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1. PURPOSE

THE DIAGNOSTIC MONITOR IS A CONTROL PROGRAM DESIGNED TO PROVIDE OVERLAP CAPABILITY AND TO HANDLE MANY PROGRAM FUNCTIONS WHICH ARE COMMON TO ALL OF THE TEST PROGRAMS.

2. PREREQUISITES

2.1 PROGRAM PREREQUISITES

1. THIS PROGRAM MUST BE LOADED BY ONE OF THE DIAGNOSTIC LOADERS.
   A. 03AA - 1442 RELOCATING LOADER
   B. 03AC - 1134 RELOCATING LOADER
   C. 03AB - 2501 RELOCATING LOADER
2. ALL PROGRAMS TO RUN UNDER CONTROL OF THIS MONITOR MUST BE IN DIAGNOSTIC MONITOR II FORMAT.

2.2 EQUIPMENT PREREQUISITES

1130 WITH INPUT FROM CARDS OR PAPER TAPE.

3. OPERATING PROCEDURE

3.1*** PROGRAM LOADING

3.1.1 FROM CARDS

PLACE THE MONITOR AND THE PROGRAMS TO BE LOADED UNDER MONITOR CONTROL IN THE READER. THE MONITOR MUST BE PRECEEDED BY A RELOCATING LOADER. PLACE THE READER IN READY CONDITION. PRESS THE 1131 RESET THEN PROGRAM LOAD. THE CARDS WILL LOAD UNTIL A BLANK CARD IS ENCOUNTERED. OR THE READER GOES NOT READY.

IF A BLANK CARD IS PLACED AFTER EACH TEST PROGRAM DECK, EACH PROGRAM WILL LOAD, EXECUTE, THEN CALL IN THE NEXT PROGRAM UNTIL THE READER BECOMES NOT READY. IF TEST DECKS ARE NOT SEPARATED BY A BLANK CARD, ALL PROGRAMS PLACED IN THE READER WILL BE LOADED AND RUN IN OVERLAP. A MAXIMUM OF FIFTEEN (15) PROGRAMS CAN BE LOADED AND RUN IN OVERLAP.

NOTE - IF THE LAST CARD IN THE READ HOPPER IS NOT A BLANK CARD, THE READER WILL GO NOT READY BEFORE THE LAST PROGRAM CARD IS READ AND THE LOADER WILL STOP AT WAIT 30F8. TO CONTINUE, PRESS THE READER START AND THE 1131 START.

3.1.2 FROM PAPER TAPE

PLACE THE MONITOR TAPE ON THE 1134 PAPER TAPE READER (THE 1134 RELOCATING LOADER, 03AC, IS INCLUDED AS THE FIRST RECORD ON THE MONITOR TAPE). MAKE THE READER READY. PRESS THE 1131 RESET THEN PROGRAM LOAD. THE MONITOR WILL LOAD, THEN STOP TO ALLOW LOADING OF THE FIRST TEST PROGRAM TAPE.

WHEN THE NEXT TAPE IS READY TO LOAD, SET BIT SWITCHES 0 AND 8 ON IF LOADING A SINGLE PROGRAM, OR SWITCHES 0, 8, 9 AND 15 ON IF LOADING OVERLAP, THEN PRESS THE INTERRUPT REQUEST KEY. THIS WILL CAUSE THE NEXT TAPE TO LOAD. THE ABOVE PROCESS MUST BE REPEATED FOR EVERY TAPE TO BE LOADED IN OVERLAP. A MAXIMUM OF FIFTEEN (15) PROGRAMS CAN BE LOADED IN OVERLAP.

3.1.3 LOAD AND GO - LOADING IS NORMALLY LOAD AND GO WHETHER LOADING ONE PROGRAM OR SEVERAL PROGRAMS IN OVERLAP.

3.1.4 PAUSE BEFORE EXECUTE-TO PAUSE BEFORE EXECUTING THE PROGRAM(S) LOADED, TURN BIT SWITCH 15 ON BEFORE LOADING THE PROGRAM. THIS WILL TURN ON THE HALT SWITCH FOR EACH PROGRAM LOADED. TO START ALL PROGRAMS SET SWITCHES 0-7 AND 15 OFF, SWITCH 8 ON, SWITCHES 9-14 FOR DESIRED CON-

TROL THEN PRESS THE INTERRUPT REQUEST KEY ON THE 1131 CONSOLE. TO START ANY SINGLE PROGRAM FOLLOW ABOVE PROCEDURE WITH SWITCHES 4-7 SET TO THE LOAD SEQUENCE NUMBER OF THE PROGRAM TO BE STARTED (SEE SECTION 3.2.3 FOR EXPLANATION OF LOAD SEQUENCE NUMBER).

NOTE - THIS START PROCEDURE IS IDENTICAL WITH RESTART AS OUTLINED IN SECTION 3.5.

3.1.5 TO LOAD AFTER INITIAL LOAD - ONCE THE MONITOR PROGRAM HAS BEEN LOADED IT IS POSSIBLE TO REQUEST AT ANY TIME THE LOADING OF ANOTHER PROGRAM OR PROGRAMS. ADDITIONAL PROGRAMS CAN BE LOADED EITHER TO RUN INDIVIDUALLY OR IN OVERLAP WITH THE PROGRAM(S) PREVIOUSLY LOADED AND/OR IN OVERLAP WITH THEMSELVES. IF A SINGLE PROGRAM IS TO BE LOADED AND RUN ALONE, IT WILL TAKE THE PLACE IN CORE OF THE PROGRAM(S) PREVIOUSLY LOADED. THIS WILL BE TRUE EVEN WHEN THE PREVIOUS PROGRAMS WERE LOADED IN OVERLAP. IF ADDITIONAL PROGRAMS ARE LOADED IN OVERLAP, THEY CAN EITHER TAKE THE PLACE OF PROGRAMS PREVIOUSLY LOADED OR THEY CAN BE LOADED TO OVERLAP WITH THE PREVIOUSLY LOADED PROGRAMS.

1. THE LOAD REQUEST IS A FUNCTION 2 SWITCH ENTRY TO THE MONITOR. THIS MEANS THAT SWITCH 0 MUST BE ON AND SWITCHES 1-7 OFF TO GIVE A LOAD REQUEST. SWITCH 8 IS THE LOAD SWITCH. SWITCH 9 IS THE CONTINUE LOAD OR OVERLAP SWITCH.

2. RELOAD - THE SWITCH SETTING FOR RELOAD IS 8080. THIS WILL CLEAR THE MONITOR OF CONTROLS FOR ALL PREVIOUSLY LOADED PROGRAMS AND LOAD THE FIRST PROGRAM IN THE READER INTO CORE LOCATION 05DC (1500 DECIMAL). IF THIS FIRST PROGRAM IS TERMINATED BY A BLANK CARD, THE LOADING WILL STOP AFTER THAT PROGRAM IS LOADED. IF THIS PROGRAM IS NOT TERMINATED BY A BLANK CARD THE NEXT PROGRAM IN THE READER WILL BE LOADED. IF THE FOLLOWING PROGRAMS ARE RELOCATABLE, THEY WILL BE RELOCATED STARTING WITH THE FIRST EVEN ADDRESS AFTER THE LAST ADDRESS USED BY THE PREVIOUSLY LOADED PROGRAM. FOR THE PURPOSE OF PROGRAM IDENTIFICATION FOR SWITCH ENTRIES, THE FIRST PROGRAM IN THIS RELOADED DECK NOW BECOMES PROGRAM NUMBER ONE (1), THE SECOND IS NUMBER TWO (2), ETC.

3. CONTINUE LOADING -
THE SWITCH SETTING TO CONTINUE LOADING IS 80C0. THIS WILL CAUSE THE NEXT PROGRAM TO BE LOADED STARTING AT THE FIRST CORE POSITION FOLLOWING THE LAST ADDRESS IN THE PREVIOUSLY LOADED PROGRAM. THUS THE NEWLY LOADED PROGRAMS CAN BE RUN IN OVERLAP WITH THE PREVIOUSLY LOADED PROGRAMS.

3.2*** PROGRAM OPERATION

3.2.1 ORGANIZATION OF CONSOLE ENTRY SWITCHES

ALL CONTROL IS EXERTED ON THE TEST PROGRAMS AND THE MONITOR BY ENTERIES IN THE 1131 CONSOLE ENTRY SWITCHES. TO PROVIDE FLEXIBILITY, THESE SWITCHES ARE DIVIDED INTO THREE GROUPS. SWITCHES 0 AND 1 ARE THE FUNCTION SWITCHES (F), SWITCHES 4-7 ARE THE PROGRAM IDENTIFICATION SWITCHES (P), AND SWITCHES 8-15 ARE THE DATA SWITCHES (D). SWITCHES 2-3 ARE NOT USED.

1. FUNCTION SWITCHES (F) ARE USED TO IDENTIFY THE FUNCTION OF THE DATA ENTERED IN SWITCHES 8-15. THE SETTING OF THESE SWITCHES DETERMINES INTO WHICH OF THE 4 SWITCH WORDS IN THE PROGRAM CONTROL TABLE THE SETTING OF THE DATA SWITCHES WILL BE STORED. OF THE FOUR FUNCTIONS AVAILABLE, THE USE OF 2 HAS BEEN STANDARDIZED.

   A. FUNCTION 00 IS USED TO SPECIFY THE PROGRAM CONTROL OPTIONS PROVIDED BY THE MONITOR. THESE ARE DISCUSSED IN DETAIL IN SECTION 3.2.4.

   B. FUNCTION 01 IS USED BY EACH TEST PROGRAM TO SELECT A SPECIFIC ROUTINE. THIS IS DISCUSSED IN SECTION 3.2.5.

2. THE PROGRAM IDENTIFICATION SWITCHES (P) ARE USED TO IDENTIFY THE SPECIFIC PROGRAM FOR WHICH THE INFORMATION IN THE DATA SWITCHES (D) IS TO BE APPLICABLE. THE NUMBER TO BE USED TO IDENTIFY ANY PROGRAM IS DEPENDENT ON THE ORDER IN WHICH THAT PROGRAM WAS LOADED, THE FIRST PROGRAM LOADED IS PROGRAM ONE(1), THE FIFTH PROGRAM LOADED IS PROGRAM FIVE (5), ETC. SWITCHES 4-7 ARE SET TO THE BINARY EQUIVALENT OF THIS PROGRAM NUMBER. THUS, TO ENTER DATA TO PROGRAM 1, SWITCHES 4,5 AND 6 MUST BE TURNED OFF AND SWITCH 7 TURNED ON.

3. THE DATA SWITCHES (D) ARE USED TO ENTER SPECIFIC DATA INTO THE PROGRAM IDENTIFIED BY THE PROGRAM SWITCHES (P). THIS DATA IS STORED IN ONE OF THE 4 SWITCH WORDS IN THE PROGRAM CONTROL TABLE OF THE PROGRAM IDENTIFIED IN THE P SWITCHES. THE SPECIFIC WORD INTO WHICH THE DATA IS STORED IS DETERMINED BY THE SETTING OF THE FUNCTION SWITCHES (F).

4. TO ENTER A SWITCH SETTING, PRESS THE INTERRUPT REQUEST KEY ON THE 1131 CONSOLE. THE RESULTING LEVEL FOUR INTERRUPT WILL BE SERVICED BY THE MONITOR READ BIT SWITCH ROUTINE. THE SWITCHES WILL BE READ AND STORED BY THE INTERRUPT ROUTINE.

3.2.2 SINGLE PROGRAM OPERATION

1. LOADING - IF MORE THAN ONE TEST PROGRAM IS PLACED IN THE READER, EACH PROGRAM MUST BE FOLLOWED BY A BLANK CARD.

2. COMMUNICATION TO PROGRAM - SET SWITCHES 4-6 OFF AND 7 ON FOR ALL COMMUNICATION WITH THE PROGRAM. NO COMMUNICATION TO THE MONITOR IS REQUIRED.

3.2.3 OVERLAP OPERATION

1. LOADING - ALL PROGRAMS TO BE RUN IN OVERLAP MUST BE PLACED IN THE READER WITH NO BLANK CARDS BETWEEN THE PROGRAM. ALL PROGRAMS WILL BE LOADED INTO CORE STORAGE. A MAXIMUM OF 15 PROGRAMS MAY BE RUN IN OVERLAP.

2. HALT AFTER LOADING - IF THE HALT SWITCH (SWITCH 15) IS ON DURING LOADING OF A PROGRAM, THE HALT SWITCH IN THAT PROGRAM WILL BE SET. THUS AFTER THE PROGRAMS ARE LOADED, THEY MAY BE INDIVIDUALLY STARTED OR ALL STARTED TOGETHER BY FOLLOWING THE RESTART PROCEDURES OUTLINED IN SECTION 3.5.

3. COMMUNICATION TO PROGRAMS - TO COMMUNICATE TO AN INDIVIDUAL PROGRAM, ITS LOAD SEQUENCE NUMBER (PRINTED AS PART OF THE LOAD MESSAGE) MUST BE ENTERED IN SWITCHES 4-7. IF A CONTROL IS TO BE APPLICABLE TO ALL PROGRAMS, SWITCHES 4-7 MUST BE OFF.

4. EXAMPLE OF COMMUNICATION - IF THE DISC, CONSOLE KEYBOARD, AND 1132 FUNCTION TESTS ARE TO BE RUN IN OVERLAP AND THEY ARE LOADED IN THE ABOVE ORDER, THEIR LOAD SEQUENCE NUMBERS WOULD BE AS FOLLOWS.

TEST	NUMBER
DISC FT	1
CONS/KEYBOARD	2
1132 FT	3

IF SWITCH 15 WAS ON DURING LOADING OF ALL PROGRAMS, NO PROGRAMS WILL START UNTIL A RESTART COMMAND IS GIVEN.

ASSUME THE FOLLOWING CONTROL IS DESIRED, THE SWITCHES MUST BE SET AS SHOWN AND THE INTERRUPT REQUEST KEY PRESSED AFTER EACH SWITCH ENTRY.

CONTROL SWITCHES

SELECT ROUTINE 5 IN THE 1132 FT	4305
SET LOOP PROGRAM ON CONSOLE/KEYBOARD FT	0210
BYPASS ERROR MESSAGE PRINTOUT IN THE 1132 FT	0304
SET DISC FT TO PRINT ROUTINE START MESSAGE AND TO HALT ON ANY ERROR	0142
START ALL PROGRAMS AND SET TO LOOP ALL PROGRAMS	0090

3.2.4 PROGRAM CONTROL _ FUNCTION 0

ALL FUNCTION 00 SWITCH ENTRIES REGARDLESS OF THE PROGRAM TO WHICH THEY REFER ARE SERVICED BY THE MONITOR. THUS, WITH THE EXCEPTION OF LOOP ON ERROR AND LOCK ON FUNCTION, WHICH ARE DEPENDENT ON SUPPORT ROUTINES IN THE INDIVIDUAL PROGRAMS, THE CONTROLS DISCUSSED HERE APPLY TO ALL MONITOR CONTROLLED PROGRAMS.

1. THE MONITOR PROVIDES THE FOLLOWING CONTROLS

   A. HALT - HALT THE PROGRAM AT THE COMPLETION OF THE PRESENT OPERATION. WHEN THE HALT SWITCH IS TURNED OFF, THE PROGRAM WILL CONTINUE FROM THE POINT AT WHICH IT WAS STOPPED.

   B. RESTART - REINITIALIZE THE PROGRAM AND RESTART. IF A ROUTINE BEEN PREVIOUSLY SELECTED, THE PROGRAM WILL BE RESTARTED AT THE BEGINNING OF THIS ROUTINE. IF NO ROUTINE IS SELECTED, THE PROGRAM WILL RESTART WITH ROUTINE ONE. THE PROGRAM HALT SWITCH IS NOT TURNED OFF BY A RESTART TO ALL RPOGRAMS. THUS A HALTED PROGRAM WILL NOT RESTART UNTIL ITS HALT SWITCH IS TURNED OFF.

   C. PRINT ROUTINE START MESSAGE - BEFORE ANY ROUTINE IS STARTED, A MESSAGE MAY BE PRINTED IDENTIFYING THAT ROUTINE AND ITS STARTING ADDRESS.

   D. LOCK ON FUNCTION - MANY OF THE PROGRAMS ARE WRITTEN TO INCORPORATE A LOCK ON FUNCTION IN MOST ROUTINES. IN THESE PROGRAMS, LOCK ON FUNCTION WILL INHIBIT THE DATA ADVANCE AND LOOP ON THE MAJOR ROUTINE FUNCTION. SEE THE DOCUMENTATION OF EACH PROGRAM TO SEE EXACTLY HOW THIS FUNCTION IS IMPLEMENTED IN THAT PROGRAM.

   E. LOOP PROGRAM - WHEN A PROGRAM GOES TO END THIS CONTROL WILL AUTOMATICALLY RESTART IT FROM ROUTINE 1.

   F. LOOP ON ERROR -THE TEST DETECTING THE ERROR WILL BE LOOPED SO LONG AS THE ERROR PERSISTS. TO LOOP INTERMITTENT ERRORS, USE THE LOCK ON FUNCTION.

   G. BYPASS ERROR PRINTOUT

   H. HALT ON ERROR - THE PROGRAM WILL STOP AT WAIT 2. SINCE THIS WAIT IS FOLLOWED BY A BRANCH BACK TO THE WAIT, INTERRUPTS WILL NOT CAUSE THE PROGRAM TO CONTINUE. TO RECOVER FROM THIS HALT, TURN TO DISPLAY MODE, PRESS START ONCE THEN RETURN TO RUN AND PRESS START.

2. ALL OF THESE CONTROLS ARE ACCOMPLISHED BY A FUNCTION ZERO SWITCH ENTRY TO EITHER A SPECIFIC PROGRAM OR TO THE MONITOR. IF THE ENTRY IS TO BE TO THE MONITOR (SWITCHES 4-7 ALL OFF), THE CONTROL WILL APPLY TO ALL PROGRAMS. IF THE ENTRY IS TO A SPECIFIC PROGRAM THE CONTROL WILL APPLY TO THAT PROGRAM ONLY.

   TO SPECIFY THE DESIRED CONTROL, SET THE SWITCHES AS FOLLOWS.

F F		P P P P	D D D	D D D D D
0 1	2 3 4 5 6 7	8 9 10	11 12 13 14 15
0 0	0 0 P P P P	X X X	X X X X X

8	RESTART
9	PRINT RTN ID
10	LOCK ON RTN
11	LOOP PROGRAM
12	LOOP ON ERROR
13	BYPASS ERROR PRINTOUT
14	HALT ON ERROR
15	HALT

WHERE - PPPP IS 0000 IF THE CONTROL IS TO ALL PROGRAMS OR IS EQUAL TO THE PROGRAM SEQUENCE NUMBER IF THE ENTRY IS TO A SPECIFIC PROGRAM.

