPCSX       SET SPACE COUNT             30C13750
0AEB 01 D4000C02       STO  L SPCSW                                   30C13760
0AED 0  082C           XIO    SENSE-1     SENSE BUSY DSW              30C13770
0AEE 01 E4000C00       AND  L K7F00                                   30C13780
0AF0 0  00EE           STO    BDSW        SAVE BUSY DSW               30C13790
                 *                                                    30C13800
0AF1 0  1010           SLA    16                                      30C13810
0AF2 0  00D3           STO    OPNSW                                   30C13820
0AF3 0  0026           STO    ICNT        RESET ICNT                  30C13830
0AF4 0  0028           STO    EBITS       RESET EBITS                 30C13840
0AF5 01 D4000C07       STO  L CKESW       RESET CKESW                 30C13850
0AF7 01 D4000C03       STO  L SPCSX                                   30C13860
                 *                                                    30C13870
0AF9 00 65001000       LDX  L1 /1000      SET INTERRUPT               30C13880
0AFB 0  6922           STX    1 WCNT       WAIT CNT                    30C13890
                 *                                                    30C13900
0AFC 01 65000B05  WAIT1 LDX  L1 WAIT3                                  30C13910
0AFE 01 740005E6       MDX  L MLSCF+1     CK FOR INTERRUPT            30C13920
0B00 0  700F           MDX    WAIT4       BR IF INTERRUPT OCCURED     30C13930
                 *                                                    30C13940
0B01 01 6D0005E5  WAIT2 STX  L1 MLSCF      SET RETURN ADDRESS          30C13950
0B03 00 44800161       BSI  I  START       GO TO MONITOR               30C13960
                 *                                                    30C13970
0B05 01 74FF081E  WAIT3 MDX  L  WCNT,-1    DECREMENT WAIT CNT          30C13980
0B07 0  70F4           MDX     WAIT1                                  30C13990
                 *                                                    30C14000
0B08 0  0811           XIO     SENSE-1     SENSE NO INTRPT DSW         30C14010
0B09 0  00D3           STO     DSNW        SET IN MSG                  30C14020
0B0A 0  C0D5           LD      BDSW+1      LD BUSY DSW S/B             30C14030
0B0B 0  F0D3           EOR     BDSW        COMPARE WITH BUSY DSW       30C14040
0B0C 01 44200A02       BSI  L  ERR2,Z      BR IF BUSY DSW ERR          30C14050
                 *                                                    30C14060
0B0E 01 4C000A0C       BSC  L  ERR3        GO PRINT NO INTRPT MSG      30C14070
                 *                                                    30C14080
0B10 01 C40005E0  WAIT4 LD   L  SW1                                    30C14090
0B12 00 44880161        BSI  I  START,+    CK FOR RTN SELECT           30C14100
0B14 01 940005DD        S    L  RID        CK FOR NEW ROUTINE          30C14110
0B16 00 44980161        BSI  I  START,<-   BR IF NOT NEW RTN            30C14120
0B18 01 44000600        BSI  L  CNTRL                                  30C14130
                 *                                                    30C14140
0B1A     0000           BSS  E                                         30C14150
0B1A 0  0000     ICNT  DC     *-*                                     30C14160
0B1B 0  3700     SENSE DC     /3700       SENSE WITHOUT RESET         30C14170
0B1C 0  0000     TBDSW DC     *-*                                     30C14180
0B1D 0  0000     EBITS DC     *-*         INT DSW ER BITS             30C14190
0B1E 0  0000     WCNT  DC     *-*                                     30C14200
                 *                                                    30C14210
                 *------------------------------------------          30C14220
                 *  ENTER HERE AFTER INTERRUPT                        30C14230
                 *------------------------------------------          30C14240
                 *                                                    30C14250
0B1F 0  C0C0     RTRN  LD     BDSW+1      LD BUSY DSW S/B             30C14260
0B20 0  F0BE           EOR     BDSW        COMPARE WITH BUSY DSW       30C14270
0B21 01 44200A02       BSI  L  ERR2,Z      BR IF BUSY DSW ERR          30C14280
                 *                                                    30C14290
0B23 0  C0F9           LD      EBITS       CK FOR INTRPT DSW ER        30C14300
```



```
0B24 01 44200A1E        BSI  L  ERR5,Z                                30C14310
                 *                                                    30C14320
0B26 01 C4000C07        LD   L  CKESW                                  30C14330
0B28 0  0001            STO     *+1                                    30C14340
0B29 00 44200000        BSI  L  *-*,Z       BR IF EMIT ERR             30C14350
                 *                                                    30C14360
0B2B 0  08EE            XIO     SENSE-1                                30C14370
0B2C 0  E0B8            AND     K00FF       MASK ALL BUT CHAN BITS     30C14380
0B2D 0  00B5            STO     CHWAS       STO IN ERR MSG             30C14390
0B2E 01 F4000BEE        EOR  L  WAS         COMPARE WITH INTRPT DSW    30C14400
0B30 0  1002            SLA     2                                      30C14410
0B31 01 4C100B37        BSC  L  RTRN1,-     BR UNLESS AFTER SPACE      30C14420
                 *                                                    30C14430
0B33 0  1006            SLA     6           LOOK AT CHANNEL BITS       30C14440
0B34 0  6115            LDX     1 /15       LD MSG NUMBER              30C14450
0B35 01 44200A80        BSI  L  ERR15,Z     BR IF NOT EQUAL            30C14460
                 *                                                    30C14470
0B37 01 4C800AE6 RTRN1  BSC  I  WAIT                                   30C14480
                 *                                                    30C14490
                 ********************************************         30C14500
                 *          CHECK READY                     *         30C14510
                 ********************************************         30C14520
                 * THIS SUBROUTINE CHECKS THE DSW FOR                 30C14530
                 * READY CONDITIONS                                   30C14540
                 *------------------------------------------          30C14550
                 *                                                    30C14560
0B39 0  0000     READY DC     *-*                                     30C14570
0B3A 0  61FD           LDX     1 -3                                   30C14580
0B3B 0  692D           STX     1 DLYCT                                30C14590
0B3C 0  08DD     RDY1  XIO      SENSE-1     SENSE DSW                  30C14600
0B3D 01 E4000BFF       AND  L  KFF00       CK BITS 0-7                30C14610
0B3F 0  00D9           STO     DSNW        STORE DSW IN MSG TABLE     30C14620
0B40 01 4C980B39       BSC  I  READY,+-    READY IF BRANCH            30C14630
0B42 0  E025           AND     RDYMK       MSK NRDY BIT               30C14640
0B43 01 74030869       MDX  L  DLYCT,3                                30C14650
0B45 0  7007           MDX     RDY2                                   30C14660
                 *                                                    30C14670
0B46 01 442009F9       BSI  L  ERR1,Z      TYPE ERROR MESSAGE         30C14680
                 *                                                    30C14690
0B48 00 44800163       BSI  I  LOG         TYPE                       30C14700
0B4A 1  0B6A           DC      STM         MESSAGE                    30C14710
                 *                                                    30C14720
0B4B 0  1810           SRA     16          SET TO DELAY FOR           30C14730
0B4C 0  D01C           STO     DLYCT        TEN SECONDS               30C14740
0B4D 01 65000B3C RDY2  LDX  L1 RDY1                                    30C14750
0B4F 01 6D0005E6       STX  L1 MLSCF+1                                30C14760
0B51 01 4C000B10       BSC  L  WAIT4       CK ROUTINE SELECT SWS      30C14770
                 *                                                    30C14780
                 ********************************************         30C14790
                 *          FORM CHECK                      *         30C14800
                 ********************************************         30C14810
                 *     THIS  SUBROUTINE CHECKS FOR A FORM CHECK       30C14820
                 *     AFTER A SPACE OR SKIP COMMAND                  30C14830
                 *------------------------------------------          30C14840
                 *                                                    30C14850
0B53 0  0000     FORMS DC     *-*                                     30C14860
0B54 0  61FD           LDX     1 -3                                   30C14870
0B55 0  6913           STX     1 DLYCT                                30C14880
0B56 0  08C3     FORM1 XIO      SENSE-1                                30C14890
0B57 0  1005           SLA     5                                      30C14900
0B58 01 4C900B53       BSC  I  FORMS,-     BR IF NO FORMS CK          30C14910
                 *                                                    30C14920
0B5A 01 74030869       MDX  L  DLYCT,3                                30C14930
0B5C 0  7005           MDX     FORM2                                  30C14940
0B5D 00 44800163       BSI  I  LOG         TYPE                       30C14950
0B5F 1  0B6A           DC      STM         MESSAGE                    30C14960
                 *                                                    30C14970
0B60 0  1810           SRA     16          SET TO DELAY FOR           30C14980
```

```
0861 0  D007          STO     DLYCT       TEN SECONDS                  30C14990
                      *                                                30C15000
                      *                                                30C15010
0862 01 65000856  FORM2 LDX   L1 FORM1                                 30C15020
0864 01 6D0005E6        STX   L1 MLSCF+1                               30C15030
0866 01 4C000810        BSC   L  WAIT4      CK ROUTINE SELECT SWS       30C15040
                      *                                                30C15050
0868 0  FB00      RDYMK DC      /FB00                                  30C15060
0869 0  0000      DLYCT DC      0           DELAY COUNTER              30C15070
                      *                                                30C15080
086A 0  0001      STM   DC      1           MESSAGE NUMBER             30C15090
0868 0  0000            DC      /0000       HEX/DECIMAL SW             30C15100
086C 0  0001            DC      /0001       DATA WORD ID               30C15110
086D 1  0D85            DC      ANRDY                                  30C15120
086E 0  0000            DC      0                                      30C15130
086F 0  1132            DC      /1132       MACHINE TYPE               30C15140
                      *                                                30C15150
                      *                                                30C15160
                      ************************************************ 30C15170
                      *           INTERRUPT ROUTINE                    30C15180
                      ************************************************ 30C15190
                      *                                                30C15200
0870 0  0000      PIRT  DC      *-*                                    30C15210
0871 01 6E000C3D        STX   L2 IOUT2+1    SAVE XR2                   30C15220
0873 0  1810            SRA     16                                     30C15230
0874 01 D4000BFC        STO   L  EXPCT+2                               30C15240
0876 00 670005DC        LDX   L3 1500       RESET INTERRUPT            30C15250
0878 0  68A5            STX     3 WCNT        WAIT COUNTER               30C15260
0879 01 7401081A        MDX   L  ICNT,1     CNT INTERRUPTS             30C15270
0878 0  1000            NOP                                            30C15280
                      *                                                30C15290
087C 01 0C000BEE        XIO   L  SRSET-1    SENSE AND RESET DSW        30C15300
087E 0  D06F            STO     WAS         SAVE DSW                   30C15310
087F 01 D4000C04        STO   L  RTRNS                                 30C15320
0881 01 4C100C0B        BSC   L  SKINT,-    BR IF NOT PRINT RESP       30C15330
                      *                                                30C15340
                      *----------------------------------------------- 30C15350
                      *           READ EMIT INTERRUPT                  30C15360
                      *----------------------------------------------- 30C15370
                      *                                                30C15380
0883 0  086E      PINT  XIO     RDEMT       READ EMIT                  30C15390
0884 0  C075            LD      EXPCT                                  30C15400
0885 0  D076            STO     EXPCT+2     BUILD EXPECTED DSW         30C15410
0886 01 44000C4D        BSI   L  CKEMT      CK EMIT SEQUENCE           30C15420
                      *                                                30C15430
0888 0  C067            LD      SCNCT       CHECK FOR PRINT            30C15440
0889 01 4C3008BC        BSC   L  PI3,Z-     BR IF PRINT                30C15450
                      *                                                30C15460
0888 0  C071            LD      IDLCT       CK FOR IDLE                30C15470
088C 01 4C200896        BSC   L  PI1,Z      BR IF IDLE                 30C15480
                      *                                                30C15490
088E 01 74FF0C05        MDX   L  STPCT,-1                              30C15500
0891 0  707A            MDX     SKINT                                  30C15510
                      *                                                30C15520
                      *----------------------------------------------- 30C15530
                      *           STOP PRINTER                         30C15540
                      *----------------------------------------------- 30C15550
                      *                                                30C15560
0891 0  D068            STO     EXPCT                                  30C15570
0892 0  D089            STO     TBDSW                                  30C15580
0893 0  D060            STO     EMTSW       RESET 1ST EMIT SW          30C15590
0894 0  0857            XIO     STPPT-1     STOP PRINTER               30C15600
0895 0  7075            MDX     SKINT                                  30C15610
                      *                                                30C15620
0896 01 74FF0BFD  PI1   MDX   L  IDLCT,-1   DEC IDLE CNT               30C15630
0898 0  7072            MDX     SKINT                                  30C15640
                      *                                                30C15650
                      *----------------------------------------------- 30C15660
```



```
                      *           IDLE CNT=0, SET TO RETURN            30C15670
                      *----------------------------------------------- 30C15680
                      *                                                30C15690
0899 0  1810            SRA     16                                     30C15700
089A 0  6310            LDX     3 16        SET FOR 16 EMITS           30C15710
089B 01 74000C02        MDX   L  SPCSW,0    CK SPACE-PRINT ON SW       30C15720
089D 0  7003            MDX     PI2                                    30C15730
                      *                                                30C15740
089E 0  D065            STO     RTRNS       SET TO RETURN TO MAINLN    30C15750
089F 0  6865            STX     3 STPCT       THEN TURN PRINT OFF      30C15760
08A0 0  706A            MDX     SKINT                                  30C15770
                      *                                                30C15780
                      *----------------------------------------------- 30C15790
                      *           SPACE WITH PRINTER ON                30C15800
                      *----------------------------------------------- 30C15810
                      *                                                30C15820
08A1 01 74FF0C02  PI2   MDX   L  SPCSW,-1   DEC SPACE COUNT            30C15830
08A3 0  1000            NOP                                            30C15840
08A4 0  6B60            STX     3 STPCT                                30C15850
08A5 0  C063            LD      K1200                                  30C15860
08A6 01 EC00081C        OR    L  TBDSW      BIULD BUSY DSW             30C15870
08A8 01 D4000AE0        STO   L  BDSW+1                                30C15880
08AA 00 67002200        LDX   L3 /2200      SET EXPECTED SPACE         30C15890
08AC 0  6B4E            STX     3 EXPCT+1     RESPONSE DSW             30C15900
08AD 00 67009200        LDX   L3 /9200      SET EXPECTED EMIT          30C15910
08AF 0  6B4A            STX     3 EXPCT       RESPONSE DSW             30C15920
08B0 01 66000D62        LDX   L2 ASPIN                                 30C15930
08B2 01 6E000AD0        STX   L2 OPSW       SET LAST OP SW             30C15940
                      *                                                30C15950
08B4 0  083F            XIO     STSPA-1     SPACE                      30C15960
                      *                                                30C15970
08B5 01 0C000B1A        XIO   L  SENSE-1    SENSE BUSY DSW             30C15980
08B7 0  E048            AND     K7F00       MASK EMIT RESPONSE AND     30C15990
                      *                       CHANNEL BITS             30C16000
08B8 01 D4000ADF        STO   L  BDSW       SAVE BUSY DSW              30C16010
08BA 01 4C000C3C        BSC   L  IOUT2                                 30C16020
                      *                                                30C16030
08BC 01 74FF0BF0  PI3   MDX   L  SCNCT,-1   DEC SCAN CNT               30C16040
08BE 0  7006            MDX     PI4         GO SET UP PRINT BUFFER     30C16050
                      *                                                30C16060
                      *----------------------------------------------- 30C16070
                      *           END OF PRINT                         30C16080
                      *----------------------------------------------- 30C16090
                      *                                                30C16100
08BF 01 4400098A        BSI   L  CLEAR      SET BUFFER TO ZERO         30C16110
08C1 00 67008200        LDX   L3 /8200      SET EXPCT FOR              30C16120
08C3 0  6B36            STX     3 EXPCT       NORMAL PRINT DSW         30C16130
08C4 0  7046            MDX     SKINT                                  30C16140
                      *                                                30C16150
                      *----------------------------------------------- 30C16160
                      *           SET UP PRINT BUFFER                  30C16170
                      *----------------------------------------------- 30C16180
                      *                                                30C16190
08C5 0  10A0      PI4   SLT     32                                     30C16200
08C6 01 C4000988        LD    L  MSGSW      CK MSG SW                  30C16210
08C8 01 4C200C9F        BSC   L  MSCAN,Z    IF SW ON- GO SET UP MSG    30C16220
08CA 01 678005E1        LDX   I3 SW2                                   30C16230
08CC 0  1847            SRA     71                                     30C16240
08CD 0  73FF            MDX     3 -1                                   30C16250
08CE 0  70FD            MDX     *-3                                    30C16260
08CF 00 67000000  PI5   LDX   L3 *-*        INITIALIZED TO -16         30C16270
08D1 00 66000000  PI6   LDX   L2 *-*        INITIALIZED TO -8          30C16280
08D3 0  C228            LD      2 40        LD WORD TO SHIFT           30C16290
08D4 0  18C1            RTE     1           SHIFT BIT                  30C16300
08D5 0  D228            STO     2 40                                   30C16310
08D6 0  7301            MDX     3 1         DECREMENT WORD CNT         30C16320
08D7 0  7007            MDX     PI7                                    30C16330
08D8 0  7201            MDX     2 1         ADV TO NEXT WORD           30C16340
```

```
08D9 0  7001            MDX     *+1
08DA 0  70E4            MDX     PI3+3       FINISHED- STOP PRINT
                *
08DB 0  63F0            LDX     3 -16       RESET SHIFT CNT
08DC 0  1090            SLT     16
08DD 00 D6000028        STO  L2 40          SET NEXT WORD
                *
08DF 0  C021    PI7     LD      K0001
08E0 00 EC000027        OR   L  39          RESTORE SCAN COMP BIT
08E2 00 D4000027        STO  L  39
08E4 0  6BEB            STX     3 PI5+1     SAVE XR1
08E5 0  6AEC            STX     2 PI6+1     SAVE XR2
08E6 01 740108EC        MDX  L  BLANK,1     WHEN ZERO- PUT BLANK
08E8 0  7022            MDX     SKINT        IN PATTERN
                *
08E9 0  63CF            LDX     3 -49       PUT BLANK
08EA 0  6801            STX     3 BLANK       IN PATTERN
08EB 0  70D9            MDX     PI4
                *
                *-------------------------------------
                * CONSTANTS AND STORAGE
                *-------------------------------------
                *
08EC            0000    BSS  E
08EC 0  0000    BLANK   DC      *-*         PATTERN BLANK CNT
08ED 0  3440    STPPT   DC      /3440       STOP PRINTER
08EE 0  0000    WAS     DC      *-*         INTERRUPT DSW
08EF 0  3701    SRSET   DC      /3701       SENSE AND RESET DSW
08FC 0  0000    SCNCT   DC      *-*         SCAN COUNT
08F1 0  3402    STPCA   DC      /3402       STOP CARRIAGE
08F2 1  0C0A    RDEMT   DC      EMIT        READ COUNTER
08F3 0  3200            DC      /3200       SCANNED
08F4 0  0000    EMTSW   DC      *-*         FIRST EMIT SW
08F5 0  3401    STSPA   DC      /3401       START SPACE
08F6 0  0000    ANDEM   DC      *-*
08F7 0  0000    OREM    DC      *-*
08F8 0  8F00    ANDOR   DC      /8F00       EMIT CK CONSTANT
08F9 0  0000            DC      /0000
08FA 0  0000    EXPCT   DC      *-*         EXPECTED INTRPT DSW
08FB 0  0000            DC      *-*
08FC 0  0000            DC      *-*
08FD 0  0000    IDLCT   DC      *-*         IDLE COUNT
08FE 0  EF00    KEF00   DC      /EF00
08FF 0  FF00    KFF00   DC      /FF00
0C00 0  7F00    K7F00   DC      /7F00
0C01 0  0001    K0001   DC      /0001
0C02 0  0000    SPCSW   DC      *-*         SPACE WITH PRINT ON SW
0C03 0  0000    SPCSX   DC      *-*
0C04 0  0000    RTRNS   DC      *-*
0C05 0  0000    STPCT   DC      *-*         STOP PRINTER COUNT
0C06 0  0000    CHARC   DC      *-*         TEMPORARY STORAGE
0C07 0  0000    CKESW   DC      *-*         ERROR SWITCH
0C08 0  0000    EMTCT   DC      *-*         EMIT COUNTER
0C09 0  1200    K1200   DC      /1200
0C0A 0  0000    EMIT    DC      *-*
                *
                *-------------------------------------
                *           SKIP INTERRUPT
                *-------------------------------------
                *
0C0B 0  C0E2    SKINT LD        WAS         LD DSW
0C0C 0  1001          SLA       1
0C0D 01 4C100C23      BSC  L    SPINT,-     BR IF NOT SKIP
                *
0C0F 0  C0EB          LD        EXPCT+1     LD EXPCT SKIP DSW
0C10 0  E8EB          OR        EXPCT+2     BUILD EXPECTED DSW
0C11 0  D0EA          STO       EXPCT+2
0C12 01 74000938      MDX  L    SKPTO       CK SKIP TO
```

```
DATE    02JAN66 01MAY66 01JUL66 15NOV66 03APR67
EC NO.  415490  4154908 415490C 419643  419643D

PROG ID 030C-2
PAGE 13
```



```
0C14 0  7001            MDX     SKIN1
0C15 0  7003            MDX     SKIN2
                *
0C16 01 74FF0939SKIN1   MDX  L  SKCNT,-1    STOP CARRIAGE AFTER 16
0C18 0  7003            MDX     SKIN3        SKIP INTRPTS WITHOUT
                *                             A MATCH
0C19 01 0C0008F0SKIN2   XIO  L  STPCA-1     STOP CARRIAGE
0C1B 0  7016            MDX     SPIN2
                *
0C1C 0  C0D1    SKIN3   LD      WAS
0C1D 0  1008            SLA     8           COMPARE PRESENT CHANNEL
0C1E 01 F4000938        EOR  L  SKPTO        WITH DESIRED
0C20 01 4C200C3C        BSC  L  IOUT2,Z     BR IF NOT EQUAL
0C22 0  70F6            MDX     SKIN2
                *
                *-------------------------------------
                *           SPACE INTERRUPT
                *-------------------------------------
                *
0C23 0  C0CA    SPINT LD        WAS
0C24 0  1002          SLA       2
0C25 01 4C100C35      BSC  L    IOUT,-      BR IF NOT SPACE
0C27 0  6310          LDX     3 16          SET TO HOLD PRNTR ON
0C28 0  C0D2          LD        EXPCT+1     LD EXPCT SPACE DSW
0C29 0  E8D2          OR        EXPCT+2     BUILD EXPECTED DSW
0C2A 0  E0D3          AND       KEF00
0C2B 0  D0D0          STO       EXPCT+2
0C2C 0  C0D5          LD        SPCSW       CK SPACE-PRINT ON SW
0C2D 01 4C2008A1      BSC  L    PI2,Z       BR IF ON
                *
0C2F 0  C0CE    SPIN1 LD        KEF00
0C30 0  E0C9          AND       EXPCT       REMOVE CARRIAGE BUSY
0C31 0  D0C8          STO       EXPCT
0C32 0  1810    SPIN2 SRA       16
0C33 0  D0C7          STO       EXPCT+1     RESET SKIP/SPACE EXPCT
0C34 0  7003          MDX       IOUT1
                *
                *-------------------------------------
                *           RETURN FROM INTERRUPT
                *-------------------------------------
                *
0C35 0  C0CE    IOUT  LD        RTRNS
0C36 01 4C280C3C      BSC  L    IOUT2,Z+    GO RTRN IF NOT PRINT
                *
0C38 01 67000B1FIOUT1 LDX  L3   RTRN
0C3A 01 6F0005E6      STX  L3   MLSCF+1     SET MLSCF
                *
0C3C 00 66000000IOUT2 LDX  L2   *-*         RESTORE XR2
0C3E 01 74000B1D      MDX  L    EBITS       SKIP IF NO DSW ER
0C40 0  700A          MDX       IOUT3
                *
0C41 0  C0AC          LD        WAS         LD DSW
0C42 01 D4000AE1      STO  L    IDSW        STO DSW WAS
0C44 0  F0B7          EOR       EXPCT+2     COMPARE WITH EXPECTED DSW
0C45 0  E0B8          AND       KEF00
0C46 01 D4000B1D      STO  L    EBITS       SAVE ER BITS
0C48 0  F0A5          EOR       WAS         BUILD DSW S/B
0C49 01 D4000AE2      STO  L    IDSW+1      STO DSW S/B
0C4B 01 4C800B70IOUT3 BSC  I    PIRT
                *
                *************************************
                *           CHECK EMIT
                *************************************
                * THIS SUBROUTINE FINDS THE FIRST CHARACTER
                * EMITTED IN THE TABLE
                *-------------------------------------
                *
0C4D 0  0000    CKEMT DC        *-*
```

```
DATE    02JAN66 01MAY66 01JUL66 15NOV66 03APR67
EC NO.  415490  4154908 415490C 419643  419643D

PROG ID 030C-2
PAGE 13A
```

```
0C4E 0  C0B8          LD     CKESW                          30C17710
0C4F 01 4CA00C4D      BSC  I  CKEMT,Z                       30C17720
0C51 0  C0B8          LD     EMIT                           30C17730
0C52 01 D4000ADB      STO  L EMTWS      STO EMIT WAS        30C17740
                      *                                     30C17750
0C54 01 740008F4      MDX  L EMTSW      CK FOR FIRST EMIT   30C17760
0C56 0  7038          MDX    CKEM6      BR IF NOT FIRST     30C17770
                      *                                     30C17780
0C57 0  C0B2          LD     EMIT                           30C17790
0C58 0  E89E          OR     OREM       CK FOR MISSING EMIT BITS 30C17800
0C59 0  D09D          STO    OREM       FF00 IF OK          30C17810
0C5A 0  C0AF          LD     EMIT                           30C17820
0C5B 0  E09A          AND    ANDEM      CK FOR SHORTED EMIT BITS 30C17830
0C5C 0  D099          STO    ANDEM      0000 IF OK          30C17840
0C5D 0  F099          EOR    OREM       CK FOR EMIT BITS OK 30C17850
0C5E 0  F0A0          EOR    KFF00                          30C17860
0C5F 01 4C200C75      BSC  L CKEM5,Z    CONT IF ALL EMIT BITS OK 30C17870
                      *                                     30C17880
0C61 0  63D0          LDX    3 -48      FIND FIRST CHARACTER 30C17890
0C62 01 C7000CEA CKEM1 LD    L3 CHAR+48  EMITTED IN          30C17900
0C64 0  90A5          S      EMIT       SEQUENCE TABLE      30C17910
0C65 01 4C180C6D      BSC  L CKEM2,+-   FOUND IF BR         30C17920
0C67 0  7301          MDX    3 1        GO TO NEXT TABLE ENTRY 30C17930
0C68 0  70F9          MDX    CKEM1                          30C17940
0C69 01 67000A3D      LDX  L3 ERR7                         30C17950
0C6B 0  6B98          STX    3 CKESW                        30C17960
0C6C 0  7006          MDX    CKEM4                          30C17970
                      *                                     30C17980
0C6D 0  6886          CKEM2 STX    EMTSW      RESET 1ST SCAN SW 30C17990
0C6E 0  7301          MDX    3 1        DECREMENT XR FOR NEXT CHAR 30C18000
0C6F 0  7001          MDX    CKEM3      AND SAVE            30C18010
0C70 0  63D0          LDX    3 -48      IF XR3 = 0, RESET   30C18020
0C71 01 6F000C06      CKEM3 STX  L3 CHARC                  30C18030
0C73 01 4C800C4D      CKEM4 BSC  I  CKEMT                  30C18040
                      *                                     30C18050
0C75 01 74FF0C08      CKEM5 MDX  L  EMTCT,-1   CNT 100 EMITS 30C18060
0C77 0  70C4          MDX    IOUT2      THEN SKIP           30C18070
0C78 01 67000A35      LDX  L3 ERR6                         30C18080
0C7A 0  688C          STX    3 CKESW    SET ER SW FOR ER 6  30C18090
0C7B 01 CC0008F6      LDD  L ANDEM      LD ERROR CODE       30C18100
0C7D 01 DC000AD8      STD  L ERR4       SET IN MESSAGE      30C18110
0C7F 01 CC0008F8      LDD  L ANDOR      REINITIALIZE EMIT   30C18120
0C81 01 DC0008F6      STD  L ANDEM       CHECK WORD         30C18130
0C83 0  6364          LDX    3 100                          30C18140
0C84 0  6B83          STX    3 EMTCT    RESET EMIT CK CNT   30C18150
0C85 01 0C0008EC      XIO  L STPPT-1    STOP PRINTER        30C18160
0C87 0  1810          SRA    16                             30C18170
0C88 01 D40008FA      STO  L EXPCT                         30C18180
0C8A 01 D40008B1C     STO  L TBDSW                         30C18190
0C8C 01 D40008F4      STO  L EMTSW      RESET 1ST EMIT SW   30C18200
0C8E 0  70A9          MDX    IOUT1                          30C18210
                      *                                     30C18220
                      *-------------------------------------- 30C18230
                      * THIS SUBROUTINE CHECKS THE CHARACTER EMITTED 30C18240
                      * WITH THE TABLE OF CHARACTERS IN THE PROPER SEQ 30C18250
                      *-------------------------------------- 30C18260
                      *                                     30C18270
0C8F 01 67800C06      CKEM6 LDX  I3 CHARC      RESET XR3 AND  CHECK IF 30C18280
0C91 01 C7000CEA      LD     L3 CHAR+48  CHAR EMITTED        30C18290
0C93 01 D4000ADC      STO  L EMTSB      STO EMIT S/B        30C18300
0C95 01 94000C0A      S    L EMIT       IS IN THE PROPER SEQUENCE 30C18310
0C97 01 4C180C6D      BSC  L CKEM2,+-   YES, IF BRANCH      30C18320
0C99 01 67000A45      LDX  L3 ERR8                         30C18330
0C9B 01 6F000C07      STX  L3 CKESW     SET ERROR SW        30C18340
0C9D 01 4C800C4D      BSC  I  CKEMT                        30C18350
                      *                                     30C18360
                      ********************************************* 30C18370
                      *            MESSAGE SET UP           30C18380
```



```
                      ********************************************* 30C18390
                      *  THIS SUBROUTINE SCANS THE PRINTER MESSAGE 30C18400
                      *  AND SETS THE PRINT BUFFER FOR THE NEXT EMIT. 30C18410
                      *-------------------------------------- 30C18420
                      *                                     30C18430
0C9F 0  63E0          MSCAN LDX    3 -32       SET TO SCAN BUFFER 30C18440
0CA0 0  10A0                SLT    32                         30C18450
0CA1 00 DC000020            STD  L 32                         30C18460
                      *                                     30C18470
0CA3 0  6200                LDX    2 0                        30C18480
0CA4 01 4C200CA9      MS1   BSC  L MS2,Z       CK FOR NEXT BUF WORD 30C18490
0CA6 0  7201                MDX    2 1                        30C18500
0CA7 01 C4000984            LD   L K8000                      30C18510
                      *                                     30C18520
0CA9 0  D00F          MS2   STO    TEMP        SAVE MSG CHAR POSITION 30C18530
0CAA 01 C7000DCE            LD   L3 BUF+32     LD NEXT MSG CHARACTER 30C18540
0CAC 01 F4000C0A            EOR  L EMIT        COMPARE CHAR WITH EMIT 30C18550
0CAE 01 4C200CB3            BSC  L MS3,Z       BR IF NOT EQUAL    30C18560
0CB0 0  C008                LD     TEMP        IF EQUAL SET BIT IN 30C18570
0CB1 0  EA1F                OR     2 31         PRINT BUFFER      30C18580
0CB2 0  D21F                STO    2 31                           30C18590
                      *                                     30C18600
0CB3 0  C005          MS3   LD     TEMP        SHIFT TO NEXT MSG  30C18610
0CB4 0  1801                SRA    1            CHAR POSITION     30C18620
0CB5 0  7301                MDX    3 1         ADV TO NEXT CHAR   30C18630
0CB6 0  70ED                MDX    MS1                            30C18640
0CB7 01 4C000C35            BSC  L IOUT                         30C18650
                      *                                     30C18660
0CB9 0  0000          TEMP  DC     *-*                        30C18670
                      *                                     30C18680
                      ********************************************* 30C18690
                      *             EMIT CHARACTERS           30C18700
                      ********************************************* 30C18710
                      * THIS IS THE TABLE OF CHARACTERS IN THE 30C18720
                      * PROPER SCAN EMIT SEQUENCE             30C18730
                      *-------------------------------------- 30C18740
                      *                                     30C18750
0CBA 0  F100          CHAR  DC     /F100     1              30C18760
0CBB 0  F200                DC     /F200     2              30C18770
0CBC 0  F300                DC     /F300     3              30C18780
0CBD 0  F400                DC     /F400     4              30C18790
0CBE 0  F500                DC     /F500     5              30C18800
0CBF 0  F600                DC     /F600     6              30C18810
0CC0 0  F700                DC     /F700     7              30C18820
0CC1 0  F800                DC     /F800     8              30C18830
0CC2 0  F900                DC     /F900     9              30C18840
0CC3 0  F000                DC     /F000     0              30C18850
0CC4 0  7E00                DC     /7E00     =              30C18860
0CC5 0  5B00                DC     /5B00     $              30C18870
0CC6 0  4B00                DC     /4B00     .              30C18880
0CC7 0  7D00                DC     /7D00     =              30C18890
0CC8 0  6B00                DC     /6B00     ,              30C18900
0CC9 0  5D00                DC     /5D00     )              30C18910
0CCA 0  6000                DC     /6000     -              30C18920
0CCB 0  4D00                DC     /4D00     (              30C18930
0CCC 0  4E00                DC     /4E00     +              30C18940
0CCD 0  6100                DC     /6100     /              30C18950
0CCE 0  5C00                DC     /5C00     *              30C18960
0CCF 0  5000                DC     /5000     +              30C18970
0CD0 0  D100                DC     /D100     J              30C18980
0CD1 0  D200                DC     /D200     K              30C18990
0CD2 0  D300                DC     /D300     L              30C19000
0CD3 0  D400                DC     /D400     M              30C19010
0CD4 0  D500                DC     /D500     N              30C19020
0CD5 0  D600                DC     /D600     O              30C19030
0CD6 0  D700                DC     /D700     P              30C19040
0CD7 0  D800                DC     /D800     Q              30C19050
0CD8 0  D900                DC     /D900     R              30C19060
```

```
00C9 0  C500            DC      /C500     E                    30C19070
00CA 0  C700            DC      /C700     G                    30C19080
00CB 0  E600            DC      /E600     M                    30C19090
00CC 0  E700            DC      /E700     X                    30C19100
00CD 0  E800            DC      /E800     Y                    30C19110
00CE 0  E900            DC      /E900     Z                    30C19120
00CF 0  C100            DC      /C100     A                    30C19130
00E0 0  C200            DC      /C200     B                    30C19140
00E1 0  C300            DC      /C300     C                    30C19150
00E2 0  C400            DC      /C400     D                    30C19160
00E3 0  C600            DC      /C600     F                    30C19170
00E4 0  C800            DC      /C800     H                    30C19180
00E5 0  C900            DC      /C900     I                    30C19190
00E6 0  E200            DC      /E200     S                    30C19200
00E7 0  E300            DC      /E300     T                    30C19210
00E8 0  E400            DC      /E400     U                    30C19220
00E9 0  E500            DC      /E500     V                    30C19230
00EA 0  F100            DC      /F100     1                    30C19240
                *                                              30C19250
                ************************************************30C19260
                *               ALPHA MESSAGES                 *30C19270
                ************************************************30C19280
                *                                              30C19290
00EB 0  923E    AWAS    DC      /923E     WAS S/B              30C19300
00EC 0  9A21            DC      /9A21                          30C19310
00ED 0  219A            DC      /219A                          30C19320
00EE 0  8C1A            DC      /8C1A                          30C19330
00EF 0  2100            DC      /2100                          30C19340
00F0 0  FFFF            DC      /FFFF                          30C19350
                *                                              30C19360
00F1 0  2184    ASDSW   DC      /2184     STATIC DSW ERR       30C19370
00F2 0  9A9E            DC      /9A9E                          30C19380
00F3 0  3E9E            DC      /3E9E                          30C19390
00F4 0  221E            DC      /221E                          30C19400
00F5 0  2132            DC      /2132                          30C19410
00F6 0  9A92            DC      /9A92                          30C19420
00F7 0  2136            DC      /2136                          30C19430
00F8 0  6262            DC      /6262                          30C19440
00F9 0  FFFF            DC      /FFFF                          30C19450
                *                                              30C19460
00FA 0  2184    ABDSW   DC      /2184     BUSY DSW ERR         30C19470
00FB 0  1A82            DC      /1A82                          30C19480
00FC 0  9AA6            DC      /9AA6                          30C19490
00FD 0  2132            DC      /2132                          30C19500
00FE 0  9A92            DC      /9A92                          30C19510
00FF 0  2136            DC      /2136                          30C19520
0100 0  6262            DC      /6262                          30C19530
0101 0  FFFF            DC      /FFFF                          30C19540
                *                                              30C19550
0102 0  2184    ADSW1   DC      /2184     LEV1 DSW ERR         30C19560
0103 0  5E36            DC      /5E36                          30C19570
0104 0  86FC            DC      /86FC                          30C19580
0105 0  2132            DC      /2132                          30C19590
0106 0  9A92            DC      /9A92                          30C19600
0107 0  2136            DC      /2136                          30C19610
0108 0  6262            DC      /6262                          30C19620
0109 0  FFFF            DC      /FFFF                          30C19630
                *                                              30C19640
010A 0  329A    ADSW    DC      /329A     DSW                  30C19650
0108 0  9221            DC      /9221                          30C19660
010C 0  FFFF            DC      /FFFF                          30C19670
                *                                              30C19680
010D 0  2121    AMINT   DC      /2121     NO INTRPT            30C19690
010E 0  8476            DC      /8476                          30C19700
010F 0  5221            DC      /5221                          30C19710
                *                                              30C19720
0110 0  2276    AINT    DC      /2276                          30C19730
0111 0  9E62            DC      /9E62                          30C19740
```



```
0112 0  569E            DC      /569E                          30C19750
0113 0  FFFF            DC      /FFFF                          30C19760
                *                                              30C19770
0114 0  329A    ADPR    DC      /329A     DSW -PRINTER         30C19780
0115 0  9221            DC      /9221                          30C19790
0116 0  2184            DC      /2184                          30C19800
                *                                              30C19810
0117 0  5662    APRTR   DC      /5662     PRINTER              30C19820
0118 0  769E            DC      /769E                          30C19830
0119 0  6200            DC      /6200                          30C19840
011A 0  FFFF            DC      /FFFF                          30C19850
                *                                              30C19860
0118 0  9A9E    ASTPD   DC      /9A9E     STOPPED              30C19870
011C 0  5256            DC      /5256                          30C19880
011D 0  5636            DC      /5636                          30C19890
011E 0  3200            DC      /3200                          30C19900
011F 0  FFFF            DC      /FFFF                          30C19910
                *                                              30C19920
0120 0  3222    ADNTO   DC      /3222     DID NOT TURN OFF     30C19930
0121 0  3221            DC      /3221                          30C19940
0122 0  7652            DC      /7652                          30C19950
0123 0  9E21            DC      /9E21                          30C19960
0124 0  9EB2            DC      /9EB2                          30C19970
0125 0  6276            DC      /6276                          30C19980
0126 0  2152            DC      /2152                          30C19990
0127 0  1212            DC      /1212                          30C20000
0128 0  FFFF            DC      /FFFF                          30C20010
                *                                              30C20020
0129 0  5256    AEBF    DC      /5256     EMIT BIT FAILURE     30C20030
012A 0  3676            DC      /3676                          30C20040
0128 0  219A            DC      /219A                          30C20050
012C 0  2652            DC      /2652                          30C20060
012D 0  629E            DC      /629E                          30C20070
012E 0  2184            DC      /2186                          30C20080
012F 0  3672            DC      /3672                          30C20090
0130 0  229E            DC      /229E                          30C20100
0131 0  211A            DC      /211A                          30C20110
0132 0  229E            DC      /229E                          30C20120
0133 0  2112            DC      /2112                          30C20130
0134 0  3E22            DC      /3E22                          30C20140
0135 0  5EB2            DC      /5EB2                          30C20150
0136 0  6236            DC      /6236                          30C20160
0137 0  FFFF            DC      /FFFF                          30C20170
                *                                              30C20180
0138 0  3672    AEMT    DC      /3672     EMIT INVALD          30C20190
0139 0  229E            DC      /229E                          30C20200
013A 0  2184            DC      /2184                          30C20210
0138 0  2276            DC      /2276                          30C20220
013C 0  B63E            DC      /B63E                          30C20230
013D 0  5E32            DC      /5E32                          30C20240
013E 0  FFFF            DC      /FFFF                          30C20250
                *                                              30C20260
013F 0  2184    AESER   DC      /2184     EMIT SEQ ERR         30C20270
0140 0  3672            DC      /3672                          30C20280
0141 0  229E            DC      /229E                          30C20290
0142 0  2100            DC      /2100                          30C20300
0143 0  9A36    ASER    DC      /9A36                          30C20310
0144 0  6621            DC      /6621                          30C20320
0145 0  3662            DC      /3662                          30C20330
0146 0  6200            DC      /6200                          30C20340
0147 0  FFFF            DC      /FFFF                          30C20350
                *                                              30C20360
0148 0  7222    AMC     DC      /7222     MISSING CHANNEL      30C20370
0149 0  9A9A            DC      /9A9A                          30C20380
014A 0  2276            DC      /2276                          30C20390
014B 0  1621            DC      /1621                          30C20400
014C 0  1E26    ACHAN   DC      /1E26                          30C20410
014D 0  3E76            DC      /3E76                          30C20420
```

```
004E 0 7636            DC    /7636                                30C20430
004F 0 5E00            DC    /5E00                                30C20440
0050 0 FFFF            DC    /FFFF                                30C20450
                       *                                          30C20460
0051 0 72B2    AMSP    DC    /72B2    MULT SPACE                  30C20470
0052 0 5E9E            DC    /5E9E                                30C20480
0053 0 2100            DC    /2100                                30C20490
                       *                                          30C20500
0054 0 9A56    ASPC    DC    /9A56    SPACE                       30C20510
0055 0 3E1E            DC    /3E1E                                30C20520
0056 0 3600            DC    /3600                                30C20530
0057 0 FFFF            DC    /FFFF                                30C20540
                       *                                          30C20550
0058 0 72B2    AMSK    DC    /72B2    MULT SKIP                   30C20560
0059 0 5E9E            DC    /5E9E                                30C20570
005A 0 2100            DC    /2100                                30C20580
                       *                                          30C20590
005B 0 9A5A    ASKP    DC    /9A5A    SKIP                        30C20600
005C 0 2256            DC    /2256                                30C20610
005D 0 FFFF            DC    /FFFF                                30C20620
                       *                                          30C20630
005E 0 5662    APRT    DC    /5662    PRINT                       30C20640
005F 0 2276            DC    /2276                                30C20650
0060 0 9E00            DC    /9E00                                30C20660
0061 0 FFFF            DC    /FFFF                                30C20670
                       *                                          30C20680
0062 0 9A56    ASPIN   DC    /9A56    SPACE- PRINT ON             30C20690
0063 0 3E1E            DC    /3E1E                                30C20700
0064 0 3684            DC    /3684                                30C20710
0065 0 2156            DC    /2156                                30C20720
0066 0 6222            DC    /6222                                30C20730
0067 0 769E            DC    /769E                                30C20740
0068 0 2152            DC    /2152                                30C20750
0069 0 7600            DC    /7600                                30C20760
006A 0 FFFF            DC    /FFFF                                30C20770
                       *                                          30C20780
006B 0 9A36    ASNER   DC    /9A36    SENSE ERR                   30C20790
006C 0 769A            DC    /769A                                30C20800
006D 0 3621            DC    /3621                                30C20810
006E 0 3662            DC    /3662                                30C20820
006F 0 6200            DC    /6200                                30C20830
0070 0 FFFF            DC    /FFFF                                30C20840
                       *                                          30C20850
0071 0 923E    AINVC   DC    /923E    WAS -INVALD CHANNEL CODE    30C20860
0072 0 9A21            DC    /9A21                                30C20870
0073 0 2184            DC    /2184                                30C20880
0074 0 2276            DC    /2276                                30C20890
0075 0 863E            DC    /863E                                30C20900
0076 0 5E32            DC    /5E32                                30C20910
0077 0 211E            DC    /211E                                30C20920
0078 0 263E            DC    /263E                                30C20930
0079 0 7676            DC    /7676                                30C20940
007A 0 365E            DC    /365E                                30C20950
007B 0 211E            DC    /211E                                30C20960
007C 0 5232            DC    /5232                                30C20970
007D 0 3600            DC    /3600                                30C20980
007E 0 FFFF            DC    /FFFF                                30C20990
                       *                                          30C21000
007F 0 095E    ALOP    DC    /095E    LAST OP-                    30C21010
0080 0 3E9A            DC    /3E9A                                30C21020
0081 0 9E21            DC    /9E21                                30C21030
0082 0 5256            DC    /5256                                30C21040
0083 0 8421            DC    /8421                                30C21050
0084 0 FFFF            DC    /FFFF                                30C21060
                       *                                          30C21070
0085 0 7662    ANRDY   DC    /7662    NRDY                        30C21080
0086 0 32A6            DC    /32A6                                30C21090
0087 0 FFFF            DC    /FFFF                                30C21100
```



```
                       *                                          30C21110
0088 0 9A36    ABSW    DC    /9A36    SET SW 1-7 TO COL           30C21120
0089 0 9E21            DC    /9E21                                30C21130
008A 0 9A92            DC    /9A92                                30C21140
008B 0 21FC            DC    /21FC                                30C21150
008C 0 84D4            DC    /84D4                                30C21160
008D 0 2112            DC    /2112                                30C21170
008E 0 5262            DC    /5262                                30C21180
008F 0 211E            DC    /211E                                30C21190
0090 0 525E            DC    /525E                                30C21200
0091 0 21E4            DC    /21E4    8-15 FOR CHAR               30C21210
0092 0 84FC            DC    /84FC                                30C21220
0093 0 F421            DC    /F421                                30C21230
0094 0 1252            DC    /1252                                30C21240
0095 0 6221            DC    /6221                                30C21250
0096 0 1E26            DC    /1E26                                30C21260
0097 0 3E62            DC    /3E62                                30C21270
0098 0 8141            DC    /8141    TURN ON 0 TO START PRINT    30C21280
0099 0 9EB2            DC    /9EB2                                30C21290
009A 0 6276            DC    /6276                                30C21300
009B 0 2152            DC    /2152                                30C21310
009C 0 7621            DC    /7621                                30C21320
009D 0 C421            DC    /C421                                30C21330
009E 0 9E52            DC    /9E52                                30C21340
009F 0 219A            DC    /219A                                30C21350
00A0 0 9E3E            DC    /9E3E                                30C21360
00A1 0 629E            DC    /629E                                30C21370
00A2 0 2156            DC    /2156                                30C21380
00A3 0 6222            DC    /6222                                30C21390
00A4 0 769E            DC    /769E                                30C21400
00A5 0 FFFF            DC    /FFFF                                30C21410
                       *                                          30C21420
00A6 0 2184    ACBSY   DC    /2184    CARRIAGE BSY                30C21430
00A7 0 1E3E            DC    /1E3E                                30C21440
00A8 0 6262            DC    /6262                                30C21450
00A9 0 223E            DC    /223E                                30C21460
00AA 0 1636            DC    /1636                                30C21470
00AB 0 211A            DC    /211A                                30C21480
00AC 0 9AA6            DC    /9AA6                                30C21490
00AD 0 FFFF            DC    /FFFF                                30C21500
                       *                                          30C21510
                       ********************************************30C21520
                       *          PRINTER MSG BUFFER AND TABLE    30C21530
                       ********************************************30C21540
                       *                                          30C21550
00AE   0020    BUF     BSS   32       PRINTER MSG BUFFER          30C21560
                       *                                          30C21570
00CE 1 0E44    PMTAB   DC    PMG16    PRINTER MESSAGE TABLE       30C21580
00CF 1 0E47            DC    PMG17                                30C21590
00D0 1 0E3F            DC    PMG15                                30C21600
00D1 1 0E30            DC    PMG11                                30C21610
00D2 1 0E33            DC    PMG12                                30C21620
00D3 1 0E37            DC    PMG13                                30C21630
00D4 1 0DEC            DC    PMG01                                30C21640
00D5 1 0DF2            DC    PMG02                                30C21650
00D6 1 0DFC            DC    PMG03                                30C21660
00D7 1 0DFF            DC    PMG04                                30C21670
00D8 1 0E02            DC    PMG05                                30C21680
00D9 1 0E0E            DC    PMG06                                30C21690
00DA 1 0E2D            DC    PMG10                                30C21700
00DB 1 0E2A            DC    PMG09                                30C21710
00DC 1 0E21            DC    PMG8I                                30C21720
00DD 1 0E30            DC    PMG11                                30C21730
00DE 1 0E48            DC    PMG19                                30C21740
00DF 1 0E4D            DC    PMG20                                30C21750
00E0 1 0E4F            DC    PMG21                                30C21760
00E1 1 0E51            DC    PMG22                                30C21770
00E2 1 0E1A            DC    PMG07                                30C21780
```

```
00E3 1 0E53          DC    PMG24                          30C21790
00E4 1 0E55          DC    PMG25                          30C21800
00E5 1 0E57          DC    PMG26                          30C21810
00E6 1 0E59          DC    PMG27                          30C21820
00E7 1 0E3A          DC    PMG14                          30C21830
00E8 1 0E49          DC    PMG18                          30C21840
00E9 1 0E33          DC    PMG12                          30C21850
00EA 1 0E37          DC    PMG13                          30C21860
00EB 1 0E27          DC    PMG08                          30C21870
                     *                                    30C21880
00EC 0 D9E3    PMG01 DC    /D9E3    RT1 EMIT              30C21890
00ED 0 F100          DC    /F100                          30C21900
00EE 0 0000          DC    /0000                          30C21910
00EF 0 C5D4          DC    /C5D4                          30C21920
00F0 0 C9E3          DC    /C9E3                          30C21930
00F1 0 FFFF          DC    /FFFF                          30C21940
                     *                                    30C21950
00F2 0 D9E3    PMG02 DC    /D9E3    RT2 SCAN CHECK        30C21960
00F3 0 F200          DC    /F200                          30C21970
00F4 0 0000          DC    /0000                          30C21980
00F5 0 E2C3          DC    /E2C3                          30C21990
00F6 0 C1D5          DC    /C1D5                          30C22000
00F7 0 0000          DC    /0000                          30C22010
00F8 0 C3C8          DC    /C3C8                          30C22020
00F9 0 C5C3          DC    /C5C3                          30C22030
00FA 0 D200          DC    /D200                          30C22040
00FB 0 FFFF          DC    /FFFF                          30C22050
                     *                                    30C22060
00FC 0 D9E3    PMG03 DC    /D9E3    RT3                   30C22070
00FD 0 F300          DC    /F300                          30C22080
00FE 0 FFFF          DC    /FFFF                          30C22090
                     *                                    30C22100
00FF 0 D9E3    PMG04 DC    /D9E3    RT4                   30C22110
0E00 0 F400          DC    /F400                          30C22120
0E01 0 FFFF          DC    /FFFF                          30C22130
                     *                                    30C22140
0E02 0 D9E3    PMG05 DC    /D9E3    RT5 RIPPLE PATTERN    30C22150
0E03 0 F500          DC    /F500                          30C22160
0E04 0 0000          DC    /0000                          30C22170
0E05 0 D9C9          DC    /D9C9                          30C22180
0E06 0 D7D7          DC    /D7D7                          30C22190
0E07 0 D3C5          DC    /D3C5                          30C22200
0E08 0 0000          DC    /0000                          30C22210
0E09 0 D7C1          DC    /D7C1                          30C22220
0E0A 0 E3E3          DC    /E3E3                          30C22230
0E0B 0 C5D9          DC    /C5D9                          30C22240
0E0C 0 D500          DC    /D500                          30C22250
0E0D 0 FFFF          DC    /FFFF                          30C22260
                     *                                    30C22270
0E0E 0 D9E3    PMG06 DC    /D9E3    RT6 ALL CHARACTERS    30C22280
0E0F 0 F600          DC    /F600                          30C22290
0E10 0 0000          DC    /0000                          30C22300
0E11 0 C1D3          DC    /C1D3                          30C22310
0E12 0 D300          DC    /D300                          30C22320
0E13 0 0000          DC    /0000                          30C22330
0E14 0 C3C8          DC    /C3C8                          30C22340
0E15 0 C1D9          DC    /C1D9                          30C22350
0E16 0 C1C3          DC    /C1C3                          30C22360
0E17 0 E3C5          DC    /E3C5                          30C22370
0E18 0 D9E2          DC    /D9E2                          30C22380
0E19 0 FFFF          DC    /FFFF                          30C22390
                     *                                    30C22400
0E1A 0 D9E3    PMG07 DC    /D9E3    RT7 STRESS            30C22410
0E1B 0 F700          DC    /F700                          30C22420
0E1C 0 0000          DC    /0000                          30C22430
0E1D 0 E2E3          DC    /E2E3                          30C22440
0E1E 0 D9C5          DC    /D9C5                          30C22450
0E1F 0 E2E2          DC    /E2E2                          30C22460
```



```
0E20 0 FFFF          DC    /FFFF                          30C22470
                     *                                    30C22480
0E21 0 C9D5    PMG8I DC    /C9D5                          30C22490
0E22 0 C9E3          DC    /C9E3                          30C22500
0E23 0 C9C1          DC    /C9C1                          30C22510
0E24 0 D3C9          DC    /D3C9                          30C22520
0E25 0 E9C5          DC    /E9C5                          30C22530
0E26 0 0000          DC    /0000                          30C22540
0E27 0 D9E3    PMG08 DC    /D9E3    RT8                   30C22550
0E28 0 F800          DC    /F800                          30C22560
0E29 0 FFFF          DC    /FFFF                          30C22570
                     *                                    30C22580
0E2A 0 D9E3    PMG09 DC    /D9E3    RT9                   30C22590
0E2B 0 F900          DC    /F900                          30C22600
0E2C 0 FFFF          DC    /FFFF                          30C22610
                     *                                    30C22620
0E2D 0 D9E3    PMG10 DC    /D9E3    RTA                   30C22630
0E2E 0 C100          DC    /C100                          30C22640
0E2F 0 FFFF          DC    /FFFF                          30C22650
                     *                                    30C22660
0E30 0 E3C5    PMG11 DC    /E3C5    TEST                  30C22670
0E31 0 E2E3          DC    /E2E3                          30C22680
0E32 0 FFFF          DC    /FFFF                          30C22690
                     *                                    30C22700
0E33 0 E2D7    PMG12 DC    /E2D7    SPACE                 30C22710
0E34 0 C1C3          DC    /C1C3                          30C22720
0E35 0 C500          DC    /C500                          30C22730
0E36 0 FFFF          DC    /FFFF                          30C22740
                     *                                    30C22750
0E37 0 E2D2    PMG13 DC    /E2D2    SKIP                  30C22760
0E38 0 C9D7          DC    /C9D7                          30C22770
0E39 0 FFFF          DC    /FFFF                          30C22780
                     *                                    30C22790
0E3A 0 C3C8    PMG14 DC    /C3C8    CHANNEL               30C22800
0E3B 0 C1D5          DC    /C1D5                          30C22810
0E3C 0 D5C5          DC    /D5C5                          30C22820
0E3D 0 D300          DC    /D300                          30C22830
0E3E 0 FFFF          DC    /FFFF                          30C22840
                     *                                    30C22850
0E3F 0 60D7    PMG15 DC    /60D7    -PRINTER              30C22860
0E40 0 D9C9          DC    /D9C9                          30C22870
0E41 0 D5E3          DC    /D5E3                          30C22880
0E42 0 C5D9          DC    /C5D9                          30C22890
0E43 0 FFFF          DC    /FFFF                          30C22900
                     *                                    30C22910
0E44 0 D6C6    PMG16 DC    /D6C6    OFF                   30C22920
0E45 0 C600          DC    /C600                          30C22930
0E46 0 FFFF          DC    /FFFF                          30C22940
                     *                                    30C22950
0E47 0 D6D5    PMG17 DC    /D6D5    ON                    30C22960
0E48 0 FFFF          DC    /FFFF                          30C22970
                     *                                    30C22980
0E49 0 E3D6    PMG18 DC    /E3D6    TO                    30C22990
0E4A 0 FFFF          DC    /FFFF                          30C23000
                     *                                    30C23010
0E4B 0 F100    PMG19 DC    /F100    1                     30C23020
0E4C 0 FFFF          DC    /FFFF                          30C23030
                     *                                    30C23040
0E4D 0 F200    PMG20 DC    /F200    2                     30C23050
0E4E 0 FFFF          DC    /FFFF                          30C23060
                     *                                    30C23070
0E4F 0 F300    PMG21 DC    /F300    3                     30C23080
0E50 0 FFFF          DC    /FFFF                          30C23090
                     *                                    30C23100
0E51 0 F400    PMG22 DC    /F400    4                     30C23110
0E52 0 FFFF          DC    /FFFF                          30C23120
                     *                                    30C23130
                     *                                    30C23140
```

1132 PRINTER FUNCTION TEST

```
0E53 0  F600        PMG24 DC    /F600     6          30C23150
0E54 0  FFFF              DC    /FFFF                30C23160
                    *                                30C23170
0E55 0  F900        PMG25 DC    /F900     9          30C23180
0E56 0  FFFF              DC    /FFFF                30C23190
                    *                                30C23200
0E57 0  F1F2        PMG26 DC    /F1F2     12         30C23210
0E58 0  FFFF              DC    /FFFF                30C23220
                    *                                30C23230
0E59 0  F3F9        PMG27 DC    /F3F9     39         30C23240
0E5A 0  FFFF              DC    /FFFF                30C23250
                    *                                30C23260
0E5C    05E8              END   BGIN                 30C23270
```


1132 PRINTER FUNCTION TEST

CROSS REFERENCE LISTING

SYMBOL	VALUE	REFERENCES
ABDSW	0CFA	0A9D
ABSW	0D88	08AB
ACBSY	0DA6	0AB9
ACHAN	0D4C	0AB2,0AB6
ADNTO	0D20	0AAB
ADPR	0D14	0AA0
ADSW	0D0A	0A9E,0AB8
ADSW1	0D02	0AA3
AEBF	0D29	0AA4
AEMT	0D38	0AA6
AESER	0D3F	0AA9
AINT	0D10	0AAD,0AAF
AINVC	0D71	0AB4
ALOP	0D7F	0ACF
ALPH4	0AD6	0ABD
AMC	0D48	0AB0
AMSK	0D58	0AAE
AMSP	0D51	0AAC
ANDEM	0BF6	05F7,0C5B,0C5C,0C7B,0C81
ANDOR	0BF8	05F5,0C7F
ANINT	0D0D	0A9F
ANRDY	0D85	0B6D
APRT	0D5E	08E9
APRTR	0D17	0AAA
ASDSW	0CF1	0A9B
ASER	0D43	0AB3
ASKP	0D5B	0927
ASNER	0D68	0AB7
ASPC	0D54	090D
ASPIN	0D62	0BB0
ASTPD	0D1B	0AA1
AWAS	0CEB	0A9A,0A9C,0AA2,0AA8
A1	09CF	06E9,06FC,09DF,09EC
A1EM	09EE	06DC,0708,09E9
A1SW	09ED	09D2,09DC
A110	09D6	09D9
A120	09E1	09DD
A130	09E2	09EB
BDSW	0ADF	0AE8,0AF0,0B0A,0B0B,0B1F,0B20,0BA8,0BB8
BEGIN	0160	0000,05E8
BGIN	05E8	0E5B
BLANK	0BEC	09A5,0BE6,0BEA
BSWS	08A4	0864,08A0
BUF	0DAE	0955,09C9,0CAA
CHANL	0ADA	0A5E
CHAR	0CBA	06DE,098D,0C62,0C91
CHARC	0C06	0C71,0C8F
CHID	08A9	0873,0882
CHMSG	07CE	073C,0782,07E4,07E8,07ED,080D,0819,083A,084E
CHM1	07E9	07E6
CHM2	07EB	07CF,0A7E
CHNUM	0A65	0A5C
CHTBL	07EF	07E0
CHWAS	0AE3	0900,0902,082D
CH1SQ	07C6	
CH12S	078F	071E,07A4,07A7,07D8,07DA
CH2SQ	07C5	
CH3SQ	07C4	
CH4SQ	07C3	
CH5SQ	07C2	
CH6SQ	07C1	
CH9SQ	07C0	
CKEMT	0C4D	0B86,0C4F,0C73,0C9D
CKEM1	0C62	0C68
CKEM2	0C6D	0C65,0C97