THE PROGRAM SEQUENCE NUMBER IS DETERMINED BY THE ORDER IN WHICH PROGRAMS ARE LOADED - THE FIRST PRO- EQUIVALENT OF THIS SEQUENCE NUMBER IS USED IN GRAM IS NUMBER 1, THE SECOND NUMBER 2, ETC. THE BI- NARY EQUIVALENT OF THIS SEQUENCE NUMBER IS USED IN SWITCHES 4-7.

THUS THE SWITCH ENTRY

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WILL CAUSE THE FIFTH PROGRAM LOADED TO RESTART AND LOOP ON ANY DETECTED ERRORS. THIS ENTRY WILL ALSO TURN OFF THE LOCK ON ROUTINE, LOOP ON PROGRAM, BYPASS ERROR PRINTOUT, HALT ON ERROR, AND HALT CONTROLS SHOULD ANY OF THESE HAVE BEEN SET ON BY A PREVIOUS SWITCH ENTRY.

3. A CONTROL IS SET BY A SWITCH ENTRY HAVING THE SWITCH FOR THAT CONTROL ON. A CONTROL IS RESET BY A SWITCH ENTRY HAVING THE SWITCH FOR THAT CONTROL OFF. THUS, TO START AGAIN AFTER HAVING SET THE HALT SWITCH FOR A PROGRAM, A SWITCH ENTRY MUST BE MADE WITH SWITCH 15 OFF AND SWITCHES 0-7 SET AS THEY WERE WHEN THE HALT CONTROL WAS SET.

4. TO ENTER THE SWITCHES AFTER THEY HAVE BEEN SET, PRESS THE INTERRUPT REQUEST KEY ON THE 1131 CONSOLE. THE RESULTING LEVEL 4 INTERRUPT WILL BE SERVICED BY TH MONITOR READ BIT SWITCH ROUTINE. SINCE THE SWITCHES ARE READ IN INTERRUPT AND THE SETTINGS PLACED IN THE PROGRAM CONTROL TABLE IN INTERRUPT, THEY WILL GIVE IMMEDIATE CONTROL TO THE PROGRAM (SO LONG AS AN INTERRUPT IS NOT CONTINUALLY ON PREVENTING SERVICE OF THE CONSOLE INTERRUPT).

3.2.5 OPTION SELECTION - FUNCTIONS 1,2,3

FUNCTION SWITCH SETTINGS 01,10 AND 11 CAUSE THE DATA IN SWITCHES 8-15 TO BE STORED IN SW1, SW2, OR SW3 RESPECTIVELY IN THE PROGRAM CONTROL TABLE OF THE PROGRAM IDENTIFIED IN THE PROGRAM SWITCHES. THESE SWITCH ENTRIES ARE INTERROGATED BY EACH INDIVIDUAL TEST PROGRAM TO PROVIDE APPROPRIATE CONTROL FOR THAT PROGRAM.

1. ROUTINE SELECTION - FUNCTION 02 IS USED BY ALL PROGRAMS FOR ROUTINE SELECTION. IF THE STANDARD TEST CONTROL ROUTINES ARE USED BY THE PROGRAM, THE ROUTINE SELECTION WILL FUNCTION AS FOLLOWS.

   A. ANY ROUTINE IS SELECTED BY SETTING INTO SWITCHES 8-15 THE BINARY EQUIVALENT OF THE HEXIDECIMAL NUMBER OF THAT ROUTINE.

   B. ONCE A ROUTINE IS SELECTED, THE PROGRAM WILL LOOP IN THAT

ROUTINE UNTIL ANOTHER ROUTINE IS SELECTED.

C. TO RETURN TO RUNNING ALL ROUTINES, THE SWITCHES SHOULD BE SET AS IF SELECTING ROUTINE ZERO. THE ROUTINE RUNNING AT THE TIME THIS ENTRY IS MADE WILL CONTINUE TO ITS NORMAL TERMINATION, THEN THE NEXT ROUTINE IN THE NORMAL SEQUENCE WILL BE RUN.

NOTE - THE ROUTINE NUMBERING STARTS WITH ROUTINE 1.

D. IF AN INVALID ROUTINE NUMBER IS SET IN THE SWITCHES, THE CONTROL ROUTINE WILL RETURN TO RUNNING ALL ROUTINES, STARTING FROM THE FIRST ROUTINE.

E. WHEN A NEW ROUTINE IS SELECTED, THE PROGRAM WILL GO TO THAT NEW ROUTINE IMMEDIATELY AFTER IF HAS SERVICED ALL PENDING INTERRUPTS.

2. OTHER TEST OPTIONS - WHILE THE USE OF FUNCTIONS 10 AND 11 HAS NOT BEEN STANDARDIZED, THESE FUNCTIONS HAVE MOST FREQUENTLY BEEN USED BY THE TEST PROGRAMS TO SPECIFY A FUNCTION WHICH IS TO BE PERFORMED REPEATEDLY AND TO ENTER NEW TEST DATA OR TEST PATTERNS.

3.2.6 SPECIAL MONITOR CONTROL

THREE SPECIAL CONTROL FEATURES ARE PROVIDED BY THE DIAGNOSTIC MONITOR THESE ARE PROGRAM STOP, ADDRESS STOP, AND PROGRAM DELAY.

1. PROGRAM STOP - THE PROGRAM STOP BUSHBUTTON SHOULD ALWAYS BE USED IN FAVOR OF THE IMMEDIATE STOP WHENEVER IT IS DESIRED TO TEMPORARILY STOP THE OPERATION OF THE PROGRAM. PRESSING PROGRAM STOP WILL CAUSE A LEVEL FIVE (5) INTERRUPT, WHICH IS SERVICED BY THE MONITOR HALT ROUTINE. THE PROGRAM WILL STOP AT A WAIT IN THE HALT ROUTINE AFTER ALL INTERRUPTS HAVE BEEN SERVICED. OPERATION OF THE PROGRAM CAN BE RESUMED BY EITHER PRESSING PROGRAM START OR BY PRESSING RESET THEN PROGRAM START. THIS SECOND START PROCEDURE ALLOWS THE CE TO USE LOAD AND DISP MODES (SET BY CONSOLE MODE SWITCH) TO LOOK AT AND/OR MODIFY ANY POSITION IN CORE BEFORE CONTINUING THE OPERATION OF THE PROGRAM. ALL CPU STATUS EXCEPT INDEX REGISTERS IS SAVED BY THE HALT ROUTINE AND RESTORED WHEN EITHER OF THE ABOVE START PROCEDURES IS USED.

2. ADDRESS STOP - THIS FEATURE WILL STOP THE PROGRAM ON ANY MAINLINE INSTRUCTION ADDRESS BEFORE IT IS EXECUTED. TO STOP AT A SELECTED ADDRESS -

A. PRESS PROGRAM STOP

B. SET THE BIT SWITCHES TO THE DESIRED STOP ADDRESS

C. SET THE CONSOLE MODE SWITCH TO INT RUN.

D. PRESS PROGRAM START - DO NOT PRESS RESET BEFORE PROGRAM START. INTERRUPT LEVEL FIVE MUST BE ON WHEN STARTING IN INTERRUPT RUN MODE FROM THE MONITOR HALT ROUTINE.

THE PROGRAM WILL STOP IN THE MONITOR HALT ROUTINE BEFORE THE INSTRUCTION AT THE SPECIFIED ADDRESS IS EXECUTED. TO RESTORE THE MACHINE STATUS TO THE NORMAL CONDITIONS BEFORE EXECUTION OF THE INSTRUCTION, SET THE CONSOLE MODE SWITCH TO SI, THEN STEP THRU THE PROGRAM UNTIL THE INTERRUPT LEVEL 5 IS TURNED OFF. THE NEXT INSTRUCTION TO BE EXECUTED WILL BE THE INSTRUCTION AT THE SELECTED STOP ADDRESS.

THE NEXT STOP ADDRESS MUST BE SET IN THE BIT SWITCHES ANY TIME THE PROGRAM HALTS AT A SELECTED ADDRESS OR HALTS AFTER PRESSING PROGRAM STOP.

3. PROGRAM DELAY - THIS FEATURE WILL PROVIDE A DELAY BETWEEN EACH INSTRUCTION EXECUTED IN MAINLINE, EFFECTIVELY SLOWING DOWN THE TOTAL OPERATION OF THE CPU. THIS FEATURE CAN BE USED TO SLOW DOWN THE OPERATION OF ANY I/O DEVICE BY DELAYING BETWEEN THE XIO COMMANDS.

THE BASE DELAY IS APPROXIMATELY 125 USEC. THIS CAN BE INCREASED IN INCREMENTS OF 25 USEC.

TO SET PROGRAM DELAY

A. SET THE BIT SWITCHES TO 8020, THEN PRESS THE INTERRUPT REQUEST KEY THIS WILL DISABLE THE ADDRESS STOP FEATURE AND TRANSFER THE INTERRUPT RUN INTERRUPT TO THE PROGRAM DELAY ROUTINE.

B. PRESS PROGRAM STOP.

C. SET THE CONSOLE MODE SWITCH TO INT RUN.

D. SET THE BIT SWITCHES FOR THE DESIRED DELAY. MINIMUM DELAY IS ALL SWITCHES OFF. THE TOTAL DELAY WILL BE APPROXIMATELY 125+25 WHERE D IS EQUAL TO THE DECIMAL EQUIVALENT OF THE BINARY SETTING OF THE SWITCHES.

E. PRESS PROGRAM START - DO NOT PRESS RESET BEFORE PROGRAM START. INTERRUPT LEVEL 5 MUST BE ON WHEN STARTING IN INTERRUPT RUN MODE FROM THE MONITOR HALT ROUTINE.

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 THE 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

Press Start on load if in relocating loader

****

3.4*** PROGRAM TERMINATION

AT THE COMPLETION OF EACH PASS IN A TEST PROGRAM, THE PROGRAM WILL CALL ON THE MONITOR END ROUTINE. THIS ROUTINE WILL RESTART THE PROGRAM IF THE LOOP ON PROGRAM SWITCH IS ON. IF THE PROGRAM IS NOT TO BE LOOPED, A MESSAGE WILL PRINT IDENTIFYING THE PROGRAM AS TERMINATED. IF NOT RUNNING IN OVERLAP, THE MONITOR WILL BRANCH TO THE LOADER TO LOAD THE NEXT PROGRAM IN THE READER (UNLESS PROGRAM MUST BE EXECUTED).

IF A SWITCH ENTRY IS MADE REQUESTING LOADING OF A PROGRAM IN RELOAD MODE, THE PROGRAMS IN CORE WILL BE AUTOMATICALLY TERMINATED. IN THIS CASE NO END MESSAGE WILL BE PRINTED.

3.5*** PROGRAM RESTART

ANY PROGRAM MAY BE RESTARTED BY A FUNCTION 00 ENTRY TO THAT PROGRAM WITH SWITCH 8 ON. THIS CAN BE DONE AT ANY TIME WHEN THE PROGRAM IS RUNNING OR AFTER THE PROGRAM HAS TERMINATED.

A RESTART REQUEST TO THE MONITOR (SWITCHES 0-7 OFF AND SWITCH 8 ON) WILL RESTART ALL PROGRAMS WHICH ARE IN CORE. IF ANY PROGRAM HAS BEEN HALTED BY SETTING ITS HALT SWITCH, IT WILL REMAIN HALTED AFTER THIS RESTART (UNLESS FIRST START AFTER LOAD IN WHICH CASE ALL HALT SWITCHES ARE RESET).

IF THE MONITOR SHOULD HANG UP FOR ANY REASON (FOR EXAMPLE IF CONSOLE INTERRUPT FAILED TO RESET), IT CAN BE RESTARTED BY PRESSING IMMEDIATE STOP, RESET, AND PROGRAM START IN THAT ORDER.

3.6*** PROGRAM PATCHING

TO FACILITATE PROGRAM CORRECTION, MODIFICATION, AND EDITING, THE RELOCATING LOADER IS ABLE TO LOAD CARDS WHICH ARE KEYPUNCHED WITH HEX DATA. THESE CARDS ARE IDENTIFIED BY A 12 PUNCH IN COLUMN 1. COLUMNS 2-5 MUST CONTAIN, IN HEX, THE CORE ADDRESS INTO WHICH THE DATA ON THE CARD IS TO BE STORED. THE REMAINDER OF THE CARD IS USED FOR DATA, WHICH IS AGAIN IN HEX. EACH DATA WORD ON THE CARD MUST BE PRECEDED BY EITHER A BLANK OR AN R. THE BLANK WILL CAUSE THE LOADER TO INTERPRET THE DATA WORD AS AN INSTRUCTION OR CONSTANT. THE R WILL CAUSE THE LOADER TO INTERPRET THE DATA WORD AS AN ADDRESS WHICH MUST BE RELOCATED IF THE PROGRAM OF WHICH THIS PATCH IS A PART IS RELOCATED. IF NO DATA WORDS ARE INCLUDED ON THE CARD FOLLOWING THE THE ADDRESS, THE LOADER WILL INTERPRET THIS CARD AS A BRANCH CARD AND WILL BRANCH TO THE ADDRESS SPECIFIED IN COLUMNS 2-5. TWO BLANK COLUMNS IN A ROW WILL TERMINATE LOADING OF THE CARD. AFTER THESE TWO BLANKS, ANY IDENTIFYING INFORMATION MAY BE PLACED ON THE CARD. PATCH CARDS MUST BE PLACED JUST BEFORE THE END CARD IN THE PROGRAM TO BE PATCHED.

SOME EXAMPLES FOLLOW

A. +0645 C400R0857 D035

THIS WILL LOAD THREE WORDS STARTING AT ADDRESS 0645 PLUS THE RELOCATION FACTOR. THE FIRST WORD WILL BE C400, THE SECOND WORD WILL BE D035. IF THIS PATCH CARD IS PLACED IN THE PROGRAM DECK BEFORE THE END CARD OF THE FIRST PROGRAM LOAD, THE RELOCATION FACTOR WILL BE ZERO.

B. +0739 BR TO 0739

THIS CARD WILL CAUSE A BRANCH TO 0739 PLUS THE RELOCATION FACTOR. CARDS FOLLOWING THIS CARD WILL NOT BE LOADED UNLESS THE PROGRAM AT 0739 LOADS THEM OR RETURNS TO THE LOADER.

4. PRINTOUTS

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.

4.2*** ERROR MESSAGES

E0001 SWS INVLD
XXXX

THE SETTING OF SWITCHES 5-7 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 0OON 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 BOSC. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

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5. COMMENTS

5.1*** INTRODUCTION TO DIAGNOSTIC MONITOR OPERATION

5.1.1 WHAT IS THE DIAGNOSTIC MONITOR

THE DIAGNOSTIC MONITOR IS A CONTROL PROGRAM DESIGNED TO PROVIDE OVERLAP CAPABILITY AND TO HANDLE MANY PROGRAM FUNCTIONS WHICH ARE COMMON TO ALL OF THE TEST PROGRAMS.

THE MONITOR IS MADE UP OF THE FOLLOWING ROUTINES

1. RELOCATING LOADER INTERFACE
2. SUPERVISOR ROUTINE
3. INTERRUPT ROUTINE
4. BIT SWITCH ROUTINE
5. LOG ROUTINE
6. HALT ROUTINE
7. END ROUTINE

5.1.2 WHY IS A MONITOR NECESSARY TO ENABLE PROGRAMS TO RUN IN OVERLAP

THE MONITOR PROVIDES THE FOLLOWING FUNCTIONS WHICH ARE NECESSARY FOR OVERLAP OPERATION

1. RELOCATING LOADER - THIS LOADER ENABLES SEVERAL PROGRAMS WHICH ARE ASSEMBLED TO USE THE SAME CORE STORAGE LOCATIONS TO BE LOADED TOGETHER IN CORE. THIS IS ACCOMPLISHED BY LOADING THE FIRST PROGRAM IN THE CORE STORAGE FOR WHICH IT WAS ASSEMBLED, THEN LOADING THE NEXT PROGRAM STARTING AT THE FIRST AVAILABLE STORE LOCATION AFTER THE PREVIOUSLY LOADED PROGRAM. ALL ADDRESSES REFERENCED IN THE PROROGRAM MUST ALSO BE MODIFIED BY A RELOCATION FACTOR, WHICH IS EQUAL TO THE DIFFERENCE BETWEEN THE ADDRESS AT WHICH THE PROGRAM IS ACTUALLY LOADED AND THE ADDRESS AT WHICH IT WAS ASSEMBLED.

2. INTERRUPT HANDLING -WHERE THERE ARE SEVERAL DEVICES ON ONE INTERRUPT LEVEL (LEVEL 4) OR WHERE TWO PROGRAMS ARE SHARING A SINGLE DEVICE (CONSOLE PRINTER IS USED BY ALL PROGRAMS), A CENTRAL INTERRUPT CONTROL IS REQUIRED TO IDENTIFY EACH INTERRUPT AND TO TRANSFER CONTROL TO THE APPROPRIATE INTERRUPT ROUTINE. THIS ROUTINE ALSO STORES THE CPU STATUS (ACCUMULATOR, EXTENSION, CARRY AND OVERFLOW, AND XR3) AND RESTORES STATUS UPON BRANCHING OUT OF INTERRUPT.

3. TIME SHARING -THIS IS THE BASIC OVERLAP FUNCTION PERFORMED BY THE

MONITOR. THIS FUNCTION IS ACCOMPLISHED BY THE MONITOR SUPERVISOR ROUTINE. THE SUPERVISOR CONTINUALLY CHECKS EACH PROGRAM LOADED FOR A REQUEST TO RUN A ROUTINE IN THAT PROGRAM. ONCE SUCH A REQUEST IS FOUND, THE SUPERVISOR WILL BRANCH TO THAT ROUTINE. AFTER THE ROUTINE IS RUN, THE TEST PROGRAM MUST BRANCH BACK TO THE SUPERVISOR. ALL OTHER PROGRAMS ARE THEN CHECKED BEFORE ANOTHER ROUTINE IN THE FIRST PROGRAM CAN BE RUN.

4. ONE INTERFACE WITH INPUT AND OUTPUT DEVICE FOR ALL PROGRAMS -EACH PROGRAM HAS NEED FOR CONTROL INPUT FROM THE BIT SWITCHES AND MESSAGE OUTPUT TO THE CONSOLE PRINTER. SINCE ONLY ONE PROGRAM CAN USE THESE DEVICES AT A TIME, THE MONITOR SERVES TO DIRECT TRAFFIC, SENDING ANY BIT SWITCH ENTRY TO THE APPROPRIATE PROGRAM AND OUTPUTTING EACH PROGRAM MESSAGE IN ITS TURN.

5.1.3 WHAT COMMON PROGRAM FUNCTIONS ARE HANDLED BY THE DIAGNOSTIC MONITOR

1. MESSAGE OUTPUT - COMMUNICATION TO THE CONSOLE PRINTER IS SERIAL AND MUST BE IN ROTATE AND TILT CODE. ANY MESSAGE TO THE PRINTER MUST, THEREFORE, FIRST BE CONVERTED, THEN TRANSFERRED TO THE PRINTER A CHARACTER AT A TIME. PUTTING THIS FACILITY IN THE MONITOR ALLOWS EACH TEST PROGRAM TO OUTPUT ITS MESSAGES BY SIMPLY SETTING UP A TABLE WHICH DEFINES THE MESSAGE THEN BRANCHING TO THE APPROPRIATE (ERROR OR STATUS) MONITOR LOG ROUTINE.

2. BIT SWITCH ENTRY-TO SIMPLIFY THE USE OF BIT SWITCHES BY EACH PROGRAM, THE MONITOR ON REQUEST READS THE BIT SWITCHES AND PLACES THE READING IN CORE STORAGE IN THE APPROPRIATE PROGRAM. THUS THE PROGRAM HAS AT ALL TIMES THE LATEST SWITCH READING. ALSO TO INCREAS THE FLEXIBILITY AND THE AMOUNT OF INFORMATION THAT CAN BE CONVEYE BY THE BIT SWITCHES, THE SWITCHES ARE DIVIDED INTO FOUR FUNCTIONS THE SWITCH SETTING CORRESPUNDING TO EACH FUNCTION IS SET IN A SEPARATE CORE POSITION IN THE PROGRAM.

3. PRINT LOAD MESSAGE - THIS MESSAGE IS PRINTED AFTER A PROGRAM IS SUCCESSFULLY LOADED. IT IDENTIFIES THE PROGRAM, THE ADDRESS AT WHICH IT WAS LOADED AND GIVES THE RELOCATION FACTOR FOR THAT PROGRAM.

4. CONTROL PROGRAM END - WHEN A PROGRAM HAS COMPLETED ONE PASS THE MONITOR DETERMINES WHETHER OR NOT IT IS TO BE LOOPED. IF NOT, IT PRINTS AN END MESSAGE AND TERMINATES THE PROGRAM.

5. RESTART - THE MONITOR WILL REINITIALIZE AND RESTART ANY SPECIFIED PROGRAMS OR ALL PROGRAMS. A MESSAGE IS PRINTED IDENTIFYING THE PROGRAM RESTARTED.

6. HALT -THE MONITOR WILL HALT EXECUTION OF ANY SPECIFIED PROGRAM OR ALL PROGRAMS. A MESSAGE IS PRINTED IDENTIFYING THE PROGRAM HALTED.

7. ERROR CONTROL - HALT ON ERROR, LOOP ON ERROR, AND BYPASS ERROR PRINTOUT ARE ALL HANDLED BY THE MONITOR.

   A. HALT ON ERROR WILL HALT AFTER THE ERROR MESSAGE IS PRINTED. IF HALT ON ERROR IS ON, BYPASS ERROR PRINTOUT WILL BE IGNORED THE PROGRAM WILL HALT AT A NON INTERRUPTABLE WAIT IN THE MONITOR.

   B. LOOP ON ERROR
   SO LONG AS THE ERROR PERSISTS.

   C. BYPASS ERROR PRINTOUTS ALLOWS THE PROGRAM TO LOOP ON AN ERROR CONDITION WITHOUT PRINTING THE ERROR MESSAGE.

8. ROUTINE NUMBER LOG - UNDER SWITCH CONTROL THE MONITOR WILL LOG THE ROUTINE NUMBER AND ADDRESS OF EACH TEST ROUTINE BEFORE THAT

ROUTINE IS RUN.

9. PROGRAM STOP - THE CONSOLE PROGRAM STOP PUSHBUTTON IS SUPPORTED BY A MONITOR ROUTINE WHICH WILL STOP ALL PROGRAMS WITHOUT LOSING ANY INTERRUPTS. THIS ROUTINE ALSO SAVES THE C.P.U. STATUS AND PROVIDES A RE-ENTRY FROM LOCATION ZERO. THIS FEATURE ALLOWS THE C.E. TO MANUALLY CHECK OR MODIFY ANY CORE LOCATION AFTER THE STOP, THEN CONVENIENTLY RESTART BY PRESSING RESET AND PROGRAM START.

10. ADDRESS STOP - THIS ROUTINE USES THE INTERRUPT RUN MODE. IN THIS MODE AN INTERRUPT OCCURS AFTER EACH MAINLINE INSTRUCTION. THE DESIRED STOP ADDRESS, SET BY THE BIT SWITCHES, IS THEN COMPARED TO THE IAR ADDRESS. THE ROUTINE HALTS ALL PROGRAMS WHEN THESE ARE EQUAL.

11. PROGRAM DELAY - THIS ROUTINE ALSO USES THE INTERRUPT RUN MODE. IN THIS MODE IT PROVIDES A MINIMUM DELAY OF 125 USECS BETWEEN THE EXECUTION OF EACH MAINLINE INSTRUCTION. THIS DELAY CAN BE INCREASED IN INCREMENTS OF 25 USECS BY BIT SWITCH CONTROL.

5.1.4. WHAT IS THE ADVANTAGE OF HAVING THESE COMMON FUNCTIONS IN A MONITOR

EACH PROGRAM IS SIMPLER AND IS FORCED TO FOLLOW A STANDARD ORGANIZATION. EACH PROGRAM IS BY ITSELF SHORTER - THAT IS OF GREATEST IMPORTANCE WHEN RUNNING IN OVERLAP SINCE IT ALLOWS MORE PROGRAMS TO BE LOADED IN THE SAME CORE.

5.1.5 HOW DOES THE MONITOR CONTROL A PROGRAM

NO TEST ROUTINES ARE RUN UNTIL A REQUEST FOR CONTROL IS MADE TO THE MONITOR BY THE TEST PROGRAM. THE MONITOR SUPERVISOR ROUTINE WILL THEN DETERMINE WHEN CONTROL IS TO BE TRANSFERRED, AND WILL TRANSFER CONTROL TO THE TEST ROUTINE. AT THE END OF THE ROUTINE OR WHENEVER WAITING FOR AN INTERRUPT, THE TEST PROGRAM MUST RETURN CONTROL TO THE MONITOR SUPERVISOR.

5.1.6 HOW DOES A TEST PROGRAM REQUEST CONTROL FROM THE MONITOR

CONTROL WILL BE TRANSFERRED TO THE TEST PROGRAM IF

1. AN INTERRUPT IS RECEIVED WHICH IS TO BE SERVICED BY THAT PROGRAM.

2. THE MONITOR SUPERVISOR FINDS AN ADDRESS IN THE MAIN LINE SEQUENCE CONTROL FIELD (MLSCF) FOR THAT PROGRAM.

THUS, BEFORE A PROGRAM GIVES UP CONTROL TO THE MONITOR, IT MUST PLACE IN ITS MLSCF AN ADDRESS TO WHICH THE MONITOR IS TO RETURN, OR IT MUST INITIATE AN OPERATION WHICH WILL RESULT IN AN INTERRUPT.

5.1.7 WHAT IS THE MAIN LINE SEQUENCE CONTROL FIELD (MLSCF)

THE MLSCF IS PART OF THE PROGRAM CONTROL TABLE WHICH IS THE MAJOR INTERFACE BETWEEN THE MONITOR AND THE TEST PROGRAM. EACH PROGRAM HAS ITS OWN PROGRAM CONTROL TABLE WHICH IS LOCATED AT THE BEGINNING PROGRAM. IT LOOKS LIKE THIS

```
*
*              PROGRAM CONTROL TABLE
*
PID    DC      /0XXX       PROGRAM ID
RID    DC      0           ROUTINE ID
RAD    DC      0           ROUTINE ADDRS
SW0    DC      0           PROGRAM CONTROL
SW1    DC      0           ROUTINE SELECTION
SW2    DC      0
SW3    DC      0
```



```
        DC      STRT        LOOP PROGRAM ADDRESS
        DC      STRT        RESTART ADDRESS
MLSCF   DC      *-*         ENTRY ONE
        DC      *-*         ENTRY TWO
        DC      /FFFF       TERMINATOR
```

THE MONITOR OBTAINS FROM THIS TABLE THE PROGRAM ID, ROUTINE NUMBER AND ROUTINE ADDRESS WHEN PRINTING ERROR AND STATUS MESSAGES. IT FINDS THE RESTART ADDRESS HERE ALSO. WHEN BIT SWITCH DATA IS ENTERED FOR A PROGRAM, THE MONITOR WILL PLACE THE DATA IN SWITCHES 8 THROUGH 15 INTO ONE OF FOUR SWITCH STORAGE WORDS IN THIS TABLE. THE STORAGE WORK USED WILL DEPEND ON THE SETTING OF SWITCHES 0 AND 1 (FUNCTION
THE MAIN LINE SEQUENCE CONTROL FIELD (MLSCF) ALSO CONTAINED IN THIS TABLE IS THE HEART OF THE MONITOR CONTROL. ALL COMMUNICATION BETWEEN THE TEST PROGRAM AND THE MONITOR SUPERVISOR IS THROUGH THE MLSCF. THE SUPERVISOR SEQUENTIALLY SCANS THE MLSCF OF EACH TEST PROGRAM. WHEN AN ADDRESS IS FOUND IN ANY MLSCF THE SUPERVISOP WILL TRANSFER TO THAT ADDRESS.

5.1.8 ONCE A TEST PROGRAM HAS OBTAINED CONTROL TO THE MONITOR

TO RETURN CONTROL TO THE MONITOR SUPERVISOR, THE TEST ROUTINE MUST EXECUTE THE FOLLOWING INSTRUCTION.

```
BSI  I  START
```

HOWEVER, BEFORE TRANSFERRING CONTROL TO THE MONITOR A RETURN TO THE TEST IN THE MLSCF.

5.1.9 HOW DOES A TEST PROGRAM PRINT A MESSAGE

ALL MESSAGES ARE PRINTED BY THE MONITOR LOG ROUTINE. COMMUNICATION WITH THIS ROUTINE IS THROUGH A CALLING SEQUENCE WHICH TRANSFERS TO THE LOG ROUTINE THE NECESSARY MESSAGE DATA.

TWO TYPES OF MESSAGES ARE PRINTED, STATUS MESSAGES AND ERROR MESSAGES A STATUS MESSAGE IS IDENTIFIED BY AN A AS THE FIRST CHARACTER IN THE MESSAGE AND IS PRINTED IN BLACK. AN ERROR MESSAGE IS IDENTIFIED BY AN E AND IS PRINTED IN RED.

5.2*** ROUTINE DESCRIPTIONS

5.2.1 THE RELOCATING LOADER

THE DIAGNOSTIC MONITOR AND ALL TEST PROGRAMS ARE LOADED BY A RELOCATING LOADER. TWO VERSIONS OF THIS LOADER ARE AVAILABLE--1442, AND PAPER TAPE. EACH OF THESE LOADERS IS INITIALLY LOADED IN CORE LOCATIONS 0-/160. THE RESIDENT PROTION IS IN LOCATIONS /40-/160.

1. FORMATS

   THESE LOADERS WILL LOAD ABSOLUTE PROGRAMS, RELOCATABLE PROGRAMS, OR HEX PATCH CARDS. THE MONITOR AND ALL NONOVERLAP PROGRAMS ARE ASSEMBLED AND LOADED IN ABSOLUTE FORMAT. ANY OVERLAP PROGRAM IS NOT ORG'D. AT 1500 MUST BE ASSEMBLED AND LOADED IN ABSOLUTE.

2. RELOCATION - THE RELOCATING LOADER ASSUMES ALL PROGRAMS WHICH ARE TO BE RELOCATED ARE ASSEMBLED AT A STARTING ADDRESS OF 05DC (1500 DECIMAL). THE FIRST PROGRAM LOADED WILL BE STORED, STARTING FROM THIS ADDRESS. ADDITIONAL PROGRAMS LOADED WILL BE RELOCATED STARTING FROM THE FIRST EVEN ADDRESS AFTER THE LAST ADDRESS IN THE PREVIOUSLY LOADED PROGRAM. THUS THE RELOCATION FACTOR IS EQUAL TO THE ADDRESS AT WHICH A PROGRAM IS LOADED MINUS 05DC (1500 DECIMAL). THIS FACTOR , TOGETHER WITH THE LOAD ADDRESS AND THE PROGRAM ID, IS PRINTED AFTER EACH PROGRAM IS LOADED.

3. CHECK SUM - ALL DATA LOADED BY THE RELOCATING LOADER IS CHECK SUMMED. IF A CHECK SUM ERROR IS DETECTED AN ERROR MESSAGE WILL BE PRINTED AND LOADING WILL BE TERMINATED. THIS CHECK SUM TAKES INTO CONSIDERATION BOTH THE CORRECTNESS OF THE DATA AND THE SEQUENCE IN WHICH THE CARDS ARE LOADED. THUS EXTRA OR MISSING CARDS WILL BE DETECTED BY THE CHECK SUM. THE CHECK WILL BE BYPASSED ON ANY CARD WHICH HAS A CHECK SUM OF ZERO. THE ADVANCE OF THE CARD COUNT WILL NOT BE BYPASSED. THUS, IF A CARD WITHIN A PROGRAM DECK MUST BE MODIFIED, IT WILL STILL LOAD IF THE CHECK SUM WORD (BITS 2-9 OF CARD COLUMN 2 AND 12-5 OF CARD COLUMN 3) IS MADE EQUAL TO ZERO. IF ADDITIONAL CARDS ARE ADDED TO THE DECK, THESE ALSO WILL LOAD IF THEIR CHECK SUM WORD IS EQUAL TO ZERO. HOWEVER, SINCE THE CARD COUNT IS ADVANCED, ANY CARDS HAVING NON-ZERO CHECK SUMS WHICH FOLLOW CARDS ADDED TO THE DECK WILL NOT LOAD. THEREFORE, ANY CARDS ADDED SHOULD BE PLACED AT THE END OF THE DECK - JUST BEFORE THE END CARD AND THE CHECK SUM OF THE END CARD CHANGED TO ZERO. TO MAKE CHANGES IN PROGRAMS WITHOUT CONCERN FOR CHECK SUM, SEE PROGRAM PATCHING (SECTION 3.6).

4. OVER CORE CHECK - IF DURING LOADING ALL OF CORE BECOMES FILLED BEFORE ALL PROGRAMS ARE LOADED, THE LOADING PROCESS WILL TERMINATE AND A MESSAGE WILL BE PRINTED (OVER CORE).

5.2.2 SUPERVISOR ROUTINE

1. THE SUPERVISOR SEQUENTIALLY SCANS THE MLSCF OF EACH PROGRAM - INCLUDING THE MONITOR. IF AN MLSCF WORD IS FOUND TO BE POSITIVE AND NON ZERO, THE SUPERVISOR WILL ASSUME THAT THE WORD CONTAINS AN ENTRY ADDRESS AND WILL EXECUTE A BRANCH TO THAT ADDRESS. THE ADDRESS OF THE MLSCF IS SAVED BY THE SUPERVISOR. THIS ADDRESS IS USED BY THE MONITOR TO IDENTIFY THE TEST PROGRAM WHEN THAT PROGRAM TRANSFERS BACK TO THE MONITOR WITH A LOG CALL, AN END CALL, OR A RETURN TO START.

2. ROUTINE START LOG - WHEN THE PROGRAM RETURNS CONTROL TO THE MONITOR (BSI I START), THE SUPERVISOR WILL CHECK THE ROUTINE START SWITCH (RTNSW). THIS SWITCH SHOULD BE SET IN THE TEST PROGRAM CONTROL ROUTINE BEFORE STARTING A NEW TEST ROUTINE. IF THIS SWITCH IS ON (NON ZERO) AND ROUTINE START LOG HAS BEEN REQUESTED (SWITCH 9 FUNCTION 0), THE SUPERVISOR WILL PRINT A MESSAGE IDENTIFYING THE PROGRAM, THE ROUTINE NUMBER AND THE ROUTINE START ADDRESS.

3. RESTART AND HALT - ARE ALSO FUNCTIONS OF THE SUPERVISOR. THE HALT BIT FOR A PROGRAM IS ONE, THE SUPERVISOR WILL BYPASS SCANNING OF THE MLSCF OF THAT PROGRAM. IF THE MONITOR HALT BIT IS A ONE, THE SUPERVISOR WILL SCAN ONLY THE MONITOR MLSCF - THUS STOPPING ALL TEST PROGRAMS.

4. EXECUTE PAUSE - THE SUPERVISOR WILL ALSO STOP PROGRAM EXECUTION WHEN PRINTING ANY MESSAGE OR WHEN LOADING A PROGRAM.

5.2.3 INTERRUPT ROUTINE

1. ALL INTERRUPTS ARE HANDLED BY THE MONITOR INTERRUPT ROUTINE. THIS ROUTINE SAVES THE STATUS OF THE CPU -EXCEPT INDEX REGISTERS 1 AND 2, TRANSFERS TO THE TEST PROGRAM INTERRUPT SERVICE ROUTINE, THEN RESTORES THE CPU STATUS BEFORE BRANCHING OUT OF INTERRUPT.

2. A TRANSFER VECTOR IS USED TO SPECIFY THE ADDRESS OF THE TEST PROGRAM INTERRUPT ROUTINE. THIS ADDRESS MUST BE SET IN THE TRANSFER VECTOR BY THE TEST PROGRAM.

3. INVALID INTERRUPTS ARE HANDLED BY THE INTERRUPT ERROR ROUTINE. AN INVALID INTERRUPT IS AN INTERRUPT FOR WHICH AN ADDRESS HAS NOT BEEN SET IN THE TRANSFER VECTOR. THE INTERRUPT ERROR ROUTINE WILL SET UP AN ERROR MESSAGE CALL AND WILL THEN TRY TO BRANCH OUT OF

THE INTERRUPT. IF THE BRANCH OUT TURNS OFF THE INTERRUPT, AN ERROR MESSAGE WILL BE PRINTED WHICH IDENTIFIES THE INTERRUPT LEVEL AND THE ILSW. IF THE INTERRUPT FAILS TO TURN OFF, THE PROGRAM WILL STOP AT THE INTERRUPT ERROR WAIT. PRESSING IMMEDIATE STOP, RESET AND PROGRAM START IN THAT ORDER WILL RESET THE INTERRUPT AND ALLOW THE ERROR MESSAGE TO BE PRINTED.

4. IF A VALID INTERRUPT WILL NOT RESET, THE PROGRAM WILL LOOP IN THE INTERRUPT ROUTINE. TO RECOVER, PRESS IMMEDIATE STOP, RESET AND PROGRAM START - IN THAT ORDER.