```
CKEM3   0C71    0C6F
CKEM4   0C73    0C6C
CKEM5   0C75    0C5F
CKEM6   0C8F    0C56
CKESW   0C07    0AF5,0826,0C4E,0C6B,0C7A,0C9B
CLEAR   098A    0880,09CD,09E1,08BF
CL10    098F    09C2
CL20    09C9    09CC
CNTRL   0600    05FF,063A,0651,0678,06AE,06C4,06F3,070F,07BD,0823,
                0858,0818
CN10    0604
CN20    060B    0602
CN30    0611    0606
DLYCT   0B69    083B,0843,0B4C,0B55,0B5A,0B61
DSWSB   0ADE
DSWW    0ADD    08DF,0A78,0B09,0B3F
EBITS   0B1D    0A29,0AF4,0B23,0C3E,0C46
EMIT    0C0A    06DA,0706,0880,098F,09E7,0BF2,0C51,0C57,0C5A,0C64,
                0C95,0CAC
EMTCT   0C08    05F3,0C75,0C84
EMTSB   0ADC    0C93
EMTSW   0BF4    093E,0B93,0C54,0C6D,0C8C
EMTWS   0ADB    0C52
END     0164    0000,0000,0000,060F
ERLCK   0166    09F2
ERM3    0AD7
ERM4    0AD8    0A86,0C7D
ERROR   0162    0000,0AC3,0AC8
ERR1    09F9    0A00,0846
ERR10   0A51    0A31
ERR11   0A56    0A2E
ERR12   0A5B    076A,0A63
ERR13   0A6D    07AC,0A74
ERR14   0A76    07D5
ERR15   0A80    0A89,0B35
ERR16   0A8B    0905,0A90
ERR17   0A92    08E4,0A97
ERR2    0A02    0A0A,0B0C,0821
ERR3    0A0C    0B0E
ERR3X   0A16    0A12,0A1D
ERR4    0A1A    0A15
ERR5    0A1E    0A33,0824
ERR5X   0A33    0A28,0A50,0A55,0A5A
ERR6    0A35    0A38,0C78
ERR7    0A3D    0A43,0C69
ERR8    0A45    0A4A,0C99
ERR9    0A4C    0A28
ETYPE   0ABA    09FE,0A08,0A16,0A23,0A39,0A41,0A49,0A4F,0A54,0A59,
                0A62,0A71,0A7D,0A88,0A8F,0A96,0ACC
ETYP1   0AC8    0AC2
ETYP2   0ACC    0AC5
EXPCT   0BFA    08D8,0908,0918,0923,0925,0940,0A10,0B74,0B84,0B85,
                0B91,0BAC,0BAF,0BC3,0C0F,0C10,0C11,0C28,0C29,0C2B,
                0C30,0C31,0C33,0C44,0C88
FORMS   0B53    08E7,0907,091D,0858
FORM1   0B56    0B62
FORM2   0B62    0B5C
ICNT    0B1A    06E2,0885,0993,0900,090A,0A13,0A25,0AF3,0B79
IDLCT   0BFD    0843,08C9,08D2,0978,0B88,0B96
IDLE    08D1    0633,064A,06A1,06D6,0704,083F,087E,08D6,0989,09E5
IDSW    0AE1    0C42,0C49
IL0     017A    0000
IL1     018A    0000,05FD
IL2     019A    0000
IL3     01AA    0000
IL4     01BA    0000
INTLZ   08AD    0628,063C,0652,0688,06B0,06CA,06F5,0716,0780,07F7,
                0825,085D,0888,08C2,08C4
```



```
INT1    08BF    088C
INT2    08C2    08BA
IN89A   0711    077C,0783,07FB,0828
IOJT    0C35    0C25,0CB7
IOUT1   0C38    0C34,0C8E
IOUT2   0C3C    0871,088A,0C20,0C36,0C77
IOUT3   0C4B    0C40
IB9AX   0775    0713,077E
KEF00   0BFE    0C2A,0C2F,0C45
KFF00   0BFF    0765,083D,0C5E
KOOFF   0AE5    0A85,082C
KO001   0C01    0BDF
KO030   08A7
K1000   09B9    0913,0921,092D
K1200   0C09    08A5
K7F00   0C00    0AEE,0BB7
K8000   09B4    0728,07FD,082A,0895,095D,099B,0CA7
LINES   06C6    0687,06C1,06F9,070C
LOCK    09EF    0635,064C,0670,06A6,068C,06EE,070A,075C,0788,0818,
                0851,089D,09F5
LOG     0163    0000,0860,0848,085D
LOGBY   0167
LOOP    0ACB    062E,0642,0657,068D,0688,06CF,06FA,072F,078E,0800,
                082D,0876,0882,09F7
LPCNT   06C8    062C,0637,0640,064E,0661,0672,0697,06A8,0602,06E5,
                0718,0761,0785,078A,0879,0888,0984,0996
LRTN    0627    0618
LTSEQ   07CC    074A,074D,07DC
MLSCF   05E5    0618,0869,0AFE,0BD1,084F,0864,0C3A
MSCAN   0C9F    08C8
MSGSW   09B8    097A,09C6,0BC6
MSG1    0A9A    09FC
MSG10   0AAC    0A53
MSG11   0AAE    0A58
MSG12   0AB0    0A61
MSG13   0AB2    0A70
MSG14   0AB4    0A7C
MSG15   0AB6    0A87,0A8E
MSG17   0AB8    0A95
MSG2    0A9C    0A06
MSG3    0A9E    0A0E
MSG4    0AA0    0A18
MSG5    0AA2    0A22
MSG6    0AA4    0A38
MSG7    0AA6    0A40
MSG8    0AA8    0A48
MSG9    0AAA    0A4E
MS1     0CA4    0CB6
MS2     0CA9    0CA4
MS3     0CB3    0CAE
NO49    06C7
NO50    06C9
NRTN    0626    061C
ONES    0986    0904,0A72
OPMSW   0AC6    0AC0,0AC7,0AF2
OPSW    0AD0    08EB,090F,0929,0882
OREM    08F7    0C58,0C59,0C5D
PCOLM   08A5    0870,088C
PID     05DC    05EA
PINT    0883
PIRT    0B70    05F8,0C48
PI1     0896    0B8C
PI2     0BA1    089D,0C2D
PI3     0BBC    0889,08DA
PI4     0BC5    0BBE,0BEB
PI5     0BCF    09A7,0BE4
PI6     0BD1    09A9,0BE5
PI7     0BDF    0BD7
```

PMG01	0DEC	0DD4
PMG02	0DF2	0DD5
PMG03	0DFC	0DD6
PMG04	0DFF	0DD7
PMG05	0E02	0DD8
PMG06	0E0E	0DD9
PMG07	0E1A	0DE2
PMG08	0E27	0DE8
PMGC9	0E2A	0DDB
PMG10	0E2D	0DDA
PMG11	0E30	0DD1,0DDD
PMG12	0E33	0DD2,0DE9
PMG13	0E37	0DD3,0DEA
PMG14	0E3A	0DE7
P4G15	0E3F	0DDC
PMG16	0E44	0DCE
PMG17	0E47	0DCF
PMG18	0E49	0DE8
PMG19	0E4B	0DDE
PMG20	0E4D	0DDF
PMG21	0E4F	0DE0
PMG22	0E51	0DE1
PMG24	0E53	0DE3
PMG25	0E55	0DE4
PMG26	0E57	07E2,0DE5
PMG27	0E59	0DE6
PMG8I	0E21	0DDC
PMSG	0946	066D,06A3,072C,0789,07E7,088D,094E,097E,0980
PMS1	0958	0957,0965
PMS2	0962	0971,0973
PMS3	0970	096C
PMS4	0974	094A,0958
PMS5	097E	
PMTAB	0DCE	095F
PRCON	08D8	08CD,08D5,08F5,097C
PRC1	08DD	08E6
PRC2	08E7	08E2
PRINT	08C6	06EC,06FF,0898,08CF,09AE
RAD	05DE	0615
RBSWS	08A0	0863
RDEMT	0BF2	0B83
RDYMK	0B68	0B42
RDY1	0B3C	0B4D
RDY2	0B4D	0B45
READY	0B39	0BB4,0B40
RID	05DD	05EC,0604,060A,0608,060D,0611,0814
RIDCK	0618	0605
RIPL	0982	068A,09B0
RIPL1	0983	0995
RIPL2	0986	0998
RIPL3	0988	06B4,06BE,09A1
RIPL4	099B	0991,099A
RIPL5	09A5	099F
RQKB	01BC	0000
RQTY	01BB	0000
RTNOM	061C	060E
RTNSW	0165	0616
RTRN	0B1F	0C38
RTRNS	0C04	087F,089E,0C35
RTRN1	0B37	0B31
RTTBL	061D	0613,061B,061C
SAVE	0982	0954,0959,095E
SAVE3	0687	0665,0666,069A,069B
SCNCT	0BF0	08D9,0B88,08BC
SCNT	0686	0667,066A
SENSE	0B1B	0735,0777,08DD,08FE,0932,0AED,0808,082B,083C,0856,0BB5
SEQSW	07C7	072A,0743,075E,0774,07D7,07DD,07DF

SETUP	08A8	0862
SHFT2	07CB	0726,0751,0753,075A
SHIFT	07CA	0724,0748,0754,0755,0758,0790,079C
SKCNT	0939	0920,0C16
SKINT	0C0B	0881,0B90,0B95,0B98,0BA0,0BC4,0BE8
SKIN1	0C16	0C14
SKIN2	0C19	0C15,0C22
SKIN3	0C1C	0C18
SKIP	0919	0798,G814,0849,0935
SKPTO	0938	091A,0C12,0C1E
SKP1	0932	0937
SPACE	08F7	0668,0733,0775,0787,0802,082F,0886,08B7,08C0,08C1,08CE,0917
SPCSW	0C02	0AE8,0B98,0BA1,0C2C
SPCSX	0C03	069C,09BD,0AE9,0AF7
SPC1	0909	08F8
SPINT	0C23	0C0D
SPIN1	0C2F	
SPIN2	0C32	0C18
SRSET	08EF	087C
START	0161	0000,0619,0803,0812,0B16
STCAR	09B5	0928
STM	086A	084A,0B5F
STOP	093A	0731,0793,080F,08AE,08F8,0931,0944,094C,0ABE
STPCA	08F1	0C19
STPCT	0C05	088E,0B9F,08A4
STPPT	08ED	093B,0B94,0C85
STPRT	09B3	08F1
STRT	05E8	05E3,05E4
STSPA	08F5	0911,0BB4
SVKB	01BD	
SW0	05DF	0947,09F0
SW1	05E0	0601,0609,0810
SW2	05E1	05ED,0804,0831,08CA
SW3	05E2	05FA,08C7
SW89A	077F	05F0,0712,0715
TABLE	0AD3	0AB8,0ABC,0ACA
TBDSW	0B1C	08EF,0942,0AE7,0B92,08A6,0C8A
TEMP	0CB9	0CA9,0C80,0CB3
TEMPB	08A2	088F,0891,0893
TEMPB	07C8	0767,076E,0770,078D,07AB,07AE,07D1,07EA,07FF,0809,0811,081D,081F,082C,0836,0845,0853,0856,0A78
TERM	09B7	0964,0967
TSTA	0825	0626
TSTB	085D	0627
TST1	0628	061D
TST2	063C	061E
TST3	0652	061F
TST4	0688	0620
TST5	06B0	0621
TST6	06CA	0622
TST7	06F5	0623
TST8	0780	0624
TST9	07F7	0625
T0AA	082F	0859
T0AB	083A	0834
T0AC	0853	0838
T0BA	0863	0867,0887,089F
T0BB	086D	0865
T0BC	0878	088A
T0BD	0880	
T0BE	088C	0883
T0BF	089A	0874,0888
T01A	0630	0639
T02A	0644	0650
T03A	0659	0677
T03A1	0666	0674
T03B	066F	065D

T03C	0668	066C
T04A	068F	06AD
T04A1	069B	06AA
T04B	06A5	0693
T05A	06B6	
T05C	06BA	06C3
T05D	06BE	
T06A	06CD	
T06B	06D1	06E4,06F2
T06C	06D3	06E7
T06D	06D8	06CE,06F0
T06E	06E9	06E0,06E8
T07A	06FC	070E
T08A	072F	0763
T08A1	0748	0756
T08A2	075A	074F
T08B	075C	073A,0746
T08C	0764	075F
T08D	0768	0723,076C,0771
T08E	0790	078C
T08F	0792	0787
T08X1	079A	0792,0784
T09A	0802	0821
T09B	080D	0807
T09C	081D	0808
T3CTL	0679	0656,0659,0658,065E,0675,068C,068F,0691,0694,06A8
VCHNL	07CD	073F,0741,0764,080A,0837
WAIT	0AE6	05EE,08F3,08F9,0915,092F,0A18,0837
WAIT1	0AFC	0807
WAIT2	0B01	
WAIT3	0B05	0AFC
WAIT4	0B10	0868,0800,0851,0866
WAS	0BEE	0737,0779,079E,07AF,0816,084B,0A83,082E,087E,0C08, 0C1C,0C23,0C41,0C48
WCNT	0B1E	0AF8,0805,0878
X16	08A6	088E

TABLE OF CONTENTS

1. PURPOSE

TO CHECK THE OPERATING PERFORMANCE OF THE 2501 READER AND THE 1442 MOD 5 PUNCH. THE PUNCH ROUTINES WILL RUN ON ANY 1442, BUT WILL CHECK ONLY THOSE FUNCTIONS WHICH ARE AVAILABLE ON 1442 MOD 5.

2. PREREQUISITES

2.1 THIS TEST MUST BE RUN UNDER CONTROL OF DIAGNOSTIC MONITOR II.

2.2 THE FOLLOWING EQUIPMENT IS REQUIRED

1. 1131 CPU.
2. 2501 CARD READER.
3. 1442 CARD PUNCH.

****

3. OPERATING PROCEDURE

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY
THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO SPECIFY OPTIONS BEFORE RUNNING.

   IF HALT AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).
3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION, REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

NOTE TO RUN 1442 IN OVERLAP WITH THE 2501, USE 1442 TIMING TEST. THE 2501/1442 TEST MUST BE LOADED FIRST. SELECT THE DESIRED 2501 ROUTINE BEFORE STARTING THE 1442. ROUTINES IN THIS TEST WILL NOT OPERATE PROPERLY.

TIMING FROM 1442 TIMING TEST WILL NOT BE ACCURATE WHEN THE TEST IS OVERLAPPED.

3.2.1 PROGRAM CONTROL - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED.

1. TO SET ROUTINE SELECTION
   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN	DESCRIPTION	
1	PUNCH ROTATE PATTERN	NORMAL ROUTINES- THE PROGRAM STARTS WITH ROUTINE 1, RUNS EACH ROUTINE IN SEQUENCE THEN TERMINATES AFTER ROUTINE 3.
2	READ ORTATE PATTERN	
3	READ COLUMN COUNT CONTROL	
4	GANG PUNCH	OPTIONAL ROUTINES THESE ROUTINES RUN ONLY IF SELECTED.
5	READ GANG PUNCHED DECK	
6	PUNCH SELECTED PATTERN	
7	READ SELECTED PATTERN	
8	REPRODUCE	
9	REPLACE ROTATE PATTERN	

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION, SET AS IT SELECTING ROUTINE ZERO.

3.2.3 COLUMN COUNT CONTROL, ROUTINES 6 + 7. FUNCTION 10.

THIS FUNCTION ALLOWS SELECTION OF THE NUMBER OF COLUMNS PUNCH OR READ IN ROUTINES 6 + 7. THE DESIRED NUMBER OF COLUMNS IN BINARY IS SET IN SWITCHES 8 - 15. IF NO ENTRY IS MADE, OR THE FUNCTION CLEARED, 80 COLUMNS ARE ASSUMED.

1. SET SWITCHES 0-1 TO 10.
2. SET PROGRAM LOAD SEQUENCE NUMBER IN SW 4-7.
3. SET THE NUMBER OF COLUMNS DESIRED IN BINARY IN SW 8-15.
4. PRESS INT REQ KEY.

**

3.2.4 ERROR PRINT CONTROL, FUNCTION 11

THIS FUNCTION PROVIDES CONTROL OF DATA COMPARE ERROR PRINTOUTS. IF THIS FUNCTION IS SET TO ZERO, ALL ERRORS WILL PRINT FOR EACH CARD. IF IT IS SET TO ANY OTHER VALUE, ONLY THE FIRST ERROR IN EACH CARD IS TYPED.

1. SET SW 0-1 ON.
2. SET PROGRAM LOAD SEQUENCE NUMBER IN SW 4-7.
3. IF ONLY ONE MESSAGE PER CARD IS DESIRED, SET ANY VALUE IN SW 8-15.
4. PRESS INT REQ KEY.

**

3.2.5 SPECIAL SWITCH FUNCTION, ROUTINES 6 +7.

ROUTINES 6 + 7 CALL FOR THE SELECTED PUNCH PATTERN TO BE PLACED IN THE SWITCHES. SWITCHES 0-11 REPRESENT PUNCH ROWS 12-9 RESPECTIVELY, AND SWITCH 12 SIGNALS THAT THE SETTING IS COMPLETE.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE-PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST CARD OF LOADER	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS. START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 3. ROUTINE 4 THRU A WILL ONLY RUN SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3/5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN OORR AAAA (MESSAGE)
OR
EPPNN OORR AAAA (MESSAGE)

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE

  THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 0E FOR MESSAGES ORIGINATED BY THIS PROGRAM.
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION
- MMMM IS THE MACHINE TYPE

4.1*** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM THE WORD HALT WILL FOLLOW THE MESSAGE.

A0E00 OOOR AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A0E01 OORR AAAA LOAD AND MAKE RDY
MMMM

THIS MESSAGE IS PRINTED WHEN THE PROGRAM IS INITIALIZING A MACHINE IN ANY ROUTINE. LOAD THE PROPER CARDS IN THE MACHINE AND PRESS START.

A0E02 OORR AAAA NRDY
MMMM

THE PROGRAM IS WAITING FOR READY ON A MACHINE BEFORE INITIATING AN OPERATION. PRESS START. IF THE MESSAGE PERSISTS EVEN THOUGH THE READY LIGHT ON THE DEVICE IS ON, THE NOT READY BIT (15) IN THE DSW IS PROBABLY STAYING ON.

A0E03 OORR AAAA LAST CARD
MMMM

THE LAST CARD BIT WAS ON THE DSW SENSED ON THE LAST OP COMPLETE INTERRUPT. THIS SHOULD OCCUR ONLY ON THE OPERATION AFTER THE START KEY WAS DEPRESSED WITH THE HOPPER EMPTY AND A CARD IN THE PREREAD STATION. IF THIS MESSAGE OCCURS AT ANY OTHER TIME, CHECK PROPER OPERATION OF DSW BIT 3.

A0E04 0006 AAAA SET PATT IN SW 0-11 THEN TN SW 12.

THIS MESSAGE FROM ROUTINE 6, 'PUNCH SELECTED PATTERN' CALLS FOR THE OPERATOR TO SET THE DESIRED PATTERN IN THE SWITCHES. SWITCHES 0-11 REPRESENT PUNCH ROWS 12-9 RESPECTIVELY. WHEN THE SETTING IS COMPLETE, TURN ON SWITCH 12 TO SIGNAL THE PROGRAM. PUNCHING WILL THEN START. IF THE SWITCH SETTING IS CHANGED, THE PATTERN WILL CHANGE SO LONG AS SWITCH 12 IS ON. IF SWITCH 12 IS TURNED OFF, AND THE PATTERN CHANGED, PUNCHING WILL STOP UNTIL SWITCH 12 IS AGAIN TURNED ON.

A0E05 0007 AAAA SET PATT IN SW 0-11 THEN TN SW 12

THIS MESSAGE FROM ROUTINE 7, 'READ SELECTED PATTERN' CALLS FOR THE OPERATOR TO SET THE PATTERN OF THE DECK HE INTENDS TO USE INTO THE BIT SWITCHES. SWITCHES 0-11 REPRESENT ROWS 12-9 RESPECITIVELY. WHEN THE SETTING IS COMPLETE, TURN ON SWITCH 12 TO SIGNAL THE PROGRAM. THE PROGRAM WILL READ CARDS, COMPARING THE DATA READ TO THE BIT SWITCH SETTING. NO PROVISION IS MADE FOR CHANGING THE SWITCHES EXCEPT AT THE BEGINNING OF ROUTINE 7.

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE 2501/1442 DSW

BIT	
0	READ COLUMN (1442)
1	PUNCH COLUMN (1442)
2	ERROR
3	LAST CARD
4	OPERATION COMPLETE
5	NOT USED
6	NOT USED
7	NOT USED
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	BUSY
15	BUSY OR NOT READY

E0001 SWS INVLD XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 OOON XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSI. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0E01 OORR AAAA WAS S/B DSW ERR LEVEL 4 DDDD DDDD MMMM

AN UNEXPECTED CONDITION HAS BEEN DETECTED IN THE DSW FOR MACHINE (MMMM) ON INTERRUPT LEVEL 4. DATA MODIFIERS (DDDD) SHOW THE DETECTED DSW, AND WHAT IT SHOULD BE, IN HEX.

E0E02 OORR AAAA WAS S/B DSW ERR LEVEL 0 DDDD DDDD MMMM

SAME AS E0E01 EXCEPT FOR LEVEL 0

E0E03 OORR AAAA NO INTRPT MMMM

AN OPERATION WAS STARTED ON THE MACHINE (MMMM) AND NO OP COMPLETE INTERRUPT WAS RECEIVED DURING A 15 SECOND TIMEOUT. THE ROUTINE RR WILL BE STARTED AGAIN FROM THE BEGINNING. THIS MESSAGE INDICATES A FAILURE OF EITHER THE INTERRUPT GENERATION CIRCUITS OR THE READY CIRCUITS.

E0E05 OORR AAAA WAS S/B DSW ERR INITIALIZING 4444 4444 MMMM

THE DSW FROM MACHINE (MMMM) WAS RESET, THEN SENSED BEFORE ANY OPERATION WAS STARTED IN ROUTINE (RR), AND AN UNEXPECTED CONDITION WAS PRESENT. DATA MODIFIERS (DDDD) SHOW THE DETECTED DSW, AND WHAT IT SHOULD BE IN HEX. THE PROGRAM WILL REPEAT THE RESET AND SENSE DSW OPERATION CONTINUOUSLY, AND RETYPE THE MESSAGE EVERY 15 SECONDS. NO OPERATION WILL BE STARTED UNTIL THE INITIAL DSW IS CORRECT.

E0E06 OORR AAAA WAS S/B COL COUNT ERR. DDDDD DDDDD 1442

AFTER PUNCHING A CARD, A COMPARISON WAS MADE OF THE ADDRESSES OF THE PUNCH TERMINATOR AND THE LAST COLUMN PUNCHED. THE DATA MODIFIERS (DDDD) SHOW THE NUMBER OF COLUMNS PUNCHED, AND THE NUMBER WHICH SHOULD HAVE PUNCHED, IN DECIMAL. A PUNCH CHECK WILL NORMALLY PRODUCE THIS ERROR, SINCE PUNCHING IS STOPPED AT THE COLUMN WHICH YIELDS THE CHECK.

E0E07 OORR AAAA WAS S/B COL COUNT ERR DDDDD DDDDD 2501

AFTER READING A CARD, THE READ AREA IS CHECKED FOR THE PROPER NUMBER OF CHARACTERS. THE DATA MODIFIERS (DDDDD) SHOW THE NUMBER READ, AND THE NUMBER EXPECTED. THIS MESSAGE COULD BE CAUSED BY FAILURES OF THE CR WORD COUNT REGISTER, CYCLE STEAL CIRCUITRY, OR THE CR ADDRESS REGISTER.

E0E08 0ORR AAAA WAS S/B COL DATA ERR
DDDO DDDO DDDDD
AFTER READING A CARD, THE DATA READ DOES NOT EQUAL THE DATA EXPECTED. THE DATA MODIFIERS (DDDO) SHOW THE DATA READ, AND THE DATA EXPECTED IN HEX, AND THE COLUMN NUMBER IN DECIMAL. THIS ERROR CAN COME FROM ROUTINES 2, 5 OR 7. NORMAL TRANSFER IS INTO CORE BITS 0-11. CORE BITS 12-15 SHOULD BE ZEROS.

5. COMMENTS

5.1*** ROUTINE DESCRIPTIONS

THERE ARE TEN TEST ROUTINES IN THE 2501/1442 FUNCTION TEST. THE FIRST THREE ARE 'NORMAL ROUTINES', IE THEY ARE RUN WHEN NO ROUTINE SELECTION IS MADE, AND CONSTITUTE A COMPLETE FUNCTIONAL CHECK OF THE 2501 AND 1442. ROUTINES 4, 5, 6, 7 AND A RUN ONLY IF SELECTED, AND PROVIDE A MEANS OF EXERCISING CERTAIN FUNCTIONS, AND/OR BIT LINES. ROUTINES 8 AND 9 ARE UTILITY ROUTINES. ALL OF THE TEST ROUTINES FOLLOW THE SAME GENERAL ORGANIZATION, UTILIZING THE SERVICE SUBROUTINES.

GENERAL ORGANIZATION OF TEST ROUTINES

1. INITIALIZE THE DEVICE (INPCH, INROR).
2. SET UP DATA FOR PUNCHING OR COMPARE.
3. CHECK STATUS. (CHK14, CHK25).
4. INITIATE I/O OPERATION (PNCH, RDACD)
5. CHECK DATA.
6. SET UP DATA FOR NEXT OPERATION.
7. RETURN TO (3). CHECK STATUS.

5.1.1 OPERATION OF NORMAL ROUTINES

A. ROUTINE 1------ PUNCH ROTATING PATTERN.

THIS ROUTINE PUNCHES A ROTATING PATTERN IN 80 COLUMNS. THE PATTERN REMAINS FIXED IN STORAGE AND THE BEGINNING ADDRESS IS INCREMENTED THRU THE FIRST 79 POSITIONS OF THE 160 WORD FIELD. THE ADDRESS IS THEN RE-INITIALIZED, AND THE PROCESS REPEATED.

B. ROUTINE 2------ READ ROTATING PATTERN.

THIS ROUTINE READS THE DECK PUNCHED BY ROUTINE ONE. DATA IS COMPARED IN THE SAME MANNER AS IT WAS PUNCHED.

C. ROUTINE 3------ READ COLUMN COUNT CONTROL

THIS ROUTINE READS CARDS, VARYING THE WORD COUNT FROM 1 TO 80. THE LENGTH CHECK IS PERFORMED BY THE RDACD SERVICE SUBROUTINE.

D. ROUTINE 4------ GANG PUNCH.

THIS ROUTINE READS ONE CARD IN THE 2501 AND PUNCHES THAT DATA CONTINOUSLY ON THE 1442. THIS ALLOWS PUNCHING ANY PATTERN FOR ADJUSTMENT OR SCOPING PURPOSES.

E. ROUTINE 5------- READ GANG PUNCHED DECK.

THIS ROUTINE READS THE FIRST CARD INTO A COMPARE AREA, AND READS THE REMAINING CARDS INTO THIS READ AREA, COMPARING THE DATA TO THAT FROM THE FIRST CARD. THIS ALLOWS READING ANY PATTERN FOR ADJUSTMENT OR SCOPING PURPOSES.

F. ROUTINE 6------ PUNCH SELECTED PATTERN.

THIS ROUTINE READS THE CONSOLE SWITCHES AND PLACES THE SETTING OF SWITCHES 0-11 IN THE PUNCH AREA. SWITCH 12 SIGNALS THE PROGRAM THAT THE SETTING IS COMPLETE. THE SETTING MAY BE CHANGED AT ANY TIME, AND THE PUNCHED PATTERN WILL CHANGE ON THE NEXT CARD. IF SWITCH 12 IS LEFT ON, PUNCHING WILL CONTINUE. IF SWITCH 12 IS OFF AND THE PATTERN CHANGED, PUNCHING IS STOPPED UNTIL THE PATTERN IS SET AND SWITCH 12 TURNED ON. THE NUMBER OF COLUMNS PUNCHED MAY BE VARIED, BY MAKING AN ENTRY TO FUNCTION 10, WITH THE NUMBER OF COLUMNS (IN BINARY) IN THE DATA SWITCHES.

G. ROUTINE 7 ------- READ SELECTED PATTERN.

THIS ROUTINE READS THE CONSOLE SWITCHES, AND COMPARES THE DATA READ TO THE SETTING OF SWITCHES 0-11. THIS SETTING IS MADE IN THE SAME MANNER AS IN ROUTINE SIX, BUT WILL NOT CHANGE EXCEPT AT THE BEGINNING OF THE ROUTINE. THE NUMBER OF COLUMNS READ AND CHECKED MAY BE VARIED, AS IN ROUTINE SIX.

H. ROUTINE 8 -------- REPRODUCE.

THIS ROUTINE WILL REPRODUCE A DECK FROM THE 2501 TO THE 1442. ALL CHECKS ARE PERFORMED IN THE SERVICE SUBROUTINES.

I. ROUTINE 9 ------ REPLACE ROTATE PATTERN.

THIS ROUTINE READS ONE CARD FROM THE 2501 AND REPLACES THE DATA IN THE ROTATE PATTERN TABLE WITH THAT READ FROM THE CARD. LINKAGE IS MADE DIRECTLY TO ROUTINE ONE AND NORMAL TESTING FOLLOWS AS IF NO SELECTION HAD BEEN MADE.

J. ROUTINE A --- READ VARIABLE DELAY.

THIS ROUTINE CHECKS THE 2501 FEED MECHANISM WITH VARYING DELAY BETWEEN READ COMMANDS. IT BEGINS READING CARDS WITH MINIMUM DELAY, AND INCREMENTS THE DELAY XX MSEC AFTER EACH CARD. IF DESIRED, A FACTOR MAY BE SET IN THE CONSOLE SWITCHES. IF ANY CONSOLE SWITCHES ARE SET, A DELAY OF THEIR VALUE TIMES XX MSEC IS GENERATED. IF THE CONSOLE SWITCHES ARE ALL OFF, THE DELAY FACTOR IS INCREMENTED FROM 1 BY 1 UNTIL THE LAST CARD IS READ.

5.2*** SERVICE SUBROUTINES

A. CNTRL -- SEQUENCE CONTROL

THIS SUBROUTINE CHECKS FOR ROUTINE SELECTION, AND CONTROLS THE SEQUENCE IN WHICH THE TEST ROUTINES ARE RUN.

B. DSW1A --- LEVEL 0 1442 INTERRUPT SERVICE

THIS SUBROUTINE SERVICES THE PUNCH COLUMN INTERRUPT FROM THE 1442. IT ISSUES THE PUNCH COMMAND, INCREMENTS THE PUNCH ADDRESS, AND CHECKS THE DSW FOR ERRORS. IT IS NOT POSSIBLE TO TYPE THE ERRORS DURING PUNCHING, SO THEY ARE ACCUMULATED FOR CHECKING AFTER OP COMPLETE.

C. DSW4A --- LEVEL 4 1442 INTERRUPT SERVICE

THIS SUBROUTINE SERVICES THE OP COMPLETE INTERRUPT FROM THE 1442. IT SAVES THE DSW AND SETS UP THE LINKAGE FOR RETURN TO THE DSW ANALYSIS SUBROUTINE.

D. DSW4B --- LEVEL 4 2501 INTERRUPT SERVICE

THIS SUBROUTINE PERFORMS THE SAME FUNCTIONS AS DSW4A, EXCEPT FOR THE 2501.

E. DSWAN --- DSW ANALYSIS

THIS SUBROUTINE IS ENTERED ON RETURN FROM EITHER 2501 OR 1442 OP COMPLETE INTERRUPT. IT FIRST CHECKS FOR ANY LEVEL 0 DSW ERRORS AND THEN ANY LEVEL 4 DSW ERROR, GENERATES THE ERROR MESSAGE, IF ANY, AND RETURNS TO THE TEST ROUTINE.

F. TYPE AND E TYPE --- MESSAGE OUT

THIS SUBROUTINE CONTAINS THE INSTRUCTIONS NECESSARY TO LINK TO MONITORS LOG ROUTINES, AND THE MESSAGE AREA.

G. WAIT --- INTERRUPT WAIT.

THIS SUBROUTINE IS ENTERED IMMEDIATELY AFTER INITIATING A READ OR PUNCH OPERATION. IT CONTAINS A TIMING LOOP, WITH A RETURN TO MONITOR TO ALLOW OTHER PROGRAMS TO OPERATE IN OVERLAP. IF NO OP COMPLETE INTERRUPT OCCURS, THE LOOP WILL TIME OUT AND THE SUBROUTINE WILL GENERATE THE NO INTERRUPT MESSAGE. WHEN THE INTERRUPT OCCURS, IT WILL CHECK THE ROUTINE SELECTION SWITCH. IF A NEW ROUTINE IS SELECTED, IT WILL LINK TO CONTROL. IF NOT, IT WILL RETURN, VIA MONITOR, TO DSWAN.

H. INPCH, INRDR --- INITIALIZE PUNCH AND INITIALIZE READER

THE PROPER SUBROUTINE IS LINKED TO FROM EACH TEST ROUTINE WHICH USES THE DEVICE, BEFORE ANY OPERATION IS STARTED ON THAT DEVICE. IT FIRST GENERATES THE LOAD MESSAGE, THEN ISSUES A SENSE DSW COMMAND TO RESET THE DEVICE, THEN ANOTHER SENSE DSW. THE SECOND DSW IS CHECKED FOR ANY BITS OTHER THAN NOT READY OR LAST CARD. IF ANY ARE PRESENT A DSW ERROR MESSAGE IS GENERATED AND THE CHECK RETRIED. THE SUBROUTINE WILL NOT RETURN TO THE TEST ROUTINE UNTIL A PROPER DSW IS SENSED.

I. CHK14, CHK25. --- CHECK STATUS

THE PROPER SUBROUTINE IS LINKED TO FROM THE TEST ROUTINE BEFORE EACH OPERATION IS STARTED ON THE DEVICE. IT CHECKS THE DSW WORD FROM THE LAST OP COMPLETE FOR LAST CARD, AND GENERATES THE MESSAGE AND LINKS TO CNTRL IF IT IS ON. IF NOT, IT CHECKS FOR READY CONDITION, WAITS UNTIL THE DEVICE IS READY, THE RETURNS TO THE TEST ROUTINE.

J. PNCH --- PUNCH A CARD

THIS SUBROUTINE CONTAINS THE INSTRUCTIONS NECESSARY TO SET UP THE PUNCH TERMINATOR, INITIATE THE PUNCH OPERATION, AND CHECK THAT PUNCHING THE PROPER NUMBER OF COLUMNS WERE PUNCHED. IF AN ERROR MESSAGE, BEFORE RETURNING TO THE TEST ROUTINE.

K. RDACD --- READ A CARD

THIS SUBROUTINE FIRST FILLS THE READ IN AREA WITH WORDS CONTAINING ONLY BIT 15, FOR LENGTH CHECKING. IT THEN INITIATES A READ OPERATION AND LINKS TO WAIT. ON RETURN FROM OP COMPLETE INTERRUPT, IT CHECKS THAT THE PROPER NUMBER OF COLUMNS WERE TRANSFERRED, GENERATES THE THE ERROR MESSAGE, IF ANY, AND RETURNS TO THE TEST ROUTINE.

5.3*** MACHINE DISCOVERED ERRORS

THE FOLLOWING ARE EXAMPLES OF WHAT MESSAGES TO EXPECT FOR CERTAIN MACHINE CHECKS. THE LIST IS NOT COMPLETE BUT IS SUPPLIED TO FAMILIARIZE THE USER WITH THE ERROR CHECKING PHILOSOPHY.

1. READ CHECK WHILE RUNNING ROUTINE 2

```
E0E01 0002 04EA          WAS S/B DSW ERR LEVEL 4
                         2801 0801 2501
   (THE DSW SHOWS AN ERROR BIT)

E0E08 0002 06EA          WAS S/B COL DATA ERR
                         4020 4060 00010

   (THE DATA DID NOT COMPARE BECAUSE A SEVEN PUNCH
    WAS DROPPED IN COL 10.  THIS MAY NOT OCCUR ON A READ
    CHECK.)

A0E02 0002 06EA          NRDY
                         2501

   (THE MACHINE WENT NOT READY WITH THE READ CHECK
    TRIGGER ON)
```

2. A FEED CHECK WOULD YIELD A DSW ERROR AND NOT READY IN SIMILAR FASHION.

3. PUNCH ECHO CHECK WHILE RUNNING ROUTINE 4

```
E0E02   0004   0739      WAS S/B DSW ERR LEVEL 0
                         6003 4003 1442
   (THE LEVEL 0 DSW SHOWS THE ERROR BIT)

E0E01   0004 0739        WAS S/B DSW ERR LEVEL 4
                         2801  00080 1442
   (SO DOES THE LEVEL 4 DSW)

E0E06   0004 0739        WAS S/B COL COUNT ERR
                         00056 00080 1442
   (THE ERROR OCCURRED IN COL 56, TERMINATING THE
    PUNCHING.)

A0E02 0004 0739          NRDY
                         1442
   (READY DROPPED DUE TO THE PUNCH CHECK)
```

4. FEED CHECK ON 1442 WOULD YIELD DSW ERRORS AND NOT READY IN SIMILAR FASHION.

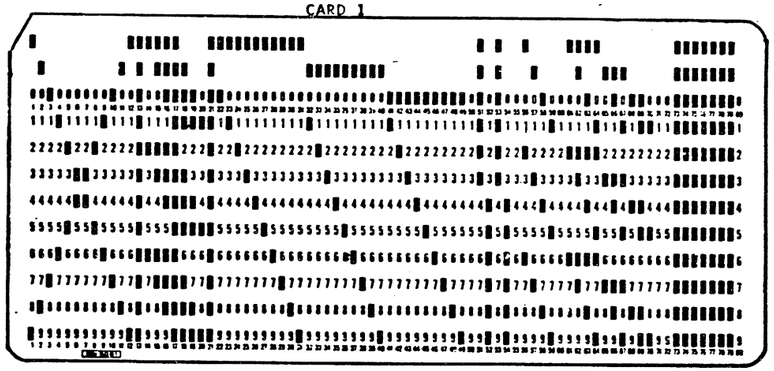
5.4*** ERROR CHECKING BY ROUTINE

EACH ROUTINE OR SUBROUTINE WILL PRODUCE ITS OWN ERROR MESSAGE. SINCE EACH OF THE SERVICE SUBROUTINES SERVICE SEVERAL TEST ROUTINES, THEIR MESSAGES MAY OCCUR IN ANY TEST ROUTINE. THE FOLLOWING IS A LIST OF THE ERROR MESSAGES, AND ITS SOURCE.

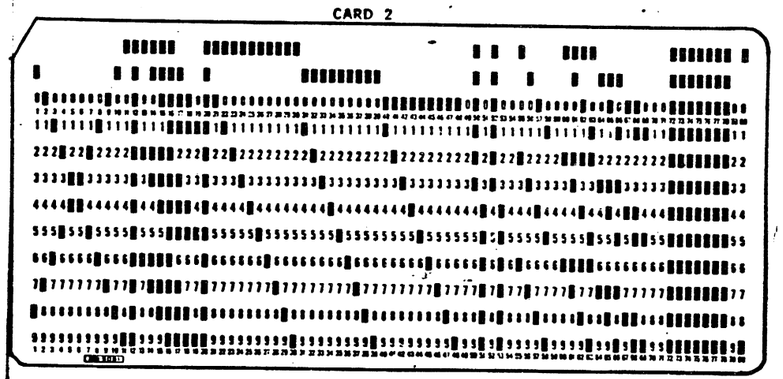
ROUTINE/SUBROUTINE	MESSAGES
DSW ANALYSIS (DSWAN)	E0E01
	E0E02
WAIT FOR INTERRUPT (WAIT)	E0E03
INITIALIZATION (INPCH, INRDR)	E0E05
PUNCH A CARD (PNCH)	E0E06
READ A CARD (RDACD)	E0E07
ROUTINES 2, 5, 7	E0E08
MONITOR	E0001
	E0002
	E0003
	E0005
	E0004

5.4 EXAMPLE OF ROTATE CARD DECK

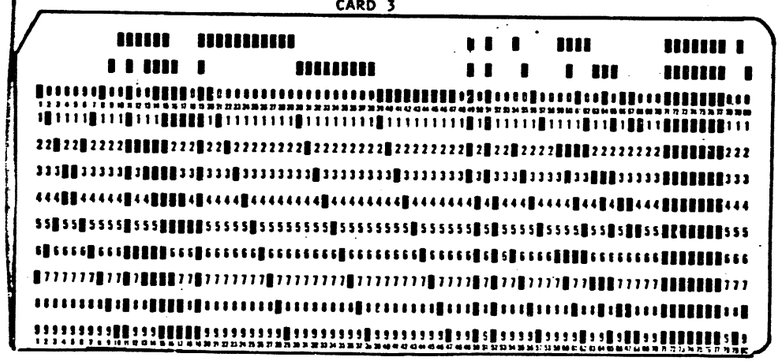
CARD 1



CARD 2



CARD 3



```
                *****************************************
                *            EQUATE TABLE
                *****************************************
                *     THIS TABLE EQUATES TEST PROGRAM LABELS
                *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR
                *     ADDRESSES.
                *
                *-------------------------------------------
                *     MONITOR ENTRY ADDRESSES
                *-------------------------------------------
0160            BEGIN EQU     /0160       BEGIN ROUTINE
0161            START EQU     BEGIN+1     SUPERVISOR ROUTINE
0162            ERROR EQU     START+1     ERROR LOG ROUTINE
0163            LOG   EQU     ERROR+1     STATUS LOG ROUTINE
0164            END   EQU     LOG+1       END ROUTINE
                *
                *-------------------------------------------
                *     MONITOR CONTROL WORD ADDRESSES
                *-------------------------------------------
0165            RTNSW EQU     END+1       ROUTINE START SW
0166            ERLCK EQU     END+2       LOCK ON ERROR CONTROL
0167            LOGBY EQU     END+3       I/O BUSY SW ADDRS
0168            RLCF  EQU     END+4       RELOCATION FACTOR ADDRS
                *
                *-------------------------------------------
                *     INTERRUPT TRANSFER VECTOR ADDRESSES
                *-------------------------------------------
017A            IL0   EQU     /017A       INTERRUPT LEVEL ZERO
018A            IL1   EQU     IL0+16      INTERRUPT LEVEL ONE
019A            IL2   EQU     IL1+16      INTERRUPT LEVEL TWO
01AA            IL3   EQU     IL2+16      INTERRUPT LEVEL THREE
01BA            IL4   EQU     IL3+16      INTERRUPT LEVEL FOUR
01B8            RQTY  EQU     IL4+1       CONSOLE PRINTER REQUEST
01BC            RQKB  EQU     RQTY+1      USE KEYBOARD REQUEST
01BD            SVKB  EQU     RQKB+1      KB SERVICE REQUEST
                *
                *****************************************
0000                  ORG     *+/05DC
                *-------------------------------------------
                *     THE MONITOR USES CORE LOCATIONS 0-05DC.
                *     FOR CONTENTS OF THESE ADDRESSES REFER
                *     TO THE DIAGNOSTIC MONITOR LISTING.
                *-------------------------------------------
                *
                *****************************************
                *            PROGRAM CONTROL TABLE
                *****************************************
                *
05DC 0 030E     PID   DC      /030E
05DD 0 0000     RID   DC      /0000       ROUTINE ID
05DE 0 0000     RAD   DC      /0000       ROUTINE ADDRS
05DF 0 0000     SW0   DC      /0000       PROGRAM CONTROL
05E0 0 0000     SW1   DC      /0000       ROUTINE SELECTION
05E1 0 0000     SW2   DC      /0000
05E2 0 0000     SW3   DC      /0000
05E3 1 05EB           DC      STRT        LOOP ADDRESS
05E4 1 05EB           DC      STRT        RESTART ADDRESS
05E5 1 05EB     MLSCF DC      STRT        ENTRY SET IN MAINLINE
05E6 0 0000           DC      /0000                 IN INTERRUPT
05E7 0 FFFF           DC      /FFFF       TERMINATOR
                *
                *****************************************
                *            INITIALIZATION AND START
                *****************************************
                *
05E8 0 4480 0160 BGIN  BSI  I  BEGIN
05EA 1 05DC           DC      PID         PCT ADDRESS
                *
```



```
05EB 0 6100     STRT  LDX   1 0
05EC 0 69F0           STX   1 RID
05ED 1 6500 0630      LDX   L1 DSW1A      1442 COL INT
05EF 0 6D00 017A      STX   L1 IL0
05F1 1 6500 063F      LDX   L1 DSW4A      1442 OP-COMP
05F3 0 6D00 01B8      STX   L1 IL4-2
05F5 1 6500 064A      LDX   L1 DSW4B      2501 OP COMP
05F7 0 6D00 01B7      STX   L1 IL4-3
05F9 0 4000           BSI     CNTRL
                *
                *****************************************
                *            SEQUENCE CONTROL ROUTINE
                *****************************************
                *     THIS ROUTINE CHECKS SW1 AND CONTROLS
                *     THE SEQUENCE IN WHICH TEST ROUTINES
                *     ARE RUN.
                *-------------------------------------------
                *
05FA 0 0000     CNTRL DC      /0000
05FB 0 C0E4           LD      SW1
05FC 1 4C08 0605      BSC   L CN20,+      BR IF NO RTN SELECTD
                *
05FE 0 D0DE     CN10  STO     RID         SAVE NEW RTN NUMBER
05FF 0 9015           S       RIDCK
0600 1 4C08 0608      BSC   L CN30,+      BR IF VALID RTN
0602 0 1810           SRA     16
0603 0 D0DC           STO     SW1         IF INVALID RTN GO
0604 0 D0D8           STO     RID          TO RTN ONE
                *
0605 1 7401 05DD CN20  MDX   L  RID,1       ADV TO NEXT RTN
0607 0 C0D5           LD      RID         CHECK FOR END OF
0608 0 90DD           S       RTNOM        NORMAL SEQUENCE    *1
0609 0 4480 0164      BSI   I  END,-Z     END OF PROGRAM
                *
060B 1 6580 05DD CN30  LDX   I1 RID       XR1=NEW ROUTINE NUMBER
060D 1 C500 0616      LD    L1 RTTBL-1    FETCH RETURN ADRS
060F 0 D0CE           STO     RAD         STORE NEW RTN ADDRS
0610 0 D0D5           STO     MLSCF+1     SET MLSCF FOR RETURN
0611 0 D400 0165      STO   L RTNSW       SET RTN START SW
0613 0 4480 0161      BSI   I START       GO TO MONITOR
                *
0615 0 000A     RIDCK DC      LRTN-RTTBL+1
0616 0 0003     RTNOM DC      NRTN-RTTBL+1                     *2
                *
                *-------------------------------------------
                *            ROUTINE ADDRESS TABLE
                *-------------------------------------------
                *
                *     NORMAL ROUTINES
0617 1 06C6     RTTBL DC      RT1         PUNCH ROTATING PATT
0618 1 06E4           DC      RT2         READ ROTATING PATTERN
0619 1 072E     NRTN  DC      RT3         READ COL COUNT CONTROL
                *     SELECTIVE ROUTINES
061A 1 073F           DC      RT4         GANG PUNCH
0618 1 0750           DC      RT5         READ GANG PUNCHED DECK
061C 1 0791           DC      RT6         PUNCH SELECTED PATTERN
061D 1 07D2           DC      RT7         READ SELECTED PATTERN
061E 1 082A           DC      RT8         REPRODUCE ROUTINE
061F 1 0843           DC      RT9         REPLACE ROTATE PATTERN
0620 1 0859     LRTN  DC      RTA         2501  VAR DELAY READ
                *
                *****************************************************
                *            I/O CONTROL COMMANDS
                *****************************************************
                *
0622    0000          BSS   E 0
0622 0 0000     FDACD DC      /0000       FEED A CARD
0623 0 1402           DC      /1402
```

```
0624 0 0000          PCHST DC      /0000       START PUNCH                30E01380
0625 0 1401                DC      /1401                                  30E01390
0626 1 0A32          PUNCH DC      WAREA       PUNCH                      30E01400
0627 0 1100                DC      /1100                                  30E01410
0628 0 0000          SNS1  DC      /0000                                  30E01420
0629 0 1703                DC      /1703       SENSE 1442 DSW             30E01430
062A 0 0000          SNS2  DC      /0000       SENSE DSW                  30E01440
062B 0 4F03                DC      /4F03       ON 2501                    30E01450
062C 1 09A8          IREAD DC      RAREA       INITIATE READ              30E01460
062D 0 4E00                DC      /4E00       ON 2501                    30E01470
062E 0 0000          SNSWS DC      *-*         READ CONSOLE SWITCHE       30E01480
062F 0 3A00                DC      /3A00                                  30E01490
                     *                                                    30E01500
                     ************************************************** 30E01510
                     *            INTERRUPT SERVICE SUBROUTINES         30E01520
                     ********************************************       30E01530
                     *                                                    30E01540
                     *---------------------------------------------       30E01550
                     *            DSW CHECK FOR LEVEL 0                   30E01560
                     *---------------------------------------------       30E01570
                     *                                                    30E01580
0630 0 0000          DSW1A DC      *-*                                    30E01590
0631 0 08F6                XIO     SNS1        SENSE DSW                  30E01600
0632 1 D400 0AEF           STO  L  WAS0                                   30E01610
0634 0 1000                NOP                 USE FOR TRAP               30E01620
0635 0 08F0                XIO     PUNCH       PUNCH A COLUMN             30E01630
0636 1 7401 0626           MDX  L  PUNCH,+1    INCRE PUNCH ADDR.          30E01640
0638 1 C400 0AEF           LD   L  WAS0        CHECK FOR LOST OR          30E01650
063A 0 F01A                EOR     K4003       EXTRANEOUS BITS            30E01660
063B 0 E81F                OR      XERR        ACCUMULATE ALL ERRORS      30E01670
063C 0 D01E                STO     XERR                                   30E01680
063D 1 4C80 0630           BSC  I  DSW1A       RETURN                     30E01690
                     *                                                    30E01700
                     *---------------------------------------------       30E01710
                     *            DSW CHECK FOR LEVEL 4 1442              30E01720
                     *---------------------------------------------       30E01730
                     *                                                    30E01740
063F 0 0000          DSW4A DC      *-*                                    30E01750
0640 0 08E7                XIO     SNS1        SENSE 1442 DSW             30E01760
0641 1 D400 0AF0           STO  L  WAS4                                   30E01770
0643 0 1000                NOP                 USE FOR TRAP               30E01780
0644 1 6700 065C           LDX  L3 DSWAN       ADRESS OF ANALYSIS ROUT    30E01790
0646 1 6F00 05E6           STX  L3 MLSCF+1     SET MONITOR RETURN         30E01800
0648 1 4C80 063F           BSC  I  DSW4A       RETURN                     30E01810
                     *                                                    30E01820
                     *---------------------------------------------       30E01830
                     *            DSW CHECK FOR LEVEL 4 2501              30E01840
                     *---------------------------------------------       30E01850
                     *                                                    30E01860
064A 0 0000          DSW4B DC      *-*                                    30E01870
064B 0 08DE                XIO     SNS2        SENSE DSW                  30E01880
064C 1 D400 0AF0           STO  L  WAS4                                   30E01890
064E 0 1000                NOP                 USE FOR TRAP               30E01900
064F 1 6700 065C           LDX  L3 DSWAN                                  30E01910
0651 1 6F00 05E6           STX  L3 MLSCF+1                                30E01920
0653 1 4C80 064A           BSC  I  DSW4B                                  30E01930
                     *                                                    30E01940
                     *---------------------------------------------       30E01950
                     *                                                    30E01960
0655 0 4003          K4003 DC      /4003                                  30E01970
0656 0 FFF7          KFFF7 DC      /FFF7                                  30E01980
0657 0 0008          K0008 DC      /0008                                  30E01990
0658 0 FFFE          KFFFE DC      /FFFE                                  30E02000
0659 0 FFF0          KFFF0 DC      /FFF0                                  30E02010
065A 0 0050          K0050 DC      /0050                                  30E02020
065B 0 0000          XERR  DC      0                                      30E02030
                     *                                                    30E02040
                     ************************************************** 30E02050
```



```
                     *            ANALYSIS ROUTINE FOR DSW                30E02060
                     ********************************************       30E02070
                     *                                                    30E02080
                     *            THIS SUBROUTINE ANALYZES THE DSW        30E02090
                     *            AFTER ANY LEVEL FOUR INTERRUPT AND      30E02100
                     *            RETURNS TO THE ROUTINE VIA THE          30E02110
                     *            ENTRY POINT OF THE WAIT SUBROUTINE      30E02120
                     *---------------------------------------------       30E02130
                     *                                                    30E02140
065C 0 C0FE          DSWAN LD      XERR        LEVEL 0 ERRORS             30E02150
065D 1 4420 067B           BSI  L  DSWEO,Z     BR IF ANY                  30E02160
                     *                                                    30E02170
065F 1 C400 0AF0           LD   L  WAS4        LAST DSW                   30E02180
0661 0 F016                EOR     K0800       OP COMP BIT                30E02190
0662 1 4C98 069C           BSC  I  WAIT,+-     BR IF NORMAL LVL 4 DSW     30E02200
                     *                                                    30E02210
0664 0 E014                AND     KEFFE       REMOVE L/C + NRDY BITS     30E02220
0665 1 4C98 069C           BSC  I  WAIT,+-     BR IF OTHERWISE NORMAL     30E02230
                     *                                                    30E02240
0667 1 F400 0AF0           EOR  L  WAS4        TO GET PROPER DSW          30E02250
0669 1 D400 0AF3           STO  L  02BE                                   30E02260
066B 0 6101                LDX     1 1         MSG NO                     30E02270
066C 0 6600 0112           LDX     L2 /0112    WAS4--02BE                 30E02280
066E 1 6700 0B0C           LDX     L3 ALVL4    LEVEL 4                    30E02290
0670 1 6F00 0AEE           STX     L3 ALPH2                               30E02300
0672 1 6700 0B16           LDX     L3 ADSWE    DSW ERROR                  30E02310
0674 1 4400 0AD5           BSI  L  ETYPE                                  30E02320
                     *                                                    30E02330
0676 1 4C80 069C           BSC  I  WAIT        RETURN TO PROGRAM          30E02340
                     *                                                    30E02350
0678 0 0800          K0800 DC      /0800                                  30E02360
0679 0 EFFE          KEFFE DC      /EFFE                                  30E02370
067A 0 1000          K1000 DC      /1000                                  30E02380
                     *                                                    30E02390
                     *---------------------------------------------       30E02400
                     *            DSW ERROR OCCURRED ON LEVEL 0           30E02410
                     *---------------------------------------------       30E02420
067B 0 0000          DSWEO DC      *-*                                    30E02430
067C 1 F400 067A           EOR  L  K1000                                  30E02440
067E 1 4C18 0696           BSC  L  EOLCC,+-    BR IF L/C ONLY             30E02450
                     *                                                    30E02460
0680 0 C0DA          EOTYP LD      XERR                                   30E02470
0681 0 F0D3                EOR     K4003       ERROR AND PROPER BITS      30E02480
0682 1 D400 0AEF           STO  L  WAS0        DSW WAS                    30E02490
0684 0 C0D0                LD      K4003       PROPER DSW                 30E02500
0685 1 D400 0AF3           STO  L  02BE        SHOULD BE                  30E02510
0687 0 6102                LDX     1 2         MSG NO                     30E02520
0688 0 6600 0111           LDX     L2 /0111    WAS0--02BE                 30E02530
068A 1 6700 0B11           LDX     L3 ALVL0    LEVEL 0                    30E02540
068C 1 6F00 0AEE           STX     L3 ALPH2                               30E02550
068E 1 6700 0B16           LDX     L3 ADSWE    WAS  S/B  DSW ERROR        30E02560
0690 1 4400 0AD5           BSI  L  ETYPE                                  30E02570
                     *                                                    30E02580
0692 0 1010          EORTN SLA     16                                     30E02590
0693 0 D0C7                STO     XERR                                   30E02600
0694 1 4C80 067B           BSC  I  DSWEO       RETURN TO ANAL ROUTINE     30E02610
                     *                                                    30E02620
0696 1 C400 0AF0     EOLCC LD   L  WAS4        CHK IF L/C ON LEVEL  4     30E02630
0698 0 1003                SLA     3                                      30E02640
0699 1 4C28 0692           BSC  L  EORTN,+Z    BR IF L/C PROPER           30E02650
069B 0 70E4                MDX     EOTYP       BR IF NOT PROPER           30E02660
                     *                                                    30E02670
                     ********************************************       30E02680
                     *            INTERRUPT WAIT ROUTINE                  30E02690
                     ********************************************       30E02700
                     *                                                    30E02710
                     *     THIS SUBROUTINE WAITS FOR INTERRUPT.           30E02720
                     *     WHEN THE INTERRUPT IS RECEIVED IT WILL         30E02730
```

```
                        *     CHECK THE ROUTINE SELECTION SWITCH.                30E02740
                        *     IF A NEW ROUTINE HAS BEEN SELECTED IT              30E02750
                        *     WILL BRANCH TO THE CONTROL ROUTINE.                30E02760
                        *-------------------------------------------------       30E02770
                        *                                                        30E02780
069C 0 0000             WAIT  DC      /0000                                      30E02790
069D 0 6500 1000              LDX   L1 /1000      SET INTERRUPT                  30E02800
069F 0 6925                   STX    1 WCNT       WAIT CNT                       30E02810
                        *                                                        30E02820
06A0 1 6500 06A9        WAIT1 LDX   L1 WAIT3                                     30E02830
06A2 1 7400 05E6              MDX   L  MLSCF+1    CK FOR INTERRUPT               30E02840
06A4 0 7008                   MDX      WAIT4      BR IF INTERRUPT OCCURED        30E02850
                        *                                                        30E02860
06A5 1 6D00 05E5        WAIT2 STX   L1 MLSCF      SET RETURN ADDRESS             30E02870
06A7 0 4480 0161              BSI   I  START      GO TO MONITOR                  30E02880
                        *                                                        30E02890
06A9 1 74FF 06C5        WAIT3 MDX   L  WCNT,-1    DECREMENT WAIT CNT             30E02900
06AB 0 70F4                   MDX      WAIT1                                     30E02910
06AC 0 700A                   MDX      WAIT5      BR IF NO INTERRUPT             30E02920
                        *                                                        30E02930
06AD 1 C400 05E0        WAIT4 LD    L  SW1                                       30E02940
06AF 0 4488 0161              BSI   I  START,+    CK FOR RTN SELECT              30E02950
06B1 1 9400 05DD              S     L  RID        CK FOR NEW ROUTINE             30E02960
06B3 1 4420 05FA              BSI   L  CNTRL,Z    BR IF NEW RTN                  30E02970
06B5 0 4480 0161              BSI   I  START      GO TO MONITOR                  30E02980
                        *                                                        30E02990
06B7 0 6103             WAIT5 LDX    1 3          MSG NO                         30E03000
06B8 0 6600 0100              LDX   L2 /0100                                     30E03010
06BA 1 6700 080C              LDX   L3 ALVL4      LEVEL 4                        30E03020
06BC 1 6F00 0AEE              STX   L3 ALPH2                                     30E03030
06BE 1 6700 0B53              LDX   L3 ANINT      NO INTERRUPT                   30E03040
06C0 1 4400 0AD5              BSI   L  ETYPE                                     30E03050
06C2 1 6580 05DE              LDX   I1 RAD        START ROUTINE OVER             30E03060
06C4 0 70E0                   MDX      WAIT2      RETURN VIA MONITOR             30E03070
                        *                                                        30E03080
06C5 0 0000             WCNT  DC      0           WAIT COUNT STORED HERE         30E03090
                        *                                                        30E03100
                        *****************************************              30E03110
                        *              ROUTINE ONE - PUNCH ROTATING PATT.        30E03120
                        *****************************************              30E03130
                        *                                                        30E03140
                        *             THIS ROUTINE PUNCHES A ROTATING            30E03150
                        *             PATTERN. NORMAL TERMINATION IS             30E03160
                        *             AFTER THE LAST CARD IS PUNCHED             30E03170
                        *                                                        30E03180
                        *                                                        30E03190
06C6 1 4400 087D        RT1   BSI   L  INPCH      TO INITIALIZE PUNCH            30E03200
                        *                                                        30E03210
06C8 0 6150             RT1C  LDX    1 80         INITIALIZE PUNCH AREA          30E03220
06C9 1 C500 0A81        RT1A  LD    L1 WARA2-1    FOR ROTATING PATTERN           30E03230
06CB 1 D500 0A31              STO   L1 WAREA-1                                   30E03240
06CD 0 71FF                   MDX    1 -1                                      30E03250
06CE 0 70FA                   MDX      RT1A                                     30E03260
                        *                                                        30E03270
06CF 1 6500 0A32              LDX   L1 WAREA      INITIALIZE PUNCH ADDR          30E03280
06D1 0 6904                   STX    1 PCHA1                                   30E03290
                        *                                                        30E03300
06D2 1 4400 0902        RT1B  BSI   L  CHK14      CHECK STATUS                   30E03310
                        *                                                        30E03320
06D4 1 4400 0963              BSI   L  PNCH       TO PUNCH A CARD                30E03330
06D6 0 0000             PCHA1 DC      *-*         PUNCH BEGINNING ADDR           30E03340
06D7 0 0050             NCOL1 DC .    80                                         30E03350
06D8 0 70F9                   MDX      RT1B       ERROR RETURN POINT             30E03360
                        *                                                        30E03370
06D9 1 7401 06D6              MDX   L  PCHA1,+1   INCRE PUNCH ADDR              30E03380
06DB 1 C400 0962              LD    L  TERAD      HAS ROTATION REACHED           30E03390
06DD 1 F400 0AD2              EOR   L  WAREN      END OF WRITE AREA              30E03400
06DF 1 4C20 06D2              BSC   L  RT1B,Z     BR IF NOT                      30E03410
```