5.2.4 BIT SWITCH ROUTINE

1. THE BIT SWITCHES ARE READ IN INTERRUPT WHEN THE INTERRUPT REQUEST KEY IS PRESSED. UNLESS EXECUTING THE KEYBOARD TEST, THE POSITION OF THE CONSOLE/KEYBOARD SWITCH IS IGNORED. WHEN EXECUTING THE KEYBOARD TEST THE BIT SWITCH IS READ ONLY IF THE CONSOLE/KEYBOARD SWITCH IS IN CONSOLE POSITION.

2. THE BIT SWITCH ROUTINE STORES THE CONTENTS OF SWITCHES 8 THROUGH 15 IN THE PROGRAM CONTROL TABLE OF THE PROGRAM IDENTIFIED BY SWITCHES 4-7. IF SWITCHES 4-7 ARE ALL OFF, THE BIT SWITCH READING WILL BE STORED IN THE MONITOR CONTROL TABLE.

3. THE PROGRAM IDENTIFICATION USED IN SWITCHES 4-7 IS A BINARY NUMBER DETERMINED BY THE ORDER IN WHICH THE PROGRAMS WERE LOADED. THE FIRST PROGRAM LOADED IS PROGRAM NO. 1 (SWITCH 7 ONLY), THE THIRD IS PROGRAM NO. 3 (SWITCH 6 AND 7), ETC. THUS IF ONLY ONE PROGRAM IS LOADED SWITCH 7 IS ALWAYS USED TO IDENTIFY THAT PROGRAM.

4. THE HALT SWITCH (SWITCH 15 FUNCTION 0) FOR ALL PROGRAMS IS INTERROGATED BY THE BIT SWITCH ROUTINE. IF THIS SWITCH IS ON THE ROUTINE WILL SET THE HALT BIT FOR THE PROGRAM IDENTIFIED BY SWITCHES 4-7. A MESSAGE WILL BE PRINTED SPECIFYING THAT THE PROGRAM HAS BEEN HALTED.

5. INVALID SWITCH SETTINGS ARE NOT STORED AND A MESSAGE IS PRINTED IDENTIFYING THE SWITCH SETTING AS INVALID. THE SWITCH SETTING IS INVALID IF THERE IS NO PROGRAM IN CORE CORRESPONDING TO THE PROGRAM IDENTIFICATION SET IN SWITCHES 5-7.

5.2.5 MESSAGE LOG ROUTINE

1. THE LOG ROUTINE WILL PRINT EITHER STATUS MESSAGES OR ERROR MESSAGE DEPENDING ON THE ENTRY TO THE ROUTINE. ERROR MESSAGES ARE DISTINGUISHED FROM STATUS MESSAGES BY AN E IN THE MESSAGE ID WHILE THE STATUS MESSAGE CONTAINS AN A. ALSO THE ERROR MESSAGE IS PRINTED IN RED, THE STATUS MESSAGE IN BLACK.

2. MESSAGE FORMET - THE MESSAGE FORMAT IS THE SAME FOR EITHER STATUS OR ERROR MESSAGES.

THE FIRST THREE WORDS ARE STANDARD MESSAGE IDENTIFICATION WORDS WHICH ARE PLACED IN THE MESSAGE BY THE LOG ROUTINE.

APPNN OORR AAAA
OR
EPPNN OORR AAAA

WHERE - A OR E IDENTIFIES THE MESSAGE AS EITHER A STATUS OR ERROR MESSAGE RESPECTIVELY.

PP IS THE LAST TWO DIGITS OF THE PROGRAM ID NUMBER. THIS IDENTIFIES THE PROGRAM TO WHICH THE MESSAGE REFERS.

NN IS THE MESSAGE NUMBER IN THE PROGRAM IDENTIFIED BY PP.

RR IS THE NUMBER OF THE ROUTINE IN THE PROGRAM IDENTIFIED BY PP WHICH WAS EXECUTING AT THE TIME CALL ON LOG WAS MADE.

AAAA IS THE ADDRESS IN CORE OF THE ROUTINE IDENTIFIED BY RR.

NOTE - FOR MONITOR MESSAGE THE ROUTINE NUMBER AND ADDRESS ARE NOT PRINTED.

3. AN ALPHA MESSAGE CAN NEXT BE PRINTED. THIS MESSAGE IS USED EITHER TO HEAD THE MESSAGE DATA (WHICH WILL BE PRINTED ON THE NEXT LINE) OR TO COMMUNICATE MACHINE STATUS AND/OR ERROR DESCRIPTION TO THE CE. IF DATA IS TO BE PRINTED FOLLOWING THE ALPHA MESSAGE A CARRIAGE RETURN AND TAB WILL BE CODED INTO THE MESSAGE FOLLOWING THE ALPHA.

4. DATA IS PRINTED IN EITHER NEXIDECIMAL OR DECIMAL. IF NO ALPHA IS INCLUDED IN THE MESSAGE,THE DATA WILL BE PRINTED ON THE SAME LINE AS THE THREE WORDS OF MESSAGE IDENTIFICATION. IF ALPHA IS INCLUDE IN THE MESSAGE, THE ALPHA PHRASES WILL BE PRINTED, THEN THE DATA WILL BE PRINTED DIRECTLY BELOW THE ALPHA.

5. DECIMAL DATA WILL ALWAYS BE 5 DIGITS WHILE HEX IS 4. IF THE DECIMAL DATA IS NEGATIVE, A MINUS (-) WILL BE PRINTED IN FRONT OF THE DECIMAL WORD.

6. MULTIPLE LINE MESSAGES WILL INCLUDE THE MESSAGE ID ON THE FIRST LINE ONLY.

7. ERROR CONTROL IS PROVIDED BY THE ERROR LOG ROUTINE. HALT ON ERROR BYPASS ERROR PRINTOUT, OR LOOP ON ERROR ARE ALL FUNCTIONS OF THIS ROUTINE.

8. IF THE LOG ROUTINE IS BUSY, THE LOG BUSY SUBROUTINE WILL SET THE ADDRESS OF THE USER LOG CALL IN THE MLSCF OF THE USER PROGRAM. THUS THE MONITOR WILL FORCE A LOOP ON THE LOG CALL UNTIL THE LOG ROUTINE IS NO LONGER BUSY.

5.2.6 END ROUTINE

THIS ROUTINE IS ENTERED ON THE COMPLETION OF EACH COMPLETE PASS BY A TEST PROGRAM. THE ROUTINE WILL RESTART THE PROGRAM CAUSING IT TO LOOP IF THE LOOP PROGRAM SWITCH FOR THE MOPITOR OR FOR THE TEST PROGRAM IS ON.

IF THE PROGRAM IS NOT LOOPED, THE MONITOR WILL PRINT AN END MESSAGE WHICH WILL IDENTIFY THE OPERATION OF THAT PROGRAM AS TERMINATED.

5.2.7 HALT ROUTINE

1. THE HALT ROUTINE IS ENTERED BY

   A. PRESSING THE PROGRAM STOP PUSHBUTTON ON THE 1131 CONSOLE.

   B. ADDRESS STOP WHEN THE IAR ADDRESS IS EQUAL TO THE ADDRESS SET IN THE BIT SWITCHES DURING THE LAST HALT.

2. THIS ROUTINE CYCLES THE PROGRAM DOWN, I.E., ALLOWS ALL INTERRUPTS TO BE SERVICED BEFORE STOPPING IN A WAIT INSTRUCTION. TO CONTINUE, PRESS PROGRAM START.

3. THE CPU STATUS IS SAVED ANYTIME A HALT OCCURS IN THE HALT ROUTINE THUS, AFTER A HALT, THE CE CAN GO MANUALLY TO ANY PLACE IN CORE, READ OR MODIFY ANY STORAGE LOCATION, THEN RETURN TO THIS ROUTINE AND CONTINUE. TO SIMPLIFY THIS RESTART PROCEDURE, A BRANCH EXIST

AT ADDRESS ZERO WHICH WILL TRANSFER TO THE HALT ROUTINE AFTER A HALT HAS OCCURRED. THUS, TO RESTART AFTER A HALT WHEN THE CONTENTS OF IAR HAVE BEEN CHANGED, PRESS RESET, THEN PROGRAM START.

4. ADDRESS STOP IS ALSO A FUNCTION OF THE HALT ROUTINE. THE FIRST INSTRUCTION FOLLOWING THE WAIT IN THE HALT ROUTINE IS AN XIO TO READ THE BIT SWITCHES. ANY ADDRESS SET IN THE BIT SWITCHES AT THIS TIME WILL BE STORED AS AN ADDRESS STOP ADDRESS. THE ADDRESS STOP FEATURE USES THE INTERRUPT RUN MODE TO PROVIDE AN INTERRUPT FOLLOWING EACH MAINLINE INSTRUCTION. THUS TO ENABLE ADDRESS STOP THE CPU MUST BE PLACED IN THE INTERRUPT RUN MODE. WHEN IN THIS MODE ADDRESS STOP WILL CAUSE THE PROGRAM TO HALT ANY TIME THE IAR IS EQUAL TO THE SETTING OF THE BIT SWITCHES ON THE LAST START FROM THE HALT ROUTINE. SINCE ADDRESS STOP ALSO HALTS IN THIS SAME HALT ROUTINE, THE NEXT STOP ADDRESS MUST BE SET IN THE SWITCHES FOLLOWING EACH ADDRESS STOP.

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

```
                *****************************************************************  30000020
                *                                                               *  30000030
                *  THIS ENGINEERING CHANGE REFLECTS MAJOR                       *  30000040
                *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS                 *  30000050
                *  TESTS WHICH RAN WITH THE EARLIER MONITOR WILL                *  30000060
                *  NOT RUN WITH THIS MONITOR.                                   *  30000070
                *                                                               *  30000080
                *  DIAGNOSTIC MONITOR II WILL NOT RUN TESTS OF                  *  30000090
                *  ENGINEERING LEVEL PRIOR TO EC 419643 DATED                   *  30000100
                *  NOV 15,1966.                                                 *  30000110
                *                                                               *  30000120
                *****************************************************************  30000130
                *  THE FOLLOWING ADDRESSES MUST BE MAINTAINED FOR               *  30000140
                *  COMPATIBILITY WITH DIMAL- PID 0302.                          *  30000150
                *                                                               *  30000160
                *  ADRS   LABEL      ADRS   LABEL      ADRS   LABEL             *  30000170
                *  /044A  ILT0       /048E  ILT4       /0414  ASTOP             *  30000180
                *  /045B  ILT1       /03F9  ILT5       /0410  AQ5               *  30000190
                *  /046C  ILT2       /0280  MRSRT      /058D  LOAD2             *  30000200
                *  /047D  ILT3       /054F  MRBSD                               *  30000210
                *                                                               *  30000220
                *****************************************************************  30000230
                     ABS                                                          30000240
0000 0 0300          DC       /0300                                               30000250
                *********************************************                    30000260
                *-------------------------------------------                    30000270
                *        1130 DIAGNOSTIC MONITOR                                30000280
                *-------------------------------------------                    30000290
                *********************************************                    30000300
                *              MONITOR RESTART                                  30000310
                *********************************************                    30000320
                *                                                               30000330
                *     RESET AND START WILL FORCE ENTRY TO                       30000340
                *     THIS ROUTINE WHICH WILL REINITIALIZE                      30000350
                *     THE MONITOR CONTROL AND BRANCH TO                         30000360
                *     THE SUPERVISOR.                                           30000370
                *-------------------------------------------                    30000380
                *                                                               30000390
0000                      ORG      0                                            30000400
0000 0 6004               LDX      4           BR FOR RESTART                   30000410
0001   0003               BSS      3           SKIP INDEX REGS                  30000420
0004 0 4C00 0280          BSC  L   MRSRT       GO RESTART                       30000430
                *                                                               30000440
                *********************************************                  30000450
                *          INTERRUPT TRANSFER VECTORS                           30000460
                *********************************************                  30000470
                *                                                               30000480
0008                      ORG      8                                           30000490
0008   0001       XFVC    BSS      1           SPACE FOR ILT0                   30000500
0009 0 045B               DC       ILT1                                         30000510
000A 0 046C               DC       ILT2                                         30000520
000B 0 047D               DC       ILT3                                         30000530
000C   0001               BSS      1           SPACE FOR ILT4                   30000540
000D 0 03F9               DC       ILT5                                         30000550
000E   0006               BSS      6           NOT USED                         30000560
                *                                                               30000570
                *********************************************                  30000580
                *              UTILITY EQUATE TABLE                             30000590
                *********************************************                  30000600
                *                                                               30000610
0014 0 054F     UTLTY     DC       MRBSD       MONITOR UTILITY CONTROL          30000620
0015 0 0414     ILIR      DC       ASTOP       INTERRUPT RUN                    30000630
0016 0 0410     AQ5A      DC       AQ5         A AND Q FOR TRACE INT            30000640
0017 0 0000               DC       /0000       NOT USED                         30000650
                *                                                               30000660
                *********************************************                  30000670
                *     INITIALIZE RESTART AND TRANSFER VEC                       30000680
                *********************************************                  30000690
```



```
                *                                                               30000700
0018 0 6004     ORGO      LDX      4                                           30000710
0019 0 044A     IXFVC     DC       ILT0                                        30000720
001A 0 045B               DC       ILT1                                        30000730
0018 0 046C               DC       ILT2                                        30000740
001C 0 047D               DC       ILT3                                        30000750
001D 0 048E               DC       ILT4                                        30000760
                *                                                               30000770
                *                                                               30000780
                *********************************************                  30000790
                *              MONITOR EQUATE TABLE                             30000800
                *********************************************                  30000810
                *                                                               30000820
                *     THIS IS A TABLE OF COMMON LABELS                          30000830
                *     USED BY THE TEST PROGRAMS TO REFER                        30000840
                *     TO DESIRED ADDRESSES IN THE MONITOR.                      30000850
                *-------------------------------------------                    30000860
                *                                                               30000870
0160                      ORG      /160                                        30000880
0160 0 01CF     BEGIN     DC       BGIN        THESE ARE CALL                   30000890
0161 0 0264     START     DC       STRT        LABELS USED BY TEST              30000900
0162 0 02A4     ERROR     DC       ERRI        PROGRAMS TO CALL                 30000910
0163 0 02F8     LOG       DC       LOGI        MONITOR ROUTINES                 30000920
0164 0 0426     END       DC       MEND                                         30000930
                *                                                               30000940
0165 0 0000     RTNSW     DC       *-*         ROUTINE START SW                 30000950
0166 0 020D     ERLCK     DC       MSW0        LOCK ON ERROR CONTROL            30000960
0167 0 02F5     LOGBY     DC       IOBSY       I/O BUSY SW ADDRS                30000970
0168 0 023E     ADDRS     DC       MXEQ2&1                                      30000980
0169 0 0000               DC       /0000       NOT USED                         30000990
016A 0 0000               DC       /0000       NOT USED                         30001000
                *                                                               30001010
                *                                                               30001020
                *-------------------------------------------                    30001030
                *     THE TEST PROGRAM MUST ENTER ITS                           30001040
                *     INTERRUPT ROUTINE ADDRESS IN THE                          30001050
                *     APPROPRIATE PLACE IN THIS TABLE                           30001060
                *     BEFORE EXECUTING ANY XIO COMMAND                          30001070
                *     WHICH WILL RESULT IN AN INTERRUPT.                        30001080
                *-------------------------------------------                    30001090
                *                                                               30001100
0168 0 04B0               DC       IERR        15                               30001110
016C 0 04B0               DC       IERR        14                               30001120
016D 0 04B0               DC       IERR        13                               30001130
016E 0 04B0               DC       IERR        12                               30001140
016F 0 04B0               DC       IERR        11                               30001150
0170 0 04B0               DC       IERR        10                               30001160
0171 0 04B0               DC       IERR         9                               30001170
0172 0 04B0               DC       IERR         8                               30001180
0173 0 04B0               DC       IERR         7                               30001190
0174 0 04B0               DC       IERR         6                               30001200
0175 0 04B0               DC       IERR         5                               30001210
0176 0 04B0               DC       IERR         4                               30001220
0177 0 04B0               DC       IERR         3                               30001230
0178 0 04B0               DC       IERR         2                               30001240
0179 0 04B0               DC       IERR         1                               30001250
017A 0 04B0     ILO       DC       IERR         0      1442 COL RQST            30001260
017B 0 04B0               DC       IERR        15                               30001270
017C 0 04B0               DC       IERR        14                               30001280
017D 0 04B0               DC       IERR        13                               30001290
017E 0 04B0               DC       IERR        12                               30001300
017F 0 04B0               DC       IERR        11                               30001310
0180 0 04B0               DC       IERR        10                               30001320
0181 0 04B0               DC       IERR         9                               30001330
0182 0 04B0               DC       IERR         8                               30001340
0183 0 04B0               DC       IERR         7                               30001350
0184 0 04B0               DC       IERR         6                               30001360
0185 0 04B0               DC       IERR         5                               30001370
```

```
0186 0 04B0                DC      IERR      4                          30001380
0187 0 04B0                DC      IERR      3                          30001390
0188 0 04B0                DC      IERR      2                          30001400
0189 0 04B0                DC      IERR      1                          30001410
018A 0 04B0          IL1   DC      IERR      0    1132 SERVICE RQST     30001420
018B 0 04B0                DC      IERR     15                          30001430
018C 0 04B0                DC      IERR     14                          30001440
018D 0 04B0                DC      IERR     13                          30001450
018E 0 04B0                DC      IERR     12                          30001460
018F 0 04B0                DC      IERR     11                          30001470
0190 0 04B0                DC      IERR     10                          30001480
0191 0 04B0                DC      IERR      9                          30001490
0192 0 04B0                DC      IERR      8                          30001500
0193 0 04B0                DC      IERR      7                          30001510
0194 0 04B0                DC      IERR      6                          30001520
0195 0 04B0                DC      IERR      5                          30001530
0196 0 04B0                DC      IERR      4                          30001540
0197 0 04B0                DC      IERR      3                          30001550
0198 0 04B0                DC      IERR      2                          30001560
0199 0 04B0                DC      IERR      1                          30001570
019A 0 04B0          IL2   DC      IERR      0    DISC SERVICE RQST     30001580
019B 0 04B0                DC      IERR     15                          30001590
019C 0 04B0                DC      IERR     14                          30001600
019D 0 04B0                DC      IERR     13                          30001610
019E 0 04B0                DC      IERR     12                          30001620
019F 0 04B0                DC      IERR     11                          30001630
01A0 0 04B0                DC      IERR     10                          30001640
01A1 0 04B0                DC      IERR      9                          30001650
01A2 0 04B0                DC      IERR      8                          30001660
01A3 0 04B0                DC      IERR      7                          30001670
01A4 0 04B0                DC      IERR      6                          30001680
01A5 0 04B0                DC      IERR      5                          30001690
01A6 0 04B0                DC      IERR      4                          30001700
01A7 0 04B0                DC      IERR      3                          30001710
01A8 0 04B0                DC      IERR      2                          30001720
01A9 0 04B0                DC      IERR      1                          30001730
01AA 0 04B0          IL3   DC      IERR      0    1627 SERVICE RQST     30001740
01AB 0 04B0                DC      IERR     15                          30001750
01AC 0 04B0                DC      IERR     14                          30001760
01AD 0 04B0                DC      IERR     13                          30001770
01AE 0 04B0                DC      IERR     12                          30001780
01AF 0 04B0                DC      IERR     11                          30001790
01B0 0 04B0                DC      IERR     10                          30001800
01B1 0 04B0                DC      IERR      9                          30001810
01B2 0 04B0                DC      IERR      8                          30001820
01B3 0 04B0                DC      IERR      7                          30001830
01B4 0 04B0                DC      IERR      6                          30001840
01B5 0 04B0                DC      IERR      5                          30001850
01B6 0 04B0                DC      IERR      4                          30001860
01B7 0 04B0                DC      IERR      3                          30001870
01B8 0 04B0                DC      IERR      2    1442 OP COMP          30001880
01B9 0 04C6                DC      MCINT     1    1053                  30001890
01BA 0 04B0          IL4   DC      IERR      0    PAPER TAPE            30001900
01BB 0 04B0          RQTY  DC      IERR      CON PRINTER REQUEST         30001910
01BC 0 04EA          RQKB  DC      MMRBS-1   KEYBOARD REQUEST            30001920
01BD 0 04B0          SVKB  DC      IERR      KB SERVE REQUEST            30001930
01BE 0 04B0          IL5   DC      IERR      INTERRUPT LEVEL 5           30001940
                     *                                                 30001950
                     ********************************************      30001960
                     *              PROGRAM ID TABLE                *  30001970
                     ********************************************      30001980
                     *                                                 30001990
                     *     THIS TABLE IS USED BY THE MONITOR           30002000
                     *     TO IDENTIFY THE PROGRAM OR PROGRAMS IN      30002010
                     *     CORE AND TO PROVIDE AN ADDRESS FOR          30002020
                     *     COMMUNICATION WITH THESE PROGRAMS.          30002030
                     *                                                 30002040
                     *     AS EACH PROGRAM IS LOADED ITS MLSCF         30002050
```



```
                     *     ADDRESS IS PLACED IN THIS TABLE AT THE      30002060
                     *     POSITION WHICH CORRESPONDS WITH             30002070
                     *     THE ORDER IN WHICH IT WAS LOADED.           30002080
                     *-------------------------------------------      30002090
018F 0 0000                DC      *-*       .       . 0F .            30002100
01C0 0 0000                DC      *-*       .       . 0E .            30002110
01C1 0 0000                DC      *-*       .       . 0D .            30002120
01C2 0 0000                DC      *-*       .       . 0C .            30002130
01C3 0 0000                DC      *-*       .       . 0B .            30002140
01C4 0 0000                DC      *-*       .       . 0A .            30002150
01C5 0 0000                DC      *-*       .       . 09 .            30002160
01C6 0 0000                DC      *-*       .       . 08 .            30002170
01C7 0 0000                DC      *-*       .       . 07 .            30002180
01C8 0 0000                DC      *-*       .       . 06 .            30002190
01C9 0 0000                DC      *-*       .       . 05 .            30002200
01CA 0 0000                DC      *-*       .       . 04 .            30002210
01CB 0 0000                DC      *-*       .       . 03 .            30002220
01CC 0 0000                DC      *-*       .       . 02 .            30002230
01CD 0 0000                DC      *-*       .       . 01 .            30002240
01CE 0 0213          MPIDT DC      MLSCF     .       . 00 .            30002250
                     *                                                 30002260
                     *                                                 30002270
                     ********************************************      30002280
                     *              BEGIN ROUTINE                   *  30002290
                     ********************************************      30002300
                     *                                                 30002310
                     *     THIS ROUTINE IS ENTERED BY ALL              30002320
                     *     PROGRAMS FOLLOWING PROGRAM LOAD.            30002330
                     *     THE ROUTINE WILL SET THE MLSCF              30002340
                     *     ADDRESS OF THE PROGRAM IN THE               30002350
                     *     PROGRAM ID TABLE, GO                        30002360
                     *     INITIALIZE THE PROGRAM, TYPE                30002370
                     *     OUT A MESSAGE IDENTIFYING THE               30002380
                     *     PROGRAM LOADED, AND START THE               30002390
                     *     PROGRAM IF LOAD AND GO.                     30002400
                     *-------------------------------------------      30002410
                     *              CALLING SEQUENCE                   30002420
                     *     BSI   I  BEGIN                              30002430
                     *     DC       ADDRESS OF PROGRAM CONTROL TABLE   30002440
                     *-------------------------------------------      30002450
                     *                                                 30002460
01CF 0 0000          BGIN  DC      *-*                                 30002470
01D0 0 7401 050D           MDX   L  PGMN,1                             30002480
01D2 0 C08A                LD       RELF      LOAD THE RELOCATION      30002490
01D3 0 D400 0511           STO   L  MTABL&5     FACTOR AND SET IN MSG   30002500
                     *                                                 30002510
01D5 0 C480 01CF           LD    I  BGIN      LD ADDR OF PCT           30002520
01D7 0 D400 050F           STO   L  MTABL&3   STORE IN MESSAGE          30002530
01D9 0 D003                STO      BGIN1&1                            30002540
01DA 0 802E                A        K0009     CALCULATE MLSCF ADRS     30002550
01DB 0 D026                STO      TEMPB     SAVE MLSCF ADDRS         30002560
                     *                                                 30002570
01DC 0 6500 0000     BGIN1 LDX   L1 *-*       XR1#PCT ADDRS            30002580
01DE 0 C100                LD    1  0         LD PID                   30002590
01DF 0 D400 050E           STO   L  MTABL&2   SET PID IN MESSAGE       30002600
01E1 0 6780 050D           LDX   I3 PGMN      XR3#PRGM NO.             30002610
01E3 0 620F                LDX   2  15                                 30002620
01E4 0 C020                LD       K8000                              30002630
01E5 0 1B00                SRA   3  0                                  30002640
01E6 0 D01D                STO      XLECT                              30002650
01E7 0 1240                SLCA  2  0                                  30002660
01E8 0 C019                LD       TEMPB                              30002670
01E9 0 D600 01BF           STO   L2 MPIDT-15  STO MLSCF ADDRS          30002680
                     *                                                 30002690
01EB 0 0C00 0552           XIO   L  RDBS      READ BIT SWS             30002700
01ED 0 C400 050C           LD    L  MTABL                             30002710
01EF 0 100F                SLA      15                                 30002720
01F0 0 180F                SRA      15                                 30002730
```

```
01F1 0 E814                OR      K0080
01F2 0 D103                STO   1 3
                      *
01F3 0 C010                LD      XLECT
01F4 0 73FF                MDX   3 -1
01F5 0 E80D                OR      SELCT       SKIP IF NOT OVERLAP
01F6 0 D00C                STO     SELCT       STORE SELECT CONTROL
                      *
                      *-------------------------------------------
                      *     THIS SUBROUTINE WILL LOG THE LOAD
                      *     MESSAGE.
                      *-------------------------------------------
                      *
01F7 0 622E                LDX   2 /002E       SET WORD CONTROL
01F8 0 6300                LDX   3 0           SET MSG ID
01F9 0 C806                LDD     MMESO       LD ALPHA ADDRS
01FA 0 4400 04F3           BSI   L MLOG        GO LOG MESSAGE
                      *
01FC 0 6700 017A           LDX   L3 ILO
01FE 0 6078                LDX     LOADR       LOAD NEXT PRGM
                      *
0200   0000                BSS   E 0
0200 0 0589           MMESO DC      ADRLD
0201 0 059F                DC      ALD
0202 0 0000           TEMPB DC      *-*
0203 0 0000           SELCT DC      *-*
0204 0 0000           XLECT DC      *-*
0205 0 8000           K8000 DC      /8000
0206 0 0080           K0080 DC      /0080
0207 0 007F           K007F DC      /007F
                      *
                      *********************************************
                      *              MONITOR CONTROL TABLE
                      *********************************************
                      *
0208   0000                BSS   E 0
0208 0 0000           ZEROS DC      0000        FIVE ZEROS USED AS MSG
0209 0 0009           K0009 DC      /0009
                      *
020A 0 0000           MPID  DC      0000        PID
020B 0 0000                 DC      0000
020C 0 0000                 DC      0000
020D 0 0000           MSW0  DC      *-*         SWITCH FUNCTION  0
020E 0 0000           MSW1  DC      *-*                          1
020F 0 0000           MSW2  DC      *-*                          2
0210 0 0000           MSW3  DC      *-*                          3
0211 0 0000                 DC      0000
0212 0 0000                 DC      0000
                      *
0213 0 0000           MLSCF DC      *-*         READ BIT SWS
0214 0 0000           TYPI  DC      *-*         TYPE INTERRUPT
0215 0 0000           ERBY  DC      *-*         ERROR BUSY
0216 0 0000           MMBSY DC      *-*         MONITOR MESSAGE BUSY
0217 0 0000           IERM  DC      *-*         INTERRUPT ERROR MESSAGE
0218 0 FFFF           TERMX DC      /FFFF
                      *
                      *********************************************
                      *              MONITOR INITIALIZATION
                      *********************************************
                      *
0219 0 6305           INLIZ LDX     3 5         SET RESTART FROM ZERO
021A 0 C318                 LD      3 IXFVC-1     AND INTERRUPT TRANSFER
021B 0 D307                 STO     3 XFVC-1      VECTOR ADDRS IN LOW CORE
021C 0 73FF                 MDX     3 -1
021D 0 70FC                 MDX       INLIZ&1
021E 0 C318                 LD      3 ORG0
021F 0 D300                 STO     3 0
                      *
```



```
                      *********************************************
                      *              SUPERVISOR ROUTINE
                      *********************************************
                      *
                      *     THIS ROUTINE POLLS ALL SELECTED
                      *     PROGRAMS LOOKING FOR AN ENTRY IN THE
                      *     MLSCF TABLE OF EACH PROGRAM. IF AN
                      *     ENTRY IS FOUND THIS ROUTINE WILL
                      *     BRANCH TO THE ADDRESS SPECIFIED BY
                      *     THE ENTRY. ONLY THE FIRST NON ZERO
                      *     ENTRY IN EACH MLSCF IS EXECUTED. UPON