```
06E1 0 70E6             RT1C  MDX      RT1C       BR IF YES                      30E03420
                        *                                                        30E03430
                        *****************************************              30E03440
                        *              ROUTINE TWO. READ ROTATING PATT           30E03450
                        *****************************************              30E03460
                        *                                                        30E03470
                        *             THIS ROUTINE READS THE ROTATE DECK         30E03480
                        *             PUNCHED IN ROUTINE ONE, CHECKING THE       30E03490
                        *             DATA AGAINST THE PUNCH PATTERN             30E03500
                        *-------------------------------------------------       30E03510
                        *                                                        30E03520
                        *                                                        30E03530
06E2 1 0A82             RT2CC DC      WARA2       FOR AREA END CHACK             30E03540
06E3 0 0000             RT2CS DC      *-*         COMPARE START ADDR             30E03550
                        *                                                        30E03560
06E4 1 4400 08BF        RT2   BSI   L  INRDR      TO INITIALIZE READR            30E03570
                        *                                                        30E03580
06E6 0 6150                   LDX    1 80                                      30E03590
06E7 1 C500 0A81        RT2A  LD    L1 WARA2-1    INITIALIZE ROTATE              30E03600
06E9 1 D500 0A31              STO   L1 WAREA-1    PATTERN IN PUNCH               30E03610
06EB 0 71FF                   MDX    1 -1         AREA FOR COMPARE               30E03620
06EC 0 70FA                   MDX      RT2A                                     30E03630
                        *                                                        30E03640
06ED 1 6500 0A32        RT2D  LDX   L1 WAREA      INITIALIZE COMPARE STAR        30E03650
06EF 0 69F3                   STX    1 RT2CS      ADDRESS                        30E03660
                        *                                                        30E03670
06F0 0 6100             RT2C  LDX    1 0                                       30E03680
06F1 1 6D00 0AD4              STX   L1 LN1SW      CLEAR FIRST LN SW              30E03690
06F3 1 4400 0933              BSI   L  CHK25      CHECK STATUS                   30E03700
                        *                                                        30E03710
06F5 1 4400 09FA              BSI   L  RDACD      TO READ A CARD                 30E03720
06F7 0 0050                   DC       80         NO OF COLS                     30E03730
                        *                                                        30E03740
06F8 0 61B0                   LDX    1 -80                                     30E03750
06F9 1 6680 06E3              LDX   I2 RT2CS      COMPARE START ADDRESS          30E03760
06FB 1 C500 09F9        RT2B  LD    L1 RAREA+81   CHAR READ                     30E03770
06FD 0 F200                   EOR    2 0          PROPER CHAR                    30E03780
06FE 1 E400 0659              AND   L  KFFF0      REMVE UNWANTED BITS            30E03790
0700 1 4C20 070C              BSC   L  RT2DA,Z    BR IF DATA ERROR               30E03800
                        *                                                        30E03810
0702 0 7201             RT2E  MDX    2 +1         TO NEXT COMP CHAR              30E03820
0703 0 7101                   MDX    1 +1         TO NXT CHAR                    30E03830
0704 0 70F6                   MDX      RT2B       CONTINUE                       30E03840
                        *                                                        30E03850
0705 0 C0DC             RT2F  LD       RT2CC      LAST ADDRESS                   30E03860
0706 0 F0DC                   EOR      RT2CS      COMP TO THIS TIME              30E03870
0707 1 4C18 06ED              BSC   L  RT2D,+-     BR IF END OF PATTERN           30E03880
                        *                                                        30E03890
0709 1 7401 06E3              MDX   L  RT2CS,+1   INCRE COMP START ADDR          30E03900
070B 0 70E4                   MDX      RT2C       BR TO CONTINUE                 30E03910
                        *                                                        30E03920
                        *             DATA ERROR.                                30E03930
                        *-------------------------------------------------       30E03940
                        *                                                        30E03950
070C 1 6D00 0AF4        RT2DA STX   L1 COL        STO ERROR COLUMN               30E03960
070E 1 7451 0AF4              MDX   L  COL,+81                                   30E03970
070E 1 7451 0AF4              MDX   L  COL,+81                                   30E03980
0710 0 1000                   NOP                SKIPPED BY MDX                 30E03990
0711 0 C200                   LD     2 0         PROPER CHAR                    30E04000
0712 1 E400 0659              AND   L  KFFF0      PASS BITS 0-11                 30E04010
0714 1 D400 0AF3              STO   L  D2BE                                      30E04020
0716 1 C500 09F9              LD    L1 RAREA+81   ERROR CHAR                    30E04030
0718 1 D400 0AF2              STO   L  WASD                                      30E04040
071A 0 690F                   STX    1 RT2D1+1    SAVE XR1                       30E04050
071B 0 6A10                   STX    2 RT2D2+1    SAVE XR2                       30E04060
071C 0 6108                   LDX    1 8                                       30E04070
071D 0 6600 0138              LDX   L2 /0138                                     30E04080
071F 1 6700 0B27              LDX   L3 ADTAE
```

```
0721 1 4400 0AD5          BSI  L  ETYPE                                    30E04090
                     *                                                    30E04100
0723 1 C400 05E2          LD   L  SW3                                      30E04110
0725 1 4C20 0705          BSC  L  RT2F,Z      BR IF 1 LN OPTION SEL        30E04120
0727 1 6D00 0AD4          STX  L1 LN1SW       SET FIRST LINE SW            30E04130
0729 0 6500 0000 RT2D1    LDX  L1 *-*         RESTORE XR1                  30E04140
072B 0 6600 0000 RT2D2    LDX  L2 *-*         RESTORE XR2                  30E04150
072D 0 70D4               MDX     RT2E        READ ANOTHER CARD            30E04160
                     *                                                    30E04170
                     ********************************************         30E04180
                     *            ROUTINE THREE                           30E04190
                     ********************************************** 30E04200
                     *                                                    30E04210
                     *            THIS ROUTINE READS CARDS VARYING        30E04220
                     *            THE COLUMN COUNT FROM ONE TO EIGHTY     30E04230
                     *---------------------------------------------       30E04240
                     *                                                    30E04250
                     *                                                    30E04260
072E 1 4400 08BF RT3      BSI  L  INRDR       INITIALIZE READER            30E04270
                     *                                                    30E04280
0730 0 6101       RT3D    LDX    1 1          INITIALIZE NUMBER            30E04290
0731 0 6904               STX    1 NCOL3      F COLUMNS                    30E04300
0732 1 4400 0933  RT3A    BSI  L  CHK25       CHECK STATUS                 30E04310
                     *                                                    30E04320
0734 1 4400 09FA          BSI  L  RDACD       READ A CARD                  30E04330
0736 0 0000       NCOL3   DC      *-*                                      30E04340
                     *                                                    30E04350
0737 0 C0FE       RT3E    LD      NCOL3       NUMBER OF COLS               30E04360
0738 1 F400 065A          EOR  L  K0050                                    30E04370
073A 1 4C18 0730          BSC  L  RT3D,+-     BR IF COL COUNT = 80         30E04380
073C 1 7401 0736          MDX  L  NCOL3,+1    INCRE NO OF COLS             30E04390
073E 0 70F3               MDX     RT3A                                     30E04400
                     *                                                    30E04410
                     ********************************************** 30E04420
                     *            ROUTINE FOUR--GANG PUNCH                30E04430
                     ********************************************** 30E04440
                     *                                                    30E04450
                     *            THIS ROUTINE READS ONE CARD             30E04460
                     *            FROM THE 2501 AND PUNCHES THAT          30E04470
                     *            PATTERN REPEATEDLY ON THE 1442          30E04480
                     *---------------------------------------------       30E04490
                     *                                                    30E04500
                     *                                                    30E04510
073F 1 4400 08BF RT4      BSI  L  INRDR       INITIALIZE READER            30E04520
0741 1 4400 0933          BSI  L  CHK25       CHECK STATUS                 30E04530
0743 1 4400 09FA          BSI  L  RDACD       READ CARD                    30E04540
0745 0 0050               DC      80          COL COUNT                    30E04550
0746 1 4400 087D          BSI  L  INPCH       INITIALIZE PUNCH             30E04560
0746 1 4400 087D          BSI  L  INPCH       INITIALIZE PUNCH             30E04560
                     *                                                    30E04570
0748 1 4400 0902  RT4A    BSI  L  CHK14       CHECK STATUS                 30E04580
074A 1 4400 0963          BSI  L  PNCH        PUNCH CARD                   30E04590
074C 1 09A9               DC      RAREA+1     FROM READ AREA               30E04600
074D 0 0050               DC      80          COL COUNT                    30E04610
074E 0 7000               MDX     *           ERROR RETURN                 30E04620
074F 0 70F8               MDX     RT4A                                     30E04630
                     *                                                    30E04640
                     ********************************************** 30E04650
                     *            ROUTINE FIVE--READ GANG PUNCHED DECK    30E04660
                     ********************************************** 30E04670
                     *                                                    30E04680
                     *            THIS ROUTINE READS CARDS, COMPARING     30E04690
                     *            THE DATA FROM EACH CARD WITH THAT       30E04700
                     *            FROM THE FIRST                          30E04710
                     *---------------------------------------------       30E04720
                     *                                                    30E04730
                     *                                                    30E04740
0750 1 4400 08BF RT5      BSI  L  INRDR       INITIALIZE READER            30E04750
```



```
0752 1 4400 0933          BSI  L  CHK25       CHECK STATUS                 30E04760
0754 1 4400 09FA          BSI  L  RDACD       READ FIRST CARD              30E04770
0756 0 0050               DC      80          COL COUNT                    30E04780
                     *                                                    30E04790
0757 0 6150               LDX    1 80                                     30E04800
0758 1 C500 09A8  RT5A    LD   L1 RAREA       MOVE COMPARE DATA            30E04810
075A 1 D500 0A31          STO  L1 WAREA-1     TO WAREA FOR COMPARE         30E04820
075C 0 71FF               MDX    1 -1                                     30E04830
075D 0 70FA               MDX     RT5A                                    30E04840
                     *                                                    30E04850
075E 1 6D00 0AD4  RT5B    STX  L1 LN1SW       RESET LN 1 SW                30E04860
0760 1 4400 0933          BSI  L  CHK25                                    30E04870
0762 1 4400 09FA          BSI  L  RDACD       READ CARD                    30E04880
0764 0 0050               DC      80          COLCOUNT                     30E04890
0765 0 61B0               LDX    1 -80        FOR COMP                     30E04900
                     *                                                    30E04910
0766 1 C500 09F9  RT5C    LD   L1 RAREA+81    CHAR READ                    30E04920
0768 1 F500 0A82          EOR  L1 WAREA+80    COMP CHAR                    30E04930
076A 1 E400 0659          AND  L  KFFF0       REMOVE UNWANTED BITS         30E04940
076C 1 4C20 0771          BSC  L  RT5D,Z      BR IF DATA ERROR             30E04950
076E 0 7101       RT5E    MDX    1 1                                      30E04960
076F 0 70F6               MDX     RT5C        CONTINUE SCAN                30E04970
0770 0 70ED               MDX     RT5B        READ ANOTHER CARD            30E04980
                     *                                                    30E04990
0771 1 C500 09F9  RT5D    LD   L1 RAREA+81    CHAR READ                    30E05000
0773 1 D400 0AF2          STO  L  WASD                                     30E05010
0775 1 C500 0A82          LD   L1 WAREA+80    PROPER CHAR                  30E05020
0777 1 E400 0659          AND  L  KFFF0       PASS BITS 0-11               30E05030
0779 1 D400 0AF3          STO  L  O2BE                                     30E05040
077B 0 6912               STX    1 RT5D1+1    SAVE XR1                     30E05050
077C 0 7151               MDX    1 +81        TO COL NO                    30E05060
077D 0 1000               NOP                                             30E05070
077E 1 6D00 0AF4          STX  L1 COL                                      30E05080
0780 0 6108               LDX    1 8          MSG NO                       30E05090
0781 0 6600 0138          LDX  L2 /0138       DATA ID                      30E05100
0783 1 6700 0B27          LDX  L3 ADTAE       DATA ERROR                   30E05110
0785 1 4400 0AD5          BSI  L  ETYPE                                    30E05120
                     *                                                    30E05130
0787 1 C400 05E2          LD   L  SW3                                      30E05140
0789 1 4C20 075E          BSC  L  RT5B,Z      BR IF 1 LN ONLY OPTION SEL   30E05150
078B 1 6D00 0AD4          STX  L1 LN1SW       SET LINE 1 SW                30E05160
078D 0 6500 0000 RT5D1    LDX  L1 *-*         RESTORE XR1                  30E05170
078F 0 70DE               MDX     RT5E                                     30E05180
                     *                                                    30E05190
                     ********************************************** 30E05200
                     *            ROUTINE SIX                             30E05210
                     ********************************************** 30E05220
                     *                                                    30E05230
                     *            THIS ROUTINE PUNCHES A                  30E05240
                     *            SELECTED PATTERN.                       30E05250
                     *---------------------------------------------       30E05260
                     *                                                    30E05270
                     *                                                    30E05280
0790 0 0000       RT6SW   DC      *-*         SWITCH SETTING               30E05290
                     *                                                    30E05300
0791 1 4400 087D  RT6     BSI  L  INPCH       INITIALIZE PUNCH             30E05310
                     *                                                    30E05320
0793 0 6500 3000  RT6A    LDX  L1 /3000       TIMING CONST FOR             30E05330
0795 1 6D00 087A          STX  L1 WTCNT       WAITING LOOP                 30E05340
                     *                                                    30E05350
0797 0 6104               LDX    1 4          MSG NO                       30E05360
0798 0 6200               LDX    2 0          NO  ATA                      30E05370
0799 1 6700 0B34          LDX  L3 ASETP                                    30E05380
079B 1 4400 0AF8          BSI  L  TYPE        TYPE SET PATT MSG            30E05390
                     *                                                    30E05400
079D 1 6500 0790          LDX  L1 RT6SW       DATA ADDR                    30E05410
079F 1 6D00 062E          STX  L1 SNSWS                                    30E05420
07A1 1 0C00 062E  RT6B    XIO  L  SNSWS       READ CONSOLE SWITCHE         30E05430
```

```
                        *
07A3 0 C0EC             LD      RT6SW       SWITCH SETTING                  30E05440
07A4 0 1803             SRA     3           CHECK BIT 12                    30E05450
07A5 0 4804             BSC     E           SKIP IF SW 12 NOT ON            30E05460
07A6 0 700A             MDX     RT6D        BRIF SW 12 ON                   30E05470
                        *                                                   30E05480
07A7 1 74FF 087A        MDX   L WTCNT,-1    SKIP WHEN COUNT ZERO            30E05490
07A9 0 7001             MDX     RT6C        BR TO DLY VIA MON               30E05500
07AA 0 70E8             MDX     RT6A        BR WHEN COUNT = 0               30E05510
                        *                                                   30E05520
07AB 1 6500 07A1 RT6C   LDX   L1 RT6B       RETURN POINT                    30E05530
07AD 1 6D00 05E5        STX   L1 MLSCF                                      30E05540
07AF 0 4480 0161        BSI   I  START      VIA MONITOR                     30E05550
                        *                                                   30E05560
07B1 0 C0DE      RT6D   LD      RT6SW       PUNCH PATTERN                   30E05570
07B2 1 E400 0656        AND   L KFFF7       REMOVE 12 BIT                   30E05580
07B4 0 6150             LDX    1 80                                         30E05590
07B5 1 D500 0A31 RT6E   STO   L1 WAREA-1    FILL WRITE AREA                 30E05600
07B7 0 71FF             MDX    1 -1         WITH SELECTED BITS              30E05610
07B8 0 70FC             MDX     RT6E                                        30E05620
                        *                                                   30E05630
07B9 1 4400 0902 RT6F   BSI   L CHK14       CHECK STATUS                    30E05640
                        *                                                   30E05650
07BB 1 C400 05E1        LD    L SW2         CHECK CC OPTION                 30E05660
07BD 1 4C20 07CE        BSC   L RT6H,Z                                      30E05670
07BF 0 6150             LDX    1 80         MAKE COL COUNT 80               30E05680
07C0 0 6903             STX    1 NCOL6                                      30E05690
                        *                                                   30E05700
07C1 1 4400 0963 RT6G   BSI   L PNCH        PUNCH A CARD                    30E05710
07C3 1 0A32             DC      WAREA       PUNCH AREA                      30E05720
07C4 0 0050      NCOL6  DC      80          NO OF COLS                      30E05730
07C5 0 7900             MDX     *           ERROR RETURN                    30E05740
                        *                                                   30E05750
07C6 1 0C00 062E        XIO   L SNSWS       READ CONS SWS                   30E05760
                        *                                                   30E05770
07C8 0 C0C7             LD      RT6SW                                       30E05780
07C9 1 E400 0A32        EOR   L WAREA       CHECK FOR CHANGES               30E05790
07CB 1 4C20 07A1        BSC   L RT6B,Z      BR IF SWS CHANGED               30E05800
                        *                                                   30E05810
07CD 0 70EB             MDX     RT6F        TO PUNCH ANOTHER CD             30E05820
                        *                                                   30E05830
07CE 1 D400 07C4 RT6H   STO   L NCOL6       STO COLUMN COUNT                30E05840
07D0 0 70F0             MDX     RT6G                                        30E05850
                        *                                                   30E05860
                        ****************************************************30E05870
                        *            ROUTINE SEVEN                          *30E05880
                        ****************************************************30E05890
                        *                                                   30E05900
                        *            READ SELECTED PATTERN                  *30E05910
                        *-----------------------------------------------------30E05920
                        *                                                   30E05930
                        *                                                   30E05940
07D1 0 0000      RT7SW  DC      *-*         SWITCH SETTING                  30E05950
                        *                                                   30E05960
07D2 1 4400 08BF RT7    BSI   L INRDR       INITIALIZE READER               30E05970
                        *                                                   30E05980
07D4 0 6500 3000 RT7A   LDX   L1 /3000      TIMING CONST FOR                30E05990
07D6 1 6D00 087A        STX   L1 WTCNT      WAITIBG LOOP                    30E06000
                        *                                                   30E06010
07D8 0 6105             LDX    1 5          MSG NO.                         30E06020
07D9 0 6200             LDX    2 0          NO DATA                         30E06030
07DA 1 6700 0B34        LDX   L3 ASETP                                      30E06040
07DC 1 4400 0AF8        BSI   L TYPE        TYPE SET PATT MSG               30E06050
                        *                                                   30E06060
07DE 1 6500 07D1        LDX   L1 RT7SW      DATA ADDR                       30E06070
07E0 1 6D00 062E        STX   L1 SNSWS                                      30E06080
07E2 1 0C00 062E RT7B   XIO   L SNSWS       READ CONSOLE SWITCHE            30E06090
                        *                                                   30E06100
                                                                            30E06110
```



```
07E4 0 C0EC             LD      RT7SW       SWITCH SETTING                  30E06120
07E5 0 1803             SRA     3           CHECK BIT 12                    30E06130
07E6 0 4804             BSC     E           SKIP IF SW 12 NOT ON            30E06140
07E7 0 700A             MDX     RT7D        BRIF SW 12 ON                   30E06150
                        *                                                   30E06160
07E8 1 74FF 087A        MDX   L WTCNT,-1    SKIP WHEN COUNT ZERO            30E06170
07EA 0 7001             MDX     RT7C        BR TO DLY VIA MON               30E06180
07EB 0 70E8             MDX     RT7A        BR WHEN COUNT = 0               30E06190
07EC 1 6500 07E2 RT7C   LDX   L1 RT7B       RETURN POINT                    30E06200
07EE 1 6D00 05E5        STX   L1 MLSCF                                      30E06210
07F0 0 4480 0161        BSI   I  START      VIA MONITOR                     30E06220
                        *                                                   30E06230
07F2 1 4400 0933 RT7D   BSI   L CHK25       CHECK STATUS                    30E06240
07F2 1 4400 0933 RT7D   BSI   L CHK25       CHECK STATUS                    30E06240
                        *                                                   30E06250
07F4 1 C400 05E1        LD    L SW2         CHECK CC OPTION                 30E06260
07F6 1 4C20 0827        BSC   L RT7H,Z                                      30E06270
07F8 0 6150             LDX    1 80         MAKE COL COUNT 80               30E06280
07F9 0 6905             STX    1 NCOL7                                      30E06290
07FA 0 6100             LDX    1 0                                          30E06300
07FB 1 6D00 0AD4        STX   L1 LN1SW      REST LN 1 SW                    30E06310
                        *                                                   30E06320
07FD 1 4400 09FA RT7G   BSI   L RDACD       READ A CARD                     30E06330
07FF 0 0050      NCOL7  DC      80          NO OF COLS                      30E06340
                        *                                                   30E06350
0800 1 6580 07FF        LDX   I1 NCOL7                                      30E06360
0802 1 C500 09A8 RT7E   LD    L1 RAREA      CHAR READ                       30E06370
0804 0 F0CC             EOR     RT7SW       SWITCH SETTING                  30E06380
0805 1 E400 0656        AND   L KFFF7       REMOVE TERM BIT                 30E06390
0807 1 4C20 080C        BSC   L RT7F,Z      BR IF DATA ERROR                30E06400
0809 0 71FF      RT7FR  MDX    1 -1                                         30E06410
080A 0 70F7             MDX     RT7E        CONTINUE SCAN                   30E06420
080B 0 70E6             MDX     RT7D        READ ANOTHER CARD               30E06430
                        *                                                   30E06440
080C 0 F0C4      RT7F   EOR     RT7SW       RESTORE CHAR READ               30E06450
080D 1 D400 0AF2        STO   L WASD                                        30E06460
080F 1 6D00 0AF4        STX   L1 COL        COL NUMBER                      30E06470
0811 0 C08F             LD      RT7SW       PROPER CHAR                     30E06480
0812 1 E400 0659        AND   L KFFF0       PASS BITS 0-11                  30E06490
0814 1 D400 0AF3        STO   L O2BE                                        30E06500
0816 0 690E             STX    1 RT7F1+1    SAVE XR1                        30E06510
0817 0 6108             LDX    1 8          MSG NO                          30E06520
0818 0 6600 0138        LDX   L2 /0138      DATA ID                         30E06530
081A 1 6700 0B27        LDX   L3 ADTAE      DATA ERROR HDG                  30E06540
081C 1 4400 0AD5        BSI   L ETYPE                                       30E06550
                        *                                                   30E06560
081E 1 C400 05E2        LD    L SW3                                         30E06570
0820 1 4C20 07F2        BSC   L RT7D,Z      BR IF 1 LN ONLY OPTION SEL      30E06580
0822 1 6D00 0AD4        STX   L1 LN1SW      SET LINE 1 SW                   30E06590
0824 0 6500 0000 RT7F1  LDX   L1 *-*        RESTORE XR1                     30E06600
0826 0 70E2             MDX     RT7FR       CHECK FOR MORE ERRORS           30E06610
                        *                                                   30E06620
0827 0 D0D7      RT7H   STO     NCOL7       STO COLUMN COUNT                30E06630
0828 0 70D4             MDX     RT7G                                        30E06640
                        *                                                   30E06650
                        ****************************************************30E06660
                        *            ROUTINE EIGHT                          *30E06670
                        ****************************************************30E06680
                        *                                                   30E06690
                        *            REPRODUCE ROUTINE                      *30E06700
                        *-----------------------------------------------------30E06710
                        *                                                   30E06720
                        *                                                   30E06730
0829 0 0000      RT8SA  DC      *-*         WAS4 SAVE AREA                  30E06740
                        *                                                   30E06750
082A 1 4400 08BF RT8    BSI   L INRDR                                       30E06760
082C 1 4400 087D        BSI   L INPCH       INITIALIZE PUNCH                30E06770
082E 0 1010             SLA     16                                          30E06780
```

```
082F 0 D0F9              STO     RT8SA       CLEAR WAS4 SAVE AREA        30E06790
                         *                                               30E06800
0830 1 4400 0902  RT8A   BSI  L  CHK14       CHECK STATUS                30E06810
0832 0 C0F6              LD      RT8SA                                   30E06820
0833 1 D400 0AF0         STO  L  WAS4        RESTORE WAS4 FOR CHK25      30E06830
0835 1 4400 0933         BSI  L  CHK25       CHECK STATUS                30E06840
0837 1 4400 09FA         BSI  L  RDACD       READ CARD                   30E06850
0839 0 0050              DC      80          COL COUNT                   30E06860
083A 1 C400 0AF0         LD   L  WAS4                                    30E06870
083C 0 D0EC              STO     RT8SA       SAVE STATUS FOR CHK25       30E06880
083D 1 4400 0963         BSI  L  PNCH        PUNCH CARD                  30E06890
083F 1 09A9              DC      RAREA+1     FROM READ AREA              30E06900
0840 0 0050              DC      80          COL COUNT                   30E06910
0841 0 7000              MDX     *           ERROR RETURN                30E06920
0842 0 70ED              MDX     RT8A                                    30E06930
                         *                                               30E06940
                         ************************************************30E06950
                         *           ROUTINE NINE--REPLACE ROTATE PATTERN30E06960
                         ************************************************30E06970
                         *                                               30E06980
                         *           THIS ROUTINE REPLACES THE ROTATE    30E06990
                         *           PATTERN WITH THAT FROM THE FIRST    30E07000
                         *           CARD IN THE 2501                    30E07010
                         *           IT THEN RETURNS TO ROUTINE ONE TO   30E07020
                         *           PUNCH THE PATTERN                   30E07030
                         *-------------------------------------------    30E07040
                         *                                               30E07050
                         *                                               30E07060
0843 1 4400 08BF  RT9    BSI  L  INRDR       INITIALIZE READER           30E07070
                         *                                               30E07080
0845 1 4400 0933  RT9A   BSI  L  CHK25       CHECK STATUS                30E07090
0847 1 4400 09FA         BSI  L  RDACD       READ CARD                   30E07100
0849 0 0050              DC      80          COL COUNT                   30E07110
084A 0 6150              LDX  1  80                                      30E07120
                         *                                               30E07130
084B 1 C500 09A8  RT9B   LD   L1 RAREA       REPLACE CHAR                30E07140
084D 1 D500 0A81         STO  L1 WARA2-1     IN ROTATE CONSTANT AREA     30E07150
084F 0 71FF              MDX  1  -1                                      30E07160
0850 0 70FA              MDX     RT9B                                    30E07170
0851 0 6100              LDX  1  0                                       30E07180
0852 1 6D00 05E0         STX  L1 SW1         ZERO ROUTINE SEL SW         30E07190
0854 1 4C00 05EB         BSC  L  STRT        RETURN TO START OF PROG     30E07200
                         *                                               30E07210
                         ************************************************30E07220
                         *           ROUTINE TEN                         30E07230
                         ************************************************30E07240
                         *                                               30E07250
                         *           READ WITH VARIABLE DELAY            30E07260
                         *           BETWEEN CARDS                       30E07270
                         *-------------------------------------------    30E07280
                         *                                               30E07290
                         *                                               30E07300
0856 0 0000       RTASW  DC       *-*         SWITCH SETTING              30E07310
0857 0 0000       RTAPC  DC       *-*         ROUTINE PASS COUNTER        30E07320
0858 0 0000       RTADC  DC       *-*         DELAY COUNTER               30E07330
                         *                                               30E07340
0859 1 4400 08BF  RTA    BSI  L  INRDR       INITIALIZE READER           30E07350
085B 1 6500 0856         LDX  L1 RTASW       INIT SENSE SWS IOCC         30E07360
085D 1 6D00 062E         STX  L1 SNSWS                                   30E07370
085F 0 6101              LDX  1  1           INITIALIZE COUNTERS         30E07380
0860 0 69F6              STX  1  RTAPC                                   30E07390
0861 0 69F6              STX  1  RTADC                                   30E07400
                         *                                               30E07410
0862 1 4400 0933  RTAA   BSI  L  CHK25       CHECK STATUS                30E07420
0864 1 0C00 062C         XIO  L  IREAD       READ A CARD                 30E07430
0866 1 0C00 062A  RTAA1  XIO  L  SNS2        SENSE DSW                   30E07440
0868 0 4804              BSC     E           SKIP IF NOT BUSY            30E07450
0869 0 70FC              MDX     RTAA1       LOOP UNTIL OP COMP          30E07460
```



```
086A 0 1010              SLA     16                                      30E07470
086B 1 D400 05E6         STO  L  MLSCF+1     NO INTERRUPT RET ENTRY      30E07480
086D 1 74FF 0858  RTAB   MDX  L  RTADC,-1    DECRE DELAY COUNT           30E07490
086F 0 70FD              MDX     RTAB        BR TO DELAY                 30E07500
0870 1 0C00 062E         XIO  L  SNSWS       SENSE CONSOLE SW            30E07510
0872 0 C0E3              LD      RTASW       SWITCH SETTING              30E07520
0873 1 4C20 0878         BSC  L  RTAC,Z      BR IF SWS SET               30E07530
0875 1 7401 0857         MDX  L  RTAPC,+1    UPDATE PASS COUNT           30E07540
0877 0 C0DF              LD      RTAPC       LOAD NEW DELAY FACTOR       30E07550
0878 0 D0DF       RTAC   STO     RTADC       STORE DELAY FACTOR          30E07560
0879 0 70E8              MDX     RTAA        BR TO READ NXT CD           30E07570
                         *                                               30E07580
                         *-------------------------------------------    30E07590
                         ************************************************30E07600
                         *****       SERVICE SUBROUTINES       *****     30E07610
                         ************************************************30E07620
                         *-------------------------------------------    30E07630
                         *                                               30E07640
                         *                                               30E07650
                         ************************************************30E07660
                         *           INITIALIZE 1442 SUBROUTINE          30E07670
                         ************************************************30E07680
                         *                                               30E07690
                         *           THIS SUBROUTINE INITIALIZES THE     30E07700
                         *           1442 PRIOR TO STARTING ANY ROUTINE  30E07710
                         *           AND TYPES A LOAD BLANKS MESSAGE     30E07720
                         *-------------------------------------------    30E07730
                         *                                               30E07740
                         *                                               30E07750
087A 0 0000       WTCNT  DC       *-*                                     30E07760
087B 0 0000       K0000  DC       /0000                                   30E07770
087C 0 0001       K0001  DC       /0001                                   30E07780
                         *                                               30E07790
087D 0 0000       INPCH  DC       *-*                                     30E07800
087E 0 6500 1442         LDX  L1 /1442       MACH TYPE                   30E07810
0880 1 6D00 0AF7         STX  L1 MACH                                    30E07820
0882 0 6101              LDX  1  1           MSG NO.                     30E07830
0883 0 6600 0100         LDX  L2 /0100       NO DATA                     30E07840
0885 1 6700 0B59         LDX  L3 ALDMR       LOAD AND MAKE RDY MSG       30E07850
0887 1 4400 0AF8         BSI  L  TYPE                                    30E07860
0889 0 1010              SLA     16                                      30E07870
088A 1 D400 0AF0         STO  L  WAS4                                    30E07880
088C 1 0C00 0628  INRST  XIO  L  SNS1        RESET UNSERVICED INT        30E07890
088E 0 6500 3000  INWAT  LDX  L1 /3000       TIMING CONST                30E07900
0890 1 6D00 0901         STX  L1 IWTCT       FOR TIMING LOOP             30E07910
0892 1 0C00 0628  WATFR  XIO  L  SNS1        GET DSW                     30E07920
0894 1 D400 0AF1         STO  L  WAS1                                    30E07930
0896 0 1000              NOP                 USE FOR TRAP                30E07940
0897 1 4C98 087D         BSC  I  INPCH,+-    BR IF RDY AND NORMAL        30E07950
0899 1 E400 0658         AND  L  KFFFE                                   30E07960
089B 1 4C20 08A5         BSC  L  DSWEI,Z     BR IF DSW INCORRECT         30E07970
089D 1 4C80 087D         BSC  I  INPCH                                   30E07980
089F 1 6500 0892  IRDYR  LDX  L1 WATFR       SET RETURN POONT            30E07990
08A1 1 6D00 05E6         STX  L1 MLSCF+1                                 30E08000
08A3 1 4C00 06AD         BSC  L  WAIT4       CHK SW1 + RET TO MONITOR    30E08010
                         *                                               30E08020
08A5 1 C400 0AF1  DSWEI  LD   L  WAS1        INCORRECT DSW               30E08030
08A7 1 4C04 08BB         BSC  L  RDYER,E     BR IN NRDY BIT ON           30E08040
08A7 1 4C04 08BB         BSC  L  RDYER,E     BR IN NRDY BIT ON           30E08040
08A9 0 C0D2              LD      K0001                                   30E08050
08AA 1 D400 0AF3         STO  L  O2BE        SHOULD BE                   30E08060
08AC 1 74FF 0901  INMSG  MDX  L  IWTCT,-1    DECRE COUNT                 30E08070
08AE 0 70F0              MDX     IRDYR       BR TO MON                   30E08080
08AF 0 6105              LDX  1  5           MSG NO                      30E08090
08B0 0 6600 0114         LDX  L2 /0114       WAS---02BE                  30E08100
08B2 1 6700 0B20         LDX  L3 AINIT       INITIALIZING                30E08110
08B4 1 6F00 0AEE         STX  L3 ALPH2                                   30E08120
08B6 1 6700 0B16         LDX  L3 ADSWE       DSW ERROR                   30E08130
```

```
08B8 1 4400 0AD5          BSI  L  ETYPE      TYPE ERROR MSG              30E08140
08BA 0 70D1               MDX     INRST      BR TO RESET AND TRY AGN     30E08150
08BB 0 C0BF         RDYER LD      K0000                                  30E08160
08BC 1 D400 0AF3          STO  L  02BE       SHOULD BE                   30E08170
08BE 0 70ED               MDX     INMSG                                  30E08180
                    *                                                    30E08190
                    ***************************************************  30E08200
                    *          INITIALIZE 2501 SUBROUTINE               30E08210
                    ***************************************************  30E08220
                    *                                                    30E08230
                    *          THIS ROUTINE INITIALIZES THE             30E08240
                    *          2501 PRIOR TO STARTING ANY ROUTINE       30E08250
                    *--------------------------------------------------  30E08260
                    *                                                    30E08270
                    *                                                    30E08280
08BF 1 08C0         INRDR DC   *- *                                      30E08290
08C0 0 6500 2501          LDX  L1 /2501      MACH TYPE                   30E08300
08C2 1 6D00 0AF7          STX  L1 MACH                                   30E08310
08C4 0 6101               LDX   1 1          MSG NO                      30E08320
08C5 0 6600 0100          LDX  L2 /0100      DATA ID                     30E08330
08C7 1 6700 0B59          LDX  L3 ALDMR      LOAD NSG                    30E08340
08C9 1 4400 0AF8          BSI  L  TYPE                                   30E08350
                    *                                                    30E08360
08CB 0 1010               SLA     16                                     30E08370
08CC 1 D400 0AF0          STO  L  WAS4                                   30E08380
08CE 1 0C00 062A    RINRS XIO  L  SNS2       RESET UNSERVICED INT        30E08390
08D0 0 6500 3000    RINWA LDX  L1 /3000      TIMING CINST                30E08400
08D2 1 6D00 0901          STX  L1 IWTCT      FOR TIMING LOOP             30E08410
                    *                                                    30E08420
08D4 1 0C00 062A    RWATF XIO  L  SNS2       GET DSW                     30E08430
08D6 1 D400 0AF1          STO  L  WASI                                   30E08440
08D8 0 1000               NOP                USE FOR TRAP                30E08450
08D9 1 4C98 08BF          BSC  I  INRDR,+-   BR IF RDY AND NORMAL        30E08460
                    *                                                    30E08470
08DB 1 E400 0679          AND  L  KEFFE      REMOVE L/C AND NRDY BITS    30E08480
08DD 1 4C20 08E1          BSC  L  RDSWE,Z    BR IF DSW ERROR             30E08490
08DF 1 4C80 08BF          BSC  I  INRDR      RETURN TO TEST ROUTINE      30E08500
08E1 1 C400 0AF1    RDSWE LD   L  WASI       GET ERROR DSW               30E08510
08E3 1 4C04 08F7          BSC  L  RRDYE,E    ERROR AND NRDY              30E08520
08E5 0 C096               LD      K0001      PROPER DSW                  30E08530
08E6 1 D400 0AF3          STO  L  02BE                                   30E08540
08E8 1 74FF 0901    RINMS MDX  L  IWTCT,-1   DEC COUNT                   30E08550
08EA 0 7010               MDX     RIRDY                                  30E08560
08EB 0 6105               LDX   1 5          MSG NO                      30E08570
08EC 0 6600 0114          LDX  L2 /0114      DATA ID                     30E08580
08EE 1 6700 0B20          LDX  L3 AINIT      INUTIALIZING                30E08590
08F0 1 6F00 0AEE          STX  L3 ALPH2                                  30E08600
08F2 1 6700 0B16          LDX  L3 ADSWE      DSW ERROR                   30E08610
08F4 1 4400 0AD5          BSI  L  ETYPE                                  30E08620
                    *                                                    30E08630
08F6 0 70D7               MDX     RINRS      TRY TO RESET AGAIN          30E08640
                    *                                                    30E08650
08F7 0 C083         RRDYE LD      K0000      READY DSW                   30E08660
08F8 1 D400 0AF3          STO  L  02BE                                   30E08670
08FA 0 70ED               MDX     RINMS                                  30E08680
                    *                                                    30E08690
08FB 1 6500 08D4    RIRDY LDX  L1 RWATF      RETURN POINT                30E08700
08FD 1 6D00 05E6          STX  L1 MLSCF+1                                30E08710
08FF 1 4C00 06AD          BSC  L  WAIT4      CHK SW1 + RET TO MONITOR    30E08720
                    *                                                    30E08730
                    ***************************************************  30E08740
                    *          CHECK STATUS 1442 SUBROUTINE             30E08750
                    ***************************************************  30E08760
                    *                                                    30E08770
                    *          THIS SUBROUTINE CHECKS FOR NRDY          30E08780
                    *          OR LAST CARD ON THE 1442. IF L/C,        30E08790
                    *          GO TO CONTROL FOR NEXT ROUTINE.          30E08800
                    *--------------------------------------------------  30E08810
```



```
                    *                                                    30E08820
                    *                                                    30E08830
0901 0 0000         IWTCT DC      *-*        WAIT LOOP COUNTER           30E08840
                    *                                                    30E08850
0902 0 0000         CHK14 DC      *-*                                    30E08860
0903 0 6500 1442          LDX  L1 /1442      MACH TYPE                   30E08870
0905 1 6D00 0AF7          STX  L1 MACH                                   30E08880
0907 1 C400 0AF0          LD   L  WAS4       LAST OP COMP DSW            30E08890
0909 0 1003               SLA     3          CHECK LAST CARD             30E08900
090A 1 4C10 0917          BSC  L  CHRDY,-    BR IF NOT LAST CARD         30E08910
090C 1 0C00 0622          XIO  L  FDACD      FEED LAST CARD OUT          30E08920
090E 0 6103               LDX   1 3          MSG NO                      30E08930
090F 0 6600 0100          LDX  L2 /0100      DATA ID                     30E08940
0911 1 6700 0B03          LDX  L3 ALCD       LAST CARD                   30E08950
0913 1 4400 0AF8          BSI  L  TYPE                                   30E08960
0915 1 4400 05FA          BSI  L  CNTRL      TO ROUTINE CONTROL          30E08970
0917 0 6500 3000    CHRDY LDX  L1 /3000                                  30E08980
0919 1 6D00 0901          STX  L1 IWTCT      FOR TIMING LOOP             30E08990
091B 1 0C00 0628    CRDYL XIO  L  SNS1       SENSE DSW                   30E09000
091D 1 4C04 0921          BSC  L  CWTFR,E    BR IF NOT READY             30E09010
091F 1 4C80 0902          BSC  I  CHK14      RETURN IF READY             30E09020
                    *                                                    30E09030
                    *          TIMING LOOP FOR NOT READY                 30E09040
0921 1 74FF 0901    CWTFR MDX  L  IWTCT,-1   DECREMENT COUNT             30E09050
0923 0 7009               MDX     CRDYR      LOOP UNTIL TIMEOUT          30E09060
0924 0 6102               LDX   1 2          MSG NO                      30E09070
0925 0 6600 0100          LDX  L2 /0100      DATA ID                     30E09080
0927 1 6700 0B09          LDX  L3 ANRDY      NOT READY                   30E09090
0929 1 4400 0AF8          BSI  L  TYPE                                   30E09100
092B 1 4C00 0917          BSC  L  CHRDY                                  30E09110
                    *                                                    30E09120
092D 1 6500 091B    CRDYR LDX  L1 CRDYL      SET RETURNTO MONITOR        30E09130
092F 1 6D00 05E6          STX  L1 MLSCF+1                                30E09140
0931 1 4C00 06AD          BSC  L  WAIT4      CHK SW1 + RET TO MONITOR    30E09150
                    *                                                    30E09160
                    ***************************************************  30E09170
                    *          CHECK STATUS 2501 SUBROUTINE             30E09180
                    ***************************************************  30E09190
                    *                                                    30E09200
                    *          THIS SUBROUTINE CHECKS FOR NRDY OR       30E09210
                    *          LAST CARD ON THE 2501. IF L/C, IT        30E09220
                    *          LINKS TO THE CONTROL ROUTINE             30E09230
                    *--------------------------------------------------  30E09240
                    *                                                    30E09250
                    *                                                    30E09260
0933 0 0000         CHK25 DC      *-*                                    30E09270
0934 0 6500 2501          LDX  L1 /2501      MACH TYPE                   30E09280
0936 1 6D00 0AF7          STX  L1 MACH                                   30E09290
0938 1 C400 0AF0          LD   L  WAS4                                   30E09300
093A 0 1003               SLA     3          CHECK FOR LAST CARD         30E09310
093B 1 4C10 0946          BSC  L  RCHRD,-    BR IF NOT LAST CARD         30E09320
093D 0 6103               LDX   1 3          MSG NO                      30E09330
093E 0 6600 0100          LDX  L2 /0100      DATA ID                     30E09340
0940 1 6700 0B03          LDX  L3 ALCD       LAST CARD                   30E09350
0942 1 4400 0AF8          BSI  L  TYPE                                   30E09360
                    *                                                    30E09370
0944 1 4400 05FA          BSI  L  CNTRL      RETURN TO SEQ CONTROL       30E09380
                    *                                                    30E09390
0946 0 6500 3000    RCHRD LDX  L1 /3000                                  30E09400
0948 1 6D00 0901          STX  L1 IWTCT      FOR TIMING LOOP             30E09410
094A 1 0C00 062A    RCRDY XIO  L  SNS2       SENSE 2501 DSW              30E09420
094C 1 4C04 0950          BSC  L  RCWTF,E    BR IF NOT READY             30E09430
094E 1 4C80 0933          BSC  I  CHK25      RETURN TO TEST ROUTINE      30E09440
                    *                                                    30E09450
0950 1 74FF 0901    RCWTF MDX  L  IWTCT,-1   DECREMENT COUNT             30E09460
0952 0 7008               MDX     RCRYR                                  30E09470
0953 0 6102               LDX   1 2          MSG NO                      30E09480
0954 0 6600 0100          LDX  L2 /0100      DATA ID                     30E09490
```

```
0956 1 6700 0B09          LDX  L3 ANRDY      NRDY                          30E09500
0958 1 4400 0AF8          BSI  L  TYPE                                     30E09510
                          *                                                30E09520
095A 0 70EB               MDX     RCHRD      TRY AGAIN                     30E09530
095B 1 6500 094A    RCRYR LDX  L1 RCRDY      SET RETURN POINT              30E09540
095D 1 6D00 05E6          STX  L1 MLSCF+1                                  30E09550
095F 1 4C00 06AD          BSC  L  WAIT4      CHK SW1 + RET TO MONITOR      30E09560
                          *                                                30E09570
                          ************************************************ 30E09580
                          *           PUNCH A CARD ROUTINE                 30E09590
                          ************************************************ 30E09600
                          *                                                30E09610
                          *           THIS SUBROUTINE PUNCHES A CARD       30E09620
                          *           AND CHECKS THAT THE PROPER NUMBER OF 30E09630
                          *           COLUMNS WERE PUNCHED                 30E09640
                          *-------------------------------------------------30E09650
                          *                                                30E09660
                          *                                                30E09670
0961 0 0000         PBGAD DC       *-*         BEGINNING ADDRESS           30E09680
0962 1 0A32         TERAD DC       WAREA       TERMINATOR ADDRESS          30E09690
0963 0 0000         PNCH  DC       *-*                                     30E09700
0964 0 6500 1442          LDX  L1 /1442       MACH TYPE                    30E09710
0966 1 6D00 0AF7          STX  L1 MACH                                     30E09720
0968 1 C480 0963          LD   I  PNCH        GET START ADDRESS            30E09730
096A 1 D400 0626          STO  L  PUNCH       PLACE IN IOCC                30E09740
096C 0 D0F4               STO     PBGAD       BEGINNING ADDRESS            30E09750
096D 1 7401 0963          MDX  L  PNCH,+1                                  30E09760
096F 1 8480 0963          A    I  PNCH        ADD NO OF COLS               30E09770
0971 1 9400 087C          S    L  K0001                                    30E09780
0973 0 D0EE               STO     TERAD       NEW ADDRESS                  30E09790
0974 1 C480 0963          LD   I  PNCH        GET NUM COL DATA             30E09800
0976 0 D030               STO     COLND       SAVE DATA                    30E09810
0977 1 7401 0963          MDX  L  PNCH,+1                                  30E09820
                          *                                                30E09830
0979 1 C480 0962          LD   I  TERAD       FETCH TERM CHAR              30E09840
097B 1 EC00 0657          OR   L  K0008       APPLY TERM BIT               30E09850
097D 1 D480 0962          STO  I  TERAD                                    30E09860
                          *                                                30E09870
097F 1 0C00 0624          XIO  L  PCHST       START PUNCH                  30E09880
0981 1 4400 069C          BSI  L  WAIT        WAIT FOR OP COMP             30E09890
                          *                                                30E09900
0983 1 74FF 0626          MDX  L  PUNCH,-1    TO LAST CHAR PUNCHED         30E09910
0985 1 C480 0962          LD   I  TERAD       LOAD PROPER LAST CHAR        30E09920
0987 1 F480 0626          EOR  I  PUNCH                                    30E09930
0989 1 4C20 0995          BSC  L  PUNEN,Z     BR IF UNUSUAL END            30E09940
098B 1 7401 0963          MDX  L  PNCH,+1     TO NORMAL RETURN             30E09950
098D 1 C480 0962    PRTN  LD   I  TERAD                                    30E09960
098F 1 E400 0656          AND  L  KFFF7       REMOVE PREVIOUS              30E09970
0991 1 D480 0962          STO  I  TERAD       TERMINATOR                   30E09980
0993 1 4C80 0963          BSC  I  PNCH        RETURN                       30E09990
                          *                                                30E10000
0995 0 C011         PUNEN LD       COLND       GET NUM COLUMNS              30E10010
0996 1 D400 0AF6          STO  L  COLCT       COL COUNT SHOULD BE          30E10020
0998 1 C400 0626          LD   L  PUNCH       LAST ADDRESSS                30E10030
099A 0 90C6               S       PBGAD       BEGIN ADDR                   30E10040
099B 1 8400 087C          A    L  K0001                                    30E10050
099D 1 D400 0AF4          STO  L  COL         COL COUNT WAS                30E10060
099F 0 6106               LDX     1 6         MSG NO                       30E10070
09A0 0 6600 01A0          LDX  L2 /01A0       DATA ID                      30E1008C
09A2 1 6700 0B46          LDX  L3 ACCER       COL COUNT ERROR              30E10090
09A4 1 4400 0AD5          BSI  L  ETYPE                                    30E10100
09A6 0 70E6               MDX     PRTN                                     30E10110
                          *                                                30E10120
09A7 0 0000         COLND DC       0           SAVE DATA HOLDER             30E10130
                          *                                                30E10140
                          ************************************************ 30E10150
                          *           READ A CARD ROUTINE                  30E10160
                          ************************************************ 30E10170
```



```
                          *                                                30E10180
                          *           THIS ROUTINE READS A CARD INTO       30E10190
                          *           THE READ AREA.                       30E10200
                          *-------------------------------------------------30E10210
                          *                                                30E10220
                          *                                                30E10230
09A8 0 0000         RAREA DC       *-*         WORD COUNT                   30E10240
09A9   0050               BSS      80          AREA                         30E10250
09F9 0 0001               DC       /0001       TERMINATOR FOR LENGTH        30E10260
09FA 0 0000         RDACD DC       *-*         RETURN ADDR                  30E10270
09FB 0 6500 2501          LDX  L1 /2501        MACH TYPE                    30E10280
09FD 1 6D00 0AF7          STX  L1 MACH                                     30E10290
09FF 1 C400 087C          LD   L  K0001        TO CLEAR READ AREA TO        30E10300
0A01 0 6150               LDX     1 80         ALL TERMINATORS              30E10310
0A02 1 D500 09A8    RDACR STO  L1 RAREA                                    30E10320
0A04 0 71FF               MDX     1 -1                                     30E10330
0A05 0 70FC               MDX     RDACR                                    30E10340
0A06 1 C480 09FA          LD   I  RDACD        FETCH NO OF COLS             30E10350
0A08 1 D400 09A8          STO  L  RAREA        STO AT WORD COUNT            30E10360
0A0A 1 7401 09FA          MDX  L  RDACD,+1     TO RETURN                    30E10370
0A0C 1 0C00 062C          XIO  L  IREAD        INITIATE READ                30E10380
0A0E 1 4400 069C          BSI  L  WAIT         WAIT FOR OP COMP             30E10390
                    **            CHECK FOR UNUSUAL END                    30E10400
0A10 1 6580 09A8          LDX  I1 RAREA        ADDR OF LAXT CHAR            30E10410
0A12 1 C500 09A8          LD   L1 RAREA        LOAD LAST CHAR               30E10420
0A14 1 4C04 0A1B          BSC  L  RUNEN,E      BR IF TERM STILL THERE       30E10430
0A16 0 7101               MDX     1 +1         TO NEXT CHAR                 30E10440
0A17 1 C500 09A8          LD   L1 RAREA        POSITION AFTER LAST CHAR     30E10450
0A19 1 4C84 09FA          BSC  I  RDACD,E      BR IF TERM NOT THERE         30E10460
0A1B 1 6580 09A8    RUNEN LDX  I1 RAREA        NO OF COLUMNS                30E10470
0A1D 1 6D00 0AF6          STX  L1 COLCT        SHOULD BE                    30E10480
0A1F 0 6150               LDX     1 80                                     30E10490
0A20 1 C500 09A8    RELD  LD   L1 RAREA        FIND LAST CHAR READ          30E10500
0A22 1 4C04 0A2F          BSC  L  RERFN,E      BR IF NOT LAST CHAR          30E10510
0A24 1 6D00 0AF4    RENON STX  L1 COL          COL COUNT WAS                30E10520
0A26 0 6107               LDX     1 7          MSG NO                       30E10530
0A27 0 6600 01A0          LDX  L2 /01A0        DATA ID                      30E10540
0A29 1 6700 0B46          LDX  L3 ACCER        COL COUNT ERROR              30E10550
0A2B 1 4400 0AD5          BSI  L  ETYPE                                    30E10560
0A2D 1 4C80 09FA          BSC  I  RDACD        RETURN TO TEST ROUTINE       30E10570
                          *                                                30E10580
0A2F 0 71FF         RERFN MDX     1 -1                                     30E10590
0A30 0 70EF               MDX     RELD                                     30E10600
0A31 0 70F2               MDX     RENON                                    30E10610
                          *                                                30E10620
                          ************************************************ 30E10630
                          *****         WRITE AREA FOR PUNCH               30E10640
                          ************************************************ 30E10650
                          *                                                30E10660
0A32 0 8010         WAREA DC       /8010       COLUMN 1                     30E10670
0A33 0 4020               DC       /4020                                    30E10680
0A34 0 2040               DC       /2040                                    30E10690
0A35 0 1080               DC       /1080                                    30E10700
0A36 0 0900               DC       /0900                                    30E10710
0A37 0 0600               DC       /0600                                    30E10720
0A38 0 0600               DC       /0600                                    30E10730
0A39 0 0900               DC       /0900                                    30E10740
0A3A 0 1080               DC       /1080                                    30E10750
0A3B 0 2040               DC       /2040                                    30E10760
0A3C 0 4020               DC       /4020                                    30E10770
0A3D 0 8010               DC       /8010                                    30E10780
0A3E 0 FFF7               DC       /FFF7                                    30E10790
0A3F 0 8880               DC       /8880                                    30E10800
0A40 0 CCC0               DC       /CCC0                                    30E10810
0A41 0 EEE0               DC       /EEE0                                    30E10820
0A42 0 FFF0               DC       /FFF0                                    30E10830
0A43 0 7777               DC       /7777                                    30E10840
0A44 0 3333               DC       /3333                                    30E10850
```

```
0A45 0 1111              DC    /1111                          30E10860
0A46 0 FFF7              DC    /FFF7    COL 21                30E10870
0A47 0 A000              DC    /A000                          30E10880
0A48 0 9000              DC    /9000    ALPHA RIPPLE          30E10890
0A49 0 8800              DC    /8800                          30E10900
0A4A 0 8400              DC    /8400                          30E10910
0A4B 0 8200              DC    /8200    COL 26                30E10920
0A4C 0 8100              DC    /8100                          30E10930
0A4D 0 8080              DC    /8080                          30E10940
0A4E 0 8040              DC    /8040                          30E10950
0A4F 0 8020              DC    /8020                          30E10960
0A50 0 8010              DC    /8010                          30E10970
0A51 0 5000              DC    /5000                          30E10980
0A52 0 4800              DC    /4800                          30E10990
0A53 0 4400              DC    /4400                          30E11000
0A54 0 4200              DC    /4200                          30E11010
0A55 0 4100              DC    /4100                          30E11020
0A56 0 4080              DC    /4080                          30E11030
0A57 0 4040              DC    /4040                          30E11040
0A58 0 4020              DC    /4020                          30E11050
0A59 0 4010              DC    /4010    COL 40 WAREA+39       30E11060
0A5A 0 3000              DC    /3000                          30E11070
0A5B 0 2800              DC    /2800                          30E11080
0A5C 0 2400              DC    /2400                          30E11090
0A5D 0 2200              DC    /2200                          30E11100
0A5E 0 2100              DC    /2100                          30E11110
0A5F 0 2080              DC    /2080                          30E11120
0A60 0 2040              DC    /2040                          30E11130
0A61 0 2020              DC    /2020                          30E11140
0A62 0 2010              DC    /2010                          30E11150
0A63 0 0000              DC    /0000                          30E11160
0A64 0 FC00              DC    /FC00                          30E11170
0A65 0 03F0              DC    /03F0                          30E11180
0A66 0 FC00              DC    /FC00                          30E11190
0A67 0 03F0              DC    /03F0                          30E11200
0A68 0 0000              DC    /0000                          30E11210
0A69 0 8887              DC    /8887                          30E11220
0A6A 0 4444              DC    /4444                          30E11230
0A6B 0 2222              DC    /2222                          30E11240
0A6C 0 1111              DC    /1111                          30E11250
0A6D 0 0007              DC    /0007                          30E11260
0A6E 0 8880              DC    /8880                          30E11270
0A6F 0 CCC4              DC    /CCC4                          30E11280
0A70 0 AAA2              DC    /AAA2                          30E11290
0A71 0 9991              DC    /9991                          30E11300
0A72 0 4444              DC    /4444                          30E11310
0A73 0 6666              DC    /6666                          30E11320
0A74 0 5555              DC    /5555                          30E11330
0A75 0 2222              DC    /2222                          30E11340
0A76 0 3333              DC    /3333                          30E11350
0A77 0 1111              DC    /1111                          30E11360
0A78 0 0005              DC    /0005    CHECK PCH TERM        30E11370
0A79 0 0006              DC    /0006                          30E11380
0A7A 0 FFF7              DC    /FFF7                          30E11390
0A7B 0 FFF7              DC    /FFF7                          30E11400
0A7C 0 FFF7              DC    /FFF7                          30E11410
0A7D 0 FFF0              DC    /FFF0                          30E11420
0A7E 0 FFF0              DC    /FFF0                          30E11430
0A7F 0 FFF0              DC    /FFF0                          30E11440
0A80 0 FFF0              DC    /FFF0                          30E11450
0A81 0 0000              DC    /0000                          30E11460
0A82 0 8010        WARA2 DC    /8010    COL 1                 30E11470
0A83 0 4020              DC    /4020                          30E11480
0A84 0 2040              DC    /2040                          30E11490
0A85 0 1080              DC    /1080                          30E11500
0A86 0 0900              DC    /0900                          30E11510
0A87 0 0600              DC    /0600                          30E11520
0A88 0 0600              DC    /0600                          30E11530
```