                      *     RETURN FROM ANY PROGRAM THE SUPERVISOR
                      *     WILL POLL ALL OTHER PROGRAMS BEFORE
                      *     EXECUTING ANOTHER ROUTINE IN
                      *     THAT PROGRAM.
                      *-------------------------------------------
                      *              CALLING SEQUENCE
                      *     BSI   I  START
                      *-------------------------------------------
                      *
0220 0 C0EC           MXEQ  LD      MSW0
0221 0 D05B                 STO     MSW0X
0222 0 E0E4                 AND     K007F
0223 0 7400 027B            MDX   L STRSW       SKIP IF NOT START
0225 0 D0E7                 STO     MSW0
                      *
0226 0 10A0                 SLT     32
0227 0 D400 0165            STO   L RTNSW       RESET RTN START SW
0229 0 D051                 STO     STRSW       RESET START SW
                      *
022A 0 0C00 03D0            XIO   L LOGT        SENSE CONSOLE DSW
022C 0 1002                 SLA     2           CK FOR INTRPT
022D 0 4428 04C6            BSI   L MCINT,Z&    BR IF RESPONSE BIT ON
                      *
022F 0 6110                 LDX     1 16
0230 0 C0D2                 LD      SELCT
0231 0 E8D3                 OR      K8000       DO NOT HALT MONITOR
0232 0 D0D1                 STO     XLECT
                      *
0233 0 C0D0           MXEQ1 LD      XLECT
0234 0 1140                 SLCA    1 0
0235 0 F0CF                 EOR     K8000
0236 0 D0CD                 STO     XLECT
0237 0 C500 01BE            LD    L1 MPIDT-16   LD MLSCF ADDRESS
0239 0 D004                 STO     MXEQ2&1
023A 0 4C02 023D            BSC   L MXEQ2,C
023C 0 70E3                 MDX     MXEQ
                      *
023D 0 6600 0213      MXEQ2 LDX   L2 MLSCF      XR2#ADDRS OF MLSCF
023F 0 6932                 STX     1 MXEQ7&1   SAVE XR1
                      *
0240 0 C2F7                 LD      2 -9        LD PID
0241 0 4C18 0258            BSC   L MXEQ5,&-    BR IF MONITOR
                      *
0243 0 C2FA                 LD      2 -6        NOT MONITOR- LD SW0
0244 0 E838                 OR      MSW0X       COMBINE WITH MON SW0
0245 0 4804                 BSC     E           SKIP IF NOT HALT
0246 0 1810                 SRA     16
0247 0 E835                 OR      MSW0X       COMBINE WITH MON SW0
0248 0 18D8                 RTE     24          CK START BIT
0249 0 4C10 0254            BSC   L MXEQ4,-     BR IF NOT START
                      *
024B 0 682F                 STX     STRSW       SET START SW
024C 0 2000                 LDS     0
024D 0 C2FA                 LD      2 -6
024E 0 E025                 AND     K007E       RESET RESTART
024F 0 D2FA                 STO     2 -6
0250 0 C024                 LD      SMSGA       SET TO PRINT RESTART MSG
```

```
0251 0 D200            STO   2 0          SET MLSCF ENTRY                30004100
0252 0 7201   MXEQ3    MDX   2 1                                         30004110
0253 0 7004            MDX     MXEQ5                                     30004120
                       *                                                 30004130
0254 0 C2FA   MXEQ4    LD    2 -6         IF NOT MONITOR- LD SWO         30004140
0255 0 E8B7            OR      MSWO       COMBINE WITH MON SWO           30004150
0256 0 4C04 0271       BSC   L MXEQ7,E    BR IF HALT SW ON               30004160
                       *                                                 30004170
0258 0 C200   MXEQ5    LD    2 0          LD MLSCF ENTRY                 30004180
0259 0 D008            STO     MXEQ6&1    SET UP FOR EXIT                30004190
025A 0 4C18 0252       BSC   L MXEQ3,&-   BR IF ZERO                     30004200
025C 0 F08B            EOR     TERMX                                     30004210
025D 0 4C18 0271       BSC   L MXEQ7,&-   BR IF TERMINATOR               30004220
025F 0 1810            SRA     16         ZERO MLSCF ENTRY               30004230
0260 0 D200            STO   2 0                                         30004240
0261 0 4C02 0000 MXEQ6 BSC   L *-*,C      EXIT TO USER                   30004250
0263 0 70EE            MDX     MXEQ3                                     30004260
                       *                                                 30004270
0264 0 0000   STRT     DC      *-*        SUPERVISOR ENTRY               30004280
0265 0 6680 023E       LDX   I2 MXEQ2&1                                  30004290
0267 0 C0A5            LD      MSWO                                      30004300
0268 0 EAFA            OR    2 -6         COMBINE WITH USER SWO          30004310
0269 0 1009            SLA     9          CK RTN START LOG SW            30004320
026A 0 7400 0165       MDX   L RTNSW      CK RTN START SW                30004330
026C 0 4810            BSC     -                                         30004340
026D 0 7003            MDX     MXEQ7      BR IF NOT BOTH                 30004350
026E 0 4400 02F8       BSI   L LOGI       LOG RTN START MSG              30004360
0270 0 0208            DC      ZEROS                                     30004370
                       *                                                 30004380
                       *                                                 30004390
0271 0 6500 0000 MXEQ7 LDX   L1 *-*       RESET XR1 TO SELECT CNTRL      30004400
0273 0 70BF            MDX     MXEQ1                                     30004410
                       *                                                 30004420
0274 0 007E   K007E    DC      /007E      CHANGE TO 007F                 30004430
0275 0 0293   SMSGA    DC      SMSG                                      30004440
0276 0 0000            DC      /0000      CAN BE USED FOR EVEN K         30004450
0277 0 8001            DC      /8001                                     30004460
0278 0 05AD            DC      ASTRT                                     30004470
0279 0 0000            DC      /0000                                     30004480
027A 0 0000   STPID    DC      *-*                                       30004490
027B 0 0000   STRSW    DC      *-*        START SW                       30004500
027C 0 0001   K0001    DC      /0001                                     30004510
027D 0 0000   MSWOX    DC      *-*                                       30004520
027E   0002            BSS     2 WARNING DON'T REMOVE USED FOR DIMAL     30004530
                       *                                                 30004540
                       ******************************************        30004550
                       *              MONITOR RESTART                    30004560
                       ******************************************        30004570
                       *  THIS SUBROUTINE RESTARTS THE MONITOR. IF THE  30004580
                       *  RESTART IS FROM PROGRAM HALT THE SUBROUTINE WILL 30004590
                       *  BRANCH TO GO. IF THE RESTART IS FROM THE INVALID 30004600
                       *  INTERRUPT TRAP, THE SUBROUTINE WILL BRANCH    30004610
                       *  INDIRECT ON THE INTERRUPT ENTRY. IF NONE OF THE 30004620
                       *  ABOVE THE SUBROUTINE WILL CONTINUE EXECUTION  30004630
                       *  OF ALL PROGRAMS NOT HALTED.                   30004640
                       *-------------------------------------          30004650
                       *                                                 30004660
                       *                                                 30004670
0280 0 C400 0412 MRSRT LD    L  STPSW      KEEP  MRSRT  AT /0280          30004680
0282 0 4C20 040B       BSC   L  GO,Z       RESTART FROM HALT              30004690
                       *                   IF YES BR TO GO                30004700
0284 0 C092            LD       IERM                                     30004710
0285 0 4CA0 04B0       BSC   I  IERR,Z     CK FOR RESTART FROM            30004720
                       *                    INVALID INTRPT TRAP           30004730
                       *                                                 30004740
0287 0 D06D            STO      IOBSY      RESET IOBSY                    30004750
0288 0 D06B            STO      ERC        RESET ERROR CALL               30004760
0289 0 6700 0414       LDX   L3 ASTOP                                    30004770
```



```
028B 0 6F00 0015       STX   L3 ILIR     INITIALIZE FOR ADRS STOP       30004780
028D 0 6700 04EA       LDX   L3 MMRBS-1                                  30004790
028F 0 6F00 018C       STX   L3 RQKB      RESTORE RQKB                   30004800
                       *                                                 30004810
0291 0 4C00 0219       BSC   L  INLIZ     CONTINUE EXECTION              30004820
                       *                                                 30004830
                       *-------------------------------------          30004840
                       *  COME TO HERE TO PRINT START MESSAGE            30004850
                       *-------------------------------------          30004860
                       *                                                 30004870
0293 0 7400 02F5 SMSG  MDX   L  IOBSY,0    CK I/O BUSY SW                 30004880
0295 0 700B            MDX      SMSG1     BR IF BUSY                     30004890
                       *                                                 30004900
0296 0 C0DD            LD       K007E                                    30004910
0297 0 EC00 027C       OR    L  K0001                                    30004920
0299 0 D0DA            STO      K007E                                    30004930
029A 0 C2F7            LD    2 -9         LD PID                         30004940
029B 0 D0DE            STO      STPID      STO IN MSG                     30004950
029C 0 405B            BSI      LOGI       PRINT START MSG                30004960
029D 0 0275            DC       SMSGA                                    30004970
                       *                                                 30004980
029E 0 C1FF            LD    1 -1         LOAD RESTART ADDRS             30004990
029F 0 D100            STO   1 0          SET IN MLSCF                   30005000
02A0 0 70D0            MDX      MXEQ7                                    30005010
                       *                                                 30005020
02A1 0 C0D3 SMSG1      LD       SMSGA      SET TO TRY AGAIN IF            30005030
02A2 0 D200            STO   2 0           PRINTOUT RTN IS BUSY          30005040
02A3 0 70CD            MDX      MXEQ7                                    30005050
                       *                                                 30005060
                       ************************************************  30005070
                       *              ERROR LOG ROUTINE                  30005080
                       ************************************************  30005090
                       *     THIS ROUTINE LOGS ERROR MESSAGES AND       30005100
                       *     CHECKS SWITCHES FOR BYPASS ERROR LOG,      30005110
                       *     HALT ON ERROR AND LOOP ON ERROR.           30005120
                       *     AFTER RECEIVING AN ERROR LOG CALL,         30005130
                       *     NORMAL PROGRAM POLLING IS INHIBITED        30005140
                       *     UNTIL ERROR MESSAGE IS TYPED.              30005150
                       *-------------------------------------          30005160
                       *              CALLING SEQUENCE                   30005170
                       *     BSI   I  ERROR                             30005180
                       *     DC       ADDRS OF MESSAGE                  30005190
                       *     DC       LOOP ADDRS - NO LOOP IF ZERO      30005200
                       *                                                 30005210
                       *              MESSAGE FORMAT                     30005220
                       *     DC       MESSAGE NUMBER                    30005230
                       *     DC       HEX/DECIMAL SWITCH                30005240
                       *     DC       DATA WORD ID                      30005250
                       *     DC       ALPHA ADDRS 1                     30005260
                       *     DC       ALPHA ADDRS 2                     30005270
                       *              0 TO 15 MODIFIERS                  30005280
                       *-------------------------------------          30005290
                       *                                                 30005300
02A4 0 0000   ERRI     DC       *-*                                      30005310
02A5 0 6580 023E       LDX   I1 MXEQ2&1    XR1#MLSCF ADDRS                30005320
02A7 0 6600 0214       LDX   L2 TYPI                                     30005330
02A9 0 6780 02A4       LDX   I3 ERRI       X3#CALL SEQ ADDR               30005340
02AB 0 C048            LD       ERC        CK FOR ERROR BUSY              30005350
02AC 0 4C20 02EB       BSC   L  BUSY,Z     BUSY RETURN                    30005360
02AE 0 6B45            STX      3 ERC      SAVE CALL SEQ ADDR             30005370
                       *                   AND SET ERC BUSY               30005380
02AF 0 6B43            STX      3 FRSW     SET ERSW                       30005390
02B0 0 C1FA            LD       1 -6       LD FUNC 0 SWS                  30005400
02B1 0 EAF9            OR       2 MSWO-TYPI OR WITH MON SWS               30005410
02B2 0 1881            SRT      1          CHECK FOR HALT ON ERR          30005420
02B3 0 4C04 02B8       BSC   L  ERRI1,E    BR IF HALT ON ERROR            30005430
02B5 0 1881            SRT      1          CK BYPASS ERR MESS             30005440
02B6 0 4C04 02C1       BSC   L  RSTX&2,E   BR IF BYPASS ERR MESS           30005450
```

```
                         *
02B8 0 7048              ERRI1 MDX     ELOG        GO TO LOG RTN
                         *
                         *-------------------------------------------
                         *     LOG FINISHED - RESTORE AND RETURN
                         *     TO USER.
                         *-------------------------------------------
                         *
02B9 0 10A0              LOGR  SLT     32
02BA 0 D03A                    STO     IOBSY       RESET IOBSY
02BB 0 D400 0204               STO  L  XLECT       RESET SUP SCAN CONTROL
02BD 0 6780 030B               LDX  I3 LOG5&1      SET XR3 TO CALL ADDR
02BF 0 6500 0000         RSTX  LDX  L1 *-*         X1#MLSCF ADRS
02C1 0 6D00 023E               STX  L1 MXEQ2&1
02C3 0 C02F                    LD      ERSW
02C4 0 4F18 0001               BSC  L3 1,&-        RETURN IF NOT ERR
                         *
02C6 0 1810              ERRI2 SRA     16
02C7 0 D02B                    STO     ERSW        RESET ERROR
02C8 0 D02B                    STO     ERC          SWITCHES
                         *
02C9 0 C02D                    LD      LINF        BYPASS SW CK AFTER 1ST
02CA 0 4F28 0002               BSC  L3 2,Z&         LINE OF MESSAGE
                         *
02CC 0 C1FA                    LD    1 -6          LD FUNC 0 SWS
02CD 0 EAF9                    OR    2 MSWO-TYPI   OR WITH MON SWS
02CE 0 1801                    SRA   1             CHECK FOR HALT ON ERR
02CF 0 4C04 02D9               BSC  L  HALT,E
                         *
02D1 0 100D              ERRI3 SLA     13          CHECK FOR LOOP
02D2 0 4F10 0002               BSC  L3 2,-          ON ERROR
                         *
02D4 0 C301                    LD    3 1           LOOP UNLESS
02D5 0 4F08 0002               BSC  L3 2,&          LOOP ADDRS ZERO
02D7 0 4F80 0001               BSC  I3 1           LOOP
                         *
02D9 0 3002              HALT  WAIT    2           HALT ON ERROR
02DA 0 70FE                    MDX     HALT
02DB 0 70F5                    MDX     ERRI3
                         *-------------------------------------------
                         *     ERROR BUSY SUBROUTINE
                         *-------------------------------------------
                         *
02DC 0 1810              ERRI7 SRA     16
02DD 0 D015                    STO     ERSW        RESET ERR SW
02DE 0 6700 02E5               LDX  L3 ERRI8       SET REENTRY
02E0 0 6F00 0215               STX  L3 ERBY         IN MLSCF
02E2 0 6903                    STX   1 ERRI8&1
02E3 0 4C00 0271               BSC  L  MXEQ7       GO TO SUPERVISOR
                         *
02E5 0 6500 0000         ERRI8 LDX  L1 *-*         RESTORE XR1
02E7 0 6780 02F4               LDX  I3 ERC         RESTORE XR3
02E9 0 6B09                    STX   3 ERSW         AND RESET ER SW
02EA 0 701A                    MDX     LOG4        GO TO LOG AGAIN
                         *
                         *
                         *-------------------------------------------
                         *     LOG BUSY SUBROUTINE
                         *-------------------------------------------
02EB 0 73FE              BUSY  MDX   3 -2
02EC 0 6F00 0216               STX  L3 MMBSY       STORE BUSY RETURN
02EE 0 4C00 0220               BSC  L  MXEQ        GO TO SUPERVISOR
                         *
                         *-------------------------------------------
                         *     CONSTANTS FOR ERROR AND LOG
                         *-------------------------------------------
                         *
02F0   0000              ERRI1 BSS  E  0
```



```
02F0 0 0000              PIDWS DC      *-*         MID STORAGE
02F1 0 0000                    DC      *-*         ROUTINE STORE
02F2 0 0000                    DC      *-*         RTN ADDRS STORE
02F3 0 0000              ERSW  DC      *-*         ERROR SW
02F4 0 0000              ERC   DC      *-*         ERROR CALL SW
02F5 0 0000              IOBSY DC      *-*         I/O BUFR BUSY SW
02F6 0 8100              CR    DC      /8100       CARRIER RETURN
02F7 0 0000              LINE  DC      *-*
                         *
                         *********************************************
                         *          LOG ROUTINE
                         *********************************************
                         *     THIS ROUTINE LOGS MONITOR AND TEST
                         *     PROGRAM MESSAGES TO THE CONSOLE
                         *     TYPEWRITER. CONTROL IS RETURNED TO THE
                         *     CALLING PROGRAM WHEN LOG IS COMPLETED.
                         *-------------------------------------------
                         *          CALLING SEQUENCE
                         *     BSI  I  LOG
                         *     DC      ADDRS OF MESSAGE
                         *
                         *          MESSAGE FORMAT
                         *     DC      MESSAGE NUMBER
                         *     DC      HEX/DECIMAL SWITCH
                         *     DC      DATA WORD ID
                         *     DC      ALPHA ADDRS 1
                         *     DC      ALPHA ADDRS 2
                         *          0 TO 15 MODIFIERS
                         *-------------------------------------------
                         *
02F8 0 0000              LOGI  DC      *-*
02F9 0 6580 023F               LDX  I1 MXEQ2&1     XR1#MLSCF ADDRS
02FB 0 6780 02F8               LDX  I3 LOGI        XR3# CALL SEQ ADDRS
02FD 0 C0F7                    LD      IOBSY       CHECK IF I/O
02FE 0 4C20 02EB               BSC  L  BUSY,Z      BUFFER BUSY
0300 0 D0F2                    STO     ERSW        RESET ERROR SW
                         *
0301 0 C9F7              ELOG  LDD   1 -9          LOAD AND STORE PID
0302 0 D8ED                    STD     PIDWS       AND ROUTINE NUMBER
0303 0 C1F9                    LD    1 -7          LD RTN ADDRS
0304 0 D0ED                    STO     PIDWS&2     STORE RTN ADDRS
                         *
0305 0 7400 02F5         LOG4  MDX  L  IOBSY,0     ERROR LOG CHECK
0307 0 7004                    MDX     ERRI7       FOR BUSY- IF BUSY
                         *                          RETURN TO ERROR RTN
0308 0 69B7                    STX   1 RSTX&1      SAVE XR1
0309 0 6B01                    STX   3 LOG5&1
030A 0 6780 0000         LOG5  LDX  I3 *-*         XR3# MESSAGE ADDRS
030C 0 C300                    LD    3 0           FETCH MESSAGE ID
030D 0 1888                    SRT     8
030F 0 C0E1                    LD      PIDWS       OR MID WITH PID
030F 0 1088                    SLT     8
0310 0 D0DF                    STO     PIDWS       STO TOTAL MESS ID
                         *
0311 0 6500 03DA               LDX  L1 TABL        XR1# CONVERSION
                         *                          TABLE ADDRESS
0313 0 62B2                    LDX   2 -78
0314 0 C110                    LD    1 16          LD SPACE
0315 0 D277              LOG7  STO   2 MESO&79     SET I/O BUFFER TO
0316 0 7201                    MDX   2 1            SPACES
0317 0 70FD                    MDX     LOG7
                         *
0318 0 6229                    LDX   2 MESO&1      XR2#I/O BUFF ADDRS
0319 0 C0DC                    LD      CR          SET CARRIER RETURN IN OUT
031A 0 D2FF                    STO   2 -1
031B 0 C115                    LD    1 21          LD SHRD CODE
031C 0 7400 02F3               MDX  L  ERSW,0      SKIP IF NOT ERROR
031E 0 C114                    LD    1 20          LD SHRD CODE
```

```
031F 0 D200              STO   2 0          STO SHIFT RED/BLACK          30006820
                     *                     IN I/O BUFFER                30006830
0320 0 C301              LD    3 1          LD HEX/DEC SW                30006840
0321 0 18D0              RTE     16                                       30006850
0322 0 C302              LD    3 2          LD WORD CONTROL              30006860
0323 0 D0D3              STO     LINE       STO MULT LINE CONTROL        30006870
0324 0 1001              SLA     1                                       30006880
0325 0 1801              SRA     1                                       30006890
0326 0 D918              STD   1 24         STO WC AND H/D SW            30006900
0327 0 4C02 0334         BSC   L LOG8,C     BR IF NOT 1ST LINE           30006910
                     *                                                   30006920
0329 0 C0C6              LD      PIDWS      LD MSG ID                    30006930
032A 0 18D0              RTE     16                                      30006940
032B 0 407A              BSI     HEX        CONV AND PUT IN MSG          30006950
032C 0 C0C4              LD      PIDWS&1    LD RTN ID                    30006960
032D 0 4C08 0334         BSC   L LOG8,&     BR IF NO RTN ID              30006970
032F 0 18D0              RTE     16                                      30006980
0330 0 4075              BSI     HEX        CONV AND PUT IN MSG          30006990
0331 0 C0C0              LD      PIDWS&2    LD RTN ADDRS                 30007000
0332 0 18D0              RTE     16                                      30007010
0333 0 4072              BSI     HEX        CONV AND PUT IN MSG          30007020
                     *                                                   30007030
0334 0 C112          LOG8 LD    1 18         LD TAB                       30007040
0335 0 D200              STO   2 0          STO TAB IN I/O BUFF          30007050
0336 0 C303              LD    3 3          LD FIRST ALPHA ADDR          30007060
0337 0 D05B              STO     ALPHA      SET ALPHA SW                 30007070
0338 0 4420 0393         BSI   L ALPHA,Z    IF NOT ZERO-GET MESS         30007080
033A 0 C304              LD    3 4          LD SEC ALPHA ADDRS           30007090
033B 0 4420 0393         BSI   L ALPHA,Z    IF NOT ZERO-GET MESS         30007100
033D 0 C055              LD      ALPHA      TEST ALPHA SW                30007110
033E 0 4C18 0345         BSC   L LOG9,&-    BR IF NO ALPHA               30007120
0340 0 C11A              LD    1 26                                      30007130
0341 0 7400 03F2         MDX   L WC,0       SKIP IF NO DATA WORDS        30007140
0343 0 D200              STO   2 0          STO CR AND TAB IN MSG        30007150
0344 0 7201              MDX   2 1                                       30007160
                     *                                                   30007170
0345 0 7314          LOG9 MDX   3 20         XR3#DATA TABLE ADDRS         30007180
0346 0 6B0B              STX   3 LOG12&1    STO DATA TABLE ADDRS         30007190
0347 0 63F1              LDX   3 -15        SET TO CK DATA ID            30007200
0348 0 C918              LDD   1 24         LD WC AND H/D SW             30007210
0349 0 4C04 0351     LOG10 BSC  L LOG12,E   BR IF PRINT DATA             30007220
034B 0 C918          LOG11 LDD  1 24         LD WC AND H/D SW            30007230
034C 0 18C1              RTE     1          SET FOR NEXT BIT             30007240
034D 0 D918              STD   1 24                                      30007250
034E 0 7301              MDX   3 1          SET XR3 FOR NEXT BIT         30007260
034F 0 70F9              MDX     LOG10      LOOP UNTIL LAST BIT          30007270
0350 0 700B              MDX     LEND                                    30007280
                     *                                                   30007290
0351 0 C700 0000     LOG12 LD   L3 *-*       LD NEXT DATA WORD           30007300
                     *                                                   30007310
0353 0 7289              MDX   2 -/77                                    30007320
0354 0 0004          FOUR DC      4         THIS WORD SKIPPED            30007330
0355 0 7277              MDX   2 /77                                     30007340
0356 0 7005              MDX     LEND       END IF MSG BUF FULL          30007350
                     *                                                   30007360
0357 0 18D0              RTE     16                                      30007370
0358 0 4C04 03B6         BSC   L DEC,F      CK HEX/DEC SW                30007380
035A 0 404B              BSI     HEX        CONV HEX IF SW OFF           30007390
035B 0 70EF              MDX     LOG11      RETURN FOR MORE              30007400
                     *                                                   30007410
035C 0 C117          LEND LD    1 23                                     30007420
035D 0 D200              STO   2 0          SET FORM FEED AND TERM       30007430
035E 0 6700 0028         LDX   L3 MESO      SET MESS START ADDRS         30007440
0360 0 6B6F              STX   3 LOGT                                    30007450
0361 0 6893              STX     IOBSY      SET I/O BUSY                 30007460
                     *                                                   30007470
                     *-----------------------------------------          30007480
                     *    TYPE THE MESSAGE- THE FIRST TYPE               30007490
```



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                     *    COMMAND IS GIVEN THEN THE PROGRAM              30007500
                     *    RETURNS TO THE SUPRVISER TO RUN                30007510
                     *    OTHER PROGRAMS UNTIL THE TYPE                  30007520
                     *    COMPLETE INTERRUPT OCCURS.                     30007530
                     *-----------------------------------------          30007540
                     *                                                   30007550
0362 0 086D          TYP  XIO     LOGT       CHECK TYPE BUSY              30007560
0363 0 180B              SRA     11                                      30007570
0364 0 4C04 0362         BSC   L TYP,E       LOOP IF BUSY                 30007580
0366 0 6700 0390         LDX   L3 TYP5       SET INTERRUPT                30007590
0368 0 6F00 01BB         STX   L3 RQTY       TRANSFER VECTOR              30007600
036A 0 6302              LDX     3 2                                     30007610
036B 0 6B69              STX     3 LOGT&5                                30007620
036C 0 C480 03D0     TYP1 LD    I LOGT                                   30007630
036E 0 74FF 03D5         MDX   L LOGT&5,-1                               30007640
0370 0 7005              MDX     TYP2                                    30007650
0371 0 7402 03D5         MDX   L LOGT&5,2                                30007660
0373 0 1008              SLA     8                                       30007670
0374 0 7401 03D0         MDX   L LOGT,1                                  30007680
                     *                                                   30007690
0376 0 D05D          TYP2 STO       LOGT&4   STO NEXT WORD               30007700
0377 0 4C18 036C         BSC   L TYP1,&-     BR IF WORD IS ZERO           30007710
0379 0 F076              EOR     TERM       CK FOR TERMINATOR            30007720
037A 0 1808              SRA     8                                       30007730
037B 0 4C18 02B9         BSC   L LOGR,&-     BR IF LAST CHAR              30007740
                     *                                                   30007750
037D 0 0854          TLOOP XIO      LOGT&2   TYPE                         30007760
037F 0 6857              STX     LOGT&6     SET TYPE WAIT CNT            30007770
037F 0 6700 0385     TYP3 LDX   L3 TYP4                                  30007780
0381 0 6F00 0214         STX   L3 TYPI       SET RETURN                   30007790
0383 0 4C00 0219         BSC   L INLIZ       GO TO SUPERVISOR             30007800
                     *                                                   30007810
0385 0 0C00 04DA     TYP4 XIO   L MCDSW                                  30007820
0387 0 1004              SLA     4                                       30007830
0388 0 4C10 036C         BSC   L TYP1,-                                  30007840
038A 0 7410 03D6         MDX   L LOGT&6,16   ADV COUNT                   30007850
038C 0 70F2              MDX     TYP3                                    30007860
038D 0 30FA              WAIT    -6          IF PROGRAM STOPS AT THIS    30007870
                     *                        WAIT, COLSOLE PRINTER      30007880
                     *                        BUSY DID NOT GO OFF.       30007890
038F 0 70DD              MDX     TYP1                                    30007900
038F 0 70ED              MDX     TLOOP                                   30007910
                     *                                                   30007920
0390 0 0000          TYP5 DC      *-*        RETURN HERE ON               30007930
0391 0 4C80 0390         BSC   I TYP5        BRANCH BACK                  30007940
                     *                                                   30007950
                     *-----------------------------------------          30007960
                     *    THIS IS THE ALPHA SUBROUTINE. IT SETS          30007970
                     *    ONE ALPHA PHRASE INTO THE I/O BUFFER.          30007980
                     *    THE ADDRESS OF THE PHRASE IS IN THE            30007990
                     *    ACCUMULATOR ON ENTRY. THE PHRASE MUST          30008000
                     *    CONSIST OF LEFT JUSTIFIED ROTATE AND           30008010
                     *    TILT CODE CHARACTERS TERMINATED BY FFFF.       30008020
                     *-----------------------------------------          30008030
                     *                                                   30008040
0393 0 0000          ALPHA DC     *-*                                    30008050
0394 0 D002              STO     ALPH1&1    STO ALPHA PHRASE ADRS        30008060
0395 0 7201              MDX   2 1          LEAVE SPACE IN MES           30008070
                     *                                                   30008080
0396 0 C400 0000     ALPH1 LD   L *-*        LD ALPHA WORD                30008090
0398 0 F116              EOR   1 22         EOR TERM                     30008100
0399 0 4C98 0393         BSC   I ALPHA,&-    FINISHED - RETURN            30008110
039B 0 C480 0397         LD    I ALPH1&1    LD ALPHA WORD                30008120
039D 0 D200              STO   2 0          STO WORD IN MES              30008130
039E 0 7401 0397         MDX   L ALPH1&1,1  MOVE TO NEXT WORD            30008140
03A0 0 7201              MDX   2 1          ADV I/O BUFFER ADDRS         30008150
                     *                                                   30008160
03A1 0 7289              MDX   2 -/77                                    30008170
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03A2 0 0005          FIVE  DC      5           THIS WORD SKIPPED          30008180
03A3 0 7277                MDX   2 /77                                    30008190
03A4 0 70B7                MDX     LEND        END IF MSG BUF FULL        30008200
                     *                                                    30008210
03A5 0 70F0                MDX     ALPH1       GET ANOTHER WORD           30008220
                     *                                                    30008230
                     *-------------------------------------------         30008240
                     *     HEXADECIMAL CONVERSION SUBROUTINE              30008250
                     *-------------------------------------------         30008260
                     *                                                    30008270
03A6 0 0000          HEX   DC      *-*                                    30008280
03A7 0 7201                MDX   2 1           LEAVE SPACE                30008290
03A8 0 C0AB                LD      FOUR        SET CHAR CONVERT           30008300
03A9 0 D02E                STO     WCNT         COUNT                     30008310
                     *                                                    30008320
03AA 0 1810          HEX1  SRA     16          CLEAR ACC TO ZERO          30008330
03AB 0 1084                SLT     4           BRING IN NEXT CHAR         30008340
03AC 0 D001                STO     HEX2&1                                 30008350
03AD 0 C500 0000     HEX2  LD    L1 *-*         GET CHAR CODE             30008360
03AF 0 D200                STO   2 0           SET IN I/O BUFFER          30008370
03B0 0 7201                MDX   2 1           ADV I/O BUFFER ADDRS       30008380
03B1 0 74FF 03D8           MDX   L WCNT,-1     CHECK IF WORD HAS          30008390
03B3 0 70F6                MDX     HEX1         BEEN COMPLETLY CNVTD      30008400
                     *                                                    30008410
03B4 0 4C80 03A6           BSC   I HEX         RETURN                     30008420
                     *                                                    30008430
                     *-------------------------------------------         30008440
                     *     DECIMAL CONVERSION SUBROUTINE                  30008450
                     *-------------------------------------------         30008460
                     *                                                    30008470
03B6 0 C0EB          DEC   LD      FIVE        SET CHAR CONVERT           30008480
03B7 0 D820                STD     WCNT         COUNT                     30008490
03B8 0 C020                LD      WCNT&1      CHECK IF WORD TO BE        30008500
03B9 0 4C10 03BF           BSC   L DEC1,-       CONVERTED IS NEGATIVE     30008510
                     *                                                    30008520
03BB 0 C031                LD      NEGS        SET A NEGATIVE SIGN        30008530
03BC 0 D200                STO   2 0           IN MESSAGE                 30008540
03BD 0 10A0                SLT     32                                     30008550
03BE 0 901A                S       WCNT&1      GENERATE 2S COMPLEMT       30008560
                     *                                                    30008570
03BF 0 7205          DEC1  MDX   2 5           SET TO STO LOW ORDR 1ST    30008580
03C0 0 18D0                RTE     16          PUT WORD IN EXTEN          30008590
                     *                                                    30008600
03C1 0 1810          DEC2  SRA     16          CLEAR ACC                  30008610
03C2 0 A814                D       TEN         CONVERT VALUE              30008620
03C3 0 18D0                RTE     16          BRING IN REMAINDER         30008630
03C4 0 D001                STO     DEC3&1      STO NXT DIGIT VALUE        30008640
03C5 0 C500 0000     DEC3  LD    L1 *-*         GET CHAR CODE             30008650
03C7 0 D200                STO   2 0           SET CHAR CODE IN OUT       30008660
03C8 0 72FF                MDX   2 -1           PUT AREA                  30008670
03C9 0 74FF 03D8           MDX   L WCNT,-1     CHECK IF END OF CONV       30008680
03CB 0 70F5                MDX     DEC2                                   30008690
                     *                                                    30008700
03CC 0 7206                MDX   2 6           FINISHED                   30008710
03CD 0 C000                LD      *           SET ACC NON ZERO           30008720
03CE 0 4C00 0349           BSC   L LOG10       RETURN                     30008730
                     *                                                    30008740
                     *-------------------------------------------         30008750
                     *     LOG ROUTINE CONSTANTS AND STORAGE              30008760
                     *-------------------------------------------         30008770
                     *                                                    30008780
                           BSS   E 0                                      30008790
03D0   0000          LOGT  DC      MES0        0    MESSAGE ADDRS         30008800
03D0 0 0028                DC      /0F00       1    1053 SENSE IOCC       30008810
03D1 0 0F00                DC      LOGT&4      2    CHAR ADDRS            30008820
03D2 0 03D4                DC      /0900       3    1053 WRITE IOCC       30008830
03D3 0 0900                DC      *-*         4    CHAR                  30008840
03D4 0 0000                DC      *-*         5    HALF WORD SW          30008850
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03D6 0 0000                DC      *-*         6    TYP DLY CNTR          30008860
03D7 0 000A          TEN   DC      /000A                                  30008870
                     *                                                    30008880
03D8   0000                BSS   E 0                                      30008890
03D8 0 0000          WCNT  DC      *-*                                    30008900
03D9 0 0000                DC      *-*                                    30008910
03DA 0 C400          TABL  DC      /C400       0    TABL&0                30008920
03DB 0 FC00                DC      /FC00       1      1                   30008930
03DC 0 D800                DC      /D800       2      2                   30008940
03DD 0 DC00                DC      /DC00       3      3                   30008950
03DE 0 F000                DC      /F000       4      4                   30008960
03DF 0 F400                DC      /F400       5      5                   30008970
03E0 0 D000                DC      /D000       6      6                   30008980
03E1 0 D400                DC      /D400       7      7                   30008990
03E2 0 E400                DC      /E400       8      8                   30009000
03E3 0 E000                DC      /E000       9      9                   30009010
03E4 0 3E00                DC      /3E00       A     10                   30009020
03E5 0 1A00                DC      /1A00       B     11                   30009030
03E6 0 1E00                DC      /1E00       C     12                   30009040
03E7 0 3200                DC      /3200       D     13                   30009050
03E8 0 3600                DC      /3600       E     14                   30009060
03E9 0 1200                DC      /1200       F     15                   30009070
03EA 0 2100                DC      /2100    SPACE    16                   30009080
03EB 0 6200                DC      /6200       R     17                   30009090
03EC 0 4121                DC      /4121    TAB      18                   30009100
03ED 0 8400          NEGS  DC      /8400    MINUS    19                   30009110
03EE 0 0936                DC      /0936    SET RED  20                   30009120
03EF 0 053E                DC      /053E    SET BLK  21                   30009130
03F0 0 FFFF          TERM  DC      /FFFF    TERM     22                   30009140
03F1 0 03FF                DC      /03FF    FORM FD  23                   30009150
03F2 0 0000          WC    DC      *-*      WD CNTL  24                   30009160
03F3 0 0000                DC      *-*      HEX/DEC  25                   30009170
03F4 0 8141                DC      /8141    CR & TAB 26                   30009180
03F5   0004                BSS     4 WARNING DON'T REMOVE USED FOR DIMAL  30009190
                     ********************************************         30009200
                     *          HALT ROUTINE                              30009210
                     ********************************************         30009220
                     *     THIS ROUTINE IS ENTERED FROM                   30009230
                     *     ADDRESS STOP BY PRESSING PROGRAM               30009240
                     *     STOP. THE ROUTINE WILL SAVE THE STATUS         30009250
                     *     OF THE MACHINE   THE ROUTINE WILL              30009260
                     *     RESTORE THIS STATUS WHEN STARTED FROM          30009270
                     *     THE WAIT OR BY NORMAL MONITOR RESTART.         30009280
                     *     PRESS RESET AND THEN START.                    30009290
                     *-------------------------------------------         30009300
                     *                    KEEP  ILT5  AT /03F9            30009310
03F9 0 0000          ILT5  DC      *-*                                    30009320
03FA 0 1000                NOP             ************************       30009330
03FB 0 D814                STD     AQ5         SAVE  AQ                   30009340
03FC 0 0815                XIO     DSW5-1      SENSE AND RESET DSW        30009350
03FD 0 4CB0 0015           BSC   I ILIR,-Z     GO SERVICE INTR OR         30009360
                     *                          GO TO STOP                30009370
                     *                                                    30009380
03FF 0 4C20 0404           BSC   L STOP,Z                                 30009390
0401 0 4480 01BE           BSI   I IL5                                    30009400
0403 0 7014                MDX     SAQ                                    30009410
                     *-------------------------------------------         30009420
                     *     STOP SUBROUTINE -SAVES STATUS THEN WAIT        30009430
                     *     START BY PRESSING START OR RESET AND           30009440
                     *     START.                                         30009450
                     *-------------------------------------------         30009460
                     *                                                    30009470
0404 0 C0FF          STOP  LD      STOP                                   30009480
0405 0 D00C                STO     STPSW       SET DELAY CNT              30009490
0406 0 74FF 0412     STOP1 MDX   L STPSW,-1    DELAY TO CYCLE             30009500
0408 0 70FD                MDX     STOP1        DOWN INTERRUPTS           30009510
0409 0 6808                STX     STPSW       SET STOP SWITCH            30009520
040A 0 3001                WAIT    1           WAIT 3001                  30009530
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                        *                                                       30009540
0408 0 1810             GO      SRA     16                                      30009550
040C 0 D005                     STO     STPSW       RESET STOP SW               30009560
040D 0 080E                     XIO     RDBSW       READ BIT SWS                30009570
040E 0 7009                     MDX     SAQ         RESTORE  AQ                 30009580
                        *                                                       30009590
0410   0000                     BSS  E  0           KEEP AQ5  AT /0410          30009600
0410 0 0000             AQ5     DC      *-*         STG FOR INT5 AND HALT       30009610
0411 0 0000                     DC      *-*         ACC AND EXT REGS            30009620
0412 0 0000             STPSW   DC      *-*         STOP SW                     30009630
0413 0 3F01             DSW5    DC      /3F01       INT 5 SENSE DSW COM         30009640
                        *                           KEEP  ASTOP  AT /0414       30009650
0414 0 C0E4             ASTOP   LD      ILT5        LD IAR ADDRS                30009660
0415 0 F008                     EOR     SADRS       COMPARE WITH SWS            30009670
0416 0 4C18 0404                BSC  L  STOP,&-     RETURN IF NOT EQUAL         30009680
0418 0 C8F7             SAQ     LDD     AQ5         RESTORE AQ                  30009690
0419 0 4CC0 03F9                BOSC I  ILT5                                    30009700
                        *                                                       30009710
041C   0000                     BSS  E  0                                       30009720
041C 0 041E             RDBSW   DC      SADRS                                   30009730
041D 0 3A00                     DC      /3A00       READ BIT SW IOCC            30009740
041E 0 0000             SADRS   DC      *-*                                     30009750
                        *                                                       30009760
                        *---------------------------------------------          30009770
                        *     DELAY SUBROUTINE - ENTERED WHEN RUNNING           30009780
                        *     IN INTERRUPT MODE. IT PROVIDES A DELAY            30009790
                        *     BETWEEN EXECUTION OF EACH MAIN LINE               30009800
                        *     INSTRUCTION. THIS DELAY CAN BE INCREASED          30009810
                        *     BY SETTING A COUNT IN MONITOR FUNCTION 2          30009820
                        *     SWITCHES.                                         30009830
                        *---------------------------------------------          30009840
                        *                                                       30009850
041F 0 C0FE             DELAY   LD      SADRS       LD DELAY COUNT              30009860
0420 0 D004                     STO     DELYC       SAVE                        30009870
0421 0 74FF 0425        DELY1   MDX  L  DELYC,-1    DECR DELAY COUNT            30009880
0423 0 70FD                     MDX     DELY1       LOOP                        30009890
0424 0 70F3                     MDX     SAQ         RETURN TO MAINLINE          30009900
0425 0 0000             DELYC   DC      *-*         DELAY COUNT                 30009910
                        *                                                       30009920
                        ***********************************************         30009930
                        *           MONITOR END ROUTINE                         30009940
                        ***********************************************         30009950
                        *     THIS ROUTINE IS ENTERED BY AN  END                30009960
                        *     CALL FROM ANY TEST PROGRAM.  IT WILL              30009970
                        *     FIRST CHECK TO SEE IF THE MONITOR                 30009980
                        *     LOOP PROGRAM SWITCH IS ON.                        30009990
                        *     IF NOT, AN END MESSAGE                            30010000
                        *     IS TYPED. IF NOT OVERLAP MODE,                    30010010
                        *     THE ROUTINE WILL BRANCH TO LOAD TO                30010020
                        *     ATTEMPT TO LOAD ANOTHER PROGRAM.                  30010030
                        *     IF LOOP,THE ROUTINE WILL BRANCH                   30010040
                        *     TO THE LOOP ADDRESS GIVEN IN THE                  30010050
                        *     PROGRAM CONTROL TABLE.                            30010060
                        *---------------------------------------------          30010070
                        *           CALLING SEQUENCE                            30010080
                        *     BSI  I  END                                       30010090
                        *---------------------------------------------          30010100
                        *                                                       30010110
0426 0 0000             MEND    DC      *-*                                     30010120
0427 0 6780 023E                LDX  I3 MXEQ2&1     X3#MLSCF ADDRS              30010130
0429 0 C3FA                     LD   3  -6          LD CONTROL SWS              30010140
042A 0 EC00 020D                OR   L  MSW0        OR WITH MON SWS             30010150
042C 0 1804                     SRA     4           CK FOR LOOP PROGRAM         30010160
042D 0 4F84 FFFE                BSC  I3 -2,E        BR IF LOOP                  30010170
                        *                                                       30010180
042F 0 10A0                     SLT     32                                      30010190
0430 0 C3F7                     LD   3  -9          LD PID                      30010200
0431 0 D400 050E                STO  L  MTABL&2     SET IN MSG                  30010210
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0433 0 C015             MMESF   LD      MMESF       LD END MESSAGE              30010220
0434 0 6600 8004                LDX  L2 /8004       SET WD CNTL                 30010230
0436 0 4400 04F3                BSI  L  MLOG        LOG MESSAGE                 30010240
                        *                                                       30010250
0438 0 C400 050D                LD   L  PGMN        CK IF OVER LAP              30010260
043A 0 1801                     SRA     1                                       30010270
043B 0 4C20 0271                BSC  L  MXEQ7,Z     BR IF OVLAP                 30010280
043D 0 C400 0155                LD   L  /155                                    30010290
043F 0 4C04 0271                BSC  L  MXEQ7,E     BR IF LD FROM TAPE          30010300
                        *                                                       30010310
0441 0 D400 050D                STO  L  PGMN        IF NOT OVLAP                30010320
0443 0 6700 05DC                LDX  L3 /05DC        GO LOAD NEXT PRGM          30010330
0445 0 6F00 015C                STX  L3 NLOC                                    30010340
0447 0 4C00 0581                BSC  L  LOAD                                    30010350