```
0A89 0 0900              DC    /0900                          30E11540
0A8A 0 1080              DC    /1080                          30E11550
0A8B 0 2040              DC    /2040                          30E11560
0A8C 0 4020              DC    /4020                          30E11570
0A8D 0 8010              DC    /8010                          30E11580
0A8E 0 FFF7              DC    /FFF7                          30E11590
0A8F 0 8880              DC    /8880                          30E11600
0A90 0 CCC0              DC    /CCC0                          30E11610
0A91 0 EEE0              DC    /EEE0                          30E11620
0A92 0 FFF0              DC    /FFF0                          30E11630
0A93 0 7777              DC    /7777                          30E11640
0A94 0 3333              DC    /3333                          30E11650
0A95 0 1111              DC    /1111                          30E11660
0A96 0 FFF7              DC    /FFF7    COL 21                30E11670
0A97 0 A000              DC    /A000                          30E11680
0A98 0 9000              DC    /9000    ALPHA RIPPLE          30E11690
0A99 0 8800              DC    /8800                          30E11700
0A9A 0 8400              DC    /8400                          30E11710
0A9B 0 8200              DC    /8200    COL 26                30E11720
0A9C 0 8100              DC    /8100                          30E11730
0A9D 0 8080              DC    /8080                          30E11740
0A9E 0 8040              DC    /8040                          30E11750
0A9F 0 8020              DC    /8020                          30E11760
0AA0 0 8010              DC    /8010                          30E11770
0AA1 0 5000              DC    /5000                          30E11780
0AA2 0 4800              DC    /4800                          30E11790
0AA3 0 4400              DC    /4400                          30E11800
0AA4 0 4200              DC    /4200                          30E11810
0AA5 0 4100              DC    /4100                          30E11820
0AA6 0 4080              DC    /4080                          30E11830
0AA7 0 4040              DC    /4040                          30E11840
0AA8 0 4020              DC    /4020                          30E11850
0AA9 0 4010              DC    /4010    COL 40 WAREA+39       30E11860
0AAA 0 3000              DC    /3000                          30E11870
0AAB 0 2800              DC    /2800                          30E11880
0AAC 0 2400              DC    /2400                          30E11890
0AAD 0 2200              DC    /2200                          30E11900
0AAE 0 2100              DC    /2100                          30E11910
0AAF 0 2080              DC    /2080                          30E11920
0AB0 0 2040              DC    /2040                          30E11930
0AB1 0 2020              DC    /2020                          30E11940
0AB2 0 2010              DC    /2010                          30E11950
0AB3 0 0000              DC    /0000                          30E11960
0AB4 0 FC00              DC    /FC00                          30E11970
0AB5 0 03F0              DC    /03F0                          30E11980
0AB6 0 FC00              DC    /FC00                          30E11990
0AB7 0 03F0              DC    /03F0                          30E12000
0AB8 0 0000              DC    /0000                          30E12010
0AB9 0 8887              DC    /8887                          30E12020
0ABA 0 4444              DC    /4444                          30E12030
0ABB 0 2222              DC    /2222                          30E12040
0ABC 0 1111              DC    /1111                          30E12050
0ABD 0 0007              DC    /0007                          30E12060
0ABE 0 8880              DC    /8880                          30E12070
0ABF 0 CCC4              DC    /CCC4                          30E12080
0AC0 0 AAA2              DC    /AAA2                          30E12090
0AC1 0 9991              DC    /9991                          30E12100
0AC2 0 4444              DC    /4444                          30E12110
0AC3 0 6666              DC    /6666                          30E12120
0AC4 0 5555              DC    /5555                          30E12130
0AC5 0 2222              DC    /2222                          30E12140
0AC6 0 3333              DC    /3333                          30E12150
0AC7 0 1111              DC    /1111                          30E12160
0AC8 0 0005              DC    /0005    CHECK PCH TERM        30E12170
0AC9 0 0006              DC    /0006                          30E12180
0ACA 0 FFF7              DC    /FFF7                          30E12190
0ACB 0 FFF7              DC    /FFF7                          30E12200
0ACC 0 FFF7              DC    /FFF7                          30E12210
```

```
0ACD 0 FFF0                DC      /FFF0                                   30E12220
0ACE 0 FFF0                DC      /FFF0                                   30E12230
0ACF 0 FFF0                DC      /FFF0                                   30E12240
0AD0 0 FFF0                DC      /FFF0                                   30E12250
0AD1 0 0000          COL80 DC      /0000                                   30E12260
                     *                                                     30E12270
0AD2 1 0AD1          WAREN DC      COL80                                   30E12280
                     *                                                     30E12290
                     ***********************************************       30E12300
                     *             MESSAGE OUT SUBROUTINE                  30E12310
                     ***********************************************       30E12320
                     *                                                     30E12330
                     *             THIS ROUTINE HANDLES LOG AND            30E12340
                     *             ERROR MESSAGES. LINKAGE TO EITHER       30E12350
                     *             ROUTINE VIA BSI WITH MESSAGE NUM        30E12360
                     *             IN XR1, DATA ID WORD IN XR2, AND        30E12370
                     *             ALPHA1 ADDRESS IN XR3. IF ALPHA2        30E12380
                     *             ADDRESS IS REQUIRES, IT MUST BE         30E12390
                     *             SET UP IN MAINLINE.                     30E12400
                     *-----------------------------------------------      30E12410
                     *                                                     30E12420
                     *                                                     30E12430
0AD3 0 8000          K8000 DC      /8000                                   30E12440
0AD4 0 0000          LN1SW DC      *-*       FIRST LINE SWITCH             30E12450
                     *                                                     30E12460
0AD5 0 0000          ETYPE DC      *-*                                     30E12470
0AD6 0 6913                STX   1 MSGNO                                   30E12480
0AD7 0 6A14                STX   2 DATID                                   30E12490
0AD8 0 6814                STX   3 ALPH1                                   30E12500
0AD9 1 7400 0AD4           MDX   L LN1SW,0   SKIP IF FIRST LINE           30E12510
0ADB 0 7008                MDX     ETYP2     BR IF 2ND LINE                30E12520
0ADC 0 4480 0162     ETYP3 BSI   I ERROR                                   30E12530
0ADE 1 0AEA                DC      MSGNO                                   30E12540
0ADF 0 0000          REPT3 DC      *-*       LOOP ADDRESS                  30E12550
0AE0 0 1010                SLA     16        CLEAR ALPH2                   30E12560
0AE1 0 D00C                STO     ALPH2     FOR NEXT MAG                  30E12570
0AE2 1 4C80 0AD5           BSC   I ETYPE                                   30E12580
                     *                                                     30E12590
0AE4 0 C007          ETYP2 LD      DATID     FOR 2ND LINE                  30E12600
0AE5 0 E8ED                OR      K8000     ADD MULT LINE BIT             30E12610
0AE6 0 D005                STO     DATID                                   30E12620
0AE7 0 1010                SLA     16                                      30E12630
0AE8 0 D004                STO     ALPH1     CLEAR HEADING                 30E12640
0AE9 0 70F2                MDX     ETYP3                                   30E12650
                     *                                                     30E12660
                     *-----------------------------------------------      30E12670
                     *             MESSAGE AREA                            30E12680
                     *-----------------------------------------------      30E12690
                     *                                                     30E12700
0AEA 0 0000          MSGND DC      *-*       MESSAGE NUMBER                30E12710
0AEB 0 00E0                DC      /00E0     HEX-DEC SWITCH                30E12720
0AEC 0 0000          DATID DC      *-*       DATA ID                       30E12730
0AED 0 0000          ALPH1 DC      *-*       ALPHA ADDRESS 1               30E12740
0AEE 0 0000          ALPH2 DC      *-*       ALPHA ADRESS 2                30E12750
0AEF 0 0000          WAS0  DC      *-*       DSW LEVEL 0 WAS               30E12760
0AF0 0 0000          WAS4  DC      *-*       DSW LEVEL 4 WAS               30E12770
0AF1 0 0000          WASI  DC      *-*       DSW INITIALLY WAS             30E12780
0AF2 0 0000          WASD  DC      *-*       DATA WAS                      30E12790
0AF3 0 0000          02BE  DC      *-*       DSW SHOULD BE                 30E12800
0AF4 0 0000          COL   DC      *-*       ERROR COLUMN                  30E12810
0AF5 0 0000          WDCNT DC      *-*       WORD COUNT                    30E12820
0AF6 0 0000          COLCT DC      *-*       COLUMN COUNT S/B              30E12830
0AF7 0 0000          MACH  DC      *-*       MACHINE TYPE                  30E12840
                     *                                                     30E12850
                     *                                                     30E12860
0AF8 0 0000          TYPE  DC      *-*                                     30E12870
0AF9 0 69F0                STX   1 MSGNO                                   30E12880
0AFA 0 6AF1                STX   2 DATID                                   30E12890
```



```
0AFB 0 6BF1                STX   3 ALPH1                                   30E12900
0AFC 0 4480 0163           BSI   I LOG                                     30E12910
0AFE 1 0AEA                DC      MSGNO                                   30E12920
0AFF 0 1010                SLA     16                                      30E12930
0B00 0 D0ED                STO     ALPH2                                   30E12940
0B01 1 4C80 0AF8           BSC   I TYPE                                    30E12950
                     *                                                     30E12960
                     ***********************************************       30E12970
                     *****          MESSAGE AREA ******************       30E12980
                     ***********************************************       30E12990
                     *                                                     30E13000
                     *                                                     30E13010
0B03 0 5E3E          ALCD  DC      /5E3E     LAST CARD                     30E13020
0B04 0 9A9E                DC      /9A9E     ST                            30E13030
0B05 0 211E                DC      /211E      C                            30E13040
0B06 0 3E62                DC      /3E62     AR                            30E13050
0B07 0 3221                DC      /3221     D                             30E13060
0B08 0 FFFF                DC      /FFFF                                   30E13070
                     *                                                     30E13080
                     *                                                     30E13090
0B09 0 7662          ANRDY DC      /7662     NRDY                          30E13100
0B0A 0 32A6                DC      /32A6     DY                            30E13110
0B0B 0 FFFF                DC      /FFFF                                   30E13120
                     *                                                     30E13130
0B0C 0 5E36          ALVL4 DC      /5E36     LEVEL 4                       30E13140
0B0D 0 B636                DC      /B636     VE                            30E13150
0B0E 0 5E21                DC      /5E21     L                             30E13160
0B0F 0 F000                DC      /F000     4                             30E13170
0B10 0 FFFF                DC      /FFFF                                   30E13180
                     *                                                     30E13190
0B11 0 5E36          ALVLO DC      /5E36     LEVEL 0                       30E13200
0B12 0 B636                DC      /B636     VE                            30E13210
0B13 0 5E21                DC      /5E21     L                             30E13220
0B14 0 C400                DC      /C400     0                             30E13230
0B15 0 FFFF                DC      /FFFF                                   30E13240
                     *                                                     30E13250
0B16 0 923E          ADSWE DC      /923E     WAS  S/B  DSW ERR             30E13260
0B17 0 9A21                DC      /9A21     S                             30E13270
0B18 0 219A                DC      /219A      S                            30E13280
0B19 0 BC1A                DC      /BC1A     /B                            30E13290
0B1A 0 2121                DC      /2121                                   30E13300
0B1B 0 329A                DC      /329A     DS                            30E13310
0B1C 0 9221                DC      /9221     W                             30E13320
0B1D 0 3662                DC      /3662     ER                            30E13330
0B1E 0 6200                DC      /6200     R                             30E13340
0B1F 0 FFFF                DC      /FFFF                                   30E13350
                     *                                                     30E13360
0B20 0 2276          AINIT DC      /2276     INITIALIZING                  30E13370
0B21 0 229E                DC      /229E     IT                            30E13380
0B22 0 223E                DC      /223E     IA                            30E13390
0B23 0 5E22                DC      /5E22     LI                            30E13400
0B24 0 A222                DC      /A222     ZI                            30E13410
0B25 0 7616                DC      /7616     NG                            30E13420
0B26 0 FFFF                DC      /FFFF                                   30E13430
                     *                                                     30E13440
0B27 0 923E          ADTAE DC      /923E     WAS  S/B  COL  DATA ERR       30E13450
0B28 0 9A21                DC      /9A21     S                             30E13460
0B29 0 219A                DC      /219A      S                            30E13470
0B2A 0 BC1A                DC      /BC1A     /B                            30E13480
0B2B 0 2121                DC      /2121                                   30E13490
0B2C 0 1E52                DC      /1E52     CO                            30E13500
0B2D 0 5E21                DC      /5E21     L                             30E13510
0B2E 0 2132                DC      /2132      D                            30E13520
0B2F 0 3E9E                DC      /3E9E     AT                            30E13530
0B30 0 3E21                DC      /3E21     A                             30E13540
0B31 0 3662                DC      /3662     ER                            30E13550
0B32 0 6221                DC      /6221     R                             30E13560
0B33 0 FFFF                DC      /FFFF                                   30E13570
```

```
                        *                                                   30E13580
0B34 0 9A36     ASETP DC        /9A36       SET PATT IN SW 0-11             30E13590
0B35 0 9E21           DC        /9E21       T                               30E13600
0B36 0 563E           DC        /563E       PA                              30E13610
0B37 0 9E9E           DC        /9E9E       TT                              30E13620
0B38 0 2122           DC        /2122        I                              30E13630
0B39 0 7621           DC        /7621       N                               30E13640
0B3A 0 9A92           DC        /9A92       SW                              30E13650
0B3B 0 21C4           DC        /21C4        0                              30E13660
0B3C 0 84FC           DC        /84FC       -1                              30E13670
0B3D 0 FC21           DC        /FC21       1                               30E13680
0B3E 0 9E26           DC        /9E26       THEN TN SW 12                   30E13690
0B3F 0 3676           DC        /3676       EN                              30E13700
0B40 0 219E           DC        /219E        T                              30E13710
0B41 0 7621           DC        /7621       N                               30E13720
0B42 0 9A92           DC        /9A92       SW                              30E13730
0B43 0 21FC           DC        /21FC        1                              30E13740
0B44 0 D821           DC        /D821       2                               30E13750
0B45 0 FFFF           DC        /FFFF                                       30E13760
                        *                                                   30E13770
0B46 0 923E     ACCER DC        /923E       WAS  S/B  COL COUNT ERR         30E13780
0B47 0 9A21           DC        /9A21       S                               30E13790
0B48 0 219A           DC        /219A        S                              30E13800
0B49 0 BC1A           DC        /BC1A       /B                              30E13810
0B4A 0 2121           DC        /2121                                       30E13820
0B4B 0 1E52           DC        /1E52       CO                              30E13830
0B4C 0 5E21           DC        /5E21       L                               30E13840
0B4D 0 1E52           DC        /1E52       CO                              30E13850
0B4E 0 B276           DC        /B276       UN                              30E13860
0B4F 0 9E21           DC        /9E21       T                               30E13870
0B50 0 3662           DC        /3662       ER                              30E13880
0B51 0 6221           DC        /6221       R                               30E13890
0B52 0 FFFF           DC        /FFFF                                       30E13900
                        *                                                   30E13910
0B53 0 7652     ANINT DC        /7652       NO INTRPT                       30E13920
0B54 0 2122           DC        /2122        I                              30E13930
0B55 0 769E           DC        /769E       NT                              30E13940
0B56 0 6256           DC        /6256       RP                              30E13950
0B57 0 9E21           DC        /9E21       T                               30E13960
0B58 0 FFFF           DC        /FFFF                                       30E13970
                        *                                                   30E13980
0B59 0 5E52     ALDMR DC        /5E52       LOAD AND MAKE RDY               30E13990
0B5A 0 3E32           DC        /3E32       AD                              30E14000
0B5B 0 213E           DC        /213E        A                              30E14010
0B5C 0 7632           DC        /7632       ND                              30E14020
0B5D 0 2172           DC        /2172        M                              30E14030
0B5E 0 3E5A           DC        /3E5A       AK                              30E14040
0B5F 0 3621           DC        /3621       E                               30E14050
0B60 0 6232           DC        /6232       RD                              30E14060
0B61 0 A621           DC        /A621       Y                               30E14070
0B62 0 FFFF           DC        /FFFF                                       30E14080
0B64   05E8           END       BGIN                                        30E14090
 NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```


C R O S S R E F E R E N C E

NAME	VALUE	REFERENCES
ACCER	0B46	09A2,0A29
ADSWE	0B16	0672,068E,08B6,08F2
ADTAE	0B27	071F,0783,081A
AINIT	0B20	08B2,08EE
ALCD	0B03	0911,0940
ALDMR	0B59	0885,08C7
ALPH1	0AED	0AD8,0AE8,0AFB
ALPH2	0AEE	0670,068C,06BC,08B4,08F0,0AE1,0B00
ALVLO	0B11	068A
ALVL4	0B0C	066E,066A
ANINT	0B53	06BE
ANRDY	0B09	0927,0956
ASETP	0B34	0799,07DA
BEGIN	0160	05E8
BGIN	05E8	0B64
CHK14	0902	06D2,0748,07B9,0830,091F
CHK25	0933	06F3,0732,0741,0752,0760,07F2,0835,0845,0862,094E
CHRDY	0917	090A,092B
CNTRL	05FA	05F9,0683,0915,0944
CN10	05FE	
CN20	0605	05FC
CN30	060B	0600
COL	0AF4	070C,070E,077E,080F,099D,0A24
COLCT	0AF6	0996,0A1D
COLND	09A7	0976,0995
COL80	0AD1	0AD2
CRDYL	091B	092D
CRDYR	092D	0923
CWTFR	0921	091D
DATID	0AEC	0AD7,0AE4,0AE6,0AFA
DSWAN	065C	0644,064F
DSWEI	08A5	089B
DSWEO	067B	065D,0694
DSW1A	0630	05ED,063D
DSW4A	063F	05F1,0648
DSW4B	064A	05F5,0653
END	0164	0609
ERLCK	0166	
ERROR	0162	0ADC
ETYPE	0AD5	0674,0690,06C0,0721,0785,081C,08B8,08F4,09A4,0A2B,0AE2
ETYP2	0AE4	0ADB
ETYP3	0ADC	0AE9
EOLCC	0696	067E
EORTN	0692	0699
EOTYP	0680	069B
FDACD	0622	090C
IL0	017A	05EF
IL1	018A	
IL2	019A	
IL3	01AA	
IL4	01BA	05F3,05F7
INMSG	08AC	08BE
INPCH	087D	06C6,0746,0791,082C,0897,089D
INRDR	08BF	06E4,072E,073F,0750,07D2,082A,0843,0859,08D9,08DF
INRST	088C	08BA
INWAT	088E	
IRDYR	089F	08AE
IREAD	062C	0864,0A0C
IWTCT	0901	0890,08AC,08D2,08E8,0919,0921,0948,0950
KEFFE	0679	0664,08DB
KFFFE	0658	0899
KFFF0	0659	06FE,0712,076A,0777,0812
KFFF7	0656	07B2,0805,098F
K0000	087B	08BB,08F7
K0001	087C	08A9,08E5,0971,099B,09FF
K0008	0657	097B

```
K0050   065A  0738
K0800   0678  0661
K1000   067A  067C
K4003   0655  063A,0681,0684
K8000   0AD3  0AE5
LN1SW   0AD4  06F1,0727,075E,078B,07FB,0822,0AD9
LOG     0163  0AFC
LOGBY   0167
LRTN    0620  0615
MACH    0AF7  0880,08C2,0905,0936,0966,09FD
MLSCF   05E5  0610,0646,0651,06A2,06A5,07AD,07EE,086B,08A1,08FD,092F,095D
MSGNO   0AEA  0AD6,0ADE,0AF9,0AFE
NCOL1   06D7
NCOL3   0736  0731,0737,073C
NCOL6   07C4  07C0,07CE
NCOL7   07FF  07F9,0800,0827
NRTN    0619  0616
O2BE    0AF3  0669,0685,0714,0779,0814,08AA,08BC,08E6,08F8
PBGAD   0961  096C,099A
PCHA1   06D6  06D1,06D9
PCHST   0624  097F
PID     05DC  05EA
PNCH    0963  06D4,074A,07C1,083D,0968,096D,096F,0974,0977,098B,0993
PRTN    098D  09A6
PUNCH   0626  0635,0636,096A,0983,0987,0998
PUNEN   0995  0989
RAD     05DE  060F,06C2
RAREA   09A8  062C,06FB,0716,074C,0758,0766,0771,0802,083F,084B,0A02,0A08,0A10
              0A12,0A17,0A1B,0A20
RCHRD   0946  093B,095A
RCRDY   094A  095B
RCRYR   095B  0952
RCWTF   0950  094C
RDACD   09FA  06F5,0734,0743,0754,0762,07FD,0837,0847,0A06,0A0A,0A19,0A2D
RDACR   0A02  0A05
RDSWE   08E1  08DD
RDYER   08BB  08A7
RELD    0A20  0A30
RENON   0A24  0A31
REPT3   0ADF
RERFN   0A2F  0A22
RID     05DD  05EC,05FE,0604,0605,0607,060B,0681
RIDCK   0615  05FF
RINMS   08E8  08FA
RINRS   08CE  08F6
RINWA   08D0
RIRDY   08FB  08EA
RLCF    0168
RQKB    01BC
RQTY    01BB
RRDYE   08F7  08E3
RTA     0859  0620
RTAA    0862  0879
RTAA1   0866  0869
RTAB    086D  086F
RTAC    0878  0873
RTADC   0858  0861,086D,0878
RTAPC   0857  0860,0875,0877
RTASW   0856  085B,0872
RTNOM   0616  0608
RTNSW   0165  0611
RTTBL   0617  060D,0615,0616
RT1     06C6  0617
RT1A    06C9  06CE
RT1B    06D2  06D8,06DF
RT1C    06C8  06E1
RT2     06E4  0618
RT2A    06E7  06EC
```



```
RT2B    06FB  0704
RT2C    06F0  070B
RT2CC   06E2  0705
RT2CS   06E3  06EF,06F9,0706,0709
RT2D    06ED  0707
RT2DA   070C  0700
RT2D1   0729  071A
RT2D2   072B  071B
RT2E    0702  072D
RT2F    0705  0725
RT3     072E  0619
RT3A    0732  073E
RT3D    0730  073A
RT3E    0737
RT4     073F  061A
RT4A    0748  074F
RT5     0750  061B
RT5A    0758  075D
RT5B    075E  0770,0789
RT5C    0766  076F
RT5D    0771  076C
RT5D1   078D  077B
RT5E    076E  078F
RT6     0791  061C
RT6A    0793  07AA
RT6B    07A1  07AB,07CB
RT6C    07AB  07A9
RT6D    07B1  07A6
RT6E    07B5  07B8
RT6F    07B9  07CD
RT6G    07C1  07D0
RT6H    07CE  07BD
RT6SW   0790  079D,07A3,07B1,07C8
RT7     07D2  061D
RT7A    07D4  07E8
RT7B    07E2  07EC
RT7C    07EC  07EA
RT7D    07F2  07E7,080B,0820
RT7E    0802  080A
RT7F    080C  0807
RT7FR   0809  0826
RT7F1   0824  0816
RT7G    07FD  0828
RT7H    0827  07F6
RT7SW   07D1  07DE,07E4,0804,080C,0811
RT8     082A  061E
RT8A    0830  0842
RT8SA   0829  082F,0832,083C
RT9     0843  061F
RT9A    0845
RT9B    084B  0850
RUNEN   0A1B  0A14
RWATF   08D4  08FB
SNSWS   062E  079F,07A1,07C6,07E0,07E2,085D,0870
SNS1    0628  0631,0640,088C,0892,091B
SNS2    062A  064B,0866,08CE,08D4,094A
START   0161  0613,06A7,06AF,06B5,07AF,07F0
STRT    05EB  05E3,05E4,05E5,0854
SVKB    01BD
SW0     05DF
SW1     05E0  05FB,0603,06AD,0852
SW2     05E1  07BB,07F4
SW3     05E2  0723,0787,081E
TERAD   0962  06DB,0973,0979,097D,0985,098D,0991
TYPE    0AF8  079B,07DC,0887,08C9,0913,0929,0942,0958,0B01
WAIT    069C  0662,0665,0676,0981,0A0E
WAIT1   06A0  06AB
WAIT2   06A5  06C4
```

```
        WAIT3   06A9  06A0
        WAIT4   06AD  06A4,08A3,08FF,0931,095F
        WAIT5   06B7  06AC
        WARA2   0A82  06C9,06E2,06E7,084D
        WAREA   0A32  0626,06CB,06CF,06E9,06ED,075A,0768,0775,07B5,07C3,07C9,0962
        WAREN   0AD2  06DD
        WASD    0AF2  0718,0773,080D
        WASI    0AF1  0894,08A5,08D6,08E1
        WASO    0AEF  0632,0638,0682
        WAS4    0AF0  0641,064C,065F,0667,0696,0833,083A,088A,08CC,0907,0938
        WATFR   0892  089F
        WCNT    06C5  059F,06A9
        WDCNT   0AF5
        WTCNT   087A  0795,07A7,07D6,07E8
        XERR    065B  0638,063C,065C,0680,0693

        END OF ASSEMBLY
```

---------- LAST PAGE ----------

TABLE OF CONTENTS

1. PURPOSE

THE 1442 CARD READ/PUNCH DIAGNOSTIC PROGRAM CHECKS THE OPERATING PERFORMANCE OF THE 1442 CARD READ/PUNCH.

2. PREREQUISITES

2.1*** PROGRAM PREREQUISITES

1130 DIAGNOSTIC MONITOR II.

2.2*** EQUIPMENT PREREQUISITES

THE FOLLOWING EQUIPMENT IS REQUIRED.

A. 1131 CENTRAL PROCESSING UNIT (CPU) WITH PROGRAM LOAD FROM CARD OR PAPER READER.
B. 1442 CARD READ/PUNCH MOD 6 OR 7.
C. AT LEAST 1400 WORDS OF AVAILABLE CORE STORAGE.

****

3. OPERATING PROCEDURE

THESE OPERATING PROCEDURES APPLY TO SINGLE PROGRAM OPERATION ONLY. FOR OVERLAP OPERATION REFER TO SECTION 3.2.3 OF THE 1130 DIAGNOSTIC MONITOR II DOCUMENTATION.

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY

THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO SPECIFY OPTIONS BEFORE RUNNING.

   IF HALTED AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).
3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. SELECT PROGRAM OPTIONS, IF DESIRED.

****

3.2*** PROGRAM OPERATION.

3.2.1 PROGRAM CONTROL OPTIONS - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	SINGLE CYCLE CONTROL AND ROUTINE START MESSAGE
10	LOCK ON FUNCTION
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED.

1. TO SET ROUTINE SELECTION
   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN		DESCRIPTION	
1		PUNCH AND FEED	NORMAL ROUTINES-
2		READ ROTATE PATTERN	THE PROGRAM STARTS WITH
3		PUNCH 40 COLUMNS	ROUTINE 1, RUNS EACH
4		PUNCH FLIPPED PATTERN	ROUTINE IN SEQUENCE
5		READ FLIPPED PATTERN	THEN TERMINATES AFTER
6	*	CLUTCH TEST	ROUTINE 6.
7	*	PUNCH FROM SWITCHES	OPTIONAL ROUTINES
8		GANG PUNCH	THESE ROUTINES RUN ONLY IF SELECTED.

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION SET AS IF SELECTING ROUTINE ZERO.

3.2.3 OPTIONAL CONTROL

1. SELECT CLUTCH DELAY

   IN THE CLUTCH TEST (RTN 6) THE DELAY BETWEEN START READ COMMANDS CAN BE SPECIFIED BY THE SWITCHES. TO DO THIS, SET SWITCHES 0-7 TO 81, 8-15 FOR THE DESIRED DELAY, THEN PRESS THE INTERRUPT REQUEST KEY. EACH BINARY INCREMENT SET IN THE SWITCHES INCREASES THE DELAY BY 8 MILLISECONDS.

2. PUNCH FROM SWITCHES

   ROUTINE 7 WILL PUNCH ALL CARDS WITH THE PATTERN SET IN SWITCHES 0-11. AFTER THE ROUTINE IS SELECTED, FOLLOW INSTRUCTIONS IN THE SET UP MESSAGE. THE NUMBER OF COLUMNS TO BE PUNCHED CAN BE SPECIFIED BY A SWITCH ENTRY WITH THE SWITCHES SET TO 81XX WHERE XX EQUALS THE NUMBER OF COLUMNS IN HEX.

3. MODIFY PUNCH DATA

   ROUTINE 9 WILL READ IN ONE CARD AND REPLACE THE PUNCH DATA TABLE WITH THE DATA PATTERN PUNCHED IN THAT CARD. THE PROGRAM WILL THEN AUTOMATICALLY RESTART FROM ROUTINE 1.

****

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE-PRESS START

***

3.3.2 ERROR HALTS

HALT NO. (B REG).	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER

****

3.4**** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 6. ROUTINE 7,8 AND 9 WILL RUN ONLY IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

3.5**** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.
   ****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

APPNN OORR AAAA (MESSAGE)
OR
EPPNN OORR AAAA (MESSAGE)

WHERE A IDENTIFIES STATUS MESSAGES
E IDENTIFIES ERROR MESSAGES
PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE

THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY MONITOR OR OF FOR MESSAGES ORIGINATED BY THIS PROGRAM.

NN IS THE MESSAGE SEQUENCE NUMBER
RR IS THE ROUTINE NUMBER
AAAA IS THE ADDRESS OF THE ROUTINE
MESSAGE IS ANY VARIABLE INFORMATION

4.1**** STATUS MESSAGES

A0000 NUM PID ADRS RELF LD
XXXX XXXX XXXX XXXX

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001 SWS PID
XXXX XXXX

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM THE WORD HALT WILL FOLLOW THE MESSAGE.

A0F00 000R AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A0F01 000R AAAA LOAD BLANKS

LOAD THE 1442 HOPPER WITH BLANK CARDS THEN PRESS 1442 START.

A0F02 000R AAAA LOAD FROM STK2

LOAD THE CARDS IN STACKER 2 (PUNCHED BY PREVIOUS ROUTINE) IN THE 1442 HOPPER, THEN PRESS 1442 START. THIS DECK WAS PUNCHED WITH A ROTATING PATTERN. IT MUST BE LOADED IN THE SAME ORDER AS PUNCHED. THERE MUST BE NO CARDS MISSING FROM THE DECK.

A0F03 000R AAAA LOAD ANY PATTERN PLUS BLANKS

IF ROUTINE 8 - THE PATTERN IN THE FIRST CARD WILL BE PUNCHED IN THE FOLLOWING BLANK CARDS.

IF ROUTINE 9 - THE ROTATE DATA TABLE WILL BE REPLACED BY THE PATTERN IN THE FIRST CARD. THE ROUTINE WILL THEN RESTART THE PROGRAM AT ROUTINE ONE.

A0F04 0006 AAAA LD GANG PUNCHED CARDS

LOAD ANY GANG PUNCHED DECK. THIS DECK CAN BE PUNCHED BY ROUTINE 8. THE FIRST CARD WILL BE READ AND ALL FOLLOWING CARDS COMPARED TO IT.

A0F05 000R AAAA NRDY - PRESS 1442 START

THIS MESSAGE WILL BE PRINTED IF THE 1442 IS NOT READY FOR ANY REASON. THE PROGRAM WILL LOOP WAITING FOR READY. TO CONTINUE, CLEAR ANY ERROR CONDITIONS AND MAKE THE 1442 READY.

A0F06 000R AAAA LAST CARD

THE LAST CARD INDICATOR WAS ON AT THE COMPLETION OF THE LAST 1442 CONTROL OPERATION. A FEED COMMAND WAS GIVEN TO RUN OUT THE LAST CARD. THE ROUTINE WILL THEN TERMINATE. IF NO ROUTINE HAS BEEN SELECTED, THE PROGRAM WILL ADVANCE TO THE NEXT ROUTINE. IF A ROUTINE HAS BEEN SELECTED, THE PROGRAM WILL RESTART THAT ROUTINE.

A0F07 0007 AAAA

SET PATT IN SW 0-11
THEN TN SW 12

THIS IS THE SET UP MESSAGE FOR ROUTINE 7. IT INSTRUCTS THE CE TO SET ANY DESIRED DATA PATTERN IN SWITCHES 0-11. WHEN SWITCH 12 IS TURNED ON, THIS PATTERN WILL BE PUNCHED. THE NUMBER OF COLUMNS PUNCHED CAN BE CONTROLLED BY A FUNCTION 2 SWITCH ENTRY WITH THE DESIRED NUMBER OF COLUMNS SET IN SWITCHES 8-15 (FOR SINGLE PROGRAM OPERATION SET SWITCHES TO 81XX WHERE XX EQUALS NUMBER OF COLUMNS IN HEX).

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE 1442 DSW

BIT	
0	READ RESPONSE
1	PUNCH RESPONSE
2	ERROR CHECK
3	LAST CARD
4	OPERATION COMPLETE
5	NOT USED
6	NOT USED
7	FEED CHECK AT READ STATION
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	BUSY
15	NOT READY OR BUSY

E0001

SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003

OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004

CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005

000N XXXX

THIS ERROR WILL OCCUR IS AN INTERRUPT OCCURS, BUT THE ILSW WAS NOT CORRECT. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSC. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E0F00 000R AAAA

CARD NOT BLANK

A PRE-PUNCHED CARD WAS DETECTED BY A PUNCH ROUTINE. THIS CARD WAS NOT PUNCHED BUT WAS REJECTED. THIS CARD WILL BE FEED OUT INTO STACKER 1.

E0F01 000R AAAA

WAS S/B - STATIC DSW ERR
XXXX 0000

A BIT, IN ADDITION TO NOT READY, WAS ON IN THE DSW WHEN IT WAS SENSED BEFORE GIVING A CONTROL COMMAND TO THE 1442. USE THE ABOVE DSW TABLE TO IDENTIFY THE BIT, THEN TAKE APPROPRIATE CORRECTIVE ACTION.

E0F02 000R AAAA

LAST OP - CCCC
WAS S/B - BUSY DSW ERR
XXXX 0003

THIS DSW WAS SENSED IMMEDIATELY AFTER THE 1442 CONTROL COMMAND WAS IDENTIFIED BY CCCC WAS GIVEN. THAT COMMAND SHOULD MAKE THE 1442 BUSY AND NOT READY. NO OTHER BITS SHOULD BE ON.

E0F03 000R AAAA

LAST OP - CCCC
DSW - NO INTRPT - LEV4
XXXX

NO OP COMPLETE INTERRUPT WAS RECEIVED FOLLOWING THE LAST CONTROL COMMAND, COMMAND, IDENTIFIED BY CCCC. THE COMMAND WAS RECEIVED BY THE 1442 IF AN E0F02 MESSAGE WAS NOT PRINTED.

E0F04 000R AAAA
WAS S/B - LEV0 DSW ERR
XXXX X003

THIS DSW WAS SENSED IN THE LEVEL ZERO INTERRUPT ROUTINE. THE RESPONSE FOR THE LAST CONTROL COMMAND (IDENTIFIED BY CCCC) SHOULD BE ON, TOGETHER WITH BUSY AND NOT READY.

E0F05 000R AAAA
LAST OP - CCCC
WAS S/B - LEV4 DSW ERR
XXXX X80X

THIS DSW WAS SENSED IN THE LEVEL 4 INTERRUPT ROUTINE. OP COMPLETE BIT SHOULD BE ON. THE LAST CARD AND NOT READY BITS MAY BE ON. ALL OTHER BITS SHOULD BE OFF.

E0F06 000R AAAA
LAST OP - PUNCH
WAS S/B - PCH CK
XXXX 0000

A PUNCH ECHO CHECK OCCURRED WHILE PUNCHING THE LAST CARD. XXXX IS THE PUNCH ECHO THAT WAS READ FROM THE 1442 BUFFER REGISTER FOLLOWING THE PUNCH CHECK. ANY BIT THAT IS ON THIS WORD IDENTIFIES A DESCREPANCY BETWEEN THE PUNCH DIE ECHO AND THE DATA WHICH WAS TO BE PUNCHED IN THE COLUMN. PUNCHING IS TERMINATED WHEN THIS ERROR IS DETECTED; THUS, THE ERROR OCCURRED IN THE LAST COLUMN PUNCHED. IF PUNCHING A ROTATE PATTERN DISCARD THE CARDS PUNCHED AND RESTART THE ROUTINE.

E0F07 000R AAAA
LAST OP - CCCC
WAS S/B - ER CK
XXXX 0000

AN ERROR CHECK OCCURRED DURING THE LAST OPERATION. IF THE LAST OPERATION WAS READ OR PUNCHED, THIS MESSAGE SHOULD BE FOLLOWED BY AN E0F08 MESSAGE WHICH WILL IDENTIFY THE NUMBER OF COLUMNS PROCESSED BEFORE THE ERROR WAS DETECTED. TO CONTINUE, CLEAR ALL CARDS FROM THE 1442 THEN PRESS START. IF PUNCHING A ROTATING PATTERN TO BE READ BY THE NEXT ROUTINE, DISCARD THE CARDS PUNCHED AND RESTART THE ROUTINE.

E0F08 000R AAAA
WAS S/B - COL CNT ER
XXXXX YYYYY

XXXXX IDENTIFIES THE NUMBER OF COLUMN INTERRUPTS THAT OCCURRED DURING THE LAST OPERATION. YYYYY IDENTIFIES THE EXPECTED NUMBER OF INTERRUPTS. IF AN ERROR CHECK OCCURRED DURING THE LAST OPERATION (IDENTIFIED BY AN E0F06 OR E0F07 MESSAGE) THE OPERATION WILL TERMINATE AT THE TIME THE ERROR OCCURS. THUS, THIS ERROR MESSAGE WILL IDENTIFY THE COLUMN BEING PROCESSED WHEN THE ERROR WAS DETECTED.

E0F09 000R AAAA
WAS S/B COL - DATA ERR
XXXX YYYY 000ZZ

THE DATA XXXX READ FROM COLUMN ZZ(IN DECIMAL) DOES NOT AGREE WITH THE EXPECTED DATA YYYY FOR THAT COLUMN. CHECK CARD FOR CORRECT DATA. IF DATA IS CORRECT THEN A READ ERROR OCCURRED. IF THE DATA IS NOT CORRECT, A PUNCH ERROR OCCURED. IN THE LATTER CASE, IF NO PUNCH CHECK WAS DETECTED WHILE PUNCHING THE CARD, THE PUNCH ECHO CHECK IS NOT FUNCTIONING.

E0F10 000R AAAA
LAST OP - CCCC
DSW - NO INTRPT - LEV0
XXXX

NO LEVEL 0 (COLUMN) INTERRUPT WAS RECEIVED FOLLOWING THE LAST CONTROL COMMAND, IDENTIFIED BY CCCC. THE COMMAND WAS RECEIVED BY THE 1442 IF ON E0F02 MESSAGE WAS NOT PRINTED.

---

5. COMMENTS

5.1*** TEST PROCEDURE

5.1.1 TEST ORGANIZATION

TESTS ARE ORGANIZED AS FOLLOWS

1. INITIALIZE THE TEST

   A. SET FOR START OF PATTERN
   B. PRINT SET UP MESSAGE.

2. INITIALIZE FOR NEXT CARD

   A. IF PUNCH TEST - READ THE CARD AND CHECK FOR BLANK.
   B. SET EXPECTED COLUMN INTERRUPT COUNT.
   C. SET LOOP ADDRESS
   D. CHECK DSW FOR READY

3. EXECUTE CONTROL COMMAND

4. CHECK FOR ERRORS

   A. CHECK DSW FOR BUSY
   B. WAIT FOR TIMED PERIOD - TIME OUT IF NO INTERRUPT
   C. CHECK COLUMN INTERRUPT DSW.
   D. CHECK FOR CORRECT NUMBER OF COLUMN INTERRUPTS.
   E. CHECK OP COMPLETE DSW.

5. ANALYZE ERROR DATA AND PRINT ERROR MESSAGES.

6. GO TO 2 ABOVE IF LOCK ON FUNCTION.

7. ADVANCE FOR NEXT CARD.

   A. ROTATE PATTERN
   B. INCREASE DELAY FOR ROUTINE 5.
   C. CHECK FOR PATTERN OR DELAY RESET.

8. GO TO NEXT CARD (2 ABOVE).

5.1.2 ERROR CHECKING

ALL TEST ROUTINES CONTAIN THE FOLLOWING COMMON ERROR CHECKING.

1. DEVICE STATUS CHECK - THE DEVICE STATUS IS READ AND CHECKED AS FOLLOWS:

   A. BEFORE AN OPERATION IS INITIATED, THE DSW SHOULD BE ZERO. ANY BITS ON WILL BE IDENTIFIED BY A MESSAGE (E0F01).

   B. IMMEDIATELY AFTER AN OPERATION, THE DSW SHOULD SHOW THE DEVICE TO BE BUSY AND NOT READY. ALL OTHER BITS SHOULD BE OFF. THIS DSW IS SAVED AND CHECKED FOR ERRORS AFTER THE OPERATION IS COMPLETED. A MESSAGE IS PRINTED IDENTIFING ANY ERROR DETECTED (E0F02).

   C. IN INTERRUPT LEVEL ZERO, COLUMN INTERRUPT. THIS DSW SHOULD SHOW THE DEVICE BUSY AND NOT READY WITH THE CORRECT RESPONSE BIT ON. ALL ERRORS DETECTED FOR A CARD ARE OR'D TOGETHER. THUS THE DSW PRINTED IN THE ERROR MESSAGE (E0F04) CONTAINS ALL ERROR BITS WHICH WHERE FOUND ON IN ANY COLUMN DSW AND WILL BE MISSING ANY NORMAL BIT WHICH WAS FOUND OFF IN ANY COLUMN DSW.

   D. IN INTERRUPT LEVEL FOUR OP COMPLETE INTERRUPT. THIS DSW SHOULD SHOW THE DEVICE READY (UNLESS THE HOPPER IS EMPTY) AND NOT BUSY, AND THE OP COMPLETE RESPONSE BIT SHOULD BE ON. A MESSAGE (E0F05) IS PRINTED IDENTIFYING ANY ERROR. NOT READY AND LAST CARD ARE ALSO IDENTIFIED BY UNIQUE MESSAGES. (A0F05 AND A0F06)

2. INTERRUPT CHECK-BOTH COLUMN INTERRUPT AND OP COMPLETE INTERRUPT ARE CHECKED AS FOLLOWS.

   A. COLUMN INTERRUPT - ALL COLUMN INTERRUPTS ARE COUNTED AND COMPARED AGAINST THE EXPECTED NUMBER. A MESSAGE IS PRINTED IF THESE DO NOT AGREE. (E0F08)

   B. OP COMPLETE INTERRUPT - AFTER THE CONTROL COMMAND IS GIVEN, THE PROGRAM GOES TO THE INTERRUPT WAIT ROUTINE. THIS ROUTINE WAITS IN A TIMED LOOP FOR AT LEAST 2 SECONDS. IF NO OP COMPLETE INTERRUPT HAS OCCURRED AT THE END OF THAT TIME, AN ERROR MESSAGE IS PRINTED (E0F03).

3. DATA CHECK

   A. PUNCH - ANY PUNCH ERROR SHOULD BE DETECTED BY THE PUNCH ECHO CIRCUITS IN THE 1442. WHEN A PUNCH ECHO CHECK OCCURS, A MESSAGE IS PRINTED (E0F06) INCLUDING THE ECHO READ BACK FROM THE 1442 BUFFER. THE BITS ON IN THE ECHO WORD IDENTIFY THE BITS IN ERROR. ANY PUNCH ERRORS NOT DETECTED BY THE PUNCH ECHO CHECK WILL CAUSE A READ DATA ERROR IN THE FOLLOWING ROUTINE.

   B. READ - ALL READ TESTS USE DECKS PREPARED BY THE PREVIOUS PUNCH ROUTINE (EXPECT TEST 6). THE READ TEST COMPARES THE DATA READ AGAINST THE DATA PUNCHED. THE EXCEPTION, TEST 6, COMPARES ALL CARDS AGAINST THE FIRST CARD READ.

5.2**** ROUTINE DESCRIPTION

THIS SECTION CONTAINS A DESCRIPTION OF THE PROGRAM ROUTINES AND SUBROUTINES IN APPROXIMATELY THE ORDER IN WHICH THEY APPEAR IN THE PROGRAM AS FOLLOWS -

1. TEST SEQUENCE CONTROL ROUTINE
2. NORMAL TEST ROUTINES
3. OPTIONAL TEST ROUTINES
4. TEST SUBROUTINES
5. ERROR CONTROL ROUTINES
6. INTERRUPT ROUTINES

5.2.1 TEST SEQUENCE CONTROL ROUTINE - CNTRL

THIS ROUTINE CHECKS THE ROUTINE SELECTION SWITCH (SW1 IN THE PROGRAM CONTROL TABLE) AND DETERMINES WHICH TEST ROUTINE IS TO BE RUN NEXT. IF A TEST ROUTINE HAS BEEN SELECTED, IT ESTABLISHED A TRANSFER TO THAT ROUTINE. IF NO ROUTINE IS SELECTED, A TRANSFER IS ESTABLISHED TO THE NEXT TEST ROUTINE IN SEQUENCE.

THE ROUTINE ADDRESS TABLE (RTTBC) WHICH IS PART OF CNTRL, CONTAINS THE ROUTINE ADDRESS FOR ALL TEST ROUTINES IN THE SEQUENCE IN WHICH THEY ARE TO BE RUN.

THE LAST TEST ROUTINE IN THE NORMAL SEQUENCE IS IDENTIFIED BY THE TABLE NRTN. AFTER THIS ROUTINE IS RUN , CNTRL WILL TRANSFER TO MONITOR END AND TERMINATE THE PROGRAM. ROUTINES FOLLOWING THE TABLE NRTN ARE CALLED OPTIONAL TEST ROUTINES AND WILL ONLY BE RUN IF SELECTED.

5.2.2 NORMAL TEST ROUTINES

IF NO TEST ROUTINE IS SELECTED, THESE SIX ROUTINES WILL RUN IN SEQUENCE THEN THE PROGRAM WILL TERMINATE.

1. TEST ROUTINE 1 - PUNCH AND FEED

   THIS ROUTINE READS A CARD, CHECKS TO SEE THAT IT IS BLANK, IF BLANK PUNCHES IT WITH THE PATTERN SET IN THE ROTATE DATA TABLE, THEN SELECTS STACKER TWO AND FEEDS THE PUNCHED CARD OUT. REPEATING THIS SEQUENCE WILL CAUSE A BLANK CARD TO FIRST BE FED INTO STACKER 1 BY THE READ COMMAND THEN A PUNCHED CARD WILL BE FED INTO STACKER 2 BY THE FEED COMMAND. THE CARDS ARE PUNCHED WITH A ROTATING PATTERN, I.E., THE PATTERN IS SHIFTED ONE COLUMN TO THE LEFT FOR EACH SUCCEEDING CARD PUNCHED.

   LOCK ON FUNCTION - THE PROGRAM WILL LOCK IN THE PUNCH OPERATION. ONLY PUNCH CONTROL COMMANDS WILL BE GIVEN. THE DATA PATTERN WILL ALSO LOCK WITH THE LAST PATTERN PRIOR TO SETTING THE LOCK SWITCH.

2. TEST ROUTINE 2 - READ ROTATE PATTERN

   THIS ROUTINE READS THE CARDS PUNCHED BY ROUTINE 1. THE DATA READ IS COMPARED TO THE DATA PUNCHED. ANY ERROR DETECTED WILL BE PRINTED.

   LOCK ON FUNCTION - NOT APPLICABLE.

3. TEST ROUTINE 3 - PUNCH 40 COLUMNS

   THIS ROUTINE WILL PUNCH THE ROTATING PATTERN IN THE FIRST 40 COLUMNS OF EACH CARD. EACH CARD IS CHECKED FOR BLANK BEFORE IT IS PUNCHED. ALL PUNCHED CARDS ARE SELECTED TO STACKER 2.

   LOCK ON FUNCTION - LOCK IN THE PUNCH FUNCTION ONLY. CARDS WILL NOT BE CHECKED FOR BLANK AND THE PATTERN WILL NOT ROTATE.

4. TEST ROUTINE 4 - PUNCH FLIPPED PATTERN

   THIS ROUTINE READS THE ROTATE PATTERN PUNCHED BY ROUTINE 3 AND COMPARES IT WITH THE DESIRED PATTERN. IT WILL THEN PUNCH THE MIRROR IMAGE OF THAT PATTERN IN COLUMNS 41-80.

   LOCK ON FUNCTION - NOT APPLICABLE.

5. TEST ROUTINE 5 - READ FLIPPED PATTERN

   THIS ROUTINE READS THE PATTERNS PUNCHED BY ROUTINES 3 AND 4. IT WILL THEN COMPARE THIS DATA WITH THE DESIRED PATTERNS.

   LOCK ON FUNCTION - NOT APPLICABLE.

6. TEST ROUTINE 6 - CLUTCH TEST

   THIS ROUTINE READS GANG PUNCHED CARDS (MAY BE BLANKS) WITH AN INCREASING DELAY BETWEEN EACH START READ COMMAND. ALL CARDS READ ARE COMPARED WITH THE FIRST CARD. THE DELAY IS INCREASED BY 1 MILLI SECOND FOR EACH CARD READ TO A MAXIMUM OF 125 MILLISECONDS. THE DELAY IS THEN RESET TO ZERO AND THE CYCLE REPEATED.

   LOCK ON FUNCTION - LOCK ON READ WITH NO CHANGE IN DELAY BETWEEN START READ COMMANDS.

   SPECIFY DELAY - THE DELAY CAN BE SPECIFIED BY A FUNCTION 2 BIT SWITCH ENTRY. THIS DELAY IS INCREASED BY APPROXIMATELY 8K (5K FOR 2.2 MSEC MEMORY) FOR EACH BINARY INCREMENT SET IN SWITCHES 8-15.

5.2.3 OPTIONAL TEST ROUTINES

1. TEST ROUTINE 7 - PUNCH FROM SWITCHES

   THIS ROUTINE WILL PUNCH ALL CARDS WITH THE DATA SET IN SWITCHES 0-11. THE NUMBER OF COLUMNS TO BE PUNCHED CAN BE SPECIFIED BY A FUNCTION 2 BIT SWITCH ENTRY. IF THE NUMBER OF COLUMNS IS NOT SPECIFIED, 80 COLUMNS WILL BE PUNCHED. CARDS ARE NOT CHECKED FOR BLANK BEFORE PUNCHING.

   LOCK ON FUNCTION - NOT APPLICABLE.

2. TEST ROUTINE 8 - GANG PUNCH

   THIS ROUTINE WILL READ THE FIRST CARD THEN PUNCH ALL FOLLOWING CARDS WITH THE DATA READ FROM THE FIRST CARD. EACH CARD WILL BE READ TO CHECK FOR BLANK.

   LOCK ON FUNCTION - WILL BYPASS THE CHECK FOR BLANK CARDS.

3. TEST ROUTINE 9 - MODIFIED PUNCH DATA

   THIS ROUTINE WILL READ IN ONE CARD AND REPLACE THE PUNCH DATA TABLE WITH THE DATA PATTERN PUNCHED IN THAT CARD. THE PROGRAM WILL THEN AUTOMATICALLY RESTART FROM ROUTINE 1.

5.2.4 TEST SUBROUTINES

1. ROTATE THE DATA TABLE

   THIS SUBROUTINE ADVANCES THE PUNCH AND READ COMPARE ADDRESSES THROUGH A DOUBLE DATA TABLE.

2. CHECK FOR BLANK CARDS

   THIS SUBROUTINE READS ONE CARD THEN CHECKS ALL COLUMNS FOR DATA. IF CARD IS NOT BLANK, AN ERROR MESSAGE IS PRINTED.

3. FEED A CARD

   THIS SUBROUTINE CHECKS FOR 1442 READY, THEN FEEDS ONE CARD. FOLLOWING THE FEED COMMAND, THE SUBROUTINE TRANSFERS TO THE WAIT ROUTINE UNTIL THE INTERRUPT IS RECEIVED.

4. READ A CARD

   THIS SUBROUTINE SETS EXPECTED COLUMN COUNT TO 80, CHECKS ON READY THEN EXECUTES A START READ COMMAND. THE SUBROUTINE TRANSFERS TO THE WAIT ROUTINE UNTIL THE INTERRUPT IS RECEIVED.

5. PUNCH A CARD

THIS SUBROUTINE SETS THE EXPECTED COLUMN COUNT, CHECKS ON READY, SELECTS STACKER 2, THEN EXECUTES A START PUNCH COMMAND. THE SUBROUTINE TRANSFERS TO THE WAIT ROUTINE UNTIL THE INTERRUPT IS RECEIVED.

6. COMPARE DATA READ

THIS SUBROUTINE COMPARES DATA READ WITH THE EXPECTED PATTERN FOR THAT CARD. IF THERE ARE ANY DISCREPANCIES, AN E0F09 MESSAGE IS PRINTED.

7. LOCK ON FUNCTION

THIS SUBROUTINE IS ENTERED AT THE COMPLETION OF EACH PUNCH ROUTINE BEFORE ADVANCING TO THE DATA FOR THE NEXT PASS. THE SUBROUTINE CHECKS THE LOCK ON FUNCTION SWITCH, SWITCH 10. IF THIS SWITCH IS ON THE SUBROUTINE GOES TO THE ADDRESS SET IN LOOP.

8. READY

THIS SUBROUTINE IS ENTERED BEFORE ANY 1442 CONTROL COMMAND IS GIVEN. IT READS THE 1442 DSW AND CHECKS IT FOR READY (ALL BITS OFF). ANY BIT ON OTHER THAN NOT READY (BIT 15) WILL BE IDENTIFIED BY AN E0F01 MESSAGE. IF ANY BIT IS ON, A NRDY MESSAGE (A0F05) WILL BE PRINTED. THIS ROUTINE STAYS IN A LOOP, PRINTING THE NRDY MESSAGE EACH 10 SECONDS, UNTIL ALL BITS IN THE DSW GO OFF.

9. LAST CARD

THIS SUBROUTINE IS ENTERED AFTER AN OPERATION IS COMPLETED IF THE LAST CARD INDICATOR WAS TURNED ON DURING THAT OPERATION. THE SUBROUTINE WILL FEED OUT THE LAST CARD, PRINT A MESSAGE INDICATING THAT THE LAST CARD INDICATOR WAS DETECTED, THEN GO TO CNTRL TO TERMINATE THE ROUTINE AND ADVANCE TO THE NEXT ROUTINE.

5.2.5 ERROR CONTROL ROUTINES

1. INTERRUPT WAIT ROUTINE

ALL SUBROUTINES COME HERE AFTER THE START OF AN I/O OPERATION FROM WHICH AN INTERRUPT IS EXPECTED. THIS ROUTINE RESETS ALL ERROR CONTROL WORDS, SENSES AND STORES THE BUSY DSW, THEN WAITS IN A TIMED LOOP (AT LEAST 2 SECONDS) FOR THE OP COMPLETE INTERRUPT.

IF NO OP COMPLETE INTERRUPT IS RECEIVED, THE FOLLOWING ERROR MESSAGES ARE PRINTED.

A. E0F02 IF BUSY DSW ERROR

B. E0F10 IF NO COLUMN INTERRUPTS

C. E0F03 - NO OP COMPLETE INTERRUPT.

IF OP COMPLETE INTERRUPT IS RECEIVED, THIS ROUTINE WILL CHECK FOR PROPER PERFORMANCE OF THE OPERATION. THE FOLLOWING CHECKS ARE MADE AND ERROR MESSAGES PRINTED IF APPROPRIATE.

A. E0F02 IF BUSY DSW ERROR

B. E0F04 IF COLUMN INTERRUPT DSW ERROR.

C. E0F05 IF OP COMPLETE DSW ERROR.

D. E0F10 IF NO COLUMN INTERRUPTS.

E. E0F08 IF INCORRECT NUMBER OF COLUMN INTERRUPTS.

THE ROUTINE WILL THEN CHECK FOR LAST CARD. IF THE LAST CARD INDICATOR IS ON, THIS ROUTINE WILL TRANSFER TO THE LAST CARD ROUTINE. IF NO LAST CARD, THE ROUTINE WILL RETURN TO THE I/O SUBROUTINE FROM WHICH IT WAS ENTERED.

2. PRINT ERROR MESSAGES

THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. IF THE MESSAGE IS THE FIRST ERROR MESSAGE FOLLOWING AN I/O CONTROL COMMAND, A LAST OP MESSAGE WILL PRECEED THE ERROR MESSAGE. THIS LAST OP MESSAGE WILL IDENTIFY THE LAST I/O CONTROL OPERATION EXECUTED. THE ERROR MESSAGE FOLLOWING REFERS TO ERRORS DETECTED IN THAT OPERATION.

5.2.6 INTERRUPT ROUTINES

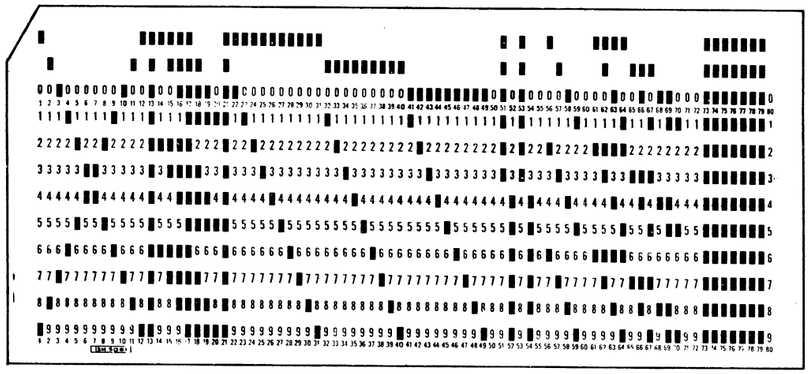
1. COLUMN INTERRUPT - LEVEL 0

THIS ROUTINE SENSES RESETS AND STORES THE DSW, THEN CHECKS FOR CORRECT DSW. ANY ERROR BITS ARE STORED. AFTER THE OPERATION IS COMPLETE, ALL ERROR BITS DETECTED DURING THAT OPERATION ARE AVAILABLE AND WILL BE PRINTED IN AN E0F04 MESSAGE.

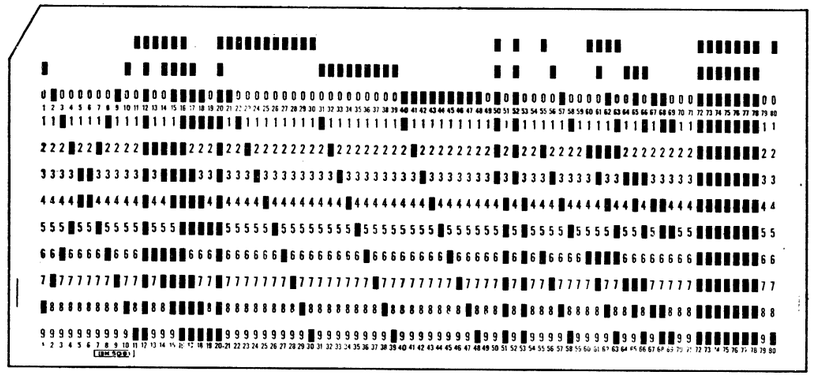
THE ROUTINE COUNTS THE NUMBER OF INTERRUPTS AND EXECUTES EITHER PUNCH OR READ COMMAND, THEN RETURNS TO THE MONITOR LEVEL 0 INTERRUPT ROUTINE.

2. OP - COMPLETE INTERRUPT - LEVEL4

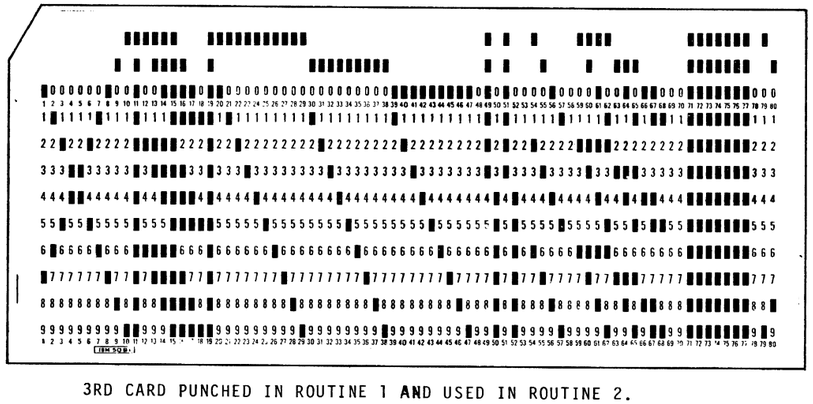
THIS ROUTINE SENSE, RESETS, AND STORES THE DSW, SETS A SWITCH INDICATING THAT THIS INTERRUPT WAS RECEIVED, THEN RETURNS TO THE MONITOR LEVEL 4 INTERRUPT ROUTINE.



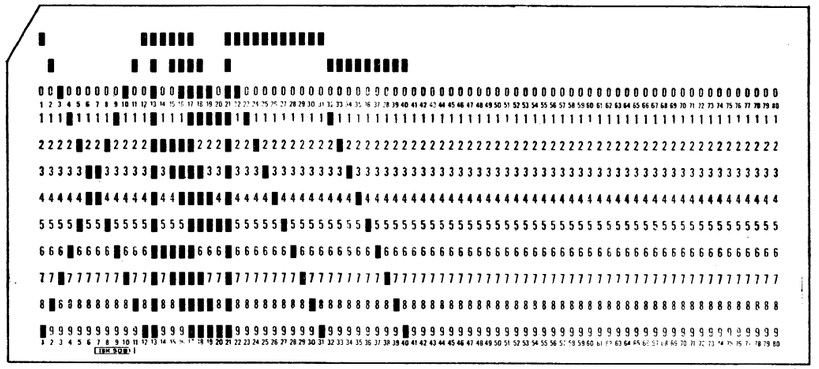
1ST CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



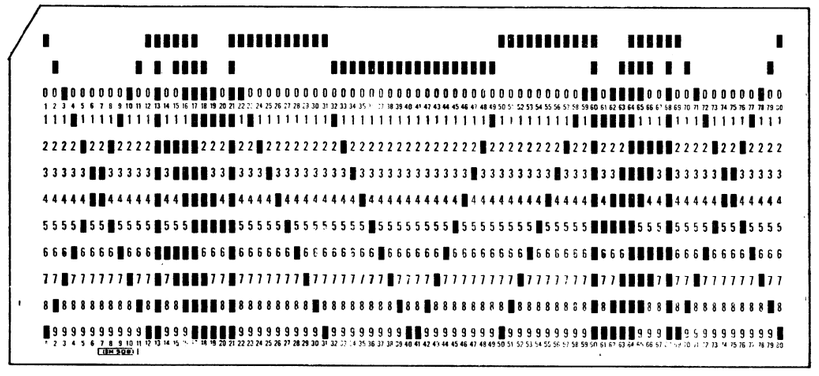
2ND CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



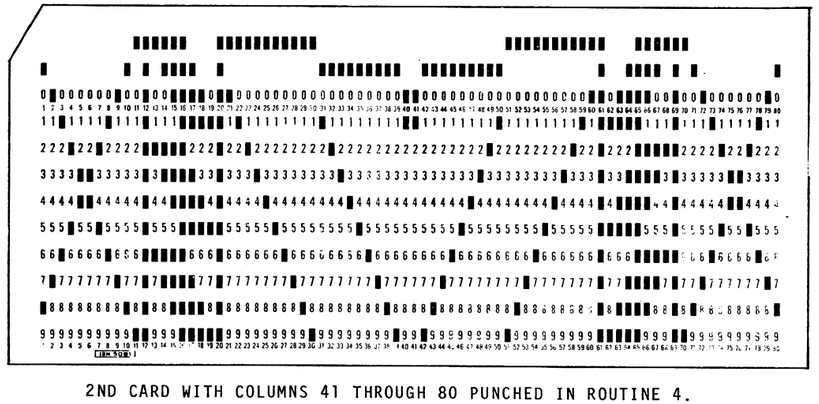
3RD CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



1ST CARD PUNCHED IN ROUTINE 3 TO BE USED IN ROUTINE 4.



1ST CARD WITH COLUMNS 41 THROUGH 80 PUNCHED IN ROUTINE 4.



2ND CARD WITH COLUMNS 41 THROUGH 80 PUNCHED IN ROUTINE 4.

```
                *************************************************** 30F00030
                *                                                   30F00040
                *  THIS ENGINEERING CHANGE REFLECTS MAJOR           30F00050
                *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS     30F00060
                *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.   30F00070
                *                                                   30F00080
                *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.   30F00090
                *                                                   30F00100
                *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966      30F00110
                *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC        30F00120
                *  MONITOR II.                                      30F00130
                *                                                   30F00140
                *************************************************** 30F00150
                ********************************************      30F00160
                *------------------------------------------      30F00170
                *     1130 - 1442 READER/PUNCH FUNCTION TEST      30F00180
                *------------------------------------------      30F00190
                ********************************************      30F00200
                *             EQUATE TABLE                         30F00210
                ********************************************      30F00220
                *     THIS TABLE EQUATES TEST PROGRAM LABELS       30F00230
                *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR       30F00240
                *     ADDRESSES.                                   30F00250
                *                                                  30F00260
                *----------------------------------------------    30F00270
                *     MONITOR ENTRY ADDRESSES                      30F00280
                *----------------------------------------------    30F00290
0160            BEGIN EQU     /160       BEGIN ROUTINE           30F00300
0161            START EQU     BEGIN&1    SUPERVISOR ROUTINE      30F00310
0162            ERROR EQU     START&1    ERROR LOG ROUTINE       30F00320
0163            LOG   EQU     ERROR&1    STATUS LOG ROUTINE      30F00330
0164            END   EQU     LOG&1      END ROUTINE             30F00340
                *                                                  30F00350
                *----------------------------------------------    30F00360
                *     MONITOR CONTROL WORD ADDRESSES               30F00370
                *----------------------------------------------    30F00380
0165            RTNSW EQU     END&1      ROUTINE START SW        30F00390
0166            ERLCK EQU     END&2      LOCK ON ERROR CONTROL   30F00400
0167            LOGBY EQU     END&3      I/O BUSY SW ADDRS       30F00410
0168            RLCF  EQU     END&4      RELOCATION FACTOR ADDRS 30F00420
                *                                                  30F00430
                *----------------------------------------------    30F00440
                *     INTERRUPT TRANSFER VECTOR ADDRESSES          30F00450
                *----------------------------------------------    30F00460
017A            IL0   EQU     /17A       INTERRUPT LEVEL ZERO    30F00470
018A            IL1   EQU     IL0&16     INTERRUPT LEVEL ONE     30F00480
019A            IL2   EQU     IL1&16     INTERRUPT LEVEL TWO     30F00490
01AA            IL3   EQU     IL2&16     INTERRUPT LEVEL THREE   30F00500
01BA            IL4   EQU     IL3&16     INTERRUPT LEVEL FOUR    30F00510
01BB            RQTY  EQU     IL4&1      CONSOLE PRINTER REQUEST 30F00520
01BC            RQKB  EQU     RQTY&1     USE KEYBOARD REQUEST    30F00530
01BD            SVKB  EQU     RQKB&1     KB SERVICE REQUEST      30F00540
                *                                                  30F00550
                ********************************************      30F00560
0000                ORG     *&/05DC                              30F00570
                *                                                  30F00580
                *----------------------------------------------    30F00590
                *     THE MONITOR USES CORE LOCATIONS 0-05DC.      30F00600
                *     FOR CONTENTS OF THESE ADDRESSES REFER        30F00610
                *     TO THE DIAGNOSTIC MONITOR LISTING.           30F00620
                *----------------------------------------------    30F00630
                *                                                  30F00640
                *                                                  30F00650
                *                                                  30F00660
                ********************************************      30F00670
                *             PROGRAM CONTROL TABLE                30F00680
                ********************************************      30F00690
                *                                                  30F00700
```



```
05DC 0 030F     PID   DC    /030F     PROGRAM ID                  30F00710
05DD 0 0000     RID   DC    *-*       ROUTINE ID                  30F00720
05DE 0 0000     RAD   DC    *-*       ROUTINE ADDRS               30F00730
05DF 0 0000     SW0   DC    *-*       PROGRAM CONTROL             30F00740
05E0 0 0000     SW1   DC    *-*       ROUTINE SELECTION           30F00750
05E1 0 0000     SW2   DC    *-*                                   30F00760
05E2 0 0000     SW3   DC    *-*                                   30F00770
05E3 1 05EB           DC    STRT      LOOP ADDRS                  30F00780
05E4 1 05EB           DC    STRT      RESTART ADDRESS             30F00790
05E5 0 0000     MLSCF DC    *-*       SET BY WAIT RTN AND MON     30F00800
05E6 0 0000           DC    *-*       SET BY CNTRL AND INRTPT     30F00810
05E7 0 FFFF           DC    /FFFF     TERMINATOR                  30F00820
                *                                                 30F00830
                ********************************************    30F00840
                *             TEST INITIALIZATION                 30F00850
                ********************************************    30F00860
                *                                                 30F00870
05E8 0 4480 0160 BGIN BSI   I BEGIN                               30F00880
05EA 1 05DC           DC    PID       PCT ADDRESS                 30F00890
                *                                                 30F00900
                *--------------------------------------------    30F00910
                *  START OF TEST AND SINGLE PASS INITIALIZATION    30F00920
                *--------------------------------------------    30F00930
                *                                                 30F00940
05EB 0 6100     STRT  LDX   1 0         SET TO START WITH         30F00950
05EC 0 69F0           STX   1 RID        FIRST ROUTINE            30F00960
05ED 1 6500 0911      LDX   L1 INTRO                              30F00970
05EF 0 6D00 017A      STX   L1 ILO      SET COL INTRPT ADDRS      30F00980
05F1 1 6D00 0884      STX   L1 M        RESET MULT LINE CONTROL   30F00990
05F3 1 6500 0937      LDX   L1 INTR4                              30F01000
05F5 0 6D00 01B8      STX   L1 IL4-2    SET OP COMP INTRPT ADDRS  30F01010
05F7 0 4000           BSI     CNTRL                               30F01020
                *                                                 30F01030
                ********************************************    30F01040
                *             SEQUENCE CONTROL ROUTINE            30F01050
                ********************************************    30F01060
                *     THIS ROUTINE CHECKS SW1 AND CONTROLS        30F01070
                *     THE SEQUENCE IN WHICH TEST ROUTINES         30F01080
                *     ARE RUN.                                    30F01090
                *--------------------------------------------    30F01100
                *                                                 30F01110
05F8 0 0000     CNTRL DC    *-*                                   30F01120
05F9 0 C0E6           LD    SW1                                   30F01130
05FA 1 4C08 0603      BSC   L CN20,&    BR IF NO RTN SELECTD      30F01140
                *                                                 30F01150
05FC 0 D0E0     CN10  STO     RID       SAVE NEW RTN NUMBER       30F01160
05FD 0 9018           S       RIDCK                               30F01170
05FE 1 4C08 0609      BSC   L CN30,&    BR IF VALID RTN           30F01180
0600 0 1810           SRA     16                                  30F01190
0601 0 D0DE           STO     SW1       IF INVALID RTN GO         30F01200
0602 0 D0DA           STO     RID        TO RTN ONE               30F01210
                *                                                 30F01220
0603 1 7401 05DD CN20 MDX   L RID,1     ADV TO NEXT RTN           30F01230
0605 0 C0D7           LD      RID       CHECK FOR END OF          30F01240
0606 0 9010           S       RTNOM      NORMAL SEQUENCE          30F01250
0607 0 44B0 0164      BSI   I END,-Z    END OF PROGRAM            30F01260
                *                                                 30F01270
0609 1 6580 05DD CN30 LDX   I1 RID      XR1#NEW ROUTINE NUMBER    30F01280
060B 1 C500 0617      LD    L1 RTTBL-1  FETCH RETURN ADRS         30F01290
060D 0 D0D0           STO     RAD       STORE NEW RTN ADDRS       30F01300
060E 0 D0D7           STO     MLSCF&1   SET MLSCF FOR RETURN      30F01310
060F 0 D400 0165      STO   L RTNSW     SET RTN START SW          30F01320
0611 0 1810           SRA     16                                  30F01330
0612 1 D400 0894      STO   L LOOP                                30F01340
0614 0 4480 0161      BSI   I START     GO TO MONITOR             30F01350
                *                                                 30F01360
0616 0 0009     RIDCK DC      LRTN-RTTBL&1                        30F01370
0617 0 0006     RTNOM DC      NRTN-RTTBL&1                        30F01380
```

```
                        *-------------------------------------------
                        *     ROUTINE ADDRESS TABLE                                30F01390
                        *-------------------------------------------                30F01400
                        *                                                          30F01410
0618 1 0621             RTTBL DC      RT1         PUNCH AND FEED                   30F01420
0619 1 0638                   DC      RT2         READ ROTATE PATTERN              30F01430
061A 1 0654                   DC      RT3         PUNCH 40 COLUMNS                 30F01440
061B 1 0669                   DC      RT4         PUNCH FLIPPED PATTERN            30F01450
061C 1 0694                   DC      RT5         READ FLIPPED PATTERN             30F01460
061D 1 06AB             NRTN  DC      RT6         READ ANY CARD                    30F01470
061E 1 06E6                   DC      RT7         PUNCH FROM BIT SWS               30F01480
061F 1 071A                   DC      RT8         GANG PUNCH                       30F01490
0620 1 0731             LRTN  DC      RT9         MODIFY ROTATE PATTERN            30F01500
                        *                                                          30F01510
                        *                                                          30F01520
                        ********************************************             30F01530
                        *            ROUTINE 1 - PUNCH AND FEED                    30F01540
                        ********************************************             30F01550
                        * THIS ROUTINE WILL READ A CARD, CHECK THAT THE            30F01560
                        * CARD IS BLANK, PUNCH THE CARD WITH A ROTATING            30F01570
                        * PATTERN, THEN FEED A CARD. ALL PUNCHED CARDS             30F01580
                        * WILL GO TO STACKER 2, ALL BLANK CARDS WILL               30F01590
                        * GO TO STACKER 1.                                        30F01600
                        *-------------------------------------------             30F01610
                        *                                                          30F01620
0621 1 6500 0A33        RT1   LDX   L1 WAREA      SET FOR START OF                 30F01630
0623 1 6D00 0784              STX   L1 DADRS       ROTATE PATTERN                  30F01640
0625 0 6101                   LDX    1 1         MESSAGE NUMBER                   30F01650
0626 1 6700 09EB              LDX   L3 ALDBK     LD BLANKS                        30F01660
0628 1 4400 0967              BSI   L  TYPE      PRINT MESSAGE                    30F01670
                        *                                                          30F01680
062A 1 4400 074A        RT11  BSI   L  BLANK     CK FOR BLANK CARD                30F01690
062C 1 6C00 0894              STX   L  LOOP      SET LOOP FUNCTION ADDRS          30F01700
062E 0 6350                   LDX    3 80        SET NUMBER OF COLUMNS            30F01710
062F 1 4400 078D              BSI   L  PNCHR     PUNCH ONE CARD                   30F01720
0631 1 4400 07F0              BSI   L  LOCK      CHECK FOR LOCK ON FUNC           30F01730
                        *                                                          30F01740
0633 1 4400 073D              BSI   L  ROTAT     ROTATE THE PATTERN               30F01750
0635 1 4400 075B              BSI   L  FEED      FEED A CARD                      30F01760
0637 0 70F2                   MDX      RT11                                        30F01770
                        *                                                          30F01780
                        ********************************************             30F01790
                        *            ROUTINE 2 - READ ROTATE PATTERN               30F01800
                        ********************************************             30F01810
                        * THIS ROUTINE WILL READ THE ROTATE PATTERN                30F01820
                        * PUNCHED BY ROUTINE 3. IT WILL COMPARE THE                30F01830
                        * PATTERN ON EACH CARD WITH THE DESIRED PATTERN            30F01840
                        * FOR THAT CARD.                                          30F01850
                        *-------------------------------------------             30F01860
                        *                                                          30F01870
0638 1 6500 0A33        RT2   LDX   L1 WAREA      SET FOR START OF                 30F01880
063A 1 6D00 0784              STX   L1 DADRS       ROTATE PATTERN                  30F01890
063C 0 6102                   LDX    1 2         MESSAGE NUMBER                   30F01900
063D 1 6700 0A0D              LDX   L3 ASTOH     STK TO HOPPER                    30F01910
063F 1 4400 0967              BSI   L  TYPE      PRINT MESSAGE                    30F01920
                        *                                                          30F01930
0641 0 6350             RT21  LDX    3 80        SET ALL BITS IN                  30F01940
0642 1 C400 0788              LD    L  TERM       READ AREA                        30F01950
0644 1 D700 0A83        RT22  STO   L3 RAREA-1                                     30F01960
0646 0 73FF                   MDX    3 -1                                        30F01970
0647 0 70FC                   MDX      RT22                                      30F01980
                        *                                                          30F01990
0648 1 6500 0A84        RT23  LDX   L1 RAREA                                       30F02000
064A 1 4400 076C              BSI   L  READR     READ ONE CARD                    30F02010
064C 1 4C10 0648              BSC   L  RT23,-    REPEAT IF NO OP COMP             30F02020
064E 0 6350                   LDX    3 80        SET NUMBER OF COLUMNS            30F02030
064F 1 4400 07A3              BSI   L  COMPR     COMPARE DATA READ                30F02040
                        *                         WITH DATA PUNCHED                30F02050
                                                                                   30F02060
```



```
                        *                                                          30F02070
0651 1 4400 073D              BSI   L  ROTAT     ROTATE THE PATTERN               30F02080
0653 0 70ED                   MDX      RT21                                      30F02090
                        *                                                          30F02100
                        ********************************************             30F02110
                        *            ROUTINE 3 - PUNCH 40 COLUMNS                  30F02120
                        ********************************************             30F02130
                        *  THIS ROUTINE WILL PUNCH THE ROTATING PATTERN           30F02140
                        *  IN THE FIRST 40 COLUMNS OF EACH CARD. ALL             30F02150
                        *  CARDS WILL GO TO STACKER 2.                           30F02160
                        *-------------------------------------------             30F02170
                        *                                                          30F02180
0654 1 6500 0A33        RT3   LDX   L1 WAREA      SET FOR START OF                 30F02190
0656 1 6D00 0784              STX   L1 DADRS       ROTATE PATTERN                  30F02200
0658 0 6101                   LDX    1 1         MESSAGE NUMBER                   30F02210
0659 1 6700 09EB              LDX   L3 ALDBK     LD BLANKS                        30F02220
065B 1 4400 0967              BSI   L  TYPE      PRINT MESSAGE                    30F02230
                        *                                                          30F02240
065D 1 4400 074A        RT31  BSI   L  BLANK     CK FOR BLANK CARD                30F02250
065F 1 6C00 0894              STX   L  LOOP      SET LOOP FUNCTION ADDRS          30F02260
0661 0 6328                   LDX    3 40        SET NUMBER OF COLUMNS            30F02270
0662 1 4400 078D              BSI   L  PNCHR     PUNCH ONE CARD                   30F02280
0664 1 4400 07F0              BSI   L  LOCK      CHECK FOR LOCK ON FUNC           30F02290
                        *                                                          30F02300
0666 1 4400 073D              BSI   L  ROTAT     ROTATE THE PATTERN               30F02310
0668 0 70F4                   MDX      RT31                                      30F02320
                        *                                                          30F02330
                        ********************************************             30F02340
                        *            ROUTINE 4 - PUNCH FLIPPED PATTERN             30F02350
                        ********************************************             30F02360
                        *  THIS ROUTINE WILL READ THE ROTATE PATTERN              30F02370
                        *  PUNCHED BY ROUTINE 3 AND COMPARE IT WITH              30F02380
                        *  THE DESIRED PATTERN. IT WILL THEN PUNCH THE           30F02390
                        *  MIRROR IMAGE OF THAT PATTERN IN COLUMNS 41-80.        30F02400
                        *-------------------------------------------             30F02410
                        *                                                          30F02420
0669 1 6500 0A33        RT4   LDX   L1 WAREA      SET FOR START OF                 30F02430
066B 1 6D00 0784              STX   L1 DADRS       ROTATE PATTERN                  30F02440
066D 0 6102                   LDX    1 2         MESSAGE NUMBER                   30F02450
066E 1 6700 0A0D              LDX   L3 ASTOH     STK TO HOPPER                    30F02460
0670 1 4400 0967              BSI   L  TYPE      PRINT MESSAGE                    30F02470
                        *                                                          30F02480
0672 1 6500 0A84        RT41  LDX   L1 RAREA                                       30F02490
0674 1 4400 076C              BSI   L  READR     READ ONE CARD                    30F02500
0676 1 4C10 0672              BSC   L  RT41,-    REPEAT IF NO OP COMP             30F02510
0678 0 6328                   LDX    3 40        SET NUMBER OF COLUMNS            30F02520
0679 1 4400 07A3              BSI   L  COMPR     COMPARE DATA READ                30F02530
                        *                         WITH DATA PUNCHED                30F02540
                        *                                                          30F02550
067B 1 4400 073D              BSI   L  ROTAT     ROTATE THE PATTERN               30F02560
                        *                                                          30F02570
067D 0 63FE             RT42  LDX    3 -2        LOAD XR 3                        30F02580
067E 0 62D8                   LDX    2 -40       LOAD XR 2                        30F02590
                        *                                                          30F02600
067F 1 C600 0AAC        FLIP  LD    L2 RAREA&40   DATA READ                       30F02610
0681 1 D700 0AD5              STO   L3 RAREA&81   NEW LOCATION                    30F02620
0683 0 73FF                   MDX    3 -1        ADJ XR 3                         30F02630
0684 0 7201                   MDX    2 1         ADJ XR 2                         30F02640
0685 0 70F9                   MDX      FLIP                                      30F02650
                        *                                                          30F02660
0686 0 62D8                   LDX    2 -40       LOAD XR 2                        30F02670
0687 0 1011                   SLA      17        CLEAR ACC                        30F02680
0688 1 D600 0AAC        CLEAR STO   L2 RAREA&40   CLEAR COL 1 TO 40                30F02690
068A 0 7201                   MDX    2 1                                         30F02700
068B 0 70FC                   MDX      CLEAR                                     30F02710
                        *                                                          30F02720
068C 1 6500 0A84              LDX   L1 RAREA                                     30F02730
068E 1 6D00 0784              STX   L1 DADRS       SET PUNCH DATA ADRS           30F02740
```

```
0690 0 6350                 LDX   3 80          SET NUMBER OF COLUMNS          30F02750
0691 1 4400 078D            BSI   L  PNCHR      PUNCH ONE CARD                 30F02760
0693 0 70DE                 MDX      RT41                                      30F02770
                            *                                                  30F02780
                            ********************************************      30F02790
                            *              ROUTINE 5 - READ FLIPPED PATTERN    30F02800
                            ********************************************      30F02810
                            *  THIS ROUTINE WILL READ THE FLIPPED PATTERN      30F02820
                            *  PUNCHED BY ROUTINES 3 AND 4, THEN COMPARE       30F02830
                            *  WITH DESIRED PATTERN.                           30F02840
                            *-----------------------------------------       30F02850
                            *                                                  30F02860
0694 1 6500 0A33            RT5   LDX   L1 WAREA      SET FOR START OF         30F02870
0696 1 6D00 0784                  STX   L1 DADRS       ROTATE PATTERN          30F02880
0698 0 6102                       LDX    1 2         MESSAGE NUMBER           30F02890
0699 1 6700 0A0D                  LDX   L3 ASTOH      STK TO HOPPER            30F02900
069B 1 4400 0967                  BSI   L  TYPE       PRINT MESSAGE            30F02910
                            *                                                  30F02920
069D 1 6500 0A84            RT51  LDX   L1 RAREA                               30F02930
069F 1 4400 076C                  BSI   L  READR      READ ONE CARD            30F02940
06A1 1 4C10 069D                  BSC   L  RT51,-     REPEAT IF NO OP COMP     30F02950
06A3 0 6328                       LDX    3 40         SET NUMBER OF COLUMNS    30F02960
06A4 1 6C00 078C                  STX   L  FLIPS      SET FLIP SW              30F02970
06A6 1 4400 07A3                  BSI   L  COMPR      COMPARE DATA READ        30F02980
                            *                          WITH DATA PUNCHED       30F02990
                            *                                                  30F03000
06A8 1 4400 073D                  BSI   L  ROTAT      ROTATE THE PATTERN       30F03010
06AA 0 70F2                       MDX      RT51                                30F03020
                            *                                                  30F03030
                            ********************************************      30F03040
                            *              ROUTINE 6 - CLUTCH TEST             30F03050
                            ********************************************      30F03060
                            *  THIS ROUTINE WILL READ GANG PUNCHED CARDS WITH  30F03070
                            *  AND INCREASING DELAY BETWEEN EACH START READ    30F03080
                            *  COMMAND. ALL CARDS READ WILL BE COMPARED WITH   30F03090
                            *  THE FIRST CARD.                                 30F03100
                            *-----------------------------------------       30F03110
                            *                                                  30F03120
06AB 0 6104                 RT6   LDX    1 4          MESSAGE NUMBER           30F03130
06AC 1 6700 0A27                  LDX   L3 ALACD      OR GANG PUNCH            30F03140
06AE 1 6F00 0974                  STX   L3 ALPHA&1                             30F03150
06B0 1 6700 09EB                  LDX   L3 ALDBK      LD BLANKS                30F03160
06B2 1 4400 0967                  BSI   L  TYPE       PRINT MESSAGE            30F03170
                            *                                                  30F03180
06B4 1 6500 0AD4                  LDX   L1 RAREB                               30F03190
06B6 1 4400 076C                  BSI   L  READR      READ ONE CARD            30F03200
                            *                                                  30F03210
06B8 0 1810                 RT61  SRA      16                                  30F03220
06B9 1 D400 06E3                  STO   L  DFACT      RESET CLUTCH DELAY FACTOR 30F03230
06BB 0 637D                       LDX    3 125                                30F03240
06BC 0 6B28                       STX    3 T6CNT      INITIALIZE PASS COUNT    30F03250
                            *                                                  30F03260
06BD 1 6C00 0894                  STX   L  LOOP       SET LOOP FUNCTION ADDRS  30F03270
06BF 1 C400 05E1            RT62  LD    L  SW2        CK SW2 FOR CONSTANT DELAY 30F03280
06C1 0 1003                       SLA      3                                   30F03290
06C2 0 4808                       BSC      &                                   30F03300
06C3 0 C01F                       LD       DFACT      LD DELAY FACTOR          30F03310
06C4 0 D01F                       STO      DLYCT      SET DELAY COUNTER        30F03320
                            *                                                  30F03330
06C5 1 6500 06CB            RT63  LDX   L1 RT64                                30F03340
06C7 1 6D00 05E6                  STX   L1 MLSCF&1    SET RETURN ADDRS         30F03350
06C9 1 4C00 08DA                  BSC   L  WAIT4      GO TO MONITOR            30F03360
                            *                                                  30F03370
06CB 1 74FF 06E4            RT64  MDX   L  DLYCT,-1   DEC COUNTER              30F03380
06CD 0 70F7                       MDX      RT63                                30F03390
                            *                                                  30F03400
06CE 1 6500 0AD4            RT65  LDX   L1 RAREB      SET FOR COMPARE          30F03410
06D0 1 6D00 0784                  STX   L1 DADRS                               30F03420
```



```
06D2 1 6500 0A84            RT62  LDX   L1 RAREA                               30F03430
06D4 1 4400 076C                  BSI   L  READR      READ ONE CARD            30F03440
06D6 1 4C10 06CE                  BSC   L  RT65,-     REPEAT IF NO OP COMP     30F03450
06D8 0 6350                       LDX    3 80         SET NUMBER OF COLUMNS    30F03460
06D9 1 4400 07A3                  BSI   L  COMPR      COMPARE DATA READ        30F03470
                            *                          WITH DATA PUNCHED       30F03480
06DB 1 4400 07F0                  BSI   L  LOCK       CK FOR LOCK ON FUNCTION  30F03490
                            *                                                  30F03500
06DD 1 7401 06E3                  MDX   L  DFACT,1    ADV CLUTCH DELAY FACTOR  30F03510
06DF 1 74FF 06E5                  MDX   L  T6CNT,-1   DEC COUNT                30F03520
06E1 0 70DD                       MDX      RT62                                30F03530
06E2 0 70D5                       MDX      RT61       RESET DELAY              30F03540
                            *                                                  30F03550
06E3 0 0000                 DFACT DC       *-*                                 30F03560
06E4 0 0000                 DLYCT DC       *-*                                 30F03570
06E5 0 0000                 T6CNT DC       *-*                                 30F03580
                            *                                                  30F03590
                            ********************************************      30F03600
                            *              ROUTINE 7 - PUNCH FROM SWITCHES     30F03610
                            ********************************************      30F03620
                            *  THIS ROUTINE WILL PUNCH ALL CARD COLUMNS        30F03630
                            *  WITH THE DATA SET IN BIT SWITCHES 0-11.         30F03640
                            *-----------------------------------------       30F03650
                            *                                                  30F03660
06E6 1 6500 0A84            RT7   LDX   L1 RAREA      SET TO PUNCH FROM        30F03670
06E8 1 6D00 0784                  STX   L1 DADRS       RAREA                   30F03680
06EA 0 6107                       LDX    1 7                                  30F03690
06EB 1 6700 09EB                  LDX   L3 ALDBK      LD BLANKS                30F03700
06ED 1 4400 0967                  BSI   L  TYPE       PRINT MESSAGE            30F03710
                            *                                                  30F03720
06EF 1 4400 0942                  BSI   L  READY                               30F03730
06F1 0 6107                       LDX    1 7                                  30F03740
06F2 1 6700 0A15                  LDX   L3 ASETP      SET PATT                 30F03750
06F4 1 4400 0967                  BSI   L  TYPE       PRINT MESSAGE            30F03760
                            *                                                  30F03770
06F6 1 0C00 0782            RT71  XIO   L  SNSWS      READ BIT SWS             30F03780
06F8 0 C020                       LD       RT7SW      LD SW SETTING            30F03790
06F9 0 100C                       SLA      12         CHECK BIT 12             30F03800
06FA 1 4C28 0702                  BSC   L  RT72,&Z    BR IF 12 ON              30F03810
                            *                                                  30F03820
06FC 1 6500 06F6                  LDX   L1 RT71                                30F03830
06FE 1 6D00 05E6                  STX   L1 MLSCF&1                             30F03840
0700 1 4C00 08DA                  BSC   L  WAIT4                               30F03850
                            *                                                  30F03860
0702 0 C016                 RT72  LD       RT7SW      LD PATTERN               30F03870
0703 0 1804                       SRA      4          REMOVE 12 BIT            30F03880
0704 0 1004                       SLA      4                                   30F03890
0705 0 D013                       STO      RT7SW                               30F03900
0706 0 6150                       LDX    1 80                                 30F03910
0707 1 D500 0A83            RT73  STO   L1 RAREA-1     FILL RAREA               30F03920
0709 0 71FF                       MDX    1 -1          WITH PATTERN             30F03930
070A 0 70FC                       MDX      RT73                                30F03940
                            *                                                  30F03950
070B 1 6780 05E1            RT74  LDX   I3 SW2        CK COL CNT OPTION        30F03960
070D 0 7300                       MDX    3 0                                  30F03970
070E 0 7001                       MDX      *&1                                 30F03980
070F 0 6350                       LDX    3 80         SKIP IF SW2 SET          30F03990
0710 1 4400 078D                  BSI   L  PNCHR      PUNCH ONE CARD           30F04000
                            *                                                  30F04010
0712 0 086F                       XIO      SNSWS      READ BIT SWS             30F04020
0713 0 C005                       LD       RT7SW                               30F04030
0714 1 F400 0A84                  EOR   L  RAREA      CK FOR CHANGE OF SWS     30F04040
0716 1 4C20 06F6                  BSC   L  RT71,Z     BR IF SW CHANGED         30F04050
0718 0 70F2                       MDX      RT74                                30F04060
                            *                                                  30F04070
0719 0 0000                 RT7SW DC       *-*        BIT SW STORAGE           30F04080
                            *                                                  30F04090
                            ********************************************      30F04100
```

```
                        *              ROUTINE 8 - GANG PUNCH                  30F04110
                        ********************************************          30F04120
                        *  THIS ROUTINE WILL READ ONE CARD THEN PUNCH          30F04130
                        *  ALL FOLLOWING CARDS WITH DATA READ FROM FIRST       30F04140
                        *  CARD.                                              30F04150
                        *-----------------------------------------           30F04160
                        *                                                     30F04170
071A 1 6500 0A84        RT8    LDX  L1 RAREA      SET TO PUNCH                30F04180
071C 1 6D00 0784               STX  L1 DADRS       DATA READ                  30F04190
071E 0 6103                    LDX   1 3          MESSAGE NUMBER              30F04200
071F 1 6700 09F1               LDX  L3 ANYP       LD ANY PATTERN PLUS BLANKS  30F04210
0721 1 4400 0967               BSI  L  TYPE       PRINT MESSAGE               30F04220
                        *                                                     30F04230
0723 1 6500 0A84               LDX  L1 RAREA                                  30F04240
0725 1 4400 076C               BSI  L  READR      READ ONE CARD               30F04250
                        *                                                     30F04260
0727 1 4400 074A        RT81   BSI  L  BLANK      CK FOR BLANK CARD           30F04270
0729 1 6C00 0894               STX  L  LOOP       SET LOOP FUNCTION ADDRS     30F04280
072B 0 6350                    LDX   3 80         SET NUMBER OF COLUMNS       30F04290
072C 1 4400 078D               BSI  L  PNCHR      PUNCH ONE CARD              30F04300
072E 1 4400 07F0               BSI  L  LOCK       CHECK FOR LOCK ON FUNC      30F04310
0730 0 70F6                    MDX    RT81                                    30F04320
                        *                                                     30F04330
                        ********************************************          30F04340
                        *              ROUTINE 9 - MODIFY ROTATE PATTERN       30F04350
                        ********************************************          30F04360
                        *  THIS ROUTINE WILL REPLACE THE ROTATE DATA           30F04370
                        *  TABLE WITH ANY DESIRED PATTERN- THEN START          30F04380
                        *  WITH ROUTINE 1.                                    30F04390
                        *-----------------------------------------           30F04400
                        *                                                     30F04410
0731 0 6103             RT9    LDX   1 3          MESSAGE NUMBER              30F04420
0732 1 6700 09F1               LDX  L3 ANYP       LD ANY PATTERN PLUS BLANKS  30F04430
0734 1 4400 0967               BSI  L  TYPE       PRINT MESSAGE               30F04440
                        *                                                     30F04450
0736 1 6500 0A33               LDX  L1 WAREA                                  30F04460
0738 0 4033                    BSI     READR      READ ONE CARD               30F04470
                        *                                                     30F04480
0739 1 6C00 05E0               STX  L  SW1        SET CONTROL TO RESTART      30F04490
073B 1 4400 05F8               BSI  L  CNTRL      GO TO CONTROL               30F04500
                        *                                                     30F04510
                        ********************************************          30F04520
                        *              ROTATE THE DATA TABLE ADDRESS           30F04530
                        ********************************************          30F04540
                        *                                                     30F04550
073D 0 0000             ROTAT  DC      *-*                                    30F04560
073E 1 7401 0784               MDX  L  DADRS,1    ADVANCE THE DATA ADDRS      30F04570
0740 1 C480 0784               LD   I  DADRS      CHECK FOR DATA              30F04580
0742 0 F045                    EOR     TERM        TABLE TERMINATOR           30F04590
0743 1 4CA0 073D               BSC  I  ROTAT,Z    RETURN IF NO TERM           30F04600
0745 1 6500 0A33               LDX  L1 WAREA      IF TERM - RESET TO          30F04610
0747 0 693C                    STX   1 DADRS       START OF TABLE             30F04620
0748 1 4C80 073D               BSC  I  ROTAT                                  30F04630
                        *                                                     30F04640
                        ********************************************          30F04650
                        *              CHECK FOR BLANK CARD                    30F04660
                        ********************************************          30F04670
                        * THIS SUBROUTINE WILL READ A CARD AND CHECK           30F04680
                        * THAT IT IS BLANK.                                   30F04690
                        *-----------------------------------------           30F04700
                        *                                                     30F04710
074A 0 0000             BLANK  DC      *-*                                    30F04720
074B 1 6500 0AD4               LDX  L1 RAREB                                  30F04730
074D 0 1810                    SRA     16                                     30F04740
074E 1 D400 0894               STO  L  LOOP       SET FOT NO LOOP             30F04750
0750 0 401B                    BSI     READR      READ ONE CARD               30F04760
                        *                                                     30F04770
0751 1 6680 08AC               LDX  I2 COLCT      CHECK FOR BLANK CARD        30F04780
```



```
0753 1 C600 0AD3        BLK1   LD     L2 RAREB-1                             30F04790
0755 1 4C20 07FE               BSC  L  ERRO,Z     BR IF NOT BLANK             30F04800
0757 0 72FF                    MDX     2 -1                                   30F04810
0758 0 70FA                    MDX       BLK1                                 30F04820
0759 1 4C80 074A               BSC  I  BLANK                                  30F04830
                        *                                                     30F04840
                        ********************************************          30F04850
                        *              FEED A CARD                             30F04860
                        ********************************************          30F04870
                        *                                                     30F04880
075B 0 0000             FEED   DC      *-*                                    30F04890
075C 1 4400 0942               BSI  L  READY                                  30F04900
075E 1 D400 0894               STO  L  LOOP       SET FOR NO LOOP             30F04910
0760 1 6500 09DC               LDX  L1 AFD                                    30F04920
0762 1 6D00 089A               STX  L1 OP                                     30F04930
0764 0 6100                    LDX   1 0          SET INTRPT DSW S/B          30F04940
0765 1 6D00 08AD               STX  L1 COLCT&1    SET FOR NO COL INTRPTS      30F04950
0767 0 081C                    XIO     FDACD-1    FEED A CARD                 30F04960
0768 1 4400 08AF               BSI  L  WAIT       WAIT FOR INTERRUPT          30F04970
076A 1 4C80 075B               BSC  I  FEED                                   30F04980
                        *                                                     30F04990
                        ********************************************          30F05000
                        *              READ A CARD                             30F05010
                        ********************************************          30F05020
                        * THIS SUBROUTINE WILL READ A CARD THEN CHECK THAT     30F05030
                        * 80 COLUMNS WERE READ AND CHECK THE BUSY, INTRPT,     30F05040
                        * AND OPERATION COMPLETE DSWS.                        30F05050
                        *-----------------------------------------           30F05060
                        *                                                     30F05070
076C 0 0000             READR  DC      *-*                                    30F05080
076D 1 6D00 0904               STX  L1 READ       SET READ BUFFER ADDRS       30F05090
076F 0 6350                    LDX   3 80                                     30F05100
0770 1 6F00 08AD               STX  L3 COLCT&1    SET COL COUNT S/B           30F05110
0772 0 1011                    SLA     17                                     30F05120
0773 0 D018                    STO     FLIPS      RESET FLIP SW               30F05130
0774 1 4400 0942               BSI  L  READY                                  30F05140
                        *                                                     30F05150
0776 1 6500 09D5               LDX  L1 ARD                                    30F05160
0778 1 6D00 089A               STX  L1 OP                                     30F05170
077A 0 6500 8003               LDX  L1 /8003      SET INTRPT DSW S/B          30F05180
077C 0 0809                    XIO     RDRST-1    START THE READER            30F05190
077D 1 4400 08AF               BSI  L  WAIT                                   30F05200
                        *                                                     30F05210
077F 1 4C80 076C               BSC  I  READR      RETURN                      30F05220
                        *                                                     30F05230
0782   0000                    BSS  E  0                                      30F05240
0782 1 0719             SNSWS  DC      RT7SW      READ BIT SWS                30F05250
0783 0 3A00                    DC      /3A00                                  30F05260
0784 0 0000             DADRS  DC      *-*                                    30F05270
0785 0 1402             FDACD  DC      /1402      FEED A CARD                 30F05280
0786 0 0000             PDATA  DC      *-*        PUNCH ADDRS BUFFER          30F05290
0787 0 1404             RDRST  DC      /1404      START READER                30F05300
0788 0 FFFF             TERM   DC      /FFFF                                  30F05310
0789 0 1401             PCHST  DC      /1401      START PUNCH                 30F05320
078A 0 0000             NCOL   DC      *-*        COL PUNCH OR COMPARE CNT    30F05330
078B 0 1480             STACK  DC      /1480      SELECT #2 STACKER           30F05340
078C 0 0000             FLIPS  DC      *-*        FLIP SW                     30F05350
                        *                                                     30F05360
                        ********************************************          30F05370
                        *              PUNCH A CARD                            30F05380
                        ********************************************          30F05390
                        * THIS SUBROUTINE WILL PUNCH A CARD THEN CHECK         30F05400
                        * THAT THE PROPER NUMBER OF COLUMNS WERE PUNCHED,      30F05410
                        * AND CHECK THE BUSY, INTERRUPT, AND OPERATION        30F05420
                        * COMPLETE DSWS.                                      30F05430
                        *-----------------------------------------           30F05440
                        *                                                     30F05450
078D 0 0000             PNCHR  DC      *-*                                    30F05460
```

```
078E 1 6F00 08AD          STX  L3 COLCT&1    SET COL COUNT S/B                30F05470
                          *                                                    30F05480
0790 1 4400 0942    PNCH1 BSI  L  READY                                        30F05490
0792 0 08F7               XIO    STACK-1     SELECT STACKER 2                 30F05500
                          *                                                    30F05510
0793 1 C400 08AD          LD   L COLCT&1                                       30F05520
0795 0 D0F4               STO    NCOL        SET PUNCH COL COUNT              30F05530
0796 0 C0ED               LD     DADRS       SET FOR START OF                 30F05540
0797 0 D0EE               STO    PDATA        NEXT PATTERN                    30F05550
0798 1 6500 09D8          LDX  L1 APCH                                         30F05560
079A 1 6D00 089A          STX  L1 OP                                           30F05570
079C 0 6500 4003          LDX  L1 /4003       SET INTRPT DWS S/B               30F05580
079E 0 08E9               XIO    PCHST-1     START THE PUNCH                  30F05590
079F 1 4400 08AF          BSI  L  WAIT        WAIT FOR INTERRUPTS              30F05600
                          *                                                    30F05610
07A1 1 4C80 078D          BSC  I  PNCHR                                        30F05620
                          *                                                    30F05630
                          ********************************************       30F05640
                          *             COMPARE DATA READ            *       30F05650
                          ********************************************       30F05660
                          * THIS SUBROUTINE WILL COMPARE THE DATA READ WITH    30F05670
                          * THE PATTERN EXPECTED FOR THAT CARD.                30F05680
                          *-------------------------------------------         30F05690
                          *                                                    30F05700
07A3 0 0000         COMPR DC     *-*                                          30F05710
07A4 0 6BE5               STX    3 NCOL      SET NUMBER OF COLUMNS            30F05720
07A5 0 6700 7401          LDX  L3 /7401      SET FOR POSITIVE INCR            30F05730
07A7 0 6B12               STX    3 INCR                                        30F05740
07A8 0 C0DB               LD     DADRS       SET FOR START OF                 30F05750
07A9 0 D0DC               STO    PDATA        NEXT PATTERN                    30F05760
07AA 0 1011               SLA    17                                           30F05770
07AB 1 D400 0884          STO  L M           SET FOR FIRST ERROR              30F05780
07AD 0 6101               LDX    1 1         XR1#COLUMN COUNT                 30F05790
                          *                                                    30F05800
07AE 1 6D00 08AE    COM1  STX  L1 COL         SAVE COL COUNT                   30F05810
07B0 1 C480 0786          LD   I PDATA       LD NEXT DATA WORD                30F05820
07B2 0 1803               SRA    3                                             30F05830
07B3 0 1003               SLA    3                                             30F05840
07B4 1 D400 08AB          STO  L DATA&1      SAVE IN DATA S/B                 30F05850
07B6 1 F500 0A83          EOR  L1 RAREA-1    COMPARE WITH DATA READ           30F05860
07B8 1 4420 0851          BSI  L ERR9,Z      BR IF ERROR                      30F05870
07BA 1 7401 0786    INCR  MDX  L PDATA,1     ADV DATA ADRS                    30F05880
07BC 0 7101               MDX    1 1         ADV COLUMN COUNT                 30F05890
07BD 0 1000               NOP                                                30F05900
07BE 1 C480 0786          LD   I PDATA       CK FOR DATA TABLE                30F05910
07C0 0 F0C7               EOR    TERM         TERMINATOR                      30F05920
07C1 1 4C20 07C6          BSC  L COM2,Z      BR IF NO TERM                    30F05930
07C3 1 6700 0A33          LDX  L3 WAREA      RESET TO START                   30F05940
07C5 0 6BC0               STX    3 PDATA     OF TABLE                         30F05950
                          *                                                    30F05960
07C6 1 C400 08AE    COM2  LD   L COL         CHECK FOR LAST COL READ          30F05970
07C8 1 9400 08AC          S    L COLCT                                         30F05980
07CA 1 4C10 07E2          BSC  L COM4,-      BR IF LAST COL                   30F05990
07CC 1 74FF 078A          MDX  L NCOL,-1     COUNT COLUMNS SHOULD             30F06000
07CE 0 70DF               MDX    COM1         HAVE READ                       30F06010
                          *                                                    30F06020
07CF 1 7400 078C    COM3  MDX  L FLIPS,0     CK FLIP SW                       30F06030
07D1 0 7015               MDX    COM5        BR IF FLIP                       30F06040
                          *                                                    30F06050
07D2 0 1011               SLA    17          THE REST OF CARD                 30F06060
07D3 1 D400 08AB          STO  L DATA&1       SHOULD BE ZERO                  30F06070
07D5 1 6D00 08AE          STX  L1 COL                                          30F06080
07D7 1 F500 0A83          EOR  L1 RAREA-1                                      30F06090
07D9 1 4420 0851          BSI  L ERR9,Z                                        30F06100
07DB 0 7101               MDX    1 1                                           30F06110
07DC 1 C400 08AE          LD   L COL                                           30F06120
07DE 1 9400 08AC          S    L COLCT                                         30F06130
07E0 1 4C28 07CF          BSC  L COM3,&Z                                       30F06140
```



```
07E2 0 1011         COM4  SLA    17                                           30F06150
07E3 1 D400 0884           STO  L M           RESET MULT LINE CONTROL          30F06160
07E5 1 4C80 07A3           BSC  I COMPR                                        30F06170
                           *                                                   30F06180
07E7 1 6700 0AAB    COM5   LDX  L3 RAREA&39   SET TO COMPARE LAST              30F06190
07E9 0 6B9C                STX    3 PDATA     HALF WITH 1ST HALF               30F06200
07EA 0 6700 74FF           LDX  L3 /74FF      SET FOR NEGATIVE INCR            30F06210
07EC 0 6BCD                STX    3 INCR                                       30F06220
07ED 0 6228                LDX    2 40        COMPARE NEXT                     30F06230
07EE 0 6A9B                STX    2 NCOL       40 COLUMNS                      30F06240
07EF 0 70BE                MDX    COM1                                         30F06250
                           *                                                   30F06260
                           ********************************************      30F06270
                           *             LOCK ON FUNCTION             *      30F06280
                           ********************************************      30F06290
                           *                                                   30F06300
07F0 0 0000         LOCK   DC     *-*                                         30F06310
07F1 1 C400 05DF           LD   L SWO         LD SWO                           30F06320
07F3 0 EC80 0166           OR   I ERLCK       COMB WITH MONITOR SWO            30F06330
07F5 0 100A                SLA    10          CHECK LOCK SW                    30F06340
07F6 1 4C90 07F0           BSC  I LOCK,-      BR IF NOT LOCK ON FUNC           30F06350
07F8 1 C400 0894           LD   L LOOP        LOAD LOOP ADDRS                  30F06360
07FA 1 4CA0 0894           BSC  I LOOP,Z      LOOP ON LAST FUNC                30F06370
07FC 1 4C80 07F0           BSC  I LOCK         IF LOOP ADDRS IS NOT ZERO       30F06380
                           *                                                   30F06390
                           ********************************************      30F06400
                           *             ERROR MESSAGE SETUP          *      30F06410
                           ********************************************      30F06420
                           *                                                   30F06430
07FE 0 6100         ERRO   LDX    1 0          CARD NOT BLANK                   30F06440
07FF 0 6200                LDX    2 /0000                                      30F06450
0800 0 C86D                LDD    MSG0                                         30F06460
0801 1 6C00 0890           STX  L OPMSW                                        30F06470
0803 1 4400 0886           BSI  L ETYPE       PRINT ERR MSG                    30F06480
0805 1 4C00 074B           BSC  L BLANK&1                                      30F06490
                           *                                                   30F06500
0807 0 0000         ERR1   DC     *-*          STATIC DSW ERROR                 30F06510
0808 1 7400 0885           MDX  L ERR5S,0     IF PREVIOUS ERR5                 30F06520
080A 0 7006                MDX    ERR1A        DO NOT PRINT THIS MSG           30F06530
080B 0 6101                LDX    1 1                                          30F06540
080C 0 6203                LDX    2 /3                                         30F06550
080D 0 C862                LDD    MSG1                                         30F06560
080E 1 6C00 0890           STX  L OPMSW                                        30F06570
0810 0 4075                BSI    ETYPE        PRINT ERR MSG                    30F06580
                           *                                                   30F06590
0811 0 1011         ERR1A  SLA    17                                           30F06600
0812 0 D072                STO    ERR5S        RESET ERR5 SW                   30F06610
0813 1 4C80 0807           BSC  I ERR1                                         30F06620
                           *                                                   30F06630
0815 0 0000         ERR2   DC     *-*          BUSY DSW ERROR                   30F06640
0816 0 6102                LDX    1 2                                          30F06650
0817 0 620C                LDX    2 /C                                         30F06660
0818 0 C859                LDD    MSG2                                         30F06670
0819 0 406C                BSI    ETYPE        PRINT ERROR MESSAGE             30F06680
081A 1 4C80 0815           BSC  I ERR2                                         30F06690
                           *                                                   30F06700
081C 0 0000         ERR4   DC     *-*          INTRPT 0 DSW ERROR               30F06710
081D 1 F400 08A7           EOR  L DSWSB       RESTORE DSW WAS                  30F06720
081F 1 D400 08A6           STO  L DSW0                                         30F06730
0821 0 6104                LDX    1 4                                          30F06740
0822 0 6230                LDX    2 /30                                        30F06750
0823 0 C852                LDD    MSG4                                         30F06760
0824 0 4061                BSI    ETYPE        PRINT ERR MSG                   30F06770
0825 1 4C80 081C           BSC  I ERR4                                         30F06780
                           *                                                   30F06790
0827 0 0000         ERR5   DC     *-*          INTRPT 4 DSW ERROR               30F06800
0828 0 685C                STX    ERR5S        SET ERROR 5 SW                  30F06810
0829 0 6600 00C0           LDX  L2 /C0         SET DATA ID                     30F06820
```

```
082B 0 F07C            EOR     DSW4        GET DSW S/B                30F06830
082C 0 D07C            STO     DSW4&1      SET IN MSG                 30F06840
082D 0 C07A            LD      DSW4                                   30F06850
082E 0 1002            SLA     2           LOOK FOR ERR CK            30F06860
082F 1 4C28 0836       BSC  L  ERR6,&Z     BR IF ERR CK               30F06870
                       *                                              30F06880
0831 0 6105            LDX  1  5                                      30F06890