                        *                                                       30010360
0449 0 05A1             MMESF   DC      AEND                                    30010370
                        *                                                       30010380
                        ***********************************************         30010390
                        *           MONITOR INTERRUPT ROUTINES                  30010400
                        ***********************************************         30010410
                        *                                                       30010420
                        *---------------------------------------------          30010430
                        *           INTERRUPT LEVEL ZERO                        30010440
                        *---------------------------------------------          30010450
                        *                       KEEP ILT0  AT /044A             30010460
044A 0 0000             ILT0    DC      *-*                                     30010470
044B 0 1000                     NOP             **************************      30010480
044C 0 D855                     STD     AQ0         SAVE  AQ                    30010490
044D 0 6B09                     STX  3  X3081       SAVE XR3                    30010500
044E 0 2809                     STS     SS0         STORE  STATUS               30010510
044F 0 085C                     XIO     ILSW-1      SENSE AND                   30010520
0450 0 630F                     LDX  3  15                                      30010530
0451 0 4820                     BSC     Z           SKIP IF NO ILSW             30010540
0452 0 1340                     SLCA 3              FIND BIT IN ILSW            30010550
0453 0 4780 0168                BSI  I3 IL0-15      GO TO USER ROUTINE          30010560
0455 0 C84C             XS1     LDD     AQ0         RESTORE  AQ                 30010570
0456 0 6700 0000        X30     LDX  L3 *-*         RESTORE XR3                 30010580
0458 0 2000             SS0     LDS     *-*         LOAD STATUS                 30010590
0459 0 4CC0 044A                BOSC I  ILT0                                    30010600
                        *                                                       30010610
                        *---------------------------------------------          30010620
                        *           INTERRUPT LEVEL ONE                         30010630
                        *---------------------------------------------          30010640
                        *                       KEEP  ILT1  AT /045B            30010650
045B 0 0000             ILT1    DC      *-*                                     30010660
045C 0 1000                     NOP             **************************      30010670
045D 0 D846                     STD     AQ1         SAVE  AQ                    30010680
045E 0 6B09                     STX  3  X31&1       SAVE XR3                    30010690
045F 0 2809                     STS     SS1         STORE STATUS                30010700
0460 0 084B                     XIO     ILSW-1      SENSE AND                   30010710
0461 0 630F                     LDX  3  15                                      30010720
0462 0 4820                     BSC     Z           SKIP IF NO ILSW             30010730
0463 0 1340                     SLCA 3              FIND BIT IN ILSW            30010740
0464 0 4780 017B                BSI  I3 IL1-15      GO TO USER ROUTINE          30010750
0466 0 C83D                     LDD     AQ1         RESTORE  AQ                 30010760
0467 0 6700 0000        X31     LDX  L3 *-*         RESTORE XR3                 30010770
0469 0 2000             SS1     LDS     *-*         LOAD STATUS                 30010780
046A 0 4CC0 045B                BOSC I  ILT1                                    30010790
                        *                                                       30010800
                        *---------------------------------------------          30010810
                        *           INTERRUPT LEVEL TWO                         30010820
                        *---------------------------------------------          30010830
                        *                       KEEP ILT2  AT /046C             30010840
046C 0 0000             ILT2    DC      *-*                                     30010850
046D 0 1000                     NOP             **************************      30010860
046E 0 D837                     STD     AQ2         SAVE  AQ                    30010870
046F 0 6B09                     STX  3  X32&1       SAVE  XR3                   30010880
0470 0 2809                     STS     SS2         STORE STATUS                30010890
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0471 0 083A              XIO     ILSW-1      SENSE AND                30010900
0472 0 630F              LDX   3 15                                   30010910
0473 0 4820              BSC     Z           SKIP IF NO ILSW          30010920
0474 0 1340              SLCA  3             FIND BIT IN ILSW         30010930
0475 0 4780 018B         BSI   I3 IL2-15     GO TO USER ROUTINE       30010940
0477 0 C82E              LDD     AQ2         RESTORE  AQ              30010950
0478 0 6700 0000   X32   LDX   L3 *-*       RESTORE XR3              30010960
047A 0 2000        SS2   LDS     *-*         RESTORF STATUS           30010970
047B 0 4CC0 046C         BOSC  I  IL12                                30010980
                   *                                                  30010990
                   *-------------------------------------------     30011000
                   *            INTERRUPT LEVEL THREE               30011010
                   *-------------------------------------------     30011020
                   *                        KEEP IL13  AT /047D     30011030
047D 0 0000        IL13  DC      *-*                                  30011040
047E 0 1000              NOP                 ************************ 30011050
047F 0 D828              STD     AQ3         SAVE  AQ                 30011060
0480 0 6809              STX   3 X33&1       SAVE  XR3                30011070
0481 0 2809              STS     SS3         STORE STATUS             30011080
0482 0 0829              XIO     ILSW-1      SENSE AND                30011090
0483 0 630F              LDX   3 15                                   30011100
0484 0 4820              BSC     Z           SKIP IF NO ILSW          30011110
0485 0 1340              SLCA  3             FIND BIT IN ILSW         30011120
0486 0 4780 019B         BSI   I3 IL3-15     GO TO USER ROUTINE       30011130
0488 0 C81F              LDD     AQ3         RESTORE  AQ              30011140
0489 0 6700 0000   X33   LDX   L3 *-*       RESTORF XR3              30011150
048B 0 2000        SS3   LDS     *-*         RESTORF STATUS           30011160
048C 0 4CC0 047D         BOSC  I  IL13                                30011170
                   *                                                  30011180
                   *-------------------------------------------     30011190
                   *            INTERRUPT LEVEL FOUR                30011200
                   *-------------------------------------------     30011210
                   *                        KEEP IL14  AT /048E     30011220
048E 0 0000        IL14  DC      *-*                                  30011230
048F 0 1000              NOP                 ************************ 30011240
0490 0 D819              STD     AQ4         SAVE  AQ                 30011250
0491 0 6B08              STX   3 X34&1       SAVE  XR3                30011260
0492 0 2808              STS     SS4         STORE STATUS             30011270
0493 0 0818              XIO     ILSW-1      SENSE AND                30011280
0494 0 630F              LDX   3 15                                   30011290
0495 0 1340              SLCA  3             FIND BIT IN ILSW         30011300
0496 0 4780 01AB         BSI   I3 IL4-15     GO TO USER ROUTINE       30011310
0498 0 C811              LDD     AQ4         RESTORE  AQ              30011320
0499 0 6700 0000   X34   LDX   L3 *-*       RESTORE XR3              30011330
049B 0 2000        SS4   LDS     *-*         RESTORE STATUS           30011340
049C 0 4CC0 048E         BOSC  I  IL14                                30011350
                   *                                                  30011360
                   *-------------------------------------------     30011370
                   *     KEYBOARD RESPONSE          BIT 1           30011380
                   *-------------------------------------------     30011390
                   *                                                  30011400
049E 0 4480 01BD   MKBR  BSI   I  SVKB      GO TO KB USER RTN        30011410
04A0 0 7031              MDX     MCI2                                 30011420
                   *                                                  30011430
                   *-------------------------------------------     30011440
                   *            INTERRUPT CONSTANTS AND STORAGE     30011450
                   *-------------------------------------------     30011460
                   *                                                  30011470
04A2   0000              BSS   E  0                                   30011480
04A2 0 0000        AQ0   DC      *-*                                  30011490
04A3 0 0000              DC      *-*                                  30011500
04A4 0 0000        AQ1   DC      *-*                                  30011510
04A5 0 0000              DC      *-*                                  30011520
04A6 0 0000        AQ2   DC      *-*         ACCUMULATOR AND          30011530
04A7 0 0000              DC      *-*         EXTENSION REGISTER       30011540
04A8 0 0000        AQ3   DC      *-*         ARE STORED HERE          30011550
04A9 0 0000              DC      *-*         DURING INTERRUPT         30011560
04AA 0 0000        AQ4   DC      *-*                                  30011570
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04AB 0 0000              DC      *-*                                  30011580
                   *                                                  30011590
04AC 0 0455        XSC1  DC      XS1                                  30011600
04AD 0 0300        ILSW  DC      /0300       INT 4 SENSE ILSW         30011610
04AE 0 0000        MCIST DC      *-*         CONSOLE INTER STOR       30011620
04AF 0 0000        MCX2  DC      *-*         CON INT RTN XR2 STORE    30011630
                   *                                                  30011640
                   *************************************************  30011650
                   *            INTERRUPT ERROR                     30011660
                   *************************************************  30011670
                   *                                                  30011680
04B0 0 0000        IERR  DC      *-*                                  30011690
04B1 0 08FA              XIO     ILSW-1      SENSE ILSW               30011700
04B2 0 7400 0217         MDX   L IERM,0      IF INTERRUPT WILL NOT    30011710
04B4 0 30F9              WAIT    -7           TURN OFF- WAIT HERE     30011720
                   *                                                  30011730
04B5 0 D05B              STO     MTABL&5     STO ILSW                 30011740
04B6 0 C0F9              LD      IERR                                 30011750
04B7 0 90F4              S       XSC1        CALCULATE INTERRUPT      30011760
04B8 0 1804              SRA     4            LEVEL                   30011770
04B9 0 D056              STO     MTABL&4     STO INTERRUPT LEVEL      30011780
04BA 0 6700 04C0         LDX   L3 IERR2                               30011790
04BC 0 6F00 0217         STX   L3 IERM                                30011800
04BE 0 4C80 04B0         BSC   I  IERR                                30011810
                   *                                                  30011820
04C0 0 6305        IERR2 LDX   3 5           SET MSG NO               30011830
04C1 0 6230           LDX   2 /0030          SET DATA WORD ID         30011840
04C2 0 10A0           SLT     32                                       30011850
04C3 0 4038           BSI     MERR           LOG MSG                  30011860
04C4 0 4C00 0271      BSC   L  MXEQ7         GO TO SUPERVISOR         30011870
                   *                                                  30011880
                   *************************************************  30011890
                   *            CONSOLE INTERRUPT ROUTINE            30011900
                   *************************************************  30011910
                   *     THIS ROUTINE WILL SERVICE THE CONSOLE        30011920
                   *     INTERRUPT. IF THE INTERRUPT IS DUE TO A      30011930
                   *     USER XIO IT WILL BRANCH TO THE USER          30011940
                   *     INTERRUPT ROUTINE.                           30011950
                   *-------------------------------------------     30011960
                   *                                                  30011970
04C6 0 0000        MCINT DC      *-*                                  30011980
04C7 0 0812              XIO     MCDSW       SENSE, RESET             30011990
04C8 0 D011              STO     MCDSW       AND STORE DSW            30012000
04C9 0 6303              LDX   3 3                                    30012010
04CA 0 1340        MCI1  SLCA  3             LOOK FOR DSW BIT         30012020
04CB 0 F400 0205         EOR   L K8000       TAKE OUT ZERO BIT        30012030
04CD 0 D0F0              STO     MCIST       SAVE REMAINING DSW       30012040
04CE 0 68E0              STX   3 MCX2        SAVE DSW POSITION CNT    30012050
04CF 0 C00A              LD      MCDSW       SET DSW IN ACCUM         30012060
04D0 0 4F82 04DB         BSC   I3 MCDSW&1,C  GO TO SERVICE RTN        30012070
04D2 0 C0DB        MCI2  LD      MCIST       RETURN - LD DSW          30012080
04D3 0 6780 04AF         LDX   I3 MCX2       RESTORE POSITION CNT     30012090
04D5 0 4C02 04CA         BSC   L  MCI1,C     IF NOT 0-CONTINUE CK     30012100
04D7 0 4C80 04C6         BSC   I  MCINT      RETURN TO MAINLINE       30012110
                   *                                                  30012120
04DA   0000              BSS   E  0                                   30012130
04DA 0 0000        MCDSW DC      *-*         CONSOLE DSW              30012140
04DB 0 0F01              DC      /0F01                                30012150
04DC 0 04E2              DC      MMR         MANUAL REQ          2    30012160
04DD 0 049E              DC      MKBR        KB RESPONSE         1    30012170
04DE 0 04DF              DC      MTWR        TW RESPONSE         0    30012180
                   *                                                  30012190
                   *-------------------------------------------     30012200
                   *     CONSOLE PRINTER RESPONSE   BIT 0             30012210
                   *-------------------------------------------     30012220
                   *                                                  30012230
04DF 0 4480 01BB   MTWR  BSI   I  RQTY      GO TO TW USER RTN        30012240
04E1 0 70F0              MDX     MCI2                                 30012250
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                        *
                        *-------------------------------------------
                        *     MANUAL REQUEST                BIT 2
                        *-------------------------------------------
                        *
04E2 0 1003             MMR   SLA     3           CK CON/KB SW
04E3 0 4C10 04EF              BSC   L  MMR1,-      BR IF KB
04E5 0 6700 04EA              LDX   L3 MMRBS-1     RESTORE RQKB
04E7 0 6F00 01BC              STX   L3 RQKB
04E9 0 7001                   MDX      MMRBS
                        *
04EA 0 0000                   DC       *-*         ENTRY FROM RQKB
04EB 0 402D             MMRBS BSI      MRBS
04EC 0 6F00 0213              STX   L3 MLSCF       SET RD SW RETURN
04EE 0 70E3                   MDX      MCI2
                        *
04EF 0 C0EA             MMR1  LD       MCDSW
04F0 0 4480 01BC              BSI   I  RQKB
04F2 0 70DF                   MDX      MCI2
                        *
                        ********************************************
                        *             MONITOR LOG ROUTINE
                        ********************************************
                        *     THIS ROUTINE SETS THE MONITOR MESSAGE
                        *     ID NUMBER, WORD COUNT AND ALPHA MESSAGE
                        *     ADDRESS INTO THE MESSAGE TABLE THEN
                        *     CALLS ON LOG OR ERROR.
                        *-------------------------------------------
                        *             CALLING SEQUENCE
                        *     BSI     MLOG
                        *             ACC # ALPHA ADDRS 1
                        *             EXT # ALPHA ADDRS 2
                        *             XR2 # WORD CNT AND MESS ID
                        *-------------------------------------------
                        *
04F3 0 0000             MLOG  DC       *-*
04F4 0 D815                   STD      MALPH       STO ALPHA ADDRESSES
04F5 0 6A13                   STX    2 MLOG2&2     STO WD CNTL
04F6 0 6B10                   STX    3 MLOG2       STO MSG NO.
04F7 0 4480 0163              BSI   I  LOG
04F9 0 0507                   DC       MLOG2       MESS ADDRS
                        *
04FA 0 4C80 04F3              BSC   I  MLOG
                        *
04FC 0 0000             MERR  DC       *-*
04FD 0 D80C                   STD      MALPH       STO ALPHA ADDRESSES
04FE 0 6A0A                   STX    2 MLOG2&2     STO WD CNTL
04FF 0 6B07                   STX    3 MLOG2       STO MSG NO.
0500 0 4480 0162              BSI   I  ERROR
0502 0 0507                   DC       MLOG2       MESS ADDRS
0503 0 0000                   DC       /0000
                        *
0504 0 4C80 04FC              BSC   I  MERR
                        *
                        *-------------------------------------------
                        *     MONITOR MESSAGE TABLE
                        *-------------------------------------------
                        *
0506   0001                   BSS   E  1
0507 0 0000             MLOG2 DC       *-*         MESSAGE NUMBER
0508 0 0000                   DC       *-*         HEX/DEC
0509 0 0000                   DC       *-*         WORD CONTROL
050A 0 0000             MALPH DC       *-*         ALPHA ADDRS 1
050B 0 0000                   DC       *-*         ALPHA ADDRS 2
050C 0 0000             MTABL DC       *-*         BIT SWITCH READINGS
050D 0 0000             PGMN  DC       *-*         PROGRAM NUMBER
050E 0 0000                   DC       *-*         PID
050F 0 0000                   DC       *-*         STORAGE ADDRS
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0510 0 0000             X8000 DC       /8000
0511 0 0000                   DC       ALD
0512 0 8000                   DC       /0000
0513 0 059F                   BSS      4 WARNING DON'T REMOVE USED FOR DIMAL
0514 0 0000             *
0515   0004             ********************************************
                        *             MONITOR READ BIT SWITCH
                        *                    ROUTINE
                        ********************************************
                        *     THIS ROUTINE READS THE BIT SWITCHES IN
                        *     INTERRUPT AND PLACES THE DATA IN SWITCHES
                        *     8-15 IN THE PCT OF THE PROGRAM IDENTIFIED
                        *     BY SWITCHES 4-7. FOLLOWING THE INTERRUPT
                        *     THE SUPERVISER WILL RETURN TO THIS ROUTINE
                        *     IN MAINLINE TO CHECK THE FUNCTION ZERO
                        *     SWITCHES FOR HALT AND LOAD.
                        *-------------------------------------------
                        *
0519 0 0000             MRBS  DC       *-*
051A 0 6300                   LDX      3 0         SET FOR NO MLSCF ENTRY
051B 0 6F00 0204              STX   L3 XLECT       SET SCAN TO START AT MON
                        *
051D 0 0834                   XIO      RDBS        READ BIT SWITCHES
051E 0 C0ED                   LD       MTABL       LOAD BIT SW
051F 0 1004                   SLA      4           CLEAR ALL BUT PRGM
0520 0 180C                   SRA      12           NUMBER BITS
0521 0 D001                   STO      *&1         STO NUM TO BE VERIFIED
0522 0 6700 0000              LDX   L3 *-*         XR3#PROGRAM NUMBER
                        *
0524 0 C400 0205              LD    L  K8000
0526 0 1800                   SRA    3 0
0527 0 630F                   LDX    3 15
0528 0 1340                   SLCA   3 0
0529 0 C700 01BF              LD    L3 MPIDT-15    LD MLSCF ADDRS
052B 0 6700 0579              LDX   L3 MRBSE       LD ERROR RETURN
052D 0 4C88 0519              BSC   I  MRBS,&      BR IF INVALID PGM NO.
                        *
052F 0 D007                   STO      MRBS3&1     STORE SW ADDRS
0530 0 C0DB                   LD       MTABL       LOAD BIT SW
0531 0 180E                   SRA      14          GET FUNCTION
0532 0 D007                   STO      MRBS4&1     STORE FUNCTION
                        *
0533 0 C0D8                   LD       MTABL       LOAD BIT SW
0534 0 1008                   SLA      8           STRIP OFF
0535 0 1808                   SRA      8           ALL BUT DATA
0536 0 6700 0000        MRBS3 LDX   L3 *-*         X1 # MLSCF ADRS
0538 0 73FA                   MDX      3 -6        ADV TO SW ADDRS
0539 0 D700 0000        MRBS4 STO   L3 *-*         PUT SW DATA IN PROG
                        *                          AT PROPER FUNC LEVEL
053B 0 C3FD                   LD       3 -3        LD PID
053C 0 D0D1                   STO      MTABL&2     STO PID IN MSG
                        *
053D 0 C400 020F              LD    L  MSW2        LD MONITOR SW 2
053F 0 100B                   SLA      11
0540 0 4C10 054B              BSC   L  MRBSC,-     BR OUT IF NO UTILITY
                        *
0542 0 C400 048E        MRBSB LD    L  ILT4
0544 0 D480 0014              STO   I  UTLTY       SET UTILITY RETURN
0546 0 6780 0014              LDX   I3 UTLTY
0548 0 7301                   MDX    3 1
0549 0 6F00 048E              STX   L3 ILT4        SET BR TO UTILITY
054B 0 6700 055A        MRBSC LDX   L3 MRBS5       LD NORMAL RETURN
054D 0 4C80 0519              BSC   I  MRBS        BR OUT OF INTRPT
                        *                          KEEP  MRBSD  AT /054F
054F 0 0000             MRBSD DC       *-*         DUMMY RETURN IF
0550 0 4C80 054F              BSC   I  MRBSD        UTILITY NOT IN CORE
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                        *                                                    30013620
                        *-------------------------------------------         30013630
                        *     CONSTANTS AND STORAGE FOR                      30013640
                        *     READ BIT SW ROUTINE                            30013650
                        *-------------------------------------------         30013660
                        *                                                    30013670
0552    0000            RDBS  BSS  E  0                                      30013680
0552 0 050C             RDBS  DC     MTABL      IOCC TO READ BIT SWS         30013690
0553 0 3A00                   DC     /3A00                                   30013700
0554 0 0581             MMES1 DC     ASWS       MESSAGE ADDRESSES            30013710
0555 0 0598                   DC     ASIVD      SWS INVLD                    30013720
0556 0 0586             MMES3 DC     AHALT                                   30013730
0557 0 05A4             MMES4 DC     ACKSM                                   30013740
0558 0 05A8             MMES7 DC     AOVCR                                   30013750
0559    0001                  BSS    1 WARNING DON'T REMOVE