0832 0 C845            LDD     MSG5                                   30F06900
0833 0 4052            BSI     ETYPE       PRINT ERR MSG              30F06910
0834 1 4C80 0827 ERR5R BSC  I  ERR5                                   30F06920
                       *                                              30F06930
0836 0 C070      ERR6  LD      DSWSB       CK FOR PUNCH OPERATION     30F06940
0837 1 4C08 0845       BSC  L  ERR7,&      BR IF NOT PUNCH            30F06950
0839 1 0C00 0904       XIO  L  READ        RD ECHO BITS               30F06960
083B 1 C480 0904       LD   I  READ                                   30F06970
083D 1 4C18 0845       BSC  L  ERR7,&-     BR IF NOT PUNCH CK         30F06980
083F 0 D062            STO     DSW         STO ECHO IN MSG            30F06990
0840 0 6106            LDX  1  6                                      30F07000
0841 0 6203            LDX  2  /3                                     30F07010
0842 0 C837            LDD     MSG6                                   30F07020
0843 0 4042            BSI     ETYPE       PRINT ERR MSG              30F07030
0844 0 70EF            MDX     ERR5R                                  30F07040
                       *                                              30F07050
0845 0 6107      ERR7  LDX  1  7           ERR CK                     30F07060
0846 0 C835            LDD     MSG7                                   30F07070
0847 0 403E            BSI     ETYPE       PRINT ERR MSG              30F07080
0848 0 70EB            MDX     ERR5R                                  30F07090
                       *                                              30F07100
0849 0 0000      ERR8  DC      *-*         COL COUNT ERROR            30F07110
084A 0 6108            LDX  1  8                                      30F07120
084B 0 6600 0C00       LDX  L2 /C00                                   30F07130
084D 0 C830            LDD     MSG8                                   30F07140
084E 0 4037            BSI     ETYPE       PRINT ERR MSG              30F07150
084F 1 4C80 0849       BSC  I  ERR8                                   30F07160
                       *                                              30F07170
0851 0 0000      ERR9  DC      *-*         DATA COMPARE ERROR         30F07180
0852 0 F058            EOR     DATA&1      RESTORE TO DATA WAS        30F07190
0853 0 D056            STO     DATA                                   30F07200
0854 0 690D            STX  1  RX1&1       SAVE XR1                   30F07210
0855 0 10A0            SLT     32                                     30F07220
0856 0 6600 9300       LDX  L2 /9300       SET FOR MULTI LINE MSG     30F07230
0858 1 7400 0884       MDX  L  M           CHECK FOR MULTI LINE       30F07240
085A 0 7005            MDX     ERR9A       BR IF FIRST LINE           30F07250
085B 0 6828            STX     M           SET MULTI LINE WORD        30F07260
085C 0 6109            LDX  1  9           MESSAGE NUMBER             30F07270
085D 0 6600 1300       LDX  L2 /1300       SET WORD CNTL              30F07280
085F 0 C820            LDD     MSG9                                   30F07290
0860 0 4025      ERR9A BSI     ETYPE       ERROR TYPE OUT             30F07300
0861 0 6500 0000 RX1   LDX  L1 *-*         RESTORE XR1                30F07310
0863 1 0C00 078A       XIO  L  STACK-1     SELECT ERROR CARD          30F07320
0865 1 4C80 0851       BSC  I  ERR9        RETURN                     30F07330
                       *                                              30F07340
0867 0 0000      ERR10 DC      *-*                                    30F07350
0868 0 6110            LDX  1  /10                                    30F07360
0869 0 6240            LDX  2  /40                                    30F07370
086A 0 C817            LDD     MSG10                                  30F07380
086B 0 401A            BSI     ETYPE                                  30F07390
086C 1 4C80 0867       BSC  I  ERR10                                  30F07400
                       *                                              30F07410
                       *   ALPHA MESSAGE ADDRESSES                    30F07420
                       *                                              30F07430
086E   0000            BSS  E  0                                      30F07440
086E 1 0976      MSG0  DC      ACNBK       CARD NOT BLANK             30F07450
086F 0 0000            DC      0000                                   30F07460
0870 1 097E      MSG1  DC      AWAS                                   30F07470
0871 1 098A            DC      ASDSW                                  30F07480
0872 1 097E      MSG2  DC      AWAS                                   30F07490
0873 1 0993            DC      ABDSW                                  30F07500
```



```
0874 1 09A3      MSG3  DC      ANINT                                  30F07510
0875 1 09AB            DC      ALV4                                   30F07520
0876 1 097E      MSG4  DC      AWAS                                   30F07530
0877 1 0A05            DC      ADSW0                                  30F07540
0878 1 097E      MSG5  DC      AWAS                                   30F07550
0879 1 099B            DC      ADSW4                                  30F07560
087A 1 097E      MSG6  DC      AWAS                                   30F07570
087B 1 09B3            DC      APCK                                   30F07580
087C 1 097E      MSG7  DC      AWAS                                   30F07590
087D 1 09B9            DC      AECK                                   30F07600
087E 1 0983      MSG8  DC      ADWAS                                  30F07610
087F 1 09BE            DC      ACCNT                                  30F07620
0880 1 097E      MSG9  DC      AWAS                                   30F07630
0881 1 09C5            DC      ADATA                                  30F07640
0882 1 09A3      MSG10 DC      ANINT                                  30F07650
0883 1 09AF            DC      ALV0                                   30F07660
0884 0 0000      M     DC      *-*         MULTI LINE CONTROL WORD    30F07670
0885 0 0000      ERR5S DC      *-*         ERR5 SW                    30F07680
                       *                                              30F07690
                       ********************************************** 30F07700
                       *           PRINT ERROR MESSAGE              * 30F07710
                       ********************************************** 30F07720
                       *     THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. 30F07730
                       *     UPON ENTRY THE MSG NO. MUST BE SET IN XR1, 30F07740
                       *     THE DATA ID IN XR2, AND THE ALPHA ADDRS IN 30F07750
                       *     THE ACCUM AND EXT.                       30F07760
                       *----------------------------------------      30F07770
                       *                                              30F07780
0886 0 0000      ETYPE DC      *-*                                    30F07790
0887 0 6915            STX  1  TABLE       MSG NUMBER                 30F07800
0888 0 6A16            STX  2  TABLE&2     DATA ID                    30F07810
0889 0 D816            STD     AMSG        ALPHA MESSAGE              30F07820
                       *                                              30F07830
088A 1 7400 0890       MDX  L  OPMSW       PRINT LAST OP MSG IF       30F07840
088C 0 7004            MDX     ETYP1        FIRST ERROR MSG AFTER     30F07850
088D 0 4480 0162       BSI  I  ERROR        A CONTROL OP              30F07860
088F 1 0896            DC      ETYP2                                  30F07870
0890 0 0000      OPMSW DC      *-*         MUST BE ZERO FOR OP MSG    30F07880
                       *                                              30F07890
0891 0 4480 0162 ETYP1 BSI  I  ERROR       PRINT ERROR MESSAGE        30F07900
0893 1 089D            DC      TABLE                                  30F07910
0894 0 0000      LOOP  DC      *-*                                    30F07920
0895 0 68FA            STX     OPMSW                                  30F07930
                       *                                              30F07940
0896 1 4C80 0886 ETYP2 BSC  I  ETYPE       RETURN                     30F07950
                       *                                              30F07960
0898 0 8000            DC      /8000                                  30F07970
0899 1 09CF            DC      ALOP                                   30F07980
089A 0 0000      OP    DC      *-*                                    30F07990
                       *                                              30F08000
                       *---------------------------------------       30F08010
                       *     ERROR MESSAGE TABLE                      30F08020
                       *---------------------------------------       30F08030
089C   0001            BSS  E  1                                      30F08040
089D 0 0000      TABLE DC      *-*         MESSAGE NUMBER             30F08050
089E 0 1C00            DC      /1C00       HEX/DECIMAL SW             30F08060
089F 0 0000            DC      *-*         DATA WORD ID               30F08070
08A0 0 0000      AMSG  DC      *-*         ALPHA ADDRS 1              30F08080
08A1 0 0000            DC      *-*         ALPHA ADDRS 2              30F08090
                       *                                              30F08100
08A2 0 0000      DSW   DC      *-*         STATIC DSW WAS             30F08110
08A3 0 0000      ZERO  DC      /0000               S/B                30F08120
08A4 0 0000      BDSW  DC      *-*         BUSY DSW WAS               30F08130
08A5 0 0003            DC      /0003             S/B                  30F08140
08A6 0 0000      DSW0  DC      *-*         INT 0 DSW WAS              30F08150
08A7 0 0000      DSWSB DC      *-*               S/B                  30F08160
08A8 0 0000      DSW4  DC      *-*         INT 4 DSW WAS              30F08170
08A9 0 0000            DC      *-*               S/B                  30F08180
```

```
08AA 0 0000          DATA  DC      *-*         DATA READ WAS                30F08190
08AB 0 0000                DC      *-*                 S/B                  30F08200
08AC 0 0000          COLCT DC      *-*         COLUMN COUNT WAS             30F08210
08AD 0 0050                DC      80                  S/B                  30F08220
08AE 0 0000          COL   DC      *-*         COLUMN IN ERROR              30F08230
                     *                                                      30F08240
                     ********************************************           30F08250
                     *            INTERRUPT WAIT ROUTINE                    30F08260
                     ********************************************           30F08270
                     *     THIS SUBROUTINE WAITS FOR INTERRUPT.             30F08280
                     *     WHEN THE INTERRUPT IS RECEIVED IT WILL           30F08290
                     *     CHECK THE ROUTINE SELECTION SWITCH.              30F08300
                     *     IF A NEW ROUTINE HAS BEEN SELECTED IT            30F08310
                     *     WILL BRANCH TO THE CONTROL ROUTINE.              30F08320
                     *-----------------------------------------           30F08330
                     *                                                      30F08340
08AF 0 0000          WAIT  DC      *-*                                      30F08350
08B0 0 69F6                STX   1 DSWSB       SAVE INT 0 DSW S/B           30F08360
08B1 0 6500 1000           LDX   L1 /1000      SET INTERRUPT                30F08370
08B3 0 695C                STX   1 WCNT         WAIT CNT                    30F08380
08B4 0 0851                XIO     SENSE       SENSE BUSY DSW               30F08390
08B5 0 D0EE                STO     BDSW                                     30F08400
08B6 0 1011                SLA     17                                       30F08410
08B7 0 D0F4                STO     COLCT       RESET COL COUNT              30F08420
08B8 0 D056                STO     EBITS       RESET INT 0 DSW ERR BITS     30F08430
08B9 0 D0D6                STO     OPMSW       RESET OP MSG SW              30F08440
                     *                                                      30F08450
08BA 1 6500 08C3     WAIT1 LDX   L1 WAIT3                                   30F08460
08BC 1 7400 05E6           MDX   L  MLSCF&1    CK FOR INTERRUPT             30F08470
08BE 0 701B                MDX     WAIT4       BR IF INTERRUPT OCCURED      30F08480
                     *                                                      30F08490
08BF 1 6D00 05E5     WAIT2 STX   L1 MLSCF      SET RETURN ADDRESS           30F08500
08C1 0 4480 0161           BSI   I  START       GO TO MONITOR                30F08510
                     *                                                      30F08520
08C3 1 74FF 0910     WAIT3 MDX   L  WCNT,-1    DECREMENT WAIT CNT           30F08530
08C5 0 70F4                MDX     WAIT1                                    30F08540
                     *                                                      30F08550
08C6 0 C0DD                LD      BDSW        CK BUSY DSW                  30F08560
08C7 0 F0DD                EOR     BDSW&1                                   30F08570
08C8 1 4420 0815           BSI   L  ERR2,Z     BR IF ER                     30F08580
08CA 0 083B                XIO     SENSE       SENSE DSW                    30F08590
08CB 0 D0DC                STO     DSW4        STORE DSW IN MSG             30F08600
08CC 0 C0E0                LD      COLCT&1     CK FOR FEED OP               30F08610
08CD 1 4C08 08D2           BSC   L  WAT3A,&    BR IF FEED OP                30F08620
08CF 0 C0DC                LD      COLCT                                    30F08630
08D0 1 4408 0867           BSI   L  ERR10,&                                 30F08640
08D2 0 6103          WAT3A LDX     1 3                                      30F08650
08D3 0 6240                LDX     2 /40                                    30F08660
08D4 0 C89F                LDD     MSG3                                     30F08670
08D5 0 40B0                BSI     ETYPE       PRINT ERR MSG                30F08680
08D6 1 6780 08AF           LDX   I3 WAIT       SET TO CONTINUE FUNCTION     30F08690
08D8 1 6F00 05E6           STX   L3 MLSCF&1                                 30F08700
                     *                                                      30F08710
08DA 1 C400 05E0     WAIT4 LD    L  SW1                                     30F08720
08DC 0 4488 0161           BSI   I  START,&    CK FOR RTN SELECT            30F08730
08DE 1 9400 05DD           S     L  RID        CK FOR NEW ROUTINE           30F08740
08E0 1 4420 05F8           BSI   L  CNTRL,Z    BR IF NEW RTN                30F08750
08E2 0 4480 0161           BSI   I  START      GO TO MONITOR                30F08760
                     *                                                      30F08770
                     *-----------------------------------------             30F08780
                     *  COME TO HERE FROM INTERRUPT AND CHECK FOR           30F08790
                     *  ERRORS BEFORE RETURNING TO TEST ROUTINE             30F08800
                     *-----------------------------------------             30F08810
                     *                                                      30F08820
08E4 0 10A0          RTRN  SLT     32                                       30F08830
08E5 0 C0BE                LD      BDSW        CK BUSY DSW                  30F08840
08E6 0 F0BE                EOR     BDSW&1                                   30F08850
08E7 1 4420 0815           BSI   L  ERR2,Z     BR IF ER                     30F08860
```



```
                     *                                                      30F08870
08E9 0 C025                LD      EBITS       CK INT 0 DSW                 30F08880
08EA 0 E023                AND     KEFFF                                    30F08890
08EB 1 4420 081C           BSI   L  ERR4,Z     BR IF ERR                    30F08900
                     *                                                      30F08910
08ED 0 C0BA                LD      DSW4        CK INT 4 DSW                 30F08920
08EE 0 F01D                EOR     K0800       REMOVE RESPONSE BIT          30F08930
08EF 0 E01D                AND     KEFFE       MASK LAST CD AND NRDY        30F08940
08F0 1 4420 0827           BSI   L  ERR5,Z     BR IF ERR                    30F08950
08F2 0 C0BA                LD      COLCT&1     CK FOR FEED OP               30F08960
08F3 1 4C08 08FC           BSC   L  RTRN1,&    BR IF FEED OP                30F08970
                     *                                                      30F08980
08F5 0 C0B6                LD      COLCT                                    30F08990
08F6 1 4408 0867           BSI   L  ERR10,&                                 30F09000
08F8 0 C0B3                LD      COLCT       CK COLUMN COUNT              30F09010
08F9 0 F0B3                EOR     COLCT&1     COMPARE WITH S/B             30F09020
08FA 1 4420 0849           BSI   L  ERR8,Z     BR IF COL COUNT ER           30F09030
                     *                                                      30F09040
                     *                                                      30F09050
08FC 0 C0AB          RTRN1 LD      DSW4        CK FOR LAST CARD             30F09060
08FD 0 1004                SLA     4                                        30F09070
08FE 1 4C02 095F           BSC   L  LSTCD,C    BR IF LAST CARD              30F09080
0900 1 4C80 08AF           BSC   I  WAIT       RETURN TO TEST RTN           30F09090
                     *                                                      30F09100
0902    0000               BSS   E  0                                       30F09110
0902 1 090A          PUNCH DC      PBUF        PUNCH                        30F09120
0903 0 1100                DC      /1100                                    30F09130
0904 1 0A84          READ  DC      RAREA       READ                         30F09140
0905 0 1200                DC      /1200                                    30F09150
0906 0 0000          SENSE DC      /0000       SENSE DSW                    30F09160
0907 0 1700                DC      /1700                                    30F09170
0908 0 0008          K0008 DC      /0008                                    30F09180
0909 0 1701          SNRS0 DC      /1701                                    30F09190
090A 0 0000          PBUF  DC      *-*         PRINT DATA BUFFER            30F09200
090B 0 1702          SNRS4 DC      /1702                                    30F09210
090C 0 0800          K0800 DC      /0800                                    30F09220
090D 0 EFFE          KEFFE DC      /EFFE                                    30F09230
090E 0 EFFF          KEFFF DC      /EFFF                                    30F09240
090F 0 0000          EBITS DC      *-*         INT 0 DSW ER BITS            30F09250
0910 0 0000          WCNT  DC      *-*                                      30F09260
                     *                                                      30F09270
                     ********************************************           30F09280
                     *            INTRPT 0 SERVICE ROUTINE                  30F09290
                     ********************************************           30F09300
                     *                                                      30F09310
0911 0 0000          INTRO DC      *-*                                      30F09320
0912 0 08F5                XIO     SNRS0-1     SENSE DSW                    30F09330
0913 0 F093                EOR     DSWSB       CK FOR CORRECT DSW           30F09340
0914 0 E8FA                OR      EBITS                                    30F09350
0915 0 D0F9                STO     EBITS       SAVE ERROR BITS              30F09360
0916 0 F090                EOR     DSWSB       RESTORE DSW                  30F09370
0917 0 1000                NOP     0           USE FOR TRAP                 30F09380
                     *                                                      30F09390
0918 1 7401 08AC           MDX   L  COLCT,1     ADV COLUMN COUNT             30F09400
091A 1 4C28 0932           BSC   L  CKRDR,&Z    CK RDR IF BO -               30F09410
091C 1 C480 0786           LD    I  PDATA      LD PUNCH DATA                30F09420
091E 1 74FF 078A           MDX   L  NCOL,-1    CK FOR LAST COL              30F09430
0920 0 7001                MDX     *&1                                      30F09440
0921 0 E8E6                OR      K0008       SET PUNCH TERMINATOR         30F09450
0922 0 D0E7                STO     PBUF        STO PUNCH DATA IN BUFFER     30F09460
0923 0 08DE                XIO     PUNCH       PCH A COLUMN                 30F09470
0924 1 7401 0786           MDX   L  PDATA,1    INCREASE PCH ADDR            30F09480
0926 1 C480 0786           LD    I  PDATA      LD NEXT PUNCH DATA           30F09490
0928 1 F400 0788           EOR   L  TERM       CK FOR END OF TABLE          30F09500
092A 1 4CA0 0911           BSC   I  INTRO,Z    RETURN IF NOT END            30F09510
092C 1 6700 0A33           LDX   L3 WAREA      RETURN TO START OF           30F09520
092E 1 6F00 0786           STX   L3 PDATA       PUNCH DATA TABLE            30F09530
0930 1 4C80 0911           BSC   I  INTRO                                   30F09540
```

```
                        *                                                       30F09550
0932 0 08D1             CKRDR XIO     READ        READ COMMAND                  30F09560
0933 1 7401 0904              MDX   L READ,1      INCREASE RD ADDR              30F09570
0935 1 4C80 0911              BSC   I INTRO                                     30F09580
                        *                                                       30F09590
                        *****************************************             30F09600
                        *             INTRPT 4 SERVICE ROUTINE                30F09610
                        *****************************************             30F09620
                        *                                                       30F09630
0937 0 0000             INTR4 DC      *-*                                       30F09640
0938 0 08D1                   XIO     SNRS4-1     SENSE DSW                     30F09650
0939 0 1000                   NOP     0           USE FOR TRAP                  30F09660
                        *                                                       30F09670
093A 1 D400 08A8              STO   L DSW4        SAVE DSW BITS                 30F09680
093C 1 6700 08E4              LDX   L3 RTRN                                     30F09690
093E 1 6F00 05E6              STX   L3 MLSCF&1    SET FOR RETURN                30F09700
0940 1 4C80 0937              BSC   I INTR4                                     30F09710
                        *                                                       30F09720
                        *****************************************             30F09730
                        *             CHECK READY                             30F09740
                        *****************************************             30F09750
                        *                                                       30F09760
0942 0 0000             READY DC      *-*                                       30F09770
0943 0 08C2                   XIO     SENSE       SENSE DSW                     30F09780
0944 1 D400 08A2              STO   L DSW         STORE DSW                     30F09790
0946 1 4C98 0942              BSC   I READY,&-    NO BITS FOUND                 30F09800
0948 0 1801                   SRA     1           REMOVE NRDY                   30F09810
0949 1 4420 0807              BSI   L ERR1,Z      BR IF OTHER THAN NRDY         30F09820
                        *                                                       30F09830
0948 0 1011             BOX   SLA     17                                        30F09840
094C 0 D011                   STO     BCNT        RESET BOX CNT                 30F09850
                        *                                                       30F09860
094D 1 6500 0953        BOX1  LDX   L1 BOX2       LD REENTRY ADDRS              30F09870
094F 1 6D00 05E6              STX   L1 MLSCF&1    SET MLSCF                     30F09880
0951 1 4C00 08DA              BSC   L WAIT4       GO TO MONITOR                 30F09890
                        *                                                       30F09900
0953 0 08B2             BOX2  XIO     SENSE       SENSE DSW                     30F09910
0954 1 4C98 0942              BSC   I READY,&-    RETURN IF READY               30F09920
0956 1 7403 095E              MDX   L BCNT,3                                    30F09930
0958 0 70F4                   MDX     BOX1                                      30F09940
                        *                                                       30F09950
0959 0 6105             NRDY  LDX     1 5         MESSAGE NUMBER                30F09960
095A 1 6700 09DF              LDX   L3 ANRDY      NOT READY                     30F09970
095C 0 400A                   BSI     TYPE        PRINT MESSAGE                 30F09980
095D 0 70ED                   MDX     BOX                                       30F09990
                        *                                                       30F10000
095E 0 0000             BCNT  DC      *-*                                       30F10010
                        *                                                       30F10020
                        *****************************************             30F10030
                        *             FEED LAST CARD                          30F10040
                        *****************************************             30F10050
                        *                                                       30F10060
095F 1 0C00 0784        LSTCD XIO   L FDACD-1     FEED COMMAND                  30F10070
0961 0 6106                   LDX   1 6           MESSAGE NUMBER                30F10080
0962 1 6700 09FF              LDX   L3 ALCD       LAST CARD                     30F10090
0964 0 4002                   BSI     TYPE        PRINT MESSAGE                 30F10100
0965 1 4400 05F8              BSI   L CNTRL       GO TO NEXT ROUTINE            30F10110
                        *                                                       30F10120
                        *****************************************             30F10130
                        *             PRINT STATUS MESSAGE                    30F10140
                        *****************************************             30F10150
                        *                                                       30F10160
0967 0 0000             TYPE  DC      *-*                                       30F10170
0968 0 6907                   STX     1 SMSG      NEW MSG NUMBER                30F10180
0969 0 6B09                   STX     3 ALPHA     UPDATE MESSAGE                30F10190
                        *                                                       30F10200
096A 0 4480 0163              BSI   I LOG         CALL ON LOG                   30F10210
096C 1 0970                   DC      SMSG        ADDR OF MSG                   30F10220
```



```
                        *                                                       30F10230
                              STO     ALPHA&1                                   30F10240
096E 1 4C80 0967              BSC   I TYPE        RETURN                        30F10250
                        *                                                       30F10260
0970 0 0000             SMSG  DC      *-*         MESSAGE NUMBER                30F10270
0971 0 0000                   DC      /0000       HEX/DECIMAL SW                30F10280
0972 0 0001                   DC      /0001       DATA WORD ID                  30F10290
0973 0 0000             ALPHA DC      *-*         ALPHA ADDRS 1                 30F10300
0974 0 0000                   DC      *-*         ALPHA ADDRS 2                 30F10310
0975 0 1442                   DC      /1442                                     30F10320
                        *                                                       30F10330
                        *****************************************             30F10340
                        *             ALPHA MESSAGES                          30F10350
                        *****************************************             30F10360
                        *                                                       30F10370
0976 0 1E3E             ACNBK DC      /1E3E       CARD NOT BLANK                30F10380
0977 0 6232                   DC      /6232                                     30F10390
0978 0 2176                   DC      /2176                                     30F10400
0979 0 529E                   DC      /529E                                     30F10410
097A 0 211A                   DC      /211A                                     30F10420
097B 0 5E3E                   DC      /5E3E                                     30F10430
097C 0 765A                   DC      /765A                                     30F10440
097D 0 FFFF                   DC      /FFFF                                     30F10450
                        *                                                       30F10460
097E 0 923E             AWAS  DC      /923E       WAS S/B                       30F10470
097F 0 9A21                   DC      /9A21                                     30F10480
0980 0 219A                   DC      /219A                                     30F10490
0981 0 BC1A                   DC      /BC1A                                     30F10500
0982 0 FFFF                   DC      /FFFF                                     30F10510
                        *                                                       30F10520
0983 0 923E             ADWAS DC      /923E       WAS S/B                       30F10530
0984 0 9A21                   DC      /9A21                                     30F10540
0985 0 2121                   DC      /2121                                     30F10550
0986 0 9ABC                   DC      /9ABC                                     30F10560
0987 0 1A21                   DC      /1A21                                     30F10570
0988 0 2121                   DC      /2121                                     30F10580
0989 0 FFFF                   DC      /FFFF                                     30F10590
                        *                                                       30F10600
098A 0 2184             ASDSW DC      /2184       -STATIC DSW ERR               30F10610
098B 0 9A9E                   DC      /9A9E                                     30F10620
098C 0 3E9E                   DC      /3E9E                                     30F10630
098D 0 221E                   DC      /221E                                     30F10640
098E 0 2132                   DC      /2132                                     30F10650
098F 0 9A92                   DC      /9A92                                     30F10660
0990 0 2136                   DC      /2136                                     30F10670
0991 0 6262                   DC      /6262                                     30F10680
0992 0 FFFF                   DC      /FFFF                                     30F10690
                        *                                                       30F10700
0993 0 2184             ABDSW DC      /2184       -BUSY DSW ERR                 30F10710
0994 0 1AB2                   DC      /1AB2                                     30F10720
0995 0 9AA6                   DC      /9AA6                                     30F10730
0996 0 2132                   DC      /2132                                     30F10740
0997 0 9A92                   DC      /9A92                                     30F10750
0998 0 2136                   DC      /2136                                     30F10760
0999 0 6262                   DC      /6262                                     30F10770
099A 0 FFFF                   DC      /FFFF                                     30F10780
                        *                                                       30F10790
099B 0 2184             ADSW4 DC      /2184       -LEV4 DSW ERR                 30F10800
099C 0 5E36                   DC      /5E36                                     30F10810
099D 0 B6F0                   DC      /B6F0                                     30F10820
099E 0 2132                   DC      /2132                                     30F10830
099F 0 9A92                   DC      /9A92                                     30F10840
09A0 0 2136                   DC      /2136                                     30F10850
09A1 0 6262                   DC      /6262                                     30F10860
09A2 0 FFFF                   DC      /FFFF                                     30F10870
                        *                                                       30F10880
09A3 0 329A             ANINT DC      /329A       DSW                           30F10890
09A4 0 9221                   DC      /9221                                     30F10900
```

```
09A5 0 2176              DC      /2176     NO INTRPT
09A6 0 5221              DC      /5221
09A7 0 2276              DC      /2276
09A8 0 9E62              DC      /9E62
09A9 0 569E              DC      /569E
09AA 0 FFFF              DC      /FFFF
                         *
09AB 0 2184      ALV4    DC      /2184     -LEV4
09AC 0 5E36              DC      /5E36
09AD 0 B6F0              DC      /B6F0
09AE 0 FFFF              DC      /FFFF
                         *
09AF 0 2184      ALV0    DC      /2184     -LEV0
09B0 0 5E36              DC      /5E36
09B1 0 B6C4              DC      /B6C4
09B2 0 FFFF              DC      /FFFF
                         *
09B3 0 2184      APCK    DC      /2184     PCH CK
09B4 0 56B2              DC      /56B2
09B5 0 761E              DC      /761E
09B6 0 2621              DC      /2621
09B7 0 1E5A              DC      /1E5A
09B8 0 FFFF              DC      /FFFF
                         *
09B9 0 2184      AECK    DC      /2184     ERR CK
09BA 0 3662              DC      /3662
09BB 0 6221              DC      /6221
09BC 0 1E5A              DC      /1E5A
09BD 0 FFFF              DC      /FFFF
                         *
09BE 0 2184      ACCNT   DC      /2184     COL CNT ER
09BF 0 1E52              DC      /1E52
09C0 0 5E21              DC      /5E21
09C1 0 1E76              DC      /1E76
09C2 0 9E21              DC      /9E21
09C3 0 3662              DC      /3662
09C4 0 FFFF              DC      /FFFF
                         *
09C5 0 2121      ADATA   DC      /2121     COL   DATA ERR
09C6 0 1E52              DC      /1E52
09C7 0 5E21              DC      /5E21
09C8 0 2121              DC      /2121
09C9 0 2184              DC      /2184
09CA 0 323E              DC      /323E
09CB 0 9E3E              DC      /9E3E
09CC 0 2136              DC      /2136
09CD 0 6262              DC      /6262
09CE 0 FFFF              DC      /FFFF
                         *
09CF 0 095E      ALOP    DC      /095E     LAST OP-
09D0 0 3E9A              DC      /3E9A
09D1 0 9E21              DC      /9E21
09D2 0 5256              DC      /5256
09D3 0 8421              DC      /8421
09D4 0 FFFF              DC      /FFFF
                         *
09D5 0 6236      ARD     DC      /6236     READ
09D6 0 3E32              DC      /3E32
09D7 0 FFFF              DC      /FFFF
                         *
09D8 0 56B2      APCH    DC      /56B2     PUNCH
09D9 0 761E              DC      /761E
09DA 0 2600              DC      /2600
09DB 0 FFFF              DC      /FFFF
                         *
09DC 0 1236      AFD     DC      /1236     FEED
09DD 0 3632              DC      /3632
09DE 0 FFFF              DC      /FFFF
```

```
30F10910
30F10920
30F10930
30F10940
30F10950
30F10960
30F10970
30F10980
30F10990
30F11000
30F11010
30F11020
30F11030
30F11040
30F11050
30F11060
30F11070
30F11080
30F11090
30F11100
30F11110
30F11120
30F11130
30F11140
30F11150
30F11160
30F11170
30F11180
30F11190
30F11200
30F11210
30F11220
30F11230
30F11240
30F11250
30F11260
30F11270
30F11280
30F11290
30F11300
30F11310
30F11320
30F11330
30F11340
30F11350
30F11360
30F11370
30F11380
30F11390
30F11400
30F11410
30F11420
30F11430
30F11440
30F11450
30F11460
30F11470
30F11480
30F11490
30F11500
30F11510
30F11520
30F11530
30F11540
30F11550
30F11560
30F11570
30F11580
```



```
                         *
09DF 0 7662      ANRDY   DC      /7662     NRDY - PRESS 1442 START
09E0 0 32A6              DC      /32A6
09E1 0 2184              DC      /2184
09E2 0 5662              DC      /5662
09E3 0 369A              DC      /369A
09E4 0 9A21              DC      /9A21
09E5 0 FCF0              DC      /FCF0
09E6 0 F0D8              DC      /F0D8
09E7 0 219A              DC      /219A
09E8 0 9E3E              DC      /9E3E
09E9 0 629E              DC      /629E
09EA 0 FFFF              DC      /FFFF
                         *
09EB 0 5E32      ALDBK   DC      /5E32     LOAD BLANKS
09EC 0 2100              DC      /2100
09ED 0 1A5E              DC      /1A5E
09EE 0 3E76              DC      /3E76
09EF 0 5A9A              DC      /5A9A
09F0 0 FFFF              DC      /FFFF
                         *
09F1 0 5E32      ANYP    DC      /5E32     LD ANY PATTERN PLUS BLANKS
09F2 0 213E              DC      /213E
09F3 0 76A6              DC      /76A6
09F4 0 2156              DC      /2156
09F5 0 3E9E              DC      /3E9E
09F6 0 9E36              DC      /9E36
09F7 0 6276              DC      /6276
09F8 0 2156              DC      /2156
09F9 0 5EB2              DC      /5EB2
09FA 0 9A21              DC      /9A21
09FB 0 1A5E              DC      /1A5E
09FC 0 3E76              DC      /3E76
09FD 0 5A9A              DC      /5A9A
09FE 0 FFFF              DC      /FFFF
                         *
09FF 0 5E3E      ALCD    DC      /5E3E     LAST CARD
0A00 0 9A9E              DC      /9A9E
0A01 0 211E              DC      /211E
0A02 0 3E62              DC      /3E62
0A03 0 3200              DC      /3200
0A04 0 FFFF              DC      /FFFF
                         *
0A05 0 2184      ADSWO   DC      /2184     -LEVO DSW ERR
0A06 0 5E36              DC      /5E36
0A07 0 B6C4              DC      /B6C4
0A08 0 2132              DC      /2132
0A09 0 9A92              DC      /9A92
0A0A 0 2136              DC      /2136
0A0B 0 6262              DC      /6262
0A0C 0 FFFF              DC      /FFFF
                         *
0A0D 0 5E32      ASTOH   DC      /5E32     LOAD FROM STK 2
0A0E 0 2112              DC      /2112
0A0F 0 6252              DC      /6252
0A10 0 7221              DC      /7221
0A11 0 9A9E              DC      /9A9E
0A12 0 5A21              DC      /5A21
0A13 0 D821              DC      /D821
0A14 0 FFFF              DC      /FFFF
                         *
0A15 0 9A36      ASETP   DC      /9A36     SET PATT IN SW 0-11
0A16 0 9E21              DC      /9E21     T
0A17 0 563E              DC      /563E     PA
0A18 0 9E9E              DC      /9E9E     TT
0A19 0 2122              DC      /2122      I
0A1A 0 7621              DC      /7621     N
0A1B 0 9A92              DC      /9A92     SW
```

```
30F11590
30F11600
30F11610
30F11620
30F11630
30F11640
30F11650
30F11660
30F11670
30F11680
30F11690
30F11700
30F11710
30F11720
30F11730
30F11740
30F11750
30F11760
30F11770
30F11780
30F11790
30F11800
30F11810
30F11820
30F11830
30F11840
30F11850
30F11860
30F11870
30F11880
30F11890
30F11900
30F11910
30F11920
30F11930
30F11940
30F11950
30F11960
30F11970
30F11980
30F11990
30F12000
30F12010
30F12020
30F12030
30F12040
30F12050
30F12060
30F12070
30F12080
30F12090
30F12100
30F12110
30F12120
30F12130
30F12140
30F12150
30F12160
30F12170
30F12180
30F12190
30F12200
30F12210
30F12220
30F12230
30F12240
30F12250
30F12260
```

```
0A1C 0 21C4              DC      /21C4       0                    30F12270
0A1D 0 84FC              DC      /84FC      -1                    30F12280
0A1E 0 FC21              DC      /FC21       1                    30F12290
0A1F 0 9E26              DC      /9E26       THEN TN SW 12        30F12300
0A20 0 3676              DC      /3676       EN                   30F12310
0A21 0 219E              DC      /219E        T                   30F12320
0A22 0 7621              DC      /7621       N                    30F12330
0A23 0 9A92              DC      /9A92       SW                   30F12340
0A24 0 21FC              DC      /21FC        1                   30F12350
0A25 0 D821              DC      /D821       2                    30F12360
0A26 0 FFFF              DC      /FFFF                            30F12370
                    *                                             30F12380
0A27 0 5262         ALACD DC     /5262       OR GANG PUNCHED CARDS 30F12390
0A28 0 2116              DC      /2116                            30F12400
0A29 0 3E76              DC      /3E76                            30F12410
0A2A 0 1621              DC      /1621                            30F12420
0A2B 0 56B2              DC      /56B2                            30F12430
0A2C 0 761E              DC      /761E                            30F12440
0A2D 0 2636              DC      /2636                            30F12450
0A2E 0 3221              DC      /3221                            30F12460
0A2F 0 1E3E              DC      /1E3E                            30F12470
0A30 0 6232              DC      /6232                            30F12480
0A31 0 9A00              DC      /9A00                            30F12490
0A32 0 FFFF              DC      /FFFF                            30F12500
                    *                                             30F12510
                    *********************************************30F12520
                    *          PUNCH DATA TABLE                   30F12530
                    *********************************************30F12540
                    *                                             30F12550
0A33 0 8010         WAREA DC     /8010       COLUMN 1             30F12560
0A34 0 4020              DC      /4020                            30F12570
0A35 0 2040              DC      /2040                            30F12580
0A36 0 1080              DC      /1080                            30F12590
0A37 0 0900              DC      /0900                            30F12600
0A38 0 0600              DC      /0600                            30F12610
0A39 0 0600              DC      /0600                            30F12620
0A3A 0 0900              DC      /0900                            30F12630
0A3B 0 1080              DC      /1080                            30F12640
0A3C 0 2040              DC      /2040                            30F12650
0A3D 0 4020              DC      /4020                            30F12660
0A3E 0 8010              DC      /8010                            30F12670
0A3F 0 FFF7              DC      /FFF7                            30F12680
0A40 0 8880              DC      /8880                            30F12690
0A41 0 CCC0              DC      /CCC0                            30F12700
0A42 0 EEE0              DC      /EEE0                            30F12710
0A43 0 FFF0              DC      /FFF0                            30F12720
0A44 0 7777              DC      /7777                            30F12730
0A45 0 3333              DC      /3333                            30F12740
0A46 0 1111              DC      /1111                            30F12750
0A47 0 FFF7              DC      /FFF7       COL 21               30F12760
0A48 0 A000              DC      /A000                            30F12770
0A49 0 9000              DC      /9000       ALPHA RIPPLE         30F12780
0A4A 0 8800              DC      /8800                            30F12790
0A4B 0 8400              DC      /8400                            30F12800
0A4C 0 8200              DC      /8200       COL 26               30F12810
0A4D 0 8100              DC      /8100                            30F12820
0A4E 0 8080              DC      /8080                            30F12830
0A4F 0 8040              DC      /8040                            30F12840
0A50 0 8020              DC      /8020                            30F12850
0A51 0 8010              DC      /8010                            30F12860
0A52 0 5000              DC      /5000                            30F12870
0A53 0 4800              DC      /4800                            30F12880
0A54 0 4400              DC      /4400                            30F12890
0A55 0 4200              DC      /4200                            30F12900
0A56 0 4100              DC      /4100                            30F12910
0A57 0 4080              DC      /4080                            30F12920
0A58 0 4040              DC      /4040                            30F12930
0A59 0 4020              DC      /4020                            30F12940
```



```
0A5A 0 4010              DC      /4010       COL 40 WAREA&39      30F12950
0A5B 0 3000              DC      /3000                            30F12960
0A5C 0 2800              DC      /2800                            30F12970
0A5D 0 2400              DC      /2400                            30F12980
0A5E 0 2200              DC      /2200                            30F12990
0A5F 0 2100              DC      /2100                            30F13000
0A60 0 2080              DC      /2080                            30F13010
0A61 0 2040              DC      /2040                            30F13020
0A62 0 2020              DC      /2020                            30F13030
0A63 0 2010              DC      /2010                            30F13040
0A64 0 0000              DC      /0000                            30F13050
0A65 0 FC00              DC      /FC00                            30F13060
0A66 0 03F0              DC      /03F0                            30F13070
0A67 0 FC00              DC      /FC00                            30F13080
0A68 0 03F0              DC      /03F0                            30F13090
0A69 0 0000              DC      /0000                            30F13100
0A6A 0 8887              DC      /8887                            30F13110
0A6B 0 4444              DC      /4444                            30F13120
0A6C 0 2222              DC      /2222                            30F13130
0A6D 0 1111              DC      /1111                            30F13140
0A6E 0 0007              DC      /0007                            30F13150
0A6F 0 8880              DC      /8880                            30F13160
0A70 0 CCC4              DC      /CCC4                            30F13170
0A71 0 AAA2              DC      /AAA2                            30F13180
0A72 0 9991              DC      /9991                            30F13190
0A73 0 4444              DC      /4444                            30F13200
0A74 0 6666              DC      /6666                            30F13210
0A75 0 5555              DC      /5555                            30F13220
0A76 0 2222              DC      /2222                            30F13230
0A77 0 3333              DC      /3333                            30F13240
0A78 0 1111              DC      /1111                            30F13250
0A79 0 0005              DC      /0005       CHECK PCH TERM       30F13260
0A7A 0 0006              DC      /0006                            30F13270
0A7B 0 FFF7              DC      /FFF7                            30F13280
0A7C 0 FFF7              DC      /FFF7                            30F13290
0A7D 0 FFF7              DC      /FFF7                            30F13300
0A7E 0 FFF0              DC      /FFF0                            30F13310
0A7F 0 FFF0              DC      /FFF0                            30F13320
0A80 0 FFF0              DC      /FFF0                            30F13330
0A81 0 FFF0              DC      /FFF0                            30F13340
0A82 0 0000              DC      /0000       COLUMN 80            30F13350
0A83 0 FFFF              DC      /FFFF       TERMINATOR           30F13360
                    *                                             30F13370
                    *********************************************30F13380
                    *          READ AREA                          30F13390
                    *********************************************30F13400
                    *                                             30F13410
0A84    0050        RAREA BSS    80                               30F13420
0AD4    0051        RAREB BSS    81                               30F13430
                    *                                             30F13440
0B26    05E8                 END     BGIN                        30F13450
 NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```

C R O S S R E F E R E N C E

NAME	VALUE	REFERENCES
ABDSW	0993	0873
ACCNT	09BE	087F
ACNBK	0976	086E
ADATA	09C5	0881
ADSWO	0A05	0877
ADSW4	099B	0879
ADWAS	0983	087E
AECK	09B9	087D
AFD	09DC	0760
ALACD	0A27	06AC
ALCD	09FF	0962
ALDBK	09EB	0626,0659,06B0,06EB
ALOP	09CF	0899
ALPHA	0973	06AE,0969,096D
ALVO	09AF	0883
ALV4	09AB	0875
AMSG	08A0	0889
ANINT	09A3	0874,0882
ANRDY	09DF	095A
ANYP	09F1	071F,0732
APCH	09D8	0798
APCK	09B3	087B
ARD	09D5	0776
ASDSW	098A	0871
ASETP	0A15	06F2
ASTOH	0A0D	063D,066E,0699
AWAS	097E	0870,0872,0876,0878,087A,087C,0880
BCNT	095E	094C,0956
BDSW	08A4	08B5,08C6,08C7,08E5,08E6
BEGIN	0160	05E8
BGIN	05E8	0B26
BLANK	074A	062A,065D,0727,0759,0805
BLK1	0753	0758
BOX	094B	095D
BOX1	094D	0958
BOX2	0953	094D
CKRDR	0932	091A
CLEAR	0688	068B
CNTRL	05F8	05F7,073B,08E0,0965
CN10	05FC	
CN20	0603	05FA
CN30	0609	05FE
COL	08AE	07AE,07C6,07D5,07DC
COLCT	08AC	0751,0765,0770,078E,0793,07C8,07DE,08B7,08CC,08CF,08F2,08F5,08F8 08F9,0918
COMPR	07A3	064F,0679,06A6,06D9,07E5
COM1	07AE	07CE,07EF
COM2	07C6	07C1
COM3	07CF	07E0
COM4	07E2	07CA
COM5	07E7	07D1
DADRS	0784	0623,063A,0656,066B,068E,0696,06D0,06E8,071C,073E,0740,0747,0796 07A8
DATA	08AA	07B4,07D3,0852,0853
DFACT	06E3	06B9,06C3,06DD
DLYCT	06E4	06C4,06CB
DSW	08A2	083F,0944
DSWSB	08A7	081D,0836,08B0,0913,0916
DSWO	08A6	081F
DSW4	08A8	082B,082C,082D,08CB,08ED,08FC,093A
EBITS	090F	08B8,08E9,0914,0915
END	0164	0607
ERLCK	0166	07F3
ERROR	0162	088D,0891
ERR0	07FE	0755
ERR1	0807	0813,0949

ERR1A	0811	080A
ERR10	0867	086C,08D0,08F6
ERR2	0815	081A,08C8,08E7
ERR4	081C	0825,08EB
ERR5	0827	0834,08F0
ERR5R	0834	0844,0848
ERR5S	0885	0808,0812,0828
ERR6	0836	082F
ERR7	0845	0837,083D
ERR8	0849	084F,08FA
ERR9	0851	07B8,07D9,0865
ERR9A	0860	085A
ETYPE	0886	0803,0810,0819,0824,0833,0843,0847,084E,0860,086B,0896,08D5
ETYP1	0891	088C
ETYP2	0896	088F
FDACD	0785	0767,095F
FEED	075B	0635,076A
FLIP	067F	0685
FLIPS	078C	06A4,0773,07CF
IL0	017A	05EF
IL1	018A	
IL2	019A	
IL3	01AA	
IL4	01BA	05F5
INCR	07BA	07A7,07EC
INTR0	0911	05ED,092A,0930,0935
INTR4	0937	05F3,0940
KEFFE	090D	08EF
KEFFF	090E	08EA
K0008	0908	0921
K0800	090C	08EE
LOCK	07F0	0631,0664,06DB,072E,07F6,07FC
LOG	0163	096A
LOGBY	0167	
LOOP	0894	0612,062C,065F,06BD,0729,074E,075E,07F8,07FA
LRTN	0620	0616
LSTCD	095F	08FE
M	0884	05F1,07AB,07E3,0858,085B
MLSCF	05E5	060E,06C7,06FE,08BC,08BF,08D8,093E,094F
MSG0	086E	0800
MSG1	0870	080D
MSG10	0882	086A
MSG2	0872	0818
MSG3	0874	08D4
MSG4	0876	0823
MSG5	0878	0832
MSG6	087A	0842
MSG7	087C	0846
MSG8	087E	084D
MSG9	0880	085F
NCOL	078A	0795,07A4,07CC,07EE,091E
NRDY	0959	
NRTN	061D	0617
OP	089A	0762,0778,079A
OPMSW	0890	0801,080E,088A,0895,08B9
PBUF	090A	0902,0922
PCHST	0789	079E
PDATA	0786	0797,07A9,07B0,07BA,07BE,07C5,07E9,091C,0924,0926,092E
PID	05DC	05EA
PNCHR	078D	062F,0662,0691,0710,072C,07A1
PNCH1	0790	
PUNCH	0902	0923
RAD	05DE	060D
RAREA	0A84	0644,0648,0672,067F,0681,0688,068C,0690,0602,06F6,0707,0714,071A 0723,07B6,07D7,07E7,0904
RAREB	0AD4	06B4,06CE,074B,0753
RDRST	0787	077C
READ	0904	076D,0839,083B,0932,0938

READR	076C	064A,0674,069F,06B6,06D4,0725,0738,0750,077F
READY	0942	06EF,075C,0774,0790,0946,0954
RID	05DD	05EC,05FC,0602,0603,0605,0609,08DE
RIDCK	0616	05FD
RLCF	0168	
ROTAT	073D	0633,0651,0666,067B,06A8,0743,0748
RQKB	01BC	
RQTY	01BB	
RTNOM	0617	0606
RTNSW	0165	060F
RTRN	08E4	093C
RTRN1	08FC	08F3
RTTBL	0618	060B,0616,0617
RT1	0621	0618
RT11	062A	0637
RT2	0638	0619
RT21	0641	0653
RT22	0644	0647
RT23	0648	064C
RT3	0654	061A
RT31	065D	0668
RT4	0669	061B
RT41	0672	0676,0693
RT42	067D	
RT5	0694	061C
RT51	069D	06A1,06AA
RT6	06AB	061D
RT61	06B8	06E2
RT62	06BF	06E1
RT63	06C5	06CD
RT64	06CB	06C5
RT65	06CE	06D6
RT7	06E6	061E
RT7SW	0719	06F8,0702,0705,0713,0782
RT71	06F6	06FC,0716
RT72	0702	06FA
RT73	0707	070A
RT74	070B	0718
RT8	071A	061F
RT81	0727	0730
RT9	0731	0620
RX1	0861	0854
SENSE	0906	08B4,08CA,0943,0953
SMSG	0970	0968,096C
SNRS0	0909	0912
SNRS4	090B	0938
SNSWS	0782	06F6,0712
STACK	078B	0792,0863
START	0161	0614,08C1,08DC,08E2
STRT	05EB	05E3,05E4
SVKB	01BD	
SW0	05DF	07F1
SW1	05E0	05F9,0601,0739,08DA
SW2	05E1	06BF,070B
SW3	05E2	
TABLE	089D	0887,0888,0893
TERM	0788	0642,0742,07C0,0928
TYPE	0967	0628,063F,065B,0670,069B,06B2,06ED,06F4,0721,0734,095C,0964,096E
T6CNT	06E5	06BC,06DF
WAIT	08AF	0768,077D,079F,08D6,0900
WAIT1	08BA	08C5
WAIT2	08BF	
WAIT3	08C3	08BA
WAIT4	08DA	06C9,0700,08BE,0951
WAREA	0A33	0621,0638,0654,0669,0694,0736,0745,07C3,092C
WAT3A	08D2	08CD
WCNT	0910	08B3,08C3
ZERO	08A3	

END OF ASSEMBLY

---------- LAST PAGE ----------

TABLE OF CONTENTS

NOTE - DO NOT RUN THIS PROGRAM IN OVERLAP.

1. PURPOSE

THE 1442 TIMING TEST IS DESIGNED TO CHECK THE FOLLOWING CONDITIONS.

A. READ AND PUNCH COLUMN TIMING TOLERANCES.
B. PUNCH COLUMN DELAY TOLERANCE.
C. PROPER DSW RESPONSES.
D. READ REGISTRATION OR COMPARE ERRORS.
E. PUNCH ECHO CHECK ERRORS.
F. CORRECT COLUMN INTERRUPT COUNTS.

THE PROGRAM WILL NOT CHECK THE FOLLOWING ITEMS WHICH MUST BE CHECKED BY SCOPING WHILE PROGRAM IS RUNNING.

A. READ CELL DURATION
B. EMITTER TIMING
C. READ OR PUNCH SINGLE SHOT TIMING (LOGIC PAGE AD000)

2. PREREQUISTIES

2.1*** PROGRAM PREREQUISITES

1130 DIAGNOSTIC MONITOR II
THIS TEST MAY NOT BE RUN IN OVERLAP WITH ANY OTHER PROGRAM.

2.2*** EQUIPMENT PREREQUISITES

1. 1131 CPU WITH PROGRAM LOAD FROM CARD OR PAPER TAPE READER.
2. 1442 MOD 5, 6, OR 7.

2.3*** MODEL NUMBER

THE 1442 MODEL NUMBER MUST BE KNOWN IN ORDER TO USE THIS PROGRAM.
THIS DATA MAY BE ENTERED VIA THE BIT SWITCHES AS OUTLINED IN SECTION 3.1 OR THIS DATA MAY BE ENTERED VIA A PATCH CARD AS FOLLOWS

COL 1 - 10	+05E1 000M
COL 11 - 19	BLANK
COL 20 - 35	1442 MOD M

WHERE M = MOD NUMBER 5, 6, OR 7

3. OPERATING PROCEDURE

3.1*** PROGRAM LOADING

STANDARD MONITOR LOADING PROCEDURES APPLY
THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

1. SET FIRST TYPEWRITER TAB 20 CHARACTERS FROM LEFT MARGIN.
2. SET BIT SWITCH 15 OFF - LOAD AND GO
   ON - TO HALT AFTER LOADING

   IF HALTED AFTER LOADING, SELECT PROGRAM OPTIONS THEN TURN OFF HALT SWITCH OR FOLLOW NORMAL RESTART PROCEDURE (SECTION 3.5).

3. LOAD DIAGNOSTIC MONITOR AND THIS PROGRAM.
4. IF MODEL NUMBER CARD IS NOT IN DECK, THE MODEL NUMBER MUST BE ENTERED BEFORE THE PROGRAM WILL RUN. THE MODEL NUMBER CARD IS THE PATCH CARD WHICH SETS THE MODEL NUMBER (SEE 2.3 **)

   A. SET SWITCHES TO 810M WHERE M EQUALS THE MODEL NUMBER((5,6,OR 7
   B. PRESS THE INTERRUPT REQUEST KEY.

5. SELECT PROGRAM OPTIONS, IF DESIRED.

******

3.2*** PROGRAM OPERATION.

STANDARD MONITOR OPERATING PROCEDURES APPLY.
THESE PROCEDURES ARE SUMMARIZED HERE. SEE DM USE PROCEDURE FOR DETAILS.

NOTE - DO NOT RUN THIS PROGRAM IN OVERLAP

3.2.1 PROGRAM CONTROL OPTIONS - FUNCTION 0

1. SET SWITCHES 0-7 TO 01.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
8	RESTART
9	PRINT ROUTINE START MESSAGE AND AVG INTERRUPT TIME IN RTNS 1 + 2
10	LOCK ON FUNCTION---(RTN 1 ONLY, PUNCH FNC ONLY)
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

3. PRESS INT REQ KEY ON CONSOLE.

**

3.2.2 ROUTINE SELECTION - FUNCTION 1

THE SELECTED ROUTINE WILL LOOP UNTIL A NEW ROUTINE IS SELECTED OR ROUTINE SELECTION IS RESET.

1. TO SET ROUTINE SELECTION

   A. SET SWITCHES 0-7 TO 41.
   B. SET ROUTINE NUMBER IN SWITCHES 12-15.

RTN		DESCRIPTION	
1	*	DELAY PUNCH + CHECK COL INTR TIME	. NORMAL ROUTINES-
2		READ + CHECK COL INTRPT TIME.	. THE PROGRAM STARTS WITH
3	*	PUNCH COL INTRPT TIME GRAPH	. ROUTINE 1, RUNS EACH
4	*	READ COL INTRPT TIME GRAPH	. ROUTINE IN SEQUENCE . THEN TERMINATES AFTER . ROUTINE 4.
5	*	MODIFY PUNCH DATA	. OPTIONAL ROUTINES- . THESE ROUTINES RUN . ONLY IF SELECTED.

* = REFER TO SECTION 3.2.3 FOR SPECIAL INSTRUCTIONS.

   C. PRESS INT REQ KEY ON CONSOLE.

2. TO RESET ROUTINE SELECTION, SET AS IF SELECTING ROUTINE ZERO.

**

3.2.3 OTHER OPTION CONTROL SELECTION

1. SPECIFY PUNCH DELAY (PUNCH DELAY -- SEE NOTE 5.2.2 RTN 1)

   THE PUNCH DELAY IN ROUTINE 1 CAN BE CONTROLLED BY A SWITCH ENTRY WITH THE SWITCHES SET TO 81XX WHERE 0X CAN BE ANY HEX NO. FROM 1 TO F (NEVER 0). X REPRESENTS THE PUNCH DELAY INCREMENT (38 USEC TIMES ANY HEX NO. FROM 1 TO F). THE PUNCH DELAY INCREMENTS IS ADDED TO THE MINIMUM PUNCH DELAY OF 219 USEC.

2. GRAPH SCALE FACTOR

   IF NO GRAPH IS PUNCHED BY ROUTINE 3 OR 4 IT IS PROBABLE THAT THE READER OR PUNCH TIMING IS SO FAR OFF THAT THE GRAPH DOES NOT PUNCH ON THE CARD. (SEE NOTE 5.2.2 RTN 3) THE GRAPH SCALE IS NORMALLY 38 USEC PER CARD ROW. THIS SCALE FACTOR CAN BE INCREASED BY A SWITCH ENTRY WITH THE SWITCHES SET TO C10X WHERE THE NEW SCALE IS EQUAL TO 38 USEC TIMES X PER CARD ROW. THIS WILL ALLOW YOU TO DETERMINE HOW BAD THE TIMING IS.

3. MODIFY PUNCH DATA

   ROUTINE 5 WILL READ IN ONE CARD AND REPLACE THE PUNCH DATA TABLE WITH THE DATA PATTERN PUNCHED IN THAT CARD. THE PROGRAM WILL THEN RESTART FROM ROUTINE 1.

******

3.3*** PROGRAM HALTS

3.3.1 NORMAL HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
3001	PROGRAM STOP OR ADDRESS STOP	PRESS START
3002	HALT ON ERROR	DISPLAY MODE-PRESS START. RUN MODE - PRESS START

**

3.3.2 ERROR HALTS

HALT NO. (B REG)	DESCRIPTION	RESTART ACTION
30F1	CHECK SUM ERROR ON FIRST	RELOAD
30F2	READER DSW ERROR WHEN LOADING LOADER	RELOAD
30F3	CARD 2 OF LOADER DID NOT LOAD	RELOAD
30F4	CAN NOT CLEAR CORE - DUE TO ERROR IN ADDRESSING UPPER CORE.	
30F5	READER CHECK WHEN LOADING MONITOR OR TEST PROGRAM	NPRO THEN PLACE CARDS RUN OUT IN FRONT OF REMAINING DECK AND PRESS. START.
30F6	MONITOR DID NOT LOAD	RELOAD
30F7	CHECK SUM WHEN LOADING MONITOR	RELOAD
30F8	READER NOT READY	MAKE READER READY
30F9	INVALID INTERRUPT WHICH WILL NOT RESET	PRESS RESET AND START
30FA	CONSOLE PRINTER HANG UP - BUSY WILL NOT GO OFF	FIX THE CONSOLE PRINTER OR NOP THIS WAIT

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AT THE END OF ROUTINE 4. ROUTINE 5 WILL ONLY RUN IF SELECTED.

IF ANY ROUTINE IS SELECTED THAT ROUTINE WILL LOOP AND WILL NOT TERMINATE.

******

3.5*** RESTART

1. SET SWITCHES 0-7 TO 01.
2. TURN ON SWITCH 8.
3. SET DESIRED CONTROL IN SWITCHES 9-14.
4. PRESS INTERRUPT REQUEST KEY.

****

4. PRINTOUTS

ALL PRINTOUTS ARE IN THE STANDARD FORMAT.

```
APPNN OORR AAAA              (MESSAGE)
OR
EPPNN OORR AAAA              (MESSAGE)
```

WHERE
- A IDENTIFIES STATUS MESSAGES
- E IDENTIFIES ERROR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
  - THIS WILL BE EITHER 00 FOR MESSAGES ORIGINATED BY THE MONITOR OR 2F FOR MESSAGES ORIGINATED BY THIS PROGRAM
- NN IS THE MESSAGE SEQUENCE NUMBER
- RR IS THE ROUTINE NUMBER
- AAAA IS THE ADDRESS OF THE ROUTINE
- MESSAGE IS ANY VARIABLE INFORMATION

4.1*** STATUS MESSAGES

A0000

```
NUM  PID  ADRS RELF  LD
XXXX XXXX XXXX XXXX
```

THIS MESSAGE IS PRINTED FOLLOWING THE LOADING OF ANY PROGRAM (EXCEPT MONITOR), THE MESSAGE GIVES THE LOAD SEQUENCE NUMBER, THE PROGRAM ID, THE ADDRESS INTO WHICH THE PROGRAM WAS LOADED, AND THE RELOCATION FACTOR.

A0001

```
SWS  PID
XXXX XXXX
```

THIS MESSAGE IS PRINTED EACH TIME A VALID SWITCH ENTRY IS READ BY THE MONITOR. THE MESSAGE CONTAINS THE SWITCH SETTING READ TOGETHER WITH THE PROGRAM ID OF THE PROGRAM INTO WHICH THE CONTENTS OF SWITCHES 8-15 WERE STORED. IF THE SWITCH ENTRY CALLED FOR HALT OF ANY PROGRAM, THE WORD HALT WILL FOLLOW THE MESSAGE.

A2F00 000R AAAA

ROUTINE START MESSAGE - IF SWITCH 9, FUNCTION 0, IS TURNED ON, THIS MESSAGE WILL BE PRINTED BEFORE THE START OF EACH ROUTINE. R IS THE NUMBER OF THE NEXT ROUTINE AND AAAA IS THE STARTING ADDRESS.

A2F01 ENTER MOD NUMBER

THIS MESSAGE REQUESTS THAT THE 1442 MOD NUMBER BE ENTERED INTO THE PROGRAM. TO DO THIS, SET THE BIT SWITCHES TO 810M WHERE M = MOD NUMBER

A2F02 000R AAAA LOAD BLANKS

LOAD THE 1442 HOPPER WITH BLANK CARDS THEN PRESS 1442 START.

A2F03 000R AAAA LOAD PCHED CARDS

LOAD THE CARDS PUNCHED BY ROUTINE 1 INTO 1442 HOPPER. THIS DECK WAS PUNCHED WITH A ROTATING PATTERN. IT MUST BE LOADED IN THE SAME ORDER AS PUNCHED. THERE MUST BE NO CARDS MISSING FROM THE DECK.

A2F04 000R AAAA LAST CARD

THE LAST CARD INDICATOR WAS ON AT THE COMPLETION OF THE LAST 1442 CONTROL OPERATION. A FEED COMMAND WAS GIVEN TO RUN OUT THE LAST CARD. THE ROUTINE WILL THEN TERMINATE. IF NO ROUTINE HAS BEEN SELECTED, THE PROGRAM WILL ADVANCE TO THE NEXT ROUTINE. IF A ROUTINE HAS BEEN SELECTED, THE PROGRAM WILL RESTART THAT ROUTINE.

A2F05 000R AAAA NRDY - PRESS 1442 START

THIS MESSAGE WILL BE PRINTED IF THE 1442 IS NOT READY FOR ANY REASON. THE PROGRAM WILL LOOP WAITING FOR READY. TO CONTINUE, CLEAR ANY ERROR CONDITIONS AND MAKE THE 1442 READY.

A2F06 0001 AAAA PUNCH DELAY - X
XXXXX

ROUTINE 1 VARIES THE TIME BETWEEN RECEIVING THE PUNCH RESPONSE AND ISSUING THE PUNCH COMMAND. THE DELAY STARTS AT MAXIMUM (333 USEC, INCREMENT 4) REDUCED IN STEPS TO MINIMUM (219 USEC, INCREMENT OF ONE). THIS MESSAGE IDENTIFIES THE DELAY FOR THE NEXT 80 CARDS. X = THE DELA INCREMENT AND XXXX EQUALS THE DELAY IN USEC.

A2F07 000R AAAA AVG COL INTRPT TIME
XXXXX YYYYY

THIS MESSAGE IS PRINTED IN ROUTINES 1 AND 2 AFTER 80 CARDS HAVE BEEN READ OR PUNCHED, OR WHEN THE ROUTINE TERMINATES.

XXXXX = AVERAGE TIME IN USEC BETWEEN COLUMN INTERRUPTS FOR ALL CARDS READ OR PUNCHED SINCE THIS AVERAGE MESSAGE WAS LAST PRINTED.
YYYYY = NORMAL AVERAGE TIME IN USEC.

******

4.2*** ERROR MESSAGES

THE DSW IS CHECKED FOR ABSOLUTE CORRECTNESS AT ALL TIMES. IF AN ERROR IS DETECTED ONE OF THE MESSAGES BELOW WILL INDICATE THE PROBLEM. IT IS LEFT TO THE OPERATOR TO ANALYZE THE DSW FOR THE SPECIFIC PROBLEM AREA.

THE 1442 DSW

BIT	
0	PUNCH RESPONSE
1	READ RESPONSE
2	ERROR CHECK
3	LAST CARD
4	OPERATION COMPLETE
5	NOT USED
6	NOT USED
7	FEED CHECK AT READ STATION
8	NOT USED
9	NOT USED
10	NOT USED
11	NOT USED
12	NOT USED
13	NOT USED
14	BUSY
15	NOT READY OR BUSY

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 4-7 DID NOT EQUAL THE LOAD SEQUENCE NUMBER OF ANY PROGRAM IN CORE.

E0003 OVR CORE

THE PROGRAM WHICH THE LOADER WAS ATTEMPTING TO LOAD EXCEEDED AVAILABLE CORE. LOADING WAS TERMINATED.

E0004 CKSUM

A CHECK SUM ERROR WAS DETECTED WHILE LOADING A TEST PROGRAM. THIS ERROR OCCURS UNDER ANY OF THE FOLLOWING CONDITIONS.

1. A CARD IS MISSING OR IS OUT OF SEQUENCE.
2. THERE IS AN EXTRA CARD IN THE DECK.
3. THE PUNCHED INFORMATION ON THE CARD IS NOT CORRECT.
4. DATA WAS LOST OR PICKED UP DUE TO A MACHINE MALFUNCTION.
5. DUE TO A CPU MALFUNCTION, THE CHECK SUM WAS NOT CORRECTLY CALCULATED.

WHEN THIS ERROR OCCURS ATTEMPT TO RELOAD THE PROGRAM.

E0005 OOON XXXX

THIS ERROR WILL OCCUR IF AN INTERRUPT OCCURS, AND THE EXPECTED ILSW WAS NOT RECEIVED. N IS THE INTERRUPT LEVEL AND XXXX IS THE ILSW. THIS PRINTOUT WILL ONLY OCCUR IF THE INTERRUPT IS RESET BY A BOSC. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E2F00 OOOR AAAA CARD NOT BLANK

A PRE-PUNCHED CARD WAS DETECTED BY A PUNCH ROUTINE. THIS CARD WAS NOT PUNCHED BUT WAS REJECTED. THIS CARD WILL BE FED OUT INTO STACKER 1.

E2F01 OOOR AAAA
WAS S/B - STATIC DSW ERR
XXXX 0000

A BIT, IN ADDITION TO NOT READY, WAS ON IN THE DSW WHEN IT WAS SENSED BEFORE GIVING A CONTROL COMMAND TO THE 1442. USE THE ABOVE DSW TABLE TO IDENTIFY THE BIT, THEN TAKE APPROPRIATE CORRECTIVE ACTION.

E2F02 OOOR AAAA
LAST OP - CCCC
WAS S/B - BUSY DSW ERR
XXXX 0003

THIS DSW WAS SENSED IMMEDIATELY AFTER THE 1442 CONTROL COMMAND WAS IDENTIFIED BY CCCC GIVEN. THAT COMMAND SHOULD MAKE THE 1442 BUSY AND NOT READY. NO OTHER BITS SHOULD BE ON.

E2F03 OOOR AAAA
LAST OP - CCCC
DSW - NO INTRPT - LEV4
XXXX

NO OP COMPLETE INTERRUPT WAS RECEIVED FOLLOWING THE LAST CONTROL COMMAND, IDENTIFIED BY CCCC. THE COMMAND WAS RECEIVED BY THE 1442 IF AN E2F02 MESSAGE WAS NOT PRINTED.

E2F04 OOOR AAAA
LAST OP - CCCC
WAS S/B - LEV0 DSW ERR
XXXX X003

THIS DSW WAS SENSED IN THE LEVEL ZERO INTERRUPT ROUTINE. THE RESPUNSE FOR THE LAST CONTROL COMMAND (IDENTIFIED BY CCCC) SHOULD BE ON, TOGETHER WITH BUSY AND NOT READY.

E2F05 OOOR AAAA
LAST OP - CCCC
WAS S/B - LEV4 DSW ERR
XXXX X80X

THIS DSW WAS SENSED IN THE LEVEL 4 INTERRUPT ROUTINE. OP COMPLETE BIT SHOULD BE ON. THE LAST CARD AND NOT READY BITS MAY BE ON. ALL OTHER BITS SHOULD BE OFF.

E2F06 OOOR AAAA
LAST OP - PUNCH
WAS S/B - PCH CK
XXXX 0000

A PUNCH ECHO CHECK OCCURRED WHILE PUNCHING THE LAST CARD. XXXX IS THE PUNCH ECHO THAT WAS READ FROM THE 1442 BUFFER REGISTER FOLLOWING THE PUNCH CHECK. ANY BIT ON IN THIS WORD IDENTIFIES A DESCREPANCY BETWEEN THE PUNCH DIE ECHO AND THE DATA WHICH WAS TO BE PUNCHED IN THE COLUMN. PUNCHING IS TERMINATED WHEN THIS ERROR IS DETECTED. THUS, THE ERROR OCCURRED IN THE LAST COLUMN PUNCHED. IF PUNCHING A ROTATE PATTERN DISCARD THE CARDS PUNCHED AND RESTART THE ROUTINE.

THIS ERROR WILL OCCUR IN ROUTINE 1 IF THE PUNCH DELAY EXCEEDS THE DURATION OF THE PUNCH RESPONSE TRIGGER. THIS TRIGGER SHOULD STAY ON FOR AT LEAST 300 USEC.

THE PROGRAM USES A MINIMUM DELAY OF 330 USEC TO HELP THE CE ADJUST THE SINGLE SHOT AS CLOSE AS POSSIBLE TO THE OPTIMUM OPERATION POINT.

E2F07 OOOR AAAA
LAST OP - CCCC
WAS S/B - ER CK
XXXX 0000

AN ERROR CHECK OCCURRED DURING THE LAST OPERATION. IF THE LAST OPERATION WAS READ OR PUNCHED, THIS MESSAGE SHOULD BE FOLLOWED BY AN EOF08 MESSAGE WHICH WILL IDENTIFY THE NUMBER OF COLUMNS PROCESSED BEFORE THE ERROR WAS DETECTED. TO CONTINUE, CLEAR ALL CARDS FROM THE 1442, THEN PRESS START. IF PUNCHING A ROTATING PATTERN TO BE READ BY THE NEXT ROUTINE, DISCARD THE CARDS PUNCHED AND RESTART THE ROUTINE.

E2F08 OOOR AAAA
WAS S/B - COL CNT ER
XXXXX YYYYY

XXXXX IDENTIFIES THE NUMBER OF COLUMN INTERRUPTS THAT OCCURRED DURING THE LAST OPERATION. YYYYY IDENTIFIES THE EXPECTED NUMBER OF INTERRUPTS. IF AN ERROR CHECK OCCURRED DURING THE LAST OPERATION (IDENTIFIED BY AN EOF06 OR EOF07 MESSAGE), THE OPERATION WILL TERMINATE AT THE TIME THE ERROR OCCURRS. THUS, THIS ERROR MESSAGE WILL IDENTIFY THE COLUMN BEING PROCESSED WHEN THE ERROR WAS DETECTED.

E2F09 000R AAAA

WAS S/B COL - DATA ERR
XXXX YYYY 000ZZ

THE DATA XXXX READS FROM COLUMN ZZ(IN DECIMAL) DOES NOT AGREE WITH THE EXPECTED DATA YYYY FOR THAT COLUMN. CHECK CARD FOR CORRECT DATA. IF DATA IS CORRECT, THEN A READ ERROR OCCURRED. IF THE DATA IS NOT CORRECT, A PUNCH ERROR OCCURRED. IN THE LATTER CASE, IF NO PUNCH CHECK WAS DETECTED WHILE PUNCHING THE CARD, THE PUNCH ECHO CHECK IS NOT FUNCTIONING.

E2F10 000R AAAA

LAST OP - CCCC
WAS MAX COL - INTRPT SLOW
XXXXX YYYYY ZZZZZ

XXXXX EQUALS THE COLUMN INTERRUPT TIME FOR THE COLUMN IDENTIFIED BY ZZZZZ. THE EXPECTED MAXIMUM TIME FOR THIS OPERATION ON THIS MODEL 1442 IS GIVEN BY YYYYY.

CHECK THE ADJUSTMENT AND LUBRICATION OF THE FEED AND READ CLUTCH. ALSO CHECK THE PUNCH INCREMENTAL DRIVE.

E2F11 000R AAAA

LAST OP - CCCC
WAS MAX COL - INTRPT FAST
XXXXX YYYYY ZZZZZ

XXXXX EQUALS THE COLUMN INTERRUPT TIME FOR THE COLUMN IDENTIFIED BY ZZZZZ. THE EXPECTED MAXIMUM TIME FOR THIS OPERATION ON THIS MODEL 1442 IS GIVEN BY YYYYY.

CHECK THE ADJUSTMENT AND LUBRICATION OF THE FEED AND READ CLUTCH. ALSO CHECK THE PUNCH INCREMENTAL DRIVE.

---

5. COMMENTS

5.1*** TEST PROCEDURE

5.1.1 TEST ORGANIZATION

THE TEST ROUTINES FOLLOW THE SAME BASIC ORGANIZATION AS THE 1442 FUNCTION TEST. THE TIMING CAPABILITY IS PART OF THE INTERRUPT ROUTINE. AFTER THE COMPLETION OF EACH OPERATION, THE TIMING RESULTS ARE AVAILABLE TO THE TEST ROUTINE FOR ANALYSIS.

5.1.2 ERROR CHECKING

SAME ERROR CHECKING AS THE 1442 FUNCTION TEST WITH THE EXCEPTION THAT THE LEVEL 0 DSW IS NOT CHECK.

IN ADDITION, THE TIMING TEST ATTEMPTS TO FORCE PUNCH DELAY ERRORS (THESE ARE DETECTED AS PUNCH CHECKS), AND IT CALCULATES THE READ AND PUNCH RESPONSE TIMES COMPARING THEM TO MIMIMUM AND MAXIMUM VALUES FOR THE APPROPRIATE 1442 MODEL.

5.2*** ROUTINE DESCRIPTION

THIS SECTION CONTAINS A DESCRIPTION OF THE PROGRAM ROUTINES AND SUBROUTINES IN APPROXIMATELY THE ORDER IN WHICH THEY APPEAR IN THE PROGRAM AS FOLLOWS -

1. TEST SEQUENCE CONTROL ROUTINE
2. NORMAL TEST ROUTINES
3. OPTIONAL TEST ROUTINES
4. TEST SUBROUTINES
5. ERROR CONTROL ROUTINES
6. INTERRUPT ROUTINE

5.2.1 TEST SEQUENCE CONTROL ROUTINE - CNTRL

THIS ROUTINE CHECKS THE ROUTINE SELECTION SWITCH (SW1 IN THE PROGRAM CONTROL TABLE) AND DETERMINES WHICH TEST ROUTINE IS TO BE RUN NEXT. IF A TEST ROUTINE HAS BEEN SELECTED, IT ESTABLISHES A TRANSFER TO THAT ROUTINE. IF NO ROUTINE IS SELECTED, A TRANSFER IS ESTABLISHED TO THE NEXT TEST ROUTINE IN SEQUENCE.

THE ROUTINE ADDRESS TABLE (RTTBL) WHICH IS PART OF CNTRL CONTAINS THE ROUTINE ADDRESS FOR ALL TEST ROUTINES IN THE SEQUENCE IN WHICH THEY ARE TO BE RUN.

THE LAST TEST ROUTINE IN THE NORMAL SEQUENCE IS IDENTIFIED BY THE TABLE NRTN. AFTER THIS ROUTINE IS RUN, CNTRL WILL TRANSFER TO MONITOR END AND TERMINATE THE PROGRAM. ROUTINES FOLLOWING THE TABLE NRTN ARE CALLED OPTIONAL TEST ROUTINES AND WILL ONLY BE RUN IF SELECTED.

5.2.2 NORMAL TEST ROUTINES

IF NO TEST ROUTINE IS SELECTED, THESE FOUR ROUTINES WILL RUN IN SEQUENCE THEN THE PROGRAM WILL TERMINATE.

1. TEST ROUTINE 1 - DELAY PUNCH

THIS ROUTINE PUNCHES CARDS USING DATA PREVIOUSLY SET IN THE DATA TABLE. THE DATA IS ROTATED BY ONE COLUMN FOR EACH CARD PUNCHED. EACH CARD IS READ AND CHECKED FOR BLANK BEFORE IT IS PUNCHED. THE ROUTINE PUNCHES THE FIRST 80 CARDS WITH A MAXIMUM PUNCH DELAY OF 333 USEC.

** NOTE **

PUNCH DELAY IS THE TIME BETWEEN THE PUNCH RESPONSE INTERRUPT AND THE PUNCH DATA COMMAND.

THE DELAY IS DECREASED BY 38 USEC. 38 USEC EQ 1 INCREMENT FOR EACH SUCCEEDING 80 CARDS. WHEN MINIMUM DELAY IS REACHED (219 USEC), THE PUNCH DELAY IS RESET TO 333 USED, AND THE CYCLE REPEATED UNTIL ALL CARDS IN THE HOPPER HAVE BEEN PUNCHED.

AT THE START OF THE ROUTINE AND AT EACH CHANGE IN PUNCH DELAY, A MESSAGE IS PRINTED (A2F06) STATING THE PUNCH DELAY AND A PUNCH DELAY INCREMENT. THE DELAY IS RESET TO 333 USEC WHEN THIS INCREMENT GOES TO ZERO.

THE TIME BETWEEN COLUMN INTERRUPTS IS DETERMINED BY THE INTERRUPT ROUTINE. IF THIS TIME FALLS OUTSIDE THE FOLLOWING LIMITS, AN ERROR MESSAGE (E2F10 OR E2F11) IS PRINTED

MODEL	MIN USEC	MAX USEC	AVG USEC
6	10600	14300	12200
5 OR 7	5300	7180	6000

AFTER PUNCHING 80 CARDS OR AT THE COMPLETION OF THE ROUTINE, AN AVERAGE COLUMN TIME MESSAGE IS PRINTED SPECIFYING THE AVERAGE TIME SINCE THE LAST AVERAGE MESSAGE WAS PRINTED.

2. TEST ROUTINE 2 - READ

THIS ROUTINE READS THE CARDS THAT WERE PUNCHED BY ROUTINE ONE. THE DATA READ IS COMPARED TO THE DATA PUNCHED. IF THESE ARE NOT EQUAL, AN ERROR MESSAGE (E2F09) IS PRINTED.

THE TIME BETWEEN COLUMN INTERRUPTS IS DETERMINED BY THE INTERRUPT ROUTINE. IF THIS TIME FALLS OUTSIDE THE FOLLOWING LIMITS, AN ERROR MESSAGE (E2F10 OR E2F11) IS PRINTED

MODEL	MIN USEC	MAX USEC	AVG USEC
6	900	1600	1300
5 OR 7	700	1300	1000

AFTER READING 80 CARDS OR AT THE COMPLETION OF THE ROUTINE, AN AVERAGE COLUMN TIME MESSAGE IS PRINTED SPECIFYING THE AVERAGE TIME SINCE THE LAST AVERAGE MESSAGE WAS PRINTED.

3. TEST ROUTINE 3 - PUNCH TIME GRAPH

THIS TEST WILL STORE THE TIME BETWEEN PUNCH COLUMN INTERRUPTS WHILE PUNCHING A CARD. ON THE NEXT CARD, IT WILL PUNCH A GRAPH WHICH DISPLAYS THE VARIATIONS IN COLUMN INTERRUPT TIME FROM COLUMN TO COLUMN. THIS PROCESS WILL BE REPEATED UNTIL THE LAST CARD INDICATOR IS SENSED. EACH ROW REPRESENTS 38 USEC.

** NOTE **

IF THE CARD IS BLANK, OR A COLUMN IS BLANK, THE RANGE FOR THE CARD OR COLUMN IS OUTSIDE THE SPECIFICATIONS. IF THE CARD IS PUNCHED IN EVERY COLUMN IT IS WITHIN SPECIFICATIONS. HOWEVER, SEVERE OSCILLATIONS OF THE GRAPH INDICATE OTHER TROUBLE SUCH AS BINDING OR STICKING MECHANISMS.

4. TEST ROUTINE 4 - READ TIME GRAPH

THIS TEST WILL READ A BLANK CARD, STORE THE TIME BETWEEN READ COLUMN INTERRUPTS, THEN PUNCH A GRAPH DISPLAYING THE VARIATION IN COLUMN INTERRUPT TIME FROM COLUMN TO COLUMN. THIS PROCESS WILL BE REPEATED UNTIL THE LAST CARD INDICATOR IS SENSED.

5.2.3 OPTIONAL TEST ROUTINE

1. TEST ROUTINE 5 - MODIFY DATA

THIS ROUTINE WILL READ ONE DATA CARD AND REPLACE THE PUNCH DATA TABLE WITH THE DATA CONTAINED ON THAT CARD. THE ROUTINE WILL THEN RESTART THE PROGRAM FROM ROUTINE ONE.

5.2.4 TEST SUBROUTINES

1. PUNCH

THIS SUBROUTINE PUNCHES ONE CARD THEN CHECKS FOR PUNCH ERRORS.

2. READ

THIS SUBROUTINE READS ONE CARD THEN CHECKS FOR READ ERRORS.

3. COMPARE COLUMN TIME

THIS SUBROUTINE CHECKS THAT COLUMN TIME FALLS WITHIN MINIMUM AND MAXIMUM LIMITS. IT ALSO ADDS ALL COLUMN TIMES AND KEEPS COUNT OF THE TOTAL NUMBER OF COLUMNS FOR CALCULATION OF THE COLUMN TIME AVERAGE.

4. PRINT COLUMN INTERRUPT AVERAGE TIME

THIS SUBROUTINE CALCULATES THE COLUMN INTERRUPT TIME AVERAGE AND PRINTS THE AVERAGE MESSAGE.

5. CHECK FOR BLANKS

THIS SUBROUTINE CHECKS EACH CARD BEFORE IT IS PUNCHED TO VERIFY THAT IT IS BLANK.

6. GRAPH SETUP

THIS SUBROUTINE WILL CALCULATE A GRAPH POINT FOR EACH COLUMN TIME. THIS SET OF GRAPH POINTS WILL BE PUNCHED ON THE NEXT CARD. THE SCALE CAN BE CHANGED WITH A FUNCTION 3 BIT SWITCH ENTRY.

7. READY

THIS SUBROUTINE IS ENTERED BEFORE ANY 1442 CONTROL COMMAND IS GIVEN. IT READS THE 1442 DSW AND CHECKS IT FOR READY (ALL BITS OFF). ANY BIT ON OTHER THAN NOT READY (BIT 15) WILL BE IDENTIFIED BY AN E2F01 MESSAGE. IF ANY BIT IS ON, A NRDY MESSAGE (A2F05) WILL BE PRINTED. THIS ROUTINE STAYS IN A LOOP, PRINTING THE NRDY MESSAGE EACH 10 SECONDS UNTIL ALL BITS IN THE DSW GO OFF.

8. LAST CARD

THIS SUBROUTINE IS ENTERED AFTER AN OPERATION IS COMPLETED IF THE LAST CARD INDICATOR WAS TURNED ON DURING THAT OPERATION. THE SUBROUTINE WILL FEED OUT THE LAST CARD, PRINT A MESSAGE INDICATING THAT THE LAST CARD INDICATOR WAS DETECTED, THEN GO TO CNTRL TO TERMINATE THE ROUTINE AND ADVANCE TO THE NEXT ROUTINE.

5.2.5 ERROR CONTROL ROUTINES

1. INTERRUPT WAIT ROUTINE

ALL SUBROUTINES COME HERE AFTER THE START OF AN I/O OPERATION FROM WHICH AN INTERRUPT IS EXPECTED. THIS ROUTINE RESETS ALL ERROR CONTROL WORDS, SENSES AND STORES THE BUSY DSW, THEN WAITS IN A TIMED LOOP (AT LEAST 20 SECONDS) FOR THE OP COMPLETE INTERRUPT.

IF NO OP COMPLETE INTERRUPT IS RECEIVED THE FOLLOWING ERROR MESSAGES ARE PRINTED.

A. E2F02 IS BUSY DSW ERROR

B. E2F03 - NO OP COMPLETE INTERRUPT

IF OP COMPLETE INTERRUPT IS RECEIVED THIS ROUTINE WILL CHECK FOR PROPER PERFORMANCES OF THE OPERATION. THE FOLLOWING CHECKS ARE MADE AND ERROR MESSAGES PRINTED IF APPROPRIATE.

A. E2F02 IF BUSY DSW ERROR

B. E2F05 IF OP COMPLETE DSW ERROR

C. E2F08 IF INCORRECT NUMBER OF COLUMN INTERRUPTS

THE ROUTINE WILL THEN CHECK FOR LAST CARD IF THE LAST CARD INDICATOR IS ON THIS ROUTINE WILL TRANSFER TO THE LAST CARD ROUTINE. IF NO LAST CARD THE ROUTINE WILL RETURN TO THE I/O SUBROUTINE FROM WHICH IT WAS ENTERED.

2. PRINT ERROR MESSAGES

THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. IF THE MESSAGE IS THE FIRST ERROR MESSAGE FOLLOWING AN I/O CONTROL COMMAND A LAST OP MESSAGE WILL PRECEED THE ERROR MESSAGE. THIS LAST OP MESSAGE WILL IDENTIFY THE LAST I/O CONTROL OPERATION EXECUTED. THE ERROR MESSAGE FOLLOWING REFERS TO ERRORS DETECTED IN THAT OPERATION.

5.2.6 INTERRUPT ROUTINES

THE COLUMN INTERRUPT TIMING IS DONE IN THIS ROUTINE. THE PROGRAM TRANSFERS HERE ON THE FIRST COLUMN INTERRUPT. ALL FOLLOWING READ OR PUNCH RESPONSES ARE SENSED IN THIS INTERRUPT ROUTINE. THE ROUTINE DOES NOT BRANCH OUT OF INTERRUPT UNTIL AN OP COMPLETE RESPONSE IS SENSED.

```
                *************************************************  32F00030
                *                                                   32F00040
                *  THIS ENGINEERING CHANGE REFLECTS MAJOR           32F00050
                *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS     32F00060
                *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.   32F00070
                *                                                   32F00080
                *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.   32F00090
                *                                                   32F00100
                *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966      32F00110
                *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC        32F00120
                *  MONITOR II.                                      32F00130
                *                                                   32F00140
                *************************************************  32F00150
                *******************************************         32F00160
                *-----------------------------------------        32F00170
                *     1130 - 1442 READER/PUNCH TIMING TEST        32F00180
                *-----------------------------------------        32F00190
                *                                                   32F00200
                *                                                   32F00210
                *                                                   32F00220
                *******************************************         32F00230
                *            EQUATE TABLE                         32F00240
                *******************************************         32F00250
                *     THIS TABLE EQUATES TEST PROGRAM LABELS       32F00260
                *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR       32F00270
                *     ADDRESSES.                                   32F00280
                *                                                  32F00290
                *-----------------------------------------        32F00300
                *     MONITOR ENTRY ADDRESSES                      32F00310
                *-----------------------------------------        32F00320
0160            BEGIN EQU     /160       BEGIN ROUTINE           32F00330
0161            START EQU     BEGIN&1    SUPERVISOR ROUTINE      32F00340
0162            ERROR EQU     START&1    ERROR LOG ROUTINE       32F00350
0163            LOG   EQU     ERROR&1    STATUS LOG ROUTINE      32F00360
0164            END   EQU     LOG&1      END ROUTINE             32F00370
                *                                                 32F00380
                *-----------------------------------------        32F00390
                *     MONITOR CONTROL WORD ADDRESSES              32F00400
                *-----------------------------------------        32F00410
0165            RTNSW EQU     END&1      ROUTINE START SW        32F00420
0166            ERLCK EQU     END&2      LOCK ON ERROR CONTROL   32F00430
0167            LOGBY EQU     END&3      I/O BUSY SW ADDRS       32F00440
                *                                                 32F00450
                *-----------------------------------------        32F00460
                *     INTERRUPT TRANSFER VECTOR ADDRESSES         32F00470
                *-----------------------------------------        32F00480
017A            IL0   EQU     /17A       INTERRUPT LEVEL ZERO    32F00490
018A            IL1   EQU     IL0&16     INTERRUPT LEVEL ONE     32F00500
019A            IL2   EQU     IL1&16     INTERRUPT LEVEL TWO     32F00510
01AA            IL3   EQU     IL2&16     INTERRUPT LEVEL THREE   32F00520
01BA            IL4   EQU     IL3&16     INTERRUPT LEVEL FOUR    32F00530
01BB            RQTY  EQU     IL4&1      CONSOLE PRINTER REQUEST 32F00540
01BC            RQKB  EQU     RQTY&1     USE KEYBOARD REQUEST    32F00550
01BD            SVKB  EQU     RQKB&1     KB SERVICE REQUEST      32F00560
                *                                                 32F00570
                *************************************************32F00580
0000                  ORG     *&/05DC                           32F00590
                *-----------------------------------------        32F00600
                *     THE MONITOR USES CORE LOCATIONS 0-05DC.     32F00610
                *     FOR CONTENTS OF THESE ADDRESSES REFER       32F00620
                *     TO THE DIAGNOSTIC MONITOR LISTING.          32F00630
                *-----------------------------------------        32F00640
                *                                                 32F00650
                *************************************************32F00660
                *            PROGRAM CONTROL TABLE                32F00670
                *************************************************32F00680
                *                                                 32F00690
05DC 0 032F     PID   DC      /032F      PROGRAM ID              32F00700
```



```
05DD 0 0000     RID   DC      /0000      ROUTINE ID              32F00710
05DE 0 0000     RAD   DC      /0000      ROUTINE ADDRS           32F00720
05DF 0 0000     SW0   DC      /0000      PROGRAM CONTROL         32F00730
05E0 0 0000     SW1   DC      /0000      ROUTINE SELECTION       32F00740
05E1 0 0000     SW2   DC      /0000                              32F00750
05E2 0 0000     SW3   DC      /0000                              32F00760
05E3 1 05EB           DC      STRT                               32F00770
05E4 1 05EB           DC      STRT       RESTART ADDRESS         32F00780
05E5 0 0000     MLSCF DC      *-*        SET BY WAIT RTN AND MON 32F00790
05E6 0 0000           DC      *-*        SET BY CNTRL AND INRTPT 32F00800
05E7 0 FFFF           DC      /FFFF      TERMINATOR              32F00810
                *                                               32F00820
                *************************************         32F00830
                *            TEST INITIALIZATION                32F00840
                *************************************         32F00850
                *                                               32F00860
05E8 0 4480 0160 BGIN BSI   I   BEGIN                           32F00870
05EA 1 05DC           DC        PID        PCT ADDRESS          32F00880
                *                                               32F00890
                *-----------------------------------------      32F00900
                *  START OF TEST AND SINGLE PASS INITIALIZATION 32F00910
                *-----------------------------------------      32F00920
                *                                               32F00930
05EB 0 6100     STRT  LDX     1 0        SET TO START WITH      32F00940
05EC 0 69F0           STX     1 RID       FIRST ROUTINE         32F00950
05ED 1 6D00 0683      STX   L1 PONLY     RESET PUNCH ONLY SW    32F00960
05EF 1 6500 096E      LDX   L1 INTR                             32F00970
05F1 0 6D00 017A      STX   L1 IL0       STO INTERRUPT TRANSFER 32F00980
05F3 1 6500 0993      LDX   L1 INTR2      VECTOR ADDRESSES      32F00990
05F5 0 6D00 01B8      STX   L1 IL4-2                            32F01000
05F7 1 C400 0682      LD    L  MODNM     CK FOR MOD NUM ENTRY   32F01010
05F9 1 4420 0654      BSI   L  CNTRL,Z   BR IF MOD NUM ENTERED  32F01020
                *                                              32F01030
05FB 0 C0E5           LD        SW2      CHECK FOR MOD NUMBER   32F01040
05FC 1 4C20 060B      BSC   L  SP,Z      BR IF MOD NUMBER ENTERED 32F01050
05FE 0 6101           LDX     1 1                               32F01060
05FF 1 6600 0AA9      LDX   L2 AMOD                             32F01070
0601 1 4400 09F2      BSI   L  TYPE      PRINT - ENTER MOD NUMBER 32F01080
                *                                              32F01090
0603 0 C0DD     STRT1 LD        SW2                             32F01100
0604 1 4C20 05EB      BSC   L  STRT,Z    LOOP UNTIL NUMBER ENTERED 32F01110
0606 1 6500 0603      LDX   L1 STRT1                            32F01120
0608 0 69DC           STX     1 MLSCF    RETURN TO THE MONITOR  32F01130
0609 0 4480 0161      BSI   I  START      TO ALLOW MSG TO PRINT 32F01140
                *                                              32F01150
060B 1 D400 0682 SP   STO   L  MODNM     STO MOD NUM            32F01160
060D 0 6100           LDX     1 0                               32F01170
060E 0 69D2           STX     1 SW2      CLEAR SW2              32F01180
060F 0 0840           XIO       TYP                             32F01190
0610 0 0841     SP1   XIO       SENTY                           32F01200
0611 0 7101           MDX     1 1                               32F01210
0612 0 1004           SLA       4                               32F01220
0613 1 4C28 0610      BSC   L  SP1,&Z                           32F01230
0615 0 7500 F900      MDX   L1 -/700                            32F01240
0617 0 7001           MDX       *&1                             32F01250
0618 0 7017           MDX       MOD                             32F01260
0619 0 6376           LDX     3 118                             32F01270
061A 1 6F00 0973      STX   L3 SPD1&1     SET NEW BASE TIME      32F01280
061C 0 6700 0090      LDX   L3 144                              32F01290
061E 1 6F00 097D      STX   L3 SPD2&1                           32F01300
0620 0 6309           LDX     3 9        SET FOR 9 PUNCH        32F01310
0621 1 6F00 06E4      STX   L3 PDMAX     DELAY INCREMENTS       32F01320
0623 0 6700 7117      LDX   L3 /7117     SET INCR TIME TO 23 USEC 32F01330
0625 1 6F00 09A8      STX   L3 DLPCH                            32F01340
0627 1 6F00 0985      STX   L3 SPD3                             32F01350
0629 0 6317           LDX     3 23                              32F01360
062A 1 6F00 06E5      STX   L3 DINCR                            32F01370
062C 0 6700 0087      LDX   L3 135                              32F01380
```

```
062E 1 6F00 06E6          STX  L3 PDBAS                                32F01390
                          *                                            32F01400
0630 0 C051          MOD  LD       MODNM      LD THE MOD NUMBER        32F01410
0631 0 100C               SLA      12                                  32F01420
0632 0 180C               SRA      12                                  32F01430
0633 0 9051               S        FIVE                                32F01440
0634 1 4C20 0638          BSC  L   MOD6,Z                              32F01450
0636 0 684C               STX      PONLY      IF MOD  SET CNTRL TO     32F01460
0637 0 401C               BSI      CNTRL       RUN PUNCH RTN ONLY      32F01470
                          *                                            32F01480
0638 1 9400 0684     MOD6 S    L   ONE        CHECK FOR MOD6           32F01490
063A 1 4C20 0649          BSC  L   MOD7,Z                              32F01500
063C 0 C83F               LDD      P6TM       IF MOD6 SET FOR          32F01510
063D 1 DC00 0912          STD  L   PCMAX       MOD6 TIMING             32F01520
063F 0 C83E               LDD      R6TM                                32F01530
0640 1 DC00 0914          STD  L   RDMAX                               32F01540
0642 0 C03D               LD       P6AVG                               32F01550
0643 1 D400 0A02          STO  L   PAVG                                32F01560
0645 0 C03B               LD       R6AVG                               32F01570
0646 1 D400 0A03          STO  L   RAVG                                32F01580
0648 0 400B               BSI      CNTRL                               32F01590
                          *                                            32F01600
0649 0 903A          MOD7 S        ONE        CHECK FOR MOD7           32F01610
064A 1 4418 0654          BSI  L   CNTRL,&-                            32F01620
064C 0 1810               SRA      16         IF NOT MOD7 MOD NUMBER   32F01630
064D 0 D093               STO      SW2         ERROR. GO REQUEST       32F01640
064E 0 709C               MDX      STRT        NEW MOD NUMBER          32F01650
                          *                                            32F01660
0650   0000               BSS  E   0                                   32F01670
0650 1 0652          TYP  DC       SENTY                               32F01680
0651 0 0900               DC       /0900                               32F01690
0652 0 0500          SENTY DC      /0500                               32F01700
0653 0 0F01               DC       /0F01                               32F01710
                          *                                            32F01720
                          ********************************************* 32F01730
                          *          SEQUENCE CONTROL ROUTINE           32F01740
                          ********************************************* 32F01750
                          * THIS ROUTINE CHECKS SWITCHES AND CONTROLS   32F01760
                          * SEQUENCE IN WHICH TEST ROUTINES ARE RUN.    32F01770
                          *-------------------------------------------- 32F01780
                          *                                            32F01790
0654 0 0000          CNTRL DC      /0000                               32F01800
0655 0 C08A               LD       SW1                                 32F01810
0656 1 4C08 0662          BSC  L   CN20,&      BR IF NO RTN SELECTD    32F01820
                          *                                            32F01830
0658 1 D400 05DD     CN10 STO  L   RID         SAVE NEW RTN NUMBER     32F01840
065A 0 901A               S        RIDCK                               32F01850
065B 1 4C08 0669          BSC  L   CN30,&      BR IF VALID RTN         32F01860
065D 0 1810               SRA      16                                  32F01870
065E 1 D400 05E0          STO  L   SW1         IF INVALID RTN GO       32F01880
0660 1 D400 05DD          STO  L   RID          TO RTN ONE             32F01890
                          *                                            32F01900
0662 1 7401 05DD     CN20 MDX  L   RID,1       ADV TO NEXT RTN         32F01910
0664 1 C400 05DD          LD   L   RID         CHECK FOR END OF        32F01920
0666 0 900F               S        RTNOM        NORMAL SEQUENCE   *1   32F01930
0667 0 44B0 0164          BSI  I   END,-Z      END OF PROGRAM          32F01940
                          *                                            32F01950
0669 1 6580 05DD     CN30 LDX  I1  RID         XR1#NEW ROUTINE NUMBER  32F01960
066B 1 C500 0676          LD   L1  RTTBL-1     FETCH RETURN ADRS       32F01970
066D 1 D400 05DE          STO  L   RAD         STORE NEW RTN ADDRS     32F01980
066F 1 D400 05E6          STO  L   MLSCF&1     SET MLSCF FOR RETURN    32F01990
0671 0 D400 0165          STO  L   RTNSW       SET RTN START SW        32F02000
0673 0 4480 0161          BSI  I   START       GO TO MONITOR           32F02010
                          *                                            32F02020
0675 0 0005          RIDCK DC      LRTN-RTTBL&1                        32F02030
0676 0 0004          RTNOM DC      NRTN-RTTBL&1                   *2   32F02040
                          *-------------------------------------------- 32F02050
                          *     ROUTINE ADDRESS TABLE                  32F02060
```



```
0677 1 0686          *-------------------------------------------- 32F02070
0678 1 06E7     RTTBL DC      TST01      DELAY PUNCH DATA          32F02080
0679 1 0721           DC      TST02      READ AND COMPARE          32F02090
067A 1 073C           DC      TST03      GRAPH PUNCH TIME          32F02100
067B 1 0752     NRTN  DC      TST04      GRAPH READ TIME           32F02110
                LRTN  DC      TST05      MODIFY DATA               32F02120
                      *                                            32F02130
                      *          1442 MODEL 6 COLUMN INTRPT TIMES  32F02140
                      *                                            32F02150
067C   0000           BSS  E                                       32F02160
067C 0 37DC     P6TM  DC      14300                                 32F02170
067D 0 2968           DC      10600      MIN PUNCH TIME            32F02180
067E 0 0640     R6TM  DC      1600       MAX READ TIME             32F02190
067F 0 0384           DC      900        MIN READ TIME             32F02200
0680 0 2FA8     P6AVG DC      12200      AVG PUNCH TIME            32F02210
0681 0 0514     R6AVG DC      1300       AVG READ TIME             32F02220
                      *                                            32F02230
0682 0 0000     MODNM DC      *-*        MOD NUM & SPEED SW        32F02240
0683 0 0000     PONLY DC      0          PUNCH ONLY SW             32F02250
0684 0 0001     ONE   DC      1                                    32F02260
0685 0 0005     FIVE  DC      5                                    32F02270
                      *                                            32F02280
                      *                                            32F02290
                      ********************************************* 32F02300
                      *          TEST ROUTINE 01 - DELAY PUNCH      32F02310
                      ********************************************* 32F02320
                      *     THIS ROUTINE PUNCHES CARDS USING DATA   32F02330
                      *     PREVIOUSLY SET IN THE DATA TABLE.  IT PUNCHES 32F02340
                      *     THE FIRST 80 CARDS WITH MAXINUM PUNCH DELAY. 32F02350
                      *     THE DELAY IS THEN DECREASED ONE INCREMENT 32F02360
                      *     FOR EACH 80 CARDS PUNCHED.  PUNCH COLUMN 32F02370
                      *     INTERRUPT TIME IS ALSO CHECKED.         32F02380
                      *-------------------------------------------- 32F02390
                      *                                            32F02400
0686 0 6102     TST01 LDX   1 2                                    32F02410
0687 1 6600 0A72      LDX   L2 ALDBK                               32F02420
0689 1 4400 09F2      BSI   L  TYPE      PRINT MSG- LOAD BLANKS    32F02430
068B 0 10A0           SLT      32                                  32F02440
068C 1 DC00 0818      STD   L  TAVG                                32F02450
068E 1 D400 081A      STO   L  AVGCT                               32F02460
                      *                                            32F02470
0690 0 C053     T010  LD       PDMAX                               32F02480
0691 0 D04F           STO      PDLAY     RESET PUNCH DELAY         32F02490
0692 0 684F           STX      PDWAS                               32F02500
                      *                                            32F02510
0693 0 6150     T011  LDX   1  80         INITIALIZE PUNCH TABLE    32F02520
0694 1 C500 0AD2      LD    L1 PDATA-1                             32F02530
0696 0 1804           SRA      4         CLEAR TERM BITS           32F02540
0697 0 1004           SLA      4                                   32F02550
0698 1 D500 0AD2      STO   L1 PDATA-1                             32F02560
069A 1 D500 0B22      STO   L1 PDATA&79  STO IN IMAGE TABLE        32F02570
069C 0 71FF           MDX   1  -1                                  32F02580
069D 0 70F6           MDX      T011&1                              32F02590
                      *                                            32F02600
069E 1 6500 0AD3 T012 LDX   L1 PDATA     SET FOR START OF          32F02610
06A0 0 6927           STX   1  T014&1     ROTATE PATTERN           32F02620
                      *                                            32F02630
06A1 1 C400 05E1 T013 LD    L  SW2       CK SW2 FOR CONSTANT DELAY 32F02640
06A3 0 100C           SLA      12        CLEAR HIGH ORDER BITS     32F02650
06A4 0 180C           SRA      12                                  32F02660
06A5 0 4820           BSC      Z                                   32F02670
06A6 0 D03A           STO      PDLAY                               32F02680
                      *                                            32F02690
06A7 1 7400 0683      MDX   L  PONLY     SKIP IF NOT MOD           32F02700
06A9 0 7002           MDX      *&2                                 32F02710
06AA 1 4400 07D7      BSI   L  CKBLK     CK FOR BLANK CARD         32F02720
                      *                                            32F02730
06AC 0 C034           LD       PDLAY                               32F02740
```

```
06AD 0 F034          EOR     PDWAS     IF PUNCH DELAY CHANGED     32F02750
06AE 1 4C18 06C7     BSC  L  T014,&-    PRINT MSG                  32F02760
06B0 1 6780 06E1     LDX  I3 PDLAY     XR3#PUNCH DELAY FACTOR      32F02770
06B2 0 6B2F          STX   3 PDWAS     SAVE LAST PUNCH DELAY       32F02780
06B3 1 C700 0AC3     LD   L3 ADFCT&2   LD 1053 CODE                32F02790
06B5 1 D400 0AC1     STO  L  ADFCT     STO DLY FACT CODE IN MSG    32F02800
06B7 0 C02D          LD      DINCR     LD PNCH DLY INCR            32F02810
06B8 0 A028          M       PDLAY     MULT BY PNCH DLY FACTOR     32F02820
06B9 0 1090          SLT     16                                    32F02830
06BA 0 802B          A       PDBAS     ADD PNCH DELAY BASE         32F02840
06BB 1 D400 0A00     STO  L  MAXPD     SET MAX PNCH DLY IN MSG     32F02850
06BD 0 6106          LDX   1 6         MSG NUMBER                  32F02860
06BE 1 6600 0ABA     LDX  L2 APDLY                                 32F02870
06C0 0 6301          LDX   3 1                                     32F02880
06C1 1 6F00 09FD     STX  L3 SMSG&2    SET MSG DATA CONTROL        32F02890
06C3 1 4400 09F2     BSI  L  TYPE      PRINT MSG- PUNCH DELAY      32F02900
                     *                                             32F02910
06C5 1 6C00 08FD     STX  L  LOOP      SET LOOP ADDRS              32F02920
06C7 0 6700 0000 T014 LDX  L3 *-*      SET TO PUNCH DATA           32F02930
06C9 1 4400 0765     BSI  L  PUNCH                                 32F02940
                     *                                             32F02950
06CB 1 4400 0796     BSI  L  COMPR     COMPARE COL INTRPT TIMES    32F02960
06CD 1 0912          DC      PCMAX                                 32F02970
06CE 1 0913          DC      PCMIN                                 32F02980
06CF 1 4400 0822     BSI  L  LOCK      CK FOR LOCK ON FUNCTION     32F02990
                     *                                             32F03000
06D1 1 7401 06C8     MDX  L  T014&1,1  ADV PUNCH ADDRS             32F03010
06D3 0 C0F4          LD      T014&1    CK FOR END OF PUNCH         32F03020
06D4 0 900E          S       ENDPD      DATA TABLE                 32F03030
06D5 1 4C08 06A1     BSC  L  T013,&    CONTINUE IF NOT END         32F03040
                     *                                             32F03050
                     *            DEC PUNCH DELAY THEN RESTART     32F03060
                     *            PUNCH PATTERN                    32F03070
                     *                                             32F03080
06D7 1 C400 05DF     LD   L  SW0                                   32F03090
06D9 0 1009          SLA     9         LOOK AT FORCE LOG SW        32F03100
06DA 0 6306          LDX   3 6         SET MSG DATA CONTROL        32F03110
06DB 1 4410 07C6     BSI  L  TYAVG,-   PRINT AVG COL TIME MSG      32F03120
                     *                                             32F03130
06DD 1 74FF 06E1     MDX  L  PDLAY,-1                              32F03140
06DF 0 70BE          MDX     T012                                  32F03150
06E0 0 70AF          MDX     T010      IF ZERO RESET               32F03160
                     *                                             32F03170
06E1 0 0000 PDLAY DC       *-*         PUNCH DELAY FACTOR          32F03180
06E2 0 0000 PDWAS DC       *-*         LAST PUNCH DELAY SAVED      32F03190
06E3 1 0B22 ENDPD DC       PDATA&79                                32F03200
06E4 0 0004 PDMAX DC       4           MAX PUNCH DELAY INCR        32F03210
                     *                                             32F03220
                     *                                             32F03230
06E5 0 0025 DINCR DC       37                                      32F03240
                     *                                             32F03250
06E6 0 00B9 PDBAS DC       185                                     32F03260
                     *                                             32F03270
                     *                                             32F03280
                     ********************************************* 32F03290
                     *            TEST ROUTINE 02 - READ AND COMPARE 32F03300
                     ********************************************* 32F03310
                     *    THIS ROUTINE READS THE CARD WHICH WERE   32F03320
                     *    PUNCHED BY ROUTINE ONE. IT COMPARE THE DATA 32F03330
                     *    WITH THE PUNCH DATA. IT ALSO CHECK THE READ 32F03340
                     *    COLUMN INTERRUPT TIME.                   32F03350
                     *---------------------------------------      32F03360
                     *                                             32F03370
06E7 0 C09B TST02 LD       PONLY       SKIP IF NOT MOD             32F03380
06E8 1 4420 0654          BSI  L  CNTRL,Z   BR IF MOD               32F03390
06EA 0 6103               LDX   1 3         SET MSG NUMBER          32F03400
06EB 1 6600 0AB2          LDX  L2 ALPC                              32F03410
06ED 1 4400 09F2          BSI  L  TYPE      PRINT MSG- LOAD PNCHD CDS 32F03420
```



```
06EF 0 10A0          SLT     32                                    32F03430
06F0 1 DC00 0818     STD  L  TAVG                                  32F03440
06F2 1 D400 081A     STO  L  AVGCT                                 32F03450
                     *                                             32F03460
06F4 1 6500 0AD2 T021 LDX  L1 PDATA-1   SET FOR START OF PATTERN    32F03470
06F6 0 6907          STX   1 T023&1                                32F03480
                     *                                             32F03490
06F7 1 4400 0784 T022 BSI  L  READ                                 32F03500
                     *                                             32F03510
06F9 0 1810          SRA     16                                    32F03520
06FA 1 D400 08E4     STO  L  M         SET FOR FIRST ERROR         32F03530
06FC 0 6101          LDX   1 1         XR3#COLUMN COUNT            32F03540
                     *                                             32F03550
06FD 0 C500 0000 T023 LD    L1 *-*      LD DATA PUNCHED             32F03560
06FF 1 6D00 0918     STX    L1 COL      STO COLUMN COUNT            32F03570
0701 0 1804          SRA     4          CLEAR STOP PUNCH BIT        32F03580
0702 0 1004          SLA     4                                      32F03590
0703 1 D400 090F     STO  L  DATA&1     STO DATA S/B                32F03600
0705 1 F500 0B74     EOR  L1 RTBL       COMPARE WITH DATA READ      32F03610
0707 1 4420 088B     BSI  L  ERR9,Z     BR IF ERROR                 32F03620
0709 0 7101          MDX   1 1          ADV TO NEXT COLUMN          32F03630
                     *                                             32F03640
070A 1 C400 0918     LD   L  COL        CHECK FOR LAST COL READ     32F03650
070C 1 9400 090C     S    L  COLCT                                  32F03660
070E 1 4C28 06FD     BSC  L  T023,&Z    LOOP UNTIL LAST COL         32F03670
                     *                                             32F03680
0710 1 4400 0796 T024 BSI  L  COMPR     COMPARE COL INTRPT TIMES    32F03690
0712 1 0914          DC      RDMAX                                 32F03700
0713 1 0915          DC      RDMIN                                 32F03710
                     *                                             32F03720
0714 1 7401 06FE     MDX  L  T023&1,1   ADV COMPARE ADRS            32F03730
0716 0 C0E7          LD      T023&1     CK FOR END OF TABLE         32F03740
0717 0 90CB          S       ENDPD                                 32F03750
0718 1 4C28 06F7     BSC  L  T022,&Z    CONTINUE TO END OF PATTERN  32F03760
                     *                                             32F03770
071A 1 C400 05DF     LD   L  SW0                                   32F03780
071C 0 1009          SLA     9          LOOK AT FORCE LOG SW        32F03790
071D 0 630A          LDX   3 /A         SET MSG DATA CONTROL        32F03800
071E 1 4410 07C6     BSI  L  TYAVG,-    PRINT AVG COL TIME MSG      32F03810
0720 0 70D3          MDX     T021       REINITIALIZE                32F03820
                     *                                             32F03830
                     ********************************************* 32F03840
                     *            TEST ROUTINE 03 - PUNCH TIME GRAPH 32F03850
                     ********************************************* 32F03860
                     *    THIS TEST WILL STORE THE TIME BETWEEN PUNCH 32F03870
                     *    COLUMN INTERRUPTS WHILE PUNCHING A CARD. ON 32F03880
                     *    THE NEXT CARD IT WILL PUNCH A GRAPH WHICH   32F03890
                     *    DISPLAYS THE VARIATION IN COLUMN INT TIME FRM 32F03900
                     *    COLUMN TO COLUMN. THIS PROCESS WILL BE      32F03910
                     *    REPEATED UNTIL THE LAST CARD INDICATOR IS   32F03920
                     *    SENSED.                                     32F03930
                     *---------------------------------------------  32F03940
                     *                                               32F03950
0721 0 6102 TST03 LDX   1 2                                          32F03960
0722 1 6600 0A72       LDX  L2 ALDBK                                 32F03970
0724 1 4400 09F2       BSI  L  TYPE       PRINT MSG- LOAD BLANKS     32F03980
                       *                                             32F03990
0726 0 1810            SRA     16                                    32F04000
0727 1 D400 06E1       STO  L  PDLAY      RESET PUNCH DELAY          32F04010
                       *                                             32F04020
0729 0 6150            LDX   1 80                                    32F04030
072A 1 D500 0B74 T031  STO  L1 RTBL                                  32F04040
072C 0 71FF            MDX   1 -1                                    32F04050
072D 0 70FC            MDX     T031                                  32F04060
072E 1 6700 0B75       LDX  L3 RTBL&1     SET TO PUNCH BLANKS        32F04070
0730 1 4400 0765       BSI  L  PUNCH                                 32F04080
0732 1 6C00 08FD T032  STX  L  LOOP       SET LOOP ADDRS             32F04090
0734 1 6780 0A02       LDX  I3 PAVG                                  32F04100
```

```
                        *                          MOD6 PAVG # 12200        32F04110
                        *                          MOD7 PAVG # 6000         32F04120
                        *                                                   32F04130
0736 1 4400 07E5                BSI  L  GRAPH      SET UP GRAPH             32F04140
0738 1 6700 0BC9                LDX  L3 TIME&2     SET TO PUNCH GRAPH       32F04150
073A 0 402A                     BSI     PUNCH                               32F04160
                        *                                                   32F04170
                        *                                                   32F04180
073B 0 70F6                     MDX     T032       REPEAT UNTIL LAST CARD   32F04190
                        *                                                   32F04200
                        ********************************************      32F04210
                        *              TEST ROUTINE 04 - READ TIME GRAPH    32F04220
                        ********************************************      32F04230
                        *     THIS TEST WILL READ A BLANK CARD, STORE THE   32F04240
                        *     TIME BETWEEN READ COLUMN INTERRUPTS, THEN    32F04250
                        *     PUNCH A GRAPH DISPLAYING THE VARIATION IN    32F04260
                        *     COLUMN INTERRUPT TIME FROM COLUMN TO COLUMN. 32F04270
                        *     THIS PROCESS WILL BE REPEATED UNTIL THE LAST 32F04280
                        *     CARD INDICATOR IS SENSED.                    32F04290
                        *-------------------------------------------       32F04300
                        *                                                   32F04310
073C 1 C400 0683 TST04  LD   L  PONLY                                       32F04320
073E 1 4420 0654                BSI  L  CNTRL,Z    BR IF MOD 5              32F04330
0740 0 6102                     LDX   1 2                                   32F04340
0741 1 6600 0A72                LDX  L2 ALDBK                               32F04350
0743 1 4400 09F2                BSI  L  TYPE       PRINT MSG- LOAD BLANKS   32F04360
0745 0 1810                     SRA     16                                  32F04370
0746 1 D400 06E1                STO  L  PDLAY      RESET PUNCH DELAY        32F04380
                        *                                                   32F04390
0748 1 4400 07D7 T041   BSI  L  CKBLK      READ A BLANK CARD                32F04400
                        *                                                   32F04410
074A 1 6780 0A03                LDX  I3 RAVG       XR3#READ TIME AVG        32F04420
                        *                          MOD6 RAVG # 1300         32F04430
                        *                          MOD7 RAVG # 1000         32F04440
                        *                                                   32F04450
074C 1 4400 07E5                BSI  L  GRAPH      SET UP GRAPH             32F04460
074E 1 6700 0BC9                LDX  L3 TIME&2     SET TO PUNCH GRAPH       32F04470
0750 0 4014                     BSI     PUNCH                               32F04480
                        *                                                   32F04490
0751 0 70F6                     MDX     T041       REPEAT UNTIL LAST CARD   32F04500
                        *                                                   32F04510
                        ********************************************      32F04520
                        *              TEST ROUTINE 05 - MODIFY DATA        32F04530
                        ********************************************      32F04540
                        *     THIS ROUTINE WILL READ ONE DATA CARD AND     32F04550
                        *     REPLACE THE PUNCH DATA TABLE WITH THE DATA   32F04560
                        *     CONTAINED ON THAT CARD. THE ROUTINE WILL     32F04570
                        *     THEN RESTART THE PROGRAM FROM ROUTINE ONE.   32F04580
                        *-------------------------------------------       32F04590
                        *                                                   32F04600
0752 0 4031 TST05       BSI     READ       READ A CARD                      32F04610
                        *                                                   32F04620
0753 1 6780 090C                LDX  I3 COLCT      XR3#COLUMN COUNT         32F04630
0755 1 C700 0B74 T051   LD   L3 RTBL       LOAD DATA READ                   32F04640
0757 1 D700 0AD2                STO  L3 PDATA-1    STO IN PUNCH TABLE       32F04650
0759 0 73FF                     MDX   3 -1         GO TO NEXT COLUMN        32F04660
075A 0 70FA                     MDX     T051       LOOP UNTIL LAST COL      32F04670
                        *                                                   32F04680
075B 1 6C00 05E0                STX  L  SW1        SET CNTRL TO RESTART RTN 1 32F04690
075D 1 4400 0654                BSI  L  CNTRL      GO TO CNTRL RTN          32F04700
                        *                                                   32F04710
                        *-------------------------------------------       32F04720
                        *                                                   32F04730
0760   0000                     BSS  E                                      32F04740
0760 0 0000 STRD        DC      *-*                                         32F04750
0761 0 1404                     DC      /1404      START READ IOCC          32F04760
0762 0 0000 STPCH       DC      *-*                                         32F04770
0763 0 1401                     DC      /1401      START PUNCH IOCC         32F04780
```



```
0764 0 0000 PTERM   DC      *-*                                             32F04790
                    *                                                       32F04800
                    ********************************************          32F04810
                    *                    PUNCH                              32F04820
                    ********************************************          32F04830
                    *     THIS SUBROUTINE PUNCHES ONE CARD                 32F04840
                    *     THEN CHECKS FOR PUNCH ERRORS                     32F04850
                    *     THE ADDRESS OF THE PUNCH DATA TABLE MUST BE      32F04860
                    *     IN XR3 UPON ENTRY.                               32F04870
                    *---------------------------------------               32F04880
                    *                                                       32F04890
0765 0 0000 PUNCH   DC      *-*                                             32F04900
0766 1 6F00 0960            STX  L3 COLPC      SET TO PUNCH 1ST COL         32F04910
0768 0 734F                 MDX   3 79         SET TERMINATOR IN            32F04920
0769 0 6BFA                 STX   3 PTERM       PUNCH DATA                  32F04930
076A 0 C300                 LD    3 0                                       32F04940
076B 1 EC00 0821            OR    L K0008                                   32F04950
076D 0 D300                 STO   3 0                                       32F04960
                    *                                                       32F04970
076E 1 4400 0988            BSI  L  READY      CK FOR READY                 32F04980
0770 1 6500 0A5F            LDX  L1 APCH                                    32F04990
0772 1 6D00 0903            STX  L1 OP                                      32F05000
0774 1 6C00 08E6            STX  L  RPSW       SET RD/PCH SW TO PCH         32F05010
0776 0 6150                 LDX   1 80         SET COL COUNT                32F05020
0777 0 08EA                 XIO     STPCH      START PUNCH                  32F05030
0778 1 4400 0919            BSI  L  WAIT       WAIT FOR INTERRUPT           32F05040
077A 1 4C90 08FD            BSC  I  LOOP,-                                  32F05050
                    *                                                       32F05060
077C 1 C480 0764            LD   I  PTERM      REMOVE TERMINATOR            32F05070
077E 0 1804                 SRA     4                                       32F05080
077F 0 1004                 SLA     4                                       32F05090
0780 1 D480 0764            STO  I  PTERM                                   32F05100
                    *                                                       32F05110
0782 1 4C80 0765            BSC  I  PUNCH      RETURN                       32F05120
                    *                                                       32F05130
                    ********************************************          32F05140
                    *                    READ                               32F05150
                    ********************************************          32F05160
                    *     THIS SUBROUTINE READS ONE CARD THEN              32F05170
                    *     CHECKS FOR READ ERRORS.                          32F05180
                    *---------------------------------------               32F05190
                    *                                                       32F05200
0784 0 0000 READ    DC      *-*                                             32F05210
0785 1 4400 09B8            BSI  L  READY      CHECK FOR READY              32F05220
0787 1 6500 0A5C            LDX  L1 ARD                                     32F05230
0789 1 6D00 0903            STX  L1 OP                                      32F05240
078B 0 1010                 SLA     16                                      32F05250
078C 1 D400 08E6            STO  L  RPSW       SET RD/PCH SW TO RD          32F05260
078E 0 6150                 LDX   1 80         SET COL COUNT                32F05270
078F 1 0C00 0760            XIO  L  STRD       START READ                   32F05280
0791 1 4400 0919            BSI  L  WAIT       WAIT FOR INTERRUPT           32F05290
                    *                                                       32F05300
0793 1 4CA8 0784            BSC  I  READ,&Z    RETURN                       32F05310
0795 0 70EF                 MDX     READ&1                                  32F05320
                    *                                                       32F05330
                    *                                                       32F05340
                    ********************************************          32F05350
                    *              COMPARE COLUMN TIME                      32F05360
                    ********************************************          32F05370
                    *     THIS SUBROUTINE CHECKS THAT COLUMN TIME          32F05380
                    *     FALLS WITHIN MINIMUM AND MAXIMUN LIMITS.         32F05390
                    *     IT ALSO ADDS ALL COLUMN TIMES AND KEEPS          32F05400
                    *     COUNT OF THE NUMBER COLUMNS FOR                  32F05410
                    *     CALCULATION OF COLUMN TIME AVERAGE.              32F05420
                    *---------------------------------------               32F05430
                    *                                                       32F05440
0796 0 0000 COMPR   DC      *-*                                             32F05450
                    *                                                       32F05460
```

```
0797 1 6580 0796          LDX   I1 COMPR      XR1#CALL ADDRS&1          32F05470
0799 0 6301               LDX    3 1          XR3#COL NUMBER            32F05480
                     *                                                 32F05490
079A 0 7301          COMP1 MDX    3 1         ADV COL NUMBER            32F05500
079B 1 6F00 0918           STX   L3 COL                                 32F05510
079D 1 C400 0918           LD    L  COL        LD COL NUMBER             32F05520
079F 1 9400 090C           S     L  COLCT      COMPARE WITH COL CNT      32F05530
07A1 1 4C30 07BB           BSC   L  COMP3,-Z   CK ON PRINT AVG           32F05540
                     *                                                 32F05550
07A3 0 C580 0000           LD    I1 0          LD MAX COL TIME           32F05560
07A5 1 9700 0BC7           S     L3 TIME       COMPARE WITH ACTUAL       32F05570
07A7 1 4408 08A3           BSI   L  ERR10,&    BR IF TO LONG             32F05580
                     *                                                 32F05590
07A9 0 C580 0001           LD    I1 1          LD MIN COL TIME           32F05600
07AB 1 9700 0BC7           S     L3 TIME       COMPARE WITH ACTUAL       32F05610
07AD 1 4410 08B0           BSI   L  ERR11,-    BR IF TO SHORT            32F05620
                     *                                                 32F05630
07AF 1 C700 0BC7     COMP2 LD    L3 TIME       TOTAL ALL COL TIME FOR AVG 32F05640
07B1 0 1890                SRT     16                                   32F05650
07B2 0 8865                AD      TAVG                                 32F05660
07B3 0 D864                STD     TAVG                                 32F05670
07B4 1 7401 081A           MDX   L  AVGCT,1    ADV COL CNT FOR AVG CALC  32F05680
07B6 0 70E3                MDX     COMP1                                32F05690
                     *                                                 32F05700
07B7 0 10A0                SLT     32          RESET IF OVER FLOW COL CNT 32F05710
07B8 0 D061                STO     AVGCT                                32F05720
07B9 0 D85E                STD     TAVG                                 32F05730
07BA 0 70DF                MDX     COMP1                                32F05740
                     *                                                 32F05750
07BB 1 C400 05DF     COMP3 LD    L  SW0                                 32F05760
07BD 0 1009                SLA     9           LOOK AT FORCE LOG SW      32F05770
07BE 0 6700 8002           LDX   L3 /8002      SET DATA CONTROL          32F05780
07C0 1 4428 07C6           BSI   L  TYAVG,&Z   PRINT AVG COL TIME MSG    32F05790
                     *                                                 32F05800
07C2 1 7402 0796           MDX   L  COMPR,2                              32F05810
07C4 1 4C80 0796           BSC   I  COMPR                                32F05820
                     *                                                 32F05830
                     *********************************************     32F05840
                     *     PRINT COLUMN INTERRUPT AVERAGE TIME       *  32F05850
                     *********************************************     32F05860
                     *     THIS SUBROUTINE CALCULATES THE COLUMN TIME *  32F05870
                     *     AVERAGE THEN PRINTS THE AVERAGE MESSAGE.  *  32F05880
                     *-------------------------------------------*     32F05890
                     *                                                 32F05900
07C6 0 0000          TYAVG DC      *-*                                  32F05910
07C7 0 C850                LDD     TAVG        CALCULATE AVG             32F05920
07C8 0 A851                D       AVGCT                                 32F05930
07C9 1 D400 0A01           STO   L  CTAVG      SET IN MSG                32F05940
07CB 0 6107                LDX    1 7          SET MSG NUMBER            32F05950
07CC 1 6600 0A9E           LDX   L2 ACOLT                                32F05960
07CE 1 6F00 09FD           STX   L3 SMSG&2     SET MSG DATA CONTROL      32F05970
07D0 1 4400 09F2           BSI   L  TYPE                                 32F05980
                     *                                                 32F05990
07D2 0 10A0                SLT     32                                    32F06000
07D3 0 D844                STD     TAVG                                  32F06010
07D4 0 D045                STO     AVGCT                                 32F06020
07D5 1 4C80 07C6           BSC   I  TYAVG      RETURN                    32F06030
                     *                                                 32F06040
                     *********************************************     32F06050
                     *           CHECK FOR BLANKS                *     32F06060
                     *********************************************     32F06070
                     *     THIS SUBROUTINE CHECKS EACH CARD BEFORE *     32F06080
                     *     IT IS PUNCHED TO VERIFY THAT IT IS BLANK. *   32F06090
                     *-------------------------------------------*     32F06100
                     *                                                 32F06110
07D7 0 0000          CKBLK DC      0                                    32F06120
07D8 1 6C00 08FD           STX   L  LOOP                                 32F06130
07DA 0 40A9                BSI     READ        READ A CARD               32F06140
```



```
                     *                                                 32F06150
07DB 1 6780 090C           LDX   I3 COLCT      VERIFY THAT CARD          32F06160
07DD 1 C700 0B74     CKB01 LD    L3 RTBL        IS BLANK BEFORE          32F06170
07DF 1 4C20 082C           BSC   L  ERRO,Z      PUNCHING IT              32F06180
07E1 0 73FF                MDX    3 -1                                   32F06190
07E2 0 70FA                MDX      CKB01      LOOP UNTIL LAST COL       32F06200
07E3 1 4C80 07D7           BSC   I  CKBLK      RETURN                    32F06210
                     *                                                 32F06220
                     *********************************************     32F06230
                     *           GRAPH SETUP                     *     32F06240
                     *********************************************     32F06250
                     *     THIS SUBROUTINE WILL CALCULATE A GRAPH *     32F06260
                     *     POINT FOR EACH COLUMN TIME.  THIS SET OF *   32F06270
                     *     GRAPH POINTS WILL BE PUNCHED ON THE NEXT *   32F06280
                     *     CARD.  THE SCALE CAN BE CHANGED WITH A *     32F06290
                     *     FNC 3 BIT SWITCH ENTRY.                *     32F06300
                     *-------------------------------------------*     32F06310
                     *                                                 32F06320
07E5 0 0000          GRAPH DC      *-*                                  32F06330
07E6 0 6B36                STX    3 AVG        STO AVG TIME              32F06340
07E7 0 6201                LDX    2 1                                    32F06350
07E8 0 6A33                STX    2 TEMP&1     SET SCALE FACTOR          32F06360
                     *                                                 32F06370
07E9 1 C400 05E2           LD    L  SW3        CK FOR NEW SCALE ENTRY    32F06380
07EB 0 100C                SLA     12          CLEAR UNWANTED BITS       32F06390
07EC 0 180C                SRA     12                                    32F06400
07ED 0 4820                BSC     Z           SKIP IF NO NEW SCALE      32F06410
07EE 0 D02D                STO     TEMP&1                                32F06420
                     *                                                 32F06430
07EF 1 6780 090C           LDX   I3 COLCT      XR3#COL CNT               32F06440
07F1 0 73FF                MDX    3 -1                                   32F06450
07F2 0 C029                LD      TEMP&1      LOAD SCALE FACTOR         32F06460
07F3 0 A02B                M       HUND        CAL SCALE                 32F06470
07F4 0 1090                SLT     16                                    32F06480
07F5 0 D028                STO     SCALE       SAVE SCALE                32F06490
                     *                                                 32F06500
07F6 0 C026          GRPH1 LD      AVG         LD AVG TIME               32F06510
07F7 1 9700 0BC8           S     L3 TIME&1     SUB ACTUAL TIME           32F06520
07F9 0 1890                SRT     16                                    32F06530
07FA 0 A823                D       SCALE       DIVIDE BY SCALE           32F06540
07FB 0 D01F                STO     TEMP                                  32F06550
07FC 1 6580 081B           LDX   I1 TEMP                                 32F06560
07FE 0 7104                MDX    1 4          XR1#GRAPH BIT POSITION    32F06570
07FF 0 1000                NOP                                          32F06580
0800 0 C01F                LD      K8000       LD A BIT                  32F06590
0801 0 1900                SRA    1 0          SHIFT TO GRAPH POSITION   32F06600
0802 0 1804                SRA     4                                     32F06610
0803 0 1004                SLA     4                                     32F06620
0804 1 D700 0BC9           STO   L3 TIME&2     STO GRAPH BIT IN PNCH BUF 32F06630
0806 0 73FF                MDX    3 -1         ADV TO NEXT COL           32F06640
0807 0 70EE                MDX      GRPH1      LOOP UNTIL LAST COL       32F06650
0808 1 6780 090C           LDX   I3 COLCT                                32F06660
080A 1 C700 0BC8           LD    L3 TIME&1                               32F06670
080C 0 E814                OR       K0008      SET LAST COL BIT          32F06680
080D 1 D700 0BC8           STO   L3 TIME&1                               32F06690
                     *                                                 32F06700
080F 1 6580 081C           LDX   I1 TEMP&1     XR1#SCALE FACTOR          32F06710
0811 0 7102                MDX    1 2                                    32F06720
0812 0 C00D                LD      K8000       CONVERT SCALE FACTOR      32F06730
0813 0 1900                SRA    1 0           TO CARD IMAGE            32F06740
0814 1 D400 0BC9           STO   L  TIME&2     SET TO PUNCH IN CD COL ONE 32F06750
0816 1 4C80 07E5           BSC   I  GRAPH      RETURN                    32F06760
                     *                                                 32F06770
0818    0000               BSS   E  0                                    32F06780
0818 0 0000          TAVG  DC      *-*         TOTAL COL TIME            32F06790
0819 0 0000                DC      *-*                                   32F06800
081A 0 0000          AVGCT DC      *-*         COL CNT FOR AVG           32F06810
081B 0 0000          TEMP  DC      *-*                                   32F06820
```

```
081C 0 0000            DC      *-*                                  32F06830
081D 0 0000       AVG  DC      *-*                                  32F06840
081E 0 0000       SCALE DC     *-*                                  32F06850
081F 0 0026       HUND DC      38                                   32F06860
0820 0 8000       K8000 DC     /8000                                32F06870
0821 0 0008       K0008 DC     /0008                                32F06880
                  *                                                 32F06890
                  ***********************************************   32F06900
                  *            LOCK ON FUNCTION ROUTINE           *  32F06910
                  ***********************************************   32F06920
                  *                                                 32F06930
0822 0 0000       LOCK DC      *-*                                  32F06940
0823 1 C400 05DF       LD   L  SWO          LD SWO                   32F06950
0825 0 EC80 0166       OR   I  ERLCK        COMB WITH MONITOR SWO    32F06960
0827 0 100A            SLA     10           CHECK LOCK SW            32F06970
0828 1 4C90 0822       BSC  I  LOCK,-       BR IF NOT LOCK ON FUNC   32F06980
082A 1 4C80 08FD       BSC  I  LOOP         LOOP ON LAST FUNC        32F06990
                  *                                                 32F07000
                  *                                                 32F07010
                  ***********************************************   32F07020
                  *            ERROR MESSAGE SETUP                *  32F07030
                  ***********************************************   32F07040
                  *                                                 32F07050
082C 0 6100       ERR0 LDX    1 0          CARD NOT BLANK           32F07060
082D 0 6200            LDX    2 /0000                               32F07070
082E 1 CC00 08CE       LDD  L  MSG0                                 32F07080
0830 1 6C00 08F9       STX  L  OPMSW                                32F07090
0832 1 4400 08EC       BSI  L  ETYPE        PRINT ERR MSG            32F07100
0834 1 0C00 08E6       XIO  L  STACK-1                               32F07110
0836 1 4C80 07D7       BSC  I  CKBLK                                 32F07120
                  *                                                 32F07130
0838 0 0000       ERR1 DC      *-*          STATIC DSW ERROR         32F07140
0839 1 7400 08E5       MDX  L  ERR5S,0      IF PREVIOUS ERR5         32F07150
083B 0 7008            MDX     ERR1A        DO NOT PRINT THIS MSG    32F07160
083C 0 6101            LDX     1 1                                   32F07170
083D 0 6203            LDX     2 /3                                  32F07180
083E 1 CC00 08D0       LDD  L  MSG1                                 32F07190
0840 1 6C00 08F9       STX  L  OPMSW                                32F07200
0842 1 4400 08EC       BSI  L  ETYPE        PRINT ERR MSG            32F07210
                  *                                                 32F07220
0844 0 1011       ERR1A SLA       17                                 32F07230
0845 1 D400 08E5       STO  L  ERR5S        RESET ERR5 SW            32F07240
0847 1 4C80 0838       BSC  I  ERR1                                  32F07250
                  *                                                 32F07260
0849 0 0000       ERR2 DC      *-*          BUSY DSW ERROR           32F07270
084A 1 CC00 08E8       LDD  L  BDSW                                 32F07280
084C 1 DC00 090A       STD  L  DSW          SET BUSY DSW IN MSG      32F07290
084E 0 6102            LDX     1 2                                   32F07300
084F 0 6203            LDX     2 3                                   32F07310
0850 1 CC00 08D2       LDD  L  MSG2                                 32F07320
0852 1 4400 08EC       BSI  L  ETYPE        PRINT ERR MSG            32F07330
0854 1 4C80 0849       BSC  I  ERR2                                  32F07340
                  *                                                 32F07350
0856 0 0000       ERR5 DC      *-*          INTRPT 4 DSW ERROR       32F07360
0857 1 6C00 08E5       STX  L  ERR5S        SET ERROR 5 SW           32F07370
0859 0 6600 0003       LDX  L2 3            SET DATA ID              32F07380
085B 1 F400 08EA       EOR  L  DSW4         GET DSW S/B              32F07390
085D 1 D400 08EB       STO  L  DSW4&1       SET IN MSG               32F07400
085F 1 CC00 08EA       LDD  L  DSW4                                 32F07410
0861 1 DC00 090A       STD  L  DSW          SET DSW IN MSG           32F07420
0863 0 1002            SLA     2            LOOK FOR ERR CK          32F07430
0864 1 4C28 086D       BSC  L  ERR6,&Z      BR IF ERR CK             32F07440
                  *                                                 32F07450
0866 0 6105            LDX     1 5                                   32F07460
0867 1 CC00 08D6       LDD  L  MSG5                                 32F07470
0869 1 4400 08EC       BS1  L  ETYPE        PRINT ERR MSG            32F07480
086B 1 4C80 0856  ERR5R BSC  I  ERR5                                 32F07490
                  *                                                 32F07500
```



```
086D 1 C400 08E6  ERR6 LD   L  RPSW         CK FOR PUNCH OPERATION   32F07510
086F 1 4C08 087F       BSC  L  ERR7,&       BR IF NOT PUNCH          32F07520
0871 1 0C00 095E       XIO  L  COLRD        RD ECHO BITS             32F07530
0873 1 C480 095E       LD   I  COLRD                                 32F07540
0875 1 4C18 087F       BSC  L  ERR7,&-      BR IF NOT PUNCH CK       32F07550
0877 1 D400 090A       STO  L  DSW          STO ECHO IN MSG          32F07560
0879 0 6106            LDX     1 6                                   32F07570
087A 0 6203            LDX     2 /3                                  32F07580
087B 0 C85C            LDD     MSG6                                  32F07590
087C 1 4400 08EC       BSI  L  ETYPE        PRINT ERR MSG            32F07600
087E 0 70EC            MDX     ERR5R                                 32F07610
                  *                                                 32F07620
087F 0 6107       ERR7 LDX    1 7          ERR CK                   32F07630
0880 0 C859            LDD     MSG7                                  32F07640
0881 1 4400 08EC       BSI  L  ETYPE        PRINT ERR MSG            32F07650
0883 0 70E7            MDX     ERR5R                                 32F07660
                  *                                                 32F07670
0884 0 0000       ERR8 DC      *-*          COL COUNT ERROR          32F07680
0885 0 6108            LDX     1 8                                   32F07690
0886 0 620C            LDX     2 /C                                  32F07700
0887 0 C854            LDD     MSG8                                  32F07710
0888 0 4063            BSI     ETYPE        PRINT ERR MSG            32F07720
0889 1 4C80 0884       BSC  I  ERR8                                  32F07730
                  *                                                 32F07740
088B 0 0000       ERR9 DC      *-*          DATA COMPARE ERROR       32F07750
088C 1 F400 090F       EOR  L  DATA&1       RESTORE TO DATA WAS      32F07760
088E 1 D400 090E       STO  L  DATA                                  32F07770
0890 0 690D            STX     1 RX1&1      SAVE XR1                 32F07780
0891 0 10A0            SLT     32                                    32F07790
0892 0 6600 C030       LDX  L2 /C030        SET FOR MULTI LINE MSG   32F07800
0894 1 7400 08E4       MDX  L  M            CHECK FOR MULTI LINE     32F07810
0896 0 7005            MDX     ERR9A        BR IF FIRST LINE         32F07820
0897 0 684C            STX     M            SET MULTI LINE WORD      32F07830
0898 0 6109            LDX     1 9          MESSAGE NUMBER           32F07840
0899 0 6600 4030       LDX  L2 /4030        SET WORD CNTL            32F07850
089B 0 C842            LDD     MSG9                                  32F07860
089C 0 404F       ERR9A BSI       ETYPE     ERROR TYPE OUT           32F07870
089D 0 6500 0000  R#1  LDX  L1 *-*          RESTORE XR1              32F07880
089F 1 0C00 08E6       XIO  L  STACK-1      SELECT ERROR CARD        32F07890
08A1 1 4C80 088B       BSC  I  ERR9         RETURN                   32F07900
                  *                                                 32F07910
                  *                                                 32F07920
08A3 0 0000       ERR10 DC     *-*                                  32F07930
08A4 0 6923            STX     1 EXR1&1     STO XR1                  32F07940
08A5 0 6B24            STX     3 EXR3&1     STO XR3                  32F07950
08A6 0 6110            LDX     1 /10        COL INTRPT SLOW          32F07960
08A7 0 C838            LDD     MSG10                                 32F07970
                  *                                                 32F07980
08A8 0 6600 4180       LDX  L2 /4180        SET FOR PUNCH MSG        32F07990
08AA 1 7400 08E6       MDX  L  RPSW         CK PUNCH/READ SW         32F08000
08AC 0 7010            MDX     ERX          BR IF PUNCH              32F08010
08AD 0 6600 4480       LDX  L2 /4480        SET FOR READ MSG         32F08020
08AF 0 700D            MDX     ERX                                   32F08030
                  *                                                 32F08040
08B0 0 0000       ERR11 DC     *-*                                  32F08050
08B1 0 6916            STX     1 EXR1&1     STO XR1                  32F08060
08B2 0 6B17            STX     3 EXR3&1     STO XR3                  32F08070
08B3 0 6111            LDX     1 /11        COL INTRPT FAST          32F08080
08B4 0 C82D            LDD     MSG11                                 32F08090
                  *                                                 32F08100
08B5 0 6600 4280       LDX  L2 /4280        SET FOR PUNCH MSG        32F08110
08B7 1 7400 08E6       MDX  L  RPSW         CK PUNCH/READ SW         32F08120
08B9 0 7003            MDX     ERX          BR IF PUNCH              32F08130
08BA 0 6600 4880       LDX  L2 /4880        SET FOR READ MSG         32F08140
08BC 0 7000            MDX     ERX                                   32F08150
                  *                                                 32F08160
08BD 1 7400 08E4  ERX  MDX  L  M                                     32F08170
08BF 0 7001            MDX     ERX1                                  32F08180
```

```
08C0 0 7004                MDX     ERX2                                  32F08190
                           *                                             32F08200
08C1 0 18A0        ERX1    SRT     32                                    32F08210
08C2 0 7600 8000           MDX     L2 /8000                              32F08220
08C4 0 1000                NOP                                           32F08230
                           *                                             32F08240
08C5 0 4026        ERX2    BSI     ETYPE     PRINT ERR MSG               32F08250
08C6 0 681D                STX     M                                     32F08260
08C7 0 6500 0000   EXR1    LDX     L1 *-*    RESTORE XR1                 32F08270
08C9 0 6700 0000   EXR3    LDX     L3 *-*    RESTORE XR3                 32F08280
08CB 1 4C00 07AF           BSC     L  COMP2                              32F08290
                           *                                             32F08300
                           BSS     E                                     32F08310
08CE   0000        MSG0    DC      ACNBK     CARD NOT BLANK              32F08320
08CE 1 0A04                DC      /0000                                 32F08330
08CF 0 0000        MSG1    DC      AWAS      STATIC DSW ERROR            32F08340
08D0 1 0A0C                DC      ASDSW                                 32F08350
08D1 1 0A1B        MSG2    DC      AWAS      BUSY DSW ERROR              32F08360
08D2 1 0A0C                DC      ABDSW                                 32F08370
08D3 1 0A24        MSG3    DC      ADSW      NO INTERRUPT                32F08380
08D4 1 0A18                DC      ANINT                                 32F08390
08D5 1 0A34        MSG5    DC      AWAS      LEVEL 4  DSW ERROR          32F08400
08D6 1 0A0C                DC      ADSW4                                 32F08410
08D7 1 0A2C        MSG6    DC      AWAS      PUNCH CHECK                 32F08420
08D8 1 0A0C                DC      APCK                                  32F08430
08D9 1 0A3A        MSG7    DC      AWAS      ERROR CHECK                 32F08440
08DA 1 0A0C                DC      AECK                                  32F08450
08DB 1 0A40        MSG8    DC      ADWAS     COLUMN COUNT ERROR          32F08460
08DC 1 0A11                DC      ACCNT                                 32F08470
08DD 1 0A45        MSG9    DC      AWAS      COLUMN DATA ERROR           32F08480
08DE 1 0A0C                DC      ADATA                                 32F08490
08DF 1 0A4C        MSG10   DC      ATL       COL INTRPT SLOW             32F08500
08E0 1 0A7E                DC      /0000                                 32F08510
08E1 0 0000        MSG11   DC      ATS       COL INTRPT FAST             32F08520
08E2 1 0A8E                DC      /0000                                 32F08530
08E3 0 0000                *                                             32F08540
08E4 0 0000        M       DC      *-*       MULTI LINE CONTROL WORD     32F08550
08E5 0 0000        ERR5S   DC      *-*       ERR5 SW                     32F08560
08E6 0 0000        RPSW    DC      *-*       READ/PUNCH SW               32F08570
08E7 0 1480        STACK   DC      /1480     SELECT #2 STACKER           32F08580
08E8 0 0000        BDSW    DC      *-*       BUSY DSW WAS                32F08590
08E9 0 0003                DC      /0003              S/B                32F08600
08EA 0 0000        DSW4    DC      *-*       INT 4 DSW WAS               32F08610
08EB 0 0000                DC      *-*                S/B                32F08620
                           *                                             32F08630
                           ********************************************  32F08640
                           *              PRINT ERROR MESSAGE          *  32F08650
                           ********************************************  32F08660
                           *     THIS ROUTINE PRINTS ALL THE ERROR MESSAGES. 32F08670
                           *     UPON ENTRY THE MSG NO. MUST BE SET IN XR1,  32F08680
                           *     THE DATA ID IN XR2, AND THE ALPHA ADDRS IN  32F08690
                           *     THE ACCUM AND EXT.                          32F08700
                           *-------------------------------------------  32F08710
                           *                                             32F08720
08EC 0 0000        ETYPE   DC      *-*                                   32F08730
08ED 0 6917                STX   1 EMSG      SET MSG NUMBER              32F08740
08EE 0 6A18                STX   2 EMSG&2    SET DATA ID                 32F08750
08EF 0 D818                STD     EMSG&3    SET ALPHA ADDRS             32F08760
08F0 1 C700 08C7           LD    L3 TIME                                 32F08770
08F2 0 D01E                STO     TIMWS                                 32F08780
                           *                                             32F08790
08F3 1 7400 08F9           MDX   L OPMSW     PRINT LAST OP MSG IF        32F08800
08F5 0 7004                MDX     ETYP1      FIRST ERROR MSG AFTER      32F08810
08F6 0 4480 0162           BSI   I ERROR      A CONTROL OP               32F08820
08F8 1 08FF                DC      ETYP2                                 32F08830
08F9 0 0000        OPMSW   DC      *-*       MUST BE ZERO FOR OP MSG     32F08840
                           *                                             32F08850
08FA 0 4480 0162   ETYP1   BSI   I ERROR      PRINT ERROR MESSAGE         32F08860
```



```
08FC 1 0905                DC      EMSG                                  32F08870
08FD 0 0000        LOOP    DC      *-*       LOOP ADDRS SET HERE         32F08880
08FE 0 68FA                STX     OPMSW                                 32F08890
                           *                                             32F08900
08FF 1 4C80 08EC   ETYP2   BSC   I ETYPE     RETURN                      32F08910
                           *                                             32F08920
0901 0 8000                DC      /8000                                 32F08930
0902 1 0A56                DC      ALOP                                  32F08940
0903 0 0000        OP      DC      *-*                                   32F08950
                           *                                             32F08960
                           *-------------------------------------------  32F08970
                           *     ERROR MESSAGE TABLE                     32F08980
                           *-------------------------------------------  32F08990
0904   0001                BSS   E 1                                     32F09000
0905 0 0000        EMSG    DC      *-*       MESSAGE NUMBER              32F09010
0906 0 7F8C                DC      /7F8C     HEX/DEC SW                  32F09020
0907 0 0000                DC      *-*       DATA I/D                    32F09030
0908 0 0000                DC      *-*       ALPHA ADDRS1                32F09040
0909 0 0000                DC      *-*       ALPHA ADDRS2                32F09050
                           *                                             32F09060
090A 0 0000        DSW     DC      *-*       DSW WAS                     32F09070
090B 0 0000                DC      *-*       DSW S/B                     32F09080
090C 0 0000        COLCT   DC      *-*       COLUMN COUNT WAS            32F09090
090D 0 0050                DC      80        COLUMN COUNT S/B            32F09100
090E 0 0000        DATA    DC      *-*       READ OR PUNCH ECHO WAS      32F09110
090F 0 0000                DC      *-*       READ DATA S/B               32F09120
0910 0 0000                DC      0000      NOT USED                    32F09130
0911 0 0000        TIMWS   DC      *-*       TIME WAS                    32F09140
0912 0 1C0C        PCMAX   DC      7180      MAX PUNCH COL TIME          32F09150
0913 0 14B4        PCMIN   DC      5300      MIN PUNCH COL TIME          32F09160
0914 0 0514        RDMAX   DC      1300      MAX READ COL TIME           32F09170
0915 0 02BC        RDMIN   DC      700       MIN READ COL TIME           32F09180
0916 0 0000                DC      0000      NOT USED                    32F09190
0917 0 0000                DC      0000      NOT USED                    32F09200
0918 0 0000        COL     DC      *-*       COL IN ERROR                32F09210
                           *                                             32F09220
                           ********************************************  32F09230
                           *              INTERRUPT WAIT ROUTINE       *  32F09240
                           ********************************************  32F09250
                           *     THIS SUBROUTINE WAITS FOR INTERRUPT.    32F09260
                           *     WHEN THE INTERRUPT IS RECEIVED IT WILL  32F09270
                           *     CHECK THE ROUTINE SELECTION SWITCH.     32F09280
                           *     IF A NEW ROUTINE HAS BEEN SELECTED IT   32F09290
                           *     WILL BRANCH TO THE CONTROL ROUTINE.     32F09300
                           *-------------------------------------------  32F09310
                           *                                             32F09320
0919 0 0000        WAIT    DC      *-*                                   32F09330
091A 0 1810                SRA     16                                    32F09340
091B 0 D0C8                STO     M         RESET MULT LINE CONTROL     32F09350
091C 0 D0EF                STO     COLCT     RESET COLUMN COUNT          32F09360
091D 0 D0DB                STO     OPMSW     RESET OP MSG SW             32F09370
091E 0 69EE                STX   1 COLCT&1                               32F09380
091F 0 6500 1000           LDX   L1 /1000    SET INTERRUPT               32F09390
0921 0 6926                STX   1 WCNT       WAIT CNT                   32F09400
0922 0 0841                XIO     SENSE     SENSE BUSY DSW              32F09410
0923 0 D0C4                STO     BDSW                                  32F09420
                           *                                             32F09430
0924 1 6500 092D   WAIT1   LDX   L1 WAIT3                                 32F09440
0926 1 7400 05E6           MDX   L MLSCF&1   CK FOR INTERRUPT             32F09450
0928 0 7015                MDX     WAIT4     BR IF INTERRUPT OCCURED     32F09460
                           *                                             32F09470
0929 1 6D00 05E5   WAIT2   STX   L1 MLSCF     SET RETURN ADDRESS          32F09480
092B 0 4480 0161           BSI   I START     GO TO MONITOR               32F09490
                           *                                             32F09500
092D 1 74FF 0948   WAIT3   MDX   L WCNT,-1   DECREMENT WAIT CNT           32F09510
092F 0 70F4                MDX     WAIT1                                 32F09520
0930 0 C0B7                LD      BDSW      CK BUSY DSW                 32F09530
0931 0 F0B7                EOR     BDSW&1                                32F09540
```

```
0932 1 4420 0849          BSI  L  ERR2,Z     BR IF ER                    32F09550
0934 0 082F               XIO    SENSE       SENSE DSW                   32F09560
0935 0 D0D4               STO    DSW         STORE DSW IN MSG            32F09570
0936 0 6103          ERR3 LDX    1 3         MESSAGE NUMBER              32F09580
0937 0 6201               LDX    2 /0001     SET WORD CNTL               32F09590
0938 0 C89B               LDD    MSG3        MSG- NO INTRPT              32F09600
0939 0 40B2               BSI    ETYPE       PRINT ERR MSG               32F09610
093A 1 6780 0919          LDX    I3 WAIT     SET TO RETRY FUNCTION       32F09620
093C 1 6F00 05E6          STX    L3 MLSCF&1                              32F09630
                          *                                              32F09640
093E 1 C400 05E0     WAIT4 LD     L  SW1                                  32F09650
0940 0 4488 0161          BSI    I  START,&  CK FOR RTN SELECT           32F09660
0942 1 9400 05DD          S      L  RID      CK FOR NEW ROUTINE          32F09670
0944 1 4420 0654          BSI    L  CNTRL,Z  BR IF NEW RTN               32F09680
0946 0 4480 0161          BSI    I  START                                32F09690
                          *                                              32F09700
0948 0 0000          WCNT DC       *-*                                    32F09710
                          *                                              32F09720
                          *            ERROR ANALYSIS                    32F09730
                          ********************************************   32F09740
                          ********************************************   32F09750
                          *  COME TO HERE FROM INTERRUPT AND CHECK FOR   32F09760
                          *  ERRORS BEFORE RETURNING TO TEST ROUTINE     32F09770
                          *------------------------------------------    32F09780
                          *                                              32F09790
0949 0 10A0          RTRN SLT      32                                     32F09800
094A 0 C09D               LD       BDSW        CK BUSY DSW               32F09810
094B 0 F09D               EOR      BDSW&1                                32F09820
094C 1 4420 0849          BSI   L  ERR2,Z      BR IF ER                  32F09830
                          *                                              32F09840
                          *                                              32F09850
094E 0 C09B               LD       DSW4        CK INT 4 DSW              32F09860
094F 0 F01A               EOR      K0800       REMOVE RESPONSE BIT       32F09870
0950 0 E01B               AND      KEFFE       MASK LAST CD AND NRDY     32F09880
0951 1 4420 0856          BSI   L  ERR5,Z      BR IF ERR                 32F09890
                          *                                              32F09900
0953 0 C0B8               LD       COLCT       CK COLUMN COUNT           32F09910
0954 0 F0B8               EOR      COLCT&1     COMPARE WITH S/B          32F09920
0955 1 4420 0884          BSI   L  ERR8,Z      BR IF COL COUNT ER        32F09930
                          *                                              32F09940
                          *                                              32F09950
0957 0 C092               LD       DSW4        CK FOR LAST CARD          32F09960
0958 0 1004               SLA      4                                     32F09970
0959 1 4C02 09D6          BSC   L  LSTCD,C     BR IF LAST CARD           32F09980
095B 1 4C80 0919          BSC   I  WAIT        RETURN TO TEST RTN        32F09990
                          *                                              32F10000
095E   0000               BSS   E                                        32F10010
095E 1 0962          COLRD DC      RDATA                                  32F10020
095F 0 1200               DC       /1200       READ COL IOCC             32F10030
0960 0 0000          COLPC DC      *-*                                    32F10040
0961 0 1100               DC       /1100       PUNCH IOCC                32F10050
0962 0 0000          RDATA DC      0000        LAST READ DATA            32F10060
0963 0 1701          SNCOL DC      /1701       SENSE AND RESET DSW IOCC  32F10070
0964 0 0000          SENSE DC      0                                     32F10080
0965 0 1700               DC       /1700       SENSE DSW IOCC            32F10090
0966 1 0968          STOP  DC      TERM                                   32F10100
0967 0 1100               DC       /1100                                 32F10110
0968 0 FFFF          TERM  DC      /FFFF                                 32F10120
0969 0 1402          FEED  DC      /1402       FEED IOCC                 32F10130
096A 0 0800          K0800 DC      /0800                                 32F10140
096B 0 1702          SNCOM DC      /1702                                 32F10150
096C 0 EFFE          KEFFE DC      /EFFE                                 32F10160
096D 0 C800          KC800 DC      /C800                                 32F10170
                          *                                              32F10180
                          ********************************************   32F10190
                          *            INTERRUPT ROUTINE                 32F10200
                          ********************************************   32F10210
                          *                                              32F10220
```



```
096E 0 0000          INTR  DC      *-*                                    32F10230
096F 0 691E               STX    1 SVXR1&1   SAVE XR1                    32F10240
0970 0 6A1F               STX    2 SVXR2&1   SAVE XR2                    32F10250
0971 0 6201               LDX    2 1         RESET COL CNT               32F10260
0972 0 6500 00E1     SPD1 LDX    L1 225      RESET TIMER                 32F10270
0974 0 08EF               XIO      SENSE     SENSE DSW                   32F10280
0975 1 4C08 099D          BSC   L  RDCOL,&    BR IF READ COL INT          32F10290
0977 0 102D               SLA      45        TIMING ADJUST               32F10300
0978 0 7034               MDX      PCH                                   32F10310
                          *                                              32F10320
0979 0 7201          INTR1 MDX    2 1         ADV COL CNT                 32F10330
097A 1 6D00 0BC7          STX    L1 TIME                                 32F10340
097C 0 6500 00BE     SPD2 LDX    L1 190      RESET TIMER                 32F10350
097E 1 C400 0BC7          LD     L  TIME     LD TIMER CNT                32F10360
0980 1 D600 0BC7          STO    L2 TIME     STO TIME/COLUMN             32F10370
0982 0 08E1               XIO      SENSE     SENSE DSW                   32F10380
0983 0 180E               SRA      14                                    32F10390
0984 1 4C04 09A3          BSC   L  PCCOL,E    BR IF PUNCH COL INT         32F10400
0986 0 1801               SRA      1                                     32F10410
0987 1 4C04 099D          BSC   L  RDCOL,E    BR IF READ COL INT          32F10420
                          *                                              32F10430
                          *     OP COMPLETE                              32F10440
                          *                                              32F10450
0989 0 72FF               MDX    2 -1        DEC FOR CORRECT COL CNT     32F10460
098A 0 1000               NOP                                           32F10470
098B 1 6E00 090C          STX    L2 COLCT    STO COL CNT                 32F10480
098D 0 6500 0000     SVXR1 LDX   L1 *-*      RESTORE XR1                 32F10490
098F 0 6600 0000     SVXR2 LDX   L2 *-*      RESTORE XR2                 32F10500
0991 1 4C80 096E          BSC    I  INTR     BR OUT OF INTR              32F10510
                          *                                              32F10520
0993 0 0000          INTR2 DC      *-*                                    32F10530
0994 0 08D5               XIO      SNCOM-1   SENSE-RESET DSW             32F10540
0995 1 D400 08EA          STO   L  DSW4       STO DSW                     32F10550
0997 1 6700 0949          LDX    L3 RTRN                                 32F10560
0999 1 6F00 05E6          STX    L3 MLSCF&1  SET FOR RETURN              32F10570
099B 1 4C80 0993          BSC    I  INTR2    BR OUT OF INTR              32F10580
                          *                                              32F10590
                          *     READ COLUMN INTERRUPT                    32F10600
                          *                                              32F10610
099D 0 08C0          RDCOL XIO     COLRD      READ A COLUMN               32F10620
099E 0 C0C3               LD       RDATA      LD DATA                     32F10630
099F 1 D600 0B74          STO    L2 RTBL       STO DATA/COL                32F10640
09A1 0 101B               SLA      27        TIMING ADJUSTMENT           32F10650
09A2 0 700D               MDX      INTR3                                 32F10660
                          *                                              32F10670
                          *     PUNCH COLUMN INTERRUPT                   32F10680
                          *                                              32F10690
09A3 1 6780 06E1     PCCOL LDX   I3 PDLAY      LD DELAY CNT                32F10700
09A5 0 7300               MDX    3 0         CK FOR MIN DELAY            32F10710
09A6 0 7001               MDX      DLPCH                                 32F10720
09A7 0 7005               MDX      PCH                                   32F10730
09A8 0 7125          DLPCH MDX    1 37        ADV TIMER                   32F10740
09A9 0 100C               SLA      12        TIMING ADJUSTMENT           32F10750
09AA 0 73FF               MDX    3 -1        DECR DELAY CNT              32F10760
09AB 0 70FC               MDX      DLPCH     LOOP UNTIL CNT ZERO         32F10770
09AC 0 1006               SLA      6         TIMING ADJUSTMENT           32F10780
                          *                                              32F10790
09AD 0 08B2          PCH   XIO     COLPC      PUNCH COLUMN                32F10800
09AE 1 7401 0960          MDX   L  COLPC,1    ADV FOR NEXT COL.           32F10810
                          *                                              32F10820
                          *------------------------------------------    32F10830
                          *     TIMER - THIS SUBROUTINE DETEMINES THE    32F10840
                          *     TIME BETWEEN COLUMN INTERRUPTS           32F10850
                          *------------------------------------------    32F10860
                          *                                              32F10870
09B0 0 08B1          INTR3 XIO     SNCOL-1    SENSE-RESET DSW             32F10880
                          *                                              32F10890
09B1 0 08B2          TIMER XIO     SENSE      SENSE DSW                   32F10900
```

```
09B2 0 E0BA              AND     KC800       MASK ALL BUT 0,1,4          32F10910
09B3 1 4C20 0979         BSC  L  INTR1,Z     BR IF INTERRUPT             32F10920
09B5 0 7126        SPD3  MDX   1 38          ADV TIMER                   32F10930
09B6 0 70FA              MDX     TIMER       LOOP FOR 30 MSEC            32F10940
09B7 0 70D5              MDX     SVXR1                                   32F10950
                   *                                                     32F10960
                   *********************************************         32F10970
                   *              CHECK READY                            32F10980
                   *********************************************         32F10990
                   *                                                     32F11000
09B8 0 0000        READY DC      *-*                                     32F11010
09B9 0 10A0              SLT     32                                      32F11020
09BA 0 08A9              XIO     SENSE       SENSE DSW                   32F11030
09BB 1 DC00 090A         STD  L  DSW         STORE DSW                   32F11040
09BD 1 4C98 09B8         BSC  I  READY,&-    NO BITS FOUND               32F11050
09BF 0 1801              SRA     1           REMOVE NRDY                 32F11060
09C0 1 4420 0838         BSI  L  ERR1,Z      BR IF OTHER THAN NRDY       32F11070
                   *                                                     32F11080
09C2 0 1011        BOX   SLA     17                                      32F11090
09C3 0 D011              STO     BCNT        RESET BOX CNT               32F11100
                   *                                                     32F11110
09C4 1 6500 09CA   BOX1  LDX  L1 BOX2        LD REENTRY ADDRS            32F11120
09C6 1 6D00 05E6         STX  L1 MLSCF&1     SET MLSCF                   32F11130
09C8 1 4C00 093E         BSC  L  WAIT4       GO TO MONITOR               32F11140
                   *                                                     32F11150
09CA 0 0899        BOX2  XIO     SENSE       SENSE DSW                   32F11160
09CB 1 4C98 09B8         BSC  I  READY,&-    RETURN IF READY             32F11170
09CD 1 7403 09D5         MDX  L  BCNT,3                                  32F11180
09CF 0 70F4              MDX     BOX1                                    32F11190
                   *                                                     32F11200
09D0 0 6105        NRDY  LDX   1 5           MESSAGE NUMBER              32F11210
09D1 1 6600 0A66         LDX  L2 ANRDY       NOT READY                   32F11220
09D3 0 401E              BSI     TYPE        PRINT MESSAGE               32F11230
09D4 0 70ED              MDX     BOX                                     32F11240
                   *                                                     32F11250
09D5 0 0000        BCNT  DC      *-*                                     32F11260
                   *                                                     32F11270
                   *********************************************         32F11280
                   *              FEED LAST CARD                         32F11290
                   *********************************************         32F11300
                   *                                                     32F11310
09D6 1 6700 0A63   LSTCD LDX  L3 AFD                                     32F11320
09D8 1 6F00 0903         STX  L3 OP                                      32F11330
09DA 0 088D              XIO     FEED-1      FEED LAST CARD              32F11340
                   *                                                     32F11350
09DB 0 6104              LDX   1 4                                       32F11360
09DC 1 6600 0A78         LDX  L2 ALCD                                    32F11370
09DE 0 4013              BSI     TYPE        PRINT MSG- LAST CARD        32F11380
                   *                                                     32F11390
09DF 0 1810              SRA     16                                      32F11400
09E0 1 D400 05E1         STO  L  SW2         RESET DELAY FACTOR          32F11410
09E2 1 D400 05E2         STO  L  SW3         RESET GRAPH SCALE           32F11420
                   *                                                     32F11430
09E4 1 C400 05DD         LD   L  RID         LD LAST RTN NUMBER          32F11440
09E6 0 900A              S       TWO         CK FOR ROUTINE 1 OR 2       32F11450
09E7 1 4430 0654         BSI  L  CNTRL,-Z    BR IF NOT 1 OR 2            32F11460
                   *                                                     32F11470
09E9 1 C400 05DF         LD   L  SW0                                     32F11480
09EB 0 1009              SLA     9           LOOK AT FORCE LOG SW        32F11490
09EC 0 6302              LDX   3 2           SET FOR AVG ONLY            32F11500
09ED 1 4410 07C6         BSI  L  TYAVG,-     PRINT AVG COL TIME MSG      32F11510
                   *                                                     32F11520
09EF 1 4400 0654         BSI  L  CNTRL       GO TO CNTRL RTN             32F11530
09F1 0 0002        TWO   DC      2                                       32F11540
                   *                                                     32F11550
                   *********************************************         32F11560
                   *              PRINT STATUS MESSAGE                   32F11570
                   *********************************************         32F11580
```



```
                   *     THIS SUBROUTINE PRINTS ALL THE STATUS         32F11590
                   *     MESSAGES. THE MESSAGE NUMBER MUST BE SET      32F11600
                   *     IN XR1 AND THE ALPHA ADDRESS IN XR2 UPON      32F11610
                   *     ENTRY.                                        32F11620
                   *-------------------------------------------        32F11630
                   *                                                   32F11640
09F2 0 0000        TYPE  DC      *-*                                   32F11650
09F3 0 6907              STX   1 SMSG        SET MSG NO.               32F11660
09F4 0 6A09              STX   2 SMSG&3      SET ALPHA ADDRS           32F11670
09F5 0 4480 0163         BSI   I LOG         PRINT MSG                 32F11680
09F7 1 09FB              DC      SMSG                                  32F11690
                   *                                                   32F11700
09F8 0 D004              STO     SMSG&2      RESET DATA CONTROL        32F11710
09F9 1 4C80 09F2         BSC   I TYPE        RETURN                    32F11720
09FB 0 0000        SMSG  DC      *-*         MSG NO.SET HERE           32F11730
09FC 0 000F              DC      /000F                                 32F11740
09FD 0 0000              DC      *-*                                   32F11750
09FE 0 0000              DC      *-*         ALPHA ADDRS SET HERE      32F11760
09FF 0 0000              DC      /0000                                 32F11770
                   *                                                   32F11780
0A00 0 0000        MAXPD DC      *-*         MAX PUNCH DELAY           32F11790
0A01 0 0000        CTAVG DC      *-*         COLUMN TIME AVERAGE       32F11800
0A02 0 1770        PAVG  DC      6000        PUNCH AVERAGE S/B         32F11810
0A03 0 03E8        RAVG  DC      1000        READ AVERAGE S/B          32F11820
                   *                                                   32F11830
                   *                                                   32F11840
                   *********************************************       32F11850
                   *              ALPHA MESSAGES                       32F11860
                   *********************************************       32F11870
                   *                                                   32F11880
0A04 0 1E3E        ACNBK DC      /1E3E       CARD NOT BLANK            32F11890
0A05 0 6232              DC      /6232                                 32F11900
0A06 0 2176              DC      /2176                                 32F11910
0A07 0 529E              DC      /529E                                 32F11920
0A08 0 211A              DC      /211A                                 32F11930
0A09 0 5E3E              DC      /5E3E                                 32F11940
0A0A 0 765A              DC      /765A                                 32F11950
0A0B 0 FFFF              DC      /FFFF                                 32F11960
                   *                                                   32F11970
0A0C 0 923E        AWAS  DC      /923E       WAS S/B                   32F11980
0A0D 0 9A21              DC      /9A21                                 32F11990
0A0E 0 219A              DC      /219A                                 32F12000
0A0F 0 BC1A              DC      /BC1A                                 32F12010
0A10 0 FFFF              DC      /FFFF                                 32F12020
                   *                                                   32F12030
0A11 0 923E        ADWAS DC      /923E       WAS S/B                   32F12040
0A12 0 9A21              DC      /9A21                                 32F12050
0A13 0 2121              DC      /2121                                 32F12060
0A14 0 9ABC              DC      /9ABC                                 32F12070
0A15 0 1A21              DC      /1A21                                 32F12080
0A16 0 2121              DC      /2121                                 32F12090
0A17 0 FFFF              DC      /FFFF                                 32F12100
                   *                                                   32F12110
0A18 0 329A        ADSW  DC      /329A       DSW                       32F12120
0A19 0 9221              DC      /9221                                 32F12130
0A1A 0 FFFF              DC      /FFFF                                 32F12140
                   *                                                   32F12150
0A1B 0 2184        ASDSW DC      /2184       -STATIC DSW ERR           32F12160
0A1C 0 9A9E              DC      /9A9E                                 32F12170
0A1D 0 3E9E              DC      /3E9E                                 32F12180
0A1E 0 221E              DC      /221E                                 32F12190
0A1F 0 2132              DC      /2132                                 32F12200
0A20 0 9A92              DC      /9A92                                 32F12210
0A21 0 2136              DC      /2136                                 32F12220
0A22 0 6262              DC      /6262                                 32F12230
0A23 0 FFFF              DC      /FFFF                                 32F12240
                   *                                                   32F12250
0A24 0 2184        ABDSW DC      /2184       -BUSY DSW ERR             32F12260
```

```
0A25 0 1AB2            DC      /1AB2                           32F12270
0A26 0 9AA6            DC      /9AA6                           32F12280
0A27 0 2132            DC      /2132                           32F12290
0A28 0 9A92            DC      /9A92                           32F12300
0A29 0 2136            DC      /2136                           32F12310
0A2A 0 6262            DC      /6262                           32F12320
0A2B 0 FFFF            DC      /FFFF                           32F12330
                       *                                       32F12340
0A2C 0 2184      ADSW4 DC      /2184     -LEV4 DSW ERR         32F12350
0A2D 0 5E36            DC      /5E36                           32F12360
0A2E 0 B6F0            DC      /B6F0                           32F12370
0A2F 0 2132            DC      /2132                           32F12380
0A30 0 9A92            DC      /9A92                           32F12390
0A31 0 2136            DC      /2136                           32F12400
0A32 0 6262            DC      /6262                           32F12410
0A33 0 FFFF            DC      /FFFF                           32F12420
                       *                                       32F12430
0A34 0 2176      ANINT DC      /2176     NO INTRPT             32F12440
0A35 0 5221            DC      /5221                           32F12450
0A36 0 2276            DC      /2276                           32F12460
0A37 0 9E62            DC      /9E62                           32F12470
0A38 0 569E            DC      /569E                           32F12480
0A39 0 FFFF            DC      /FFFF                           32F12490
                       *                                       32F12500
0A3A 0 2184      APCK  DC      /2184     PCH CK                32F12510
0A3B 0 56B2            DC      /56B2                           32F12520
0A3C 0 761E            DC      /761E                           32F12530
0A3D 0 2621            DC      /2621                           32F12540
0A3E 0 1E5A            DC      /1E5A                           32F12550
0A3F 0 FFFF            DC      /FFFF                           32F12560
                       *                                       32F12570
0A40 0 2184      AECK  DC      /2184     ERR CK                32F12580
0A41 0 3662            DC      /3662                           32F12590
0A42 0 6221            DC      /6221                           32F12600
0A43 0 1E5A            DC      /1E5A                           32F12610
0A44 0 FFFF            DC      /FFFF                           32F12620
                       *                                       32F12630
0A45 0 2184      ACCNT DC      /2184     COL CNT ER            32F12640
0A46 0 1E52            DC      /1E52                           32F12650
0A47 0 5E21            DC      /5E21                           32F12660
0A48 0 1E76            DC      /1E76                           32F12670
0A49 0 9E21            DC      /9E21                           32F12680
0A4A 0 3662            DC      /3662                           32F12690
0A4B 0 FFFF            DC      /FFFF                           32F12700
                       *                                       32F12710
0A4C 0 2121      ADATA DC      /2121     COL   DATA ERR        32F12720
0A4D 0 1E52            DC      /1E52                           32F12730
0A4E 0 5E21            DC      /5E21                           32F12740
0A4F 0 2121            DC      /2121                           32F12750
0A50 0 2184            DC      /2184                           32F12760
0A51 0 323E            DC      /323E                           32F12770
0A52 0 9E3E            DC      /9E3E                           32F12780
0A53 0 2136            DC      /2136                           32F12790
0A54 0 6262            DC      /6262                           32F12800
0A55 0 FFFF            DC      /FFFF                           32F12810
                       *                                       32F12820
0A56 0 095E      ALOP  DC      /095E     LAST OP-              32F12830
0A57 0 3E9A            DC      /3E9A                           32F12840
0A58 0 9E21            DC      /9E21                           32F12850
0A59 0 5256            DC      /5256                           32F12860
0A5A 0 8421            DC      /8421                           32F12870
0A5B 0 FFFF            DC      /FFFF                           32F12880
                       *                                       32F12890
0A5C 0 6236      ARD   DC      /6236     READ                  32F12900
0A5D 0 3E32            DC      /3E32                           32F12910
0A5E 0 FFFF            DC      /FFFF                           32F12920
                       *                                       32F12930
0A5F 0 56B2      APCH  DC      /56B2     PUNCH                 32F12940
```



```
0A60 0 761E            DC      /761E                           32F12950
0A61 0 2600            DC      /2600                           32F12960
0A62 0 FFFF            DC      /FFFF                           32F12970
0A63 0 1236      AFD   DC      /1236     FEED                  32F12980
0A64 0 3632            DC      /3632                           32F12990
0A65 0 FFFF            DC      /FFFF                           32F13000
                       *                                       32F13010
0A66 0 7662      ANRDY DC      /7662     NRDY - PRESS 1442 START 32F13020
0A67 0 32A6            DC      /32A6                           32F13030
0A68 0 2184            DC      /2184                           32F13040
0A69 0 5662            DC      /5662                           32F13050
0A6A 0 369A            DC      /369A                           32F13060
0A6B 0 9A21            DC      /9A21                           32F13070
0A6C 0 FCF0            DC      /FCF0                           32F13080
0A6D 0 F0D8            DC      /F0D8                           32F13090
0A6E 0 219A            DC      /219A                           32F13100
0A6F 0 9E3E            DC      /9E3E                           32F13110
0A70 0 629E            DC      /629E                           32F13120
0A71 0 FFFF            DC      /FFFF                           32F13130
                       *                                       32F13140
0A72 0 5E32      ALDBK DC      /5E32     LOAD BLANKS           32F13150
0A73 0 2100            DC      /2100                           32F13160
0A74 0 1A5E            DC      /1A5E                           32F13170
0A75 0 3E76            DC      /3E76                           32F13180
0A76 0 5A9A            DC      /5A9A                           32F13190
0A77 0 FFFF            DC      /FFFF                           32F13200
                       *                                       32F13210
0A78 0 5E3E      ALCD  DC      /5E3E     LAST CARD             32F13220
0A79 0 9A9E            DC      /9A9E                           32F13230
0A7A 0 211E            DC      /211E                           32F13240
0A7B 0 3E62            DC      /3E62                           32F13250
0A7C 0 3200            DC      /3200                           32F13260
0A7D 0 FFFF            DC      /FFFF                           32F13270
                       *                                       32F13280
0A7E 0 923E      ATL   DC      /923E     WAS MAX -COL INTRPT SLOW 32F13290
0A7F 0 9A21            DC      /9A21                           32F13300
0A80 0 2121            DC      /2121                           32F13310
0A81 0 723E            DC      /723E                           32F13320
0A82 0 9621            DC      /9621                           32F13330
0A83 0 2121            DC      /2121                           32F13340
0A84 0 1E52            DC      /1E52                           32F13350
0A85 0 5E21            DC      /5E21                           32F13360
0A86 0 2184            DC      /2184                           32F13370
0A87 0 2276            DC      /2276                           32F13380
0A88 0 9E62            DC      /9E62                           32F13390
0A89 0 569E            DC      /569E                           32F13400
0A8A 0 219A            DC      /219A                           32F13410
0A8B 0 5E52            DC      /5E52                           32F13420
0A8C 0 9200            DC      /9200                           32F13430
0A8D 0 FFFF            DC      /FFFF                           32F13440
                       *                                       32F13450
0A8E 0 923E      ATS   DC      /923E     WAS MIN -COL INTRPT FAST 32F13460
0A8F 0 9A21            DC      /9A21                           32F13470
0A90 0 2121            DC      /2121                           32F13480
0A91 0 7222            DC      /7222                           32F13490
0A92 0 7621            DC      /7621                           32F13500
0A93 0 2121            DC      /2121                           32F13510
0A94 0 1E52            DC      /1E52                           32F13520
0A95 0 5E21            DC      /5E21                           32F13530
0A96 0 2184            DC      /2184                           32F13540
0A97 0 2276            DC      /2276                           32F13550
0A98 0 9E62            DC      /9E62                           32F13560
0A99 0 569E            DC      /569E                           32F13570
0A9A 0 2112            DC      /2112                           32F13580
0A9B 0 3E9A            DC      /3E9A                           32F13590
0A9C 0 9E00            DC      /9E00                           32F13600
0A9D 0 FFFF            DC      /FFFF                           32F13610
                       *                                       32F13620
```

```
0A9E 0 3E00          ACOLT DC      /3E00      AVG COL INTRPT TIME      32F13630
0A9F 0 B616                DC      /B616                               32F13640
0AA0 0 211E                DC      /211E                               32F13650
0AA1 0 525E                DC      /525E                               32F13660
0AA2 0 2122                DC      /2122                               32F13670
0AA3 0 769E                DC      /769E                               32F13680
0AA4 0 6256                DC      /6256                               32F13690
0AA5 0 9E21                DC      /9E21                               32F13700
0AA6 0 9E22                DC      /9E22                               32F13710
0AA7 0 7236                DC      /7236                               32F13720
0AA8 0 FFFF                DC      /FFFF                               32F13730
                     *                                                 32F13740
0AA9 0 3676          AMOD  DC      /3676      ENTER MOD NUMBER         32F13750
0AAA 0 9E36                DC      /9E36                               32F13760
0AAB 0 6221                DC      /6221                               32F13770
0AAC 0 7252                DC      /7252                               32F13780
0AAD 0 3221                DC      /3221                               32F13790
0AAE 0 76B2                DC      /76B2                               32F13800
0AAF 0 721A                DC      /721A                               32F13810
0AB0 0 3662                DC      /3662                               32F13820
0AB1 0 FFFF                DC      /FFFF                               32F13830
                     *                                                 32F13840
0AB2 0 5E32          ALPC  DC      /5E32      LD PCHED CARDS           32F13850
0AB3 0 2156                DC      /2156                               32F13860
0AB4 0 1E26                DC      /1E26                               32F13870
0AB5 0 3632                DC      /3632                               32F13880
0AB6 0 211E                DC      /211E                               32F13890
0AB7 0 3E62                DC      /3E62                               32F13900
0AB8 0 329A                DC      /329A                               32F13910
0AB9 0 FFFF                DC      /FFFF                               32F13920
                     *                                                 32F13930
0ABA 0 56B2          APDLY DC      /56B2      PUNCH DELAY - X          32F13940
0ABB 0 761E                DC      /761E                               32F13950
0ABC 0 2621                DC      /2621                               32F13960
0ABD 0 3236                DC      /3236                               32F13970
0ABE 0 5E3E                DC      /5E3E                               32F13980
0ABF 0 A621                DC      /A621                               32F13990
0AC0 0 8421                DC      /8421                               32F14000
0AC1 0 0000          ADFCT DC      *-*        DELAY FACTOR             32F14010
0AC2 0 FFFF                DC      /FFFF                               32F14020
0AC3 0 C400                DC      /C400       0                       32F14030
0AC4 0 FC00                DC      /FC00       1                       32F14040
0AC5 0 D800                DC      /D800       2                       32F14050
0AC6 0 DC00                DC      /DC00       3                       32F14060
0AC7 0 F000                DC      /F000       4                       32F14070
0AC8 0 F400                DC      /F400       5                       32F14080
0AC9 0 D000                DC      /D000       6                       32F14090
0ACA 0 D400                DC      /D400       7                       32F14100
0ACB 0 E400                DC      /E400       8                       32F14110
0ACC 0 E000                DC      /E000       9                       32F14120
0ACD 0 FCC4                DC      /FCC4      10                       32F14130
0ACE 0 FCFC                DC      /FCFC      11                       32F14140
0ACF 0 FCD8                DC      /FCD8      12                       32F14150
0AD0 0 FCDC                DC      /FCDC      13                       32F14160
0AD1 0 FCF0                DC      /FCF0      14                       32F14170
0AD2 0 FCF4                DC      /FCF4      15                       32F14180
                     *                                                 32F14190
                     *                                                 32F14200
                     ********************************************      32F14210
                     *              PUNCH DATA TABLE                   32F14220
                     ********************************************      32F14230
                     *                                                 32F14240
0AD3 0 8010          PDATA DC      /8010      COLUMN 1                 32F14250
0AD4 0 4020                DC      /4020                               32F14260
0AD5 0 2040                DC      /2040                               32F14270
0AD6 0 1080                DC      /1080                               32F14280
0AD7 0 0900                DC      /0900                               32F14290
0AD8 0 0600                DC      /0600                               32F14300
```



```
0AD9 0 0600          DC      /0600                               32F14310
0ADA 0 0900          DC      /0900                               32F14320
0ADB 0 1080          DC      /1080                               32F14330
0ADC 0 2040          DC      /2040                               32F14340
0ADD 0 4020          DC      /4020                               32F14350
0ADE 0 8010          DC      /8010                               32F14360
0ADF 0 FFF0          DC      /FFF0                               32F14370
0AE0 0 8880          DC      /8880                               32F14380
0AE1 0 CCC0          DC      /CCC0                               32F14390
0AE2 0 EEE0          DC      /EEE0                               32F14400
0AE3 0 FFF0          DC      /FFF0                               32F14410
0AE4 0 7770          DC      /7770                               32F14420
0AE5 0 3330          DC      /3330                               32F14430
0AE6 0 1110          DC      /1110                               32F14440
0AE7 0 FFF0          DC      /FFF0      COL 21                   32F14450
0AE8 0 A000          DC      /A000                               32F14460
0AE9 0 9000          DC      /9000      ALPHA RIPPLE             32F14470
0AEA 0 8800          DC      /8800                               32F14480
0AEB 0 8400          DC      /8400                               32F14490
0AEC 0 8200          DC      /8200      COL 26                   32F14500
0AED 0 8100          DC      /8100                               32F14510
0AEE 0 8080          DC      /8080                               32F14520
0AEF 0 8040          DC      /8040                               32F14530
0AF0 0 8020          DC      /8020                               32F14540
0AF1 0 8010          DC      /8010                               32F14550
0AF2 0 5000          DC      /5000                               32F14560
0AF3 0 4800          DC      /4800                               32F14570
0AF4 0 4400          DC      /4400                               32F14580
0AF5 0 4200          DC      /4200                               32F14590
0AF6 0 4100          DC      /4100                               32F14600
0AF7 0 4080          DC      /4080                               32F14610
0AF8 0 4040          DC      /4040                               32F14620
0AF9 0 4020          DC      /4020                               32F14630
0AFA 0 4010          DC      /4010      COL 40 WAREA&39          32F14640
0AFB 0 3000          DC      /3000                               32F14650
0AFC 0 2800          DC      /2800                               32F14660
0AFD 0 2400          DC      /2400                               32F14670
0AFE 0 2200          DC      /2200                               32F14680
0AFF 0 2100          DC      /2100                               32F14690
0B00 0 2080          DC      /2080                               32F14700
0B01 0 2040          DC      /2040                               32F14710
0B02 0 2020          DC      /2020                               32F14720
0B03 0 2010          DC      /2010                               32F14730
0B04 0 0000          DC      /0000                               32F14740
0B05 0 FC00          DC      /FC00                               32F14750
0B06 0 03F0          DC      /03F0                               32F14760
0B07 0 FC00          DC      /FC00                               32F14770
0B08 0 03F0          DC      /03F0                               32F14780
0B09 0 0000          DC      /0000                               32F14790
0B0A 0 8880          DC      /8880                               32F14800
0B0B 0 4440          DC      /4440                               32F14810
0B0C 0 2220          DC      /2220                               32F14820
0B0D 0 1110          DC      /1110                               32F14830
0B0E 0 0000          DC      /0000                               32F14840
0B0F 0 8880          DC      /8880                               32F14850
0B10 0 CCC0          DC      /CCC0                               32F14860
0B11 0 AAA0          DC      /AAA0                               32F14870
0B12 0 9990          DC      /9990                               32F14880
0B13 0 4440          DC      /4440                               32F14890
0B14 0 6660          DC      /6660                               32F14900
0B15 0 5550          DC      /5550                               32F14910
0B16 0 2220          DC      /2220                               32F14920
0B17 0 3330          DC      /3330                               32F14930
0B18 0 1110          DC      /1110                               32F14940
0B19 0 0000          DC      /0000                               32F14950
0B1A 0 0000          DC      /0000                               32F14960
0B1B 0 FFF0          DC      /FFF0                               32F14970
0B1C 0 FFF0          DC      /FFF0                               32F14980
```

```
0B1D 0 FFF0              DC      /FFF0                                  32F14990
0B1E 0 FFF0              DC      /FFF0                                  32F15000
0B1F 0 FFF0              DC      /FFF0                                  32F15010
0B20 0 FFF0              DC      /FFF0                                  32F15020
0B21 0 FFF0              DC      /FFF0                                  32F15030
0B22 0 0000              DC      /0000       COLUMN 80                  32F15040
0B23   0051              BSS     81                                     32F15050
                         *                                              32F15060
                         ******************************************     32F15070
                         *              STORAGE BUFFERS           *     32F15080
                         ******************************************     32F15090
                         *                                              32F15100
0B74   0053              RTBL    BSS     83          READ BUFFER        32F15110
                         *                                              32F15120
0BC7   0052              TIME    BSS     82          INTERRUPT TIME BUFFER 32F15130
0C19 0 FFFF                      DC      /FFFF                          32F15140
0C1A   05E8                      END     BGIN                           32F15150
 NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```


C R O S S R E F E R E N C E

NAME	VALUE	REFERENCES
ABDSW	0A24	08D3
ACCNT	0A45	08DD
ACNBK	0A04	08CE
ACOLT	0A9E	07CC
ADATA	0A4C	08DF
ADFCT	0AC1	06B3,06B5
ADSW	0A18	08D4
ADSW4	0A2C	08D7
ADWAS	0A11	08DC
AECK	0A40	08DB
AFD	0A63	09D6
ALCD	0A78	09DC
ALDBK	0A72	0687,0722,0741
ALOP	0A56	0902
ALPC	0AB2	06EB
AMOD	0AA9	05FF
ANINT	0A34	08D5
ANRDY	0A66	09D1
APCH	0A5F	0770
APCK	0A3A	08D9
APDLY	0ABA	06BE
ARD	0A5C	0787
ASDSW	0A1B	08D1
ATL	0A7E	08E0
ATS	0A8E	08E2
AVG	081D	07E6,07F6
AVGCT	081A	068E,06F2,07B4,07B8,07C8,07D4
AWAS	0A0C	08D0,08D2,08D6,08D8,08DA,08DE
BCNT	09D5	09C3,09CD
BDSW	08E8	084A,0923,0930,0931,094A,094B
BEGIN	0160	05E8
BGIN	05E8	0C1A
BOX	09C2	09D4
BOX1	09C4	09CF
BOX2	09CA	09C4
CKBLK	07D7	06AA,0748,07E3,0836
CKB01	07DD	07E2
CNTRL	0654	05F9,0637,0648,064A,06E8,073E,075D,0944,09E7,09EF
CN10	0658	
CN20	0662	0656
CN30	0669	065B
COL	0918	06FF,070A,079B,079D
COLCT	090C	070C,0753,079F,07DB,07EF,0808,091C,091E,0953,0954,098B
COLPC	0960	0766,09AD,09AE
COLRD	095E	0871,0873,099D
COMPR	0796	06CB,0710,0797,07C2,07C4
COMP1	079A	07B6,07BA
COMP2	07AF	08CB
COMP3	07BB	07A1
CTAVG	0A01	07C9
DATA	090E	0703,088C,088E
DINCR	06E5	062A,06B7
DLPCH	09A8	0625,09A6,09AB
DSW	090A	084C,0861,0877,0935,09BB
DSW4	08EA	085B,085D,085F,094E,0957,0995
EMSG	0905	08ED,08EE,08EF,08FC
END	0164	0667
ENDPD	06E3	06D4,0717
ERLCK	0166	0825
ERROR	0162	08F6,08FA
ERR0	082C	07DF
ERR1	0838	0847,09C0
ERR1A	0844	083B
ERR10	08A3	07A7
ERR11	08B0	07AD
ERR2	0849	0854,0932,094C

```
ERR3    0936
ERR5    0856   086B,0951
ERR5R   086B   087E,0883
ERR5S   08E5   0839,0845,0857
ERR6    086D   0864
ERR7    087F   086F,0875
ERR8    0884   0889,0955
ERR9    088B   0707,08A1
ERR9A   089C   0896
ERX     08BD   08AC,08AF,08B9,08BC
ERX1    08C1   08BF
ERX2    08C5   08C0
ETYPE   08EC   0832,0842,0852,0869,087C,0881,0888,089C,08C5,08FF,0939
ETYP1   08FA   08F5
ETYP2   08FF   08F8
EXR1    08C7   08A4,08B1
EXR3    08C9   08A5,08B2
FEED    0969   09DA
FIVE    0685   0633
GRAPH   07E5   0736,074C,0816
GRPH1   07F6   0807
HUND    081F   07F3
IL0     017A   05F1
IL1     018A
IL2     019A
IL3     01AA
IL4     01BA   05F5
INTR    096E   05EF,0991
INTR1   0979   09B3
INTR2   0993   05F3,099B
INTR3   09B0   09A2
KC800   096D   09B2
KEFFE   096C   0950
K0008   0821   076B,080C
K0800   096A   094F
K8000   0820   0800,0812
LOCK    0822   06CF,0828
LOG     0163   09F5
LOGBY   0167
LOOP    08FD   06C5,0732,077A,07D8,082A
LRTN    067B   0675
LSTCD   09D6   0959
M       08E4   06FA,0894,0897,08BD,08C6,091B
MAXPD   0A00   06BB
MLSCF   05E5   0608,066F,0926,0929,093C,0999,09C6
MOD     0630   0618
MODNM   0682   05F7,060B,0630
MOD6    0638   0634
MOD7    0649   063A
MSG0    08CE   082E
MSG1    08D0   083E
MSG10   08E0   08A7
MSG11   08E2   08B4
MSG2    08D2   0850
MSG3    08D4   0938
MSG5    08D6   0867
MSG6    08D8   087B
MSG7    08DA   0880
MSG8    08DC   0887
MSG9    08DE   089B
NRDY    09D0
NRTN    067A   0676
ONE     0684   0638,0649
OP      0903   0772,0789,09D8
OPMSW   08F9   0830,0840,08F3,08FE,091D
PAVG    0A02   0643,0734
PCCOL   09A3   0984
PCH     09AD   0978,09A7
```



```
PCMAX   0912   063D,06CD
PCMIN   0913   06CE
PDATA   0AD3   0694,0698,069A,069E,06E3,06F4,0757
PDBAS   06E6   062E,068A
PDLAY   06E1   0691,06A6,06AC,06B0,06B8,06DD,0727,0746,09A3
PDMAX   06E4   0621,0690
PDWAS   06E2   0692,06AD,06B2
PID     05DC   05EA
PONLY   0683   05ED,0636,06A7,06E7,073C
PTERM   0764   0769,077C,0780
PUNCH   0765   06C9,0730,073A,0750,0782
P6AVG   0680   0642
P6TM    067C   063C
RAD     05DE   066D
RAVG    0A03   0646,074A
RDATA   0962   095E,099E
RDCOL   099D   0975,0987
RDMAX   0914   0640,0712
RDMIN   0915   0713
READ    0784   06F7,0752,0793,0795,07DA
READY   09B8   076E,0785,09BD,09CB
RID     05DD   05EC,0658,0660,0662,0664,0669,0942,09E4
RIDCK   0675   065A
RPSW    08E6   0774,078C,086D,08AA,08B7
RQKB    01BC
RQTY    01BB
RTBL    0B74   0705,072A,072E,0755,07DD,099F
RTNOM   0676   0666
RTNSW   0165   0671
RTRN    0949   0997
RTTBL   0677   066B,0675,0676
RX1     089D   0890
R6AVG   0681   0645
R6TM    067E   063F
SCALE   081E   07F5,07FA
SENSE   0964   0922,0934,0974,0982,09B1,09BA,09CA
SENTY   0652   0610,0650
SMSG    09FB   06C1,07CE,09F3,09F4,09F7,09F8
SNCOL   0963   09B0
SNCOM   096B   0994
SP      060B   05FC
SPD1    0972   061A
SPD2    097C   061E
SPD3    09B5   0627
SP1     0610   0613
STACK   08E7   0834,089F
START   0161   0609,0673,092B,0940,0946
STOP    0966
STPCH   0762   0777
STRD    0760   078F
STRT    05EB   05E3,05E4,0604,064E
STRT1   0603   0606
SVKB    01BD
SVXR1   098D   096F,09B7
SVXR2   098F   0970
SW0     05DF   06D7,071A,07BB,0823,09E9
SW1     05E0   0655,065E,075B,093E
SW2     05E1   05FB,0603,060E,064D,06A1,09E0
SW3     05E2   07E9,09E2
TAVG    0818   068C,06F0,07B2,07B3,07B9,07C7,07D3
TEMP    081B   07E8,07EE,07F2,07FB,07FC,080F
TERM    0968   0966
TIME    0BC7   0738,074E,07A5,07AB,07AF,07F7,0804,080A,080D,0814,08F0,097A,097E
               0980
TIMER   09B1   09B6
TIMWS   0911   08F2
TST01   0686   0677
TST02   06E7   0678
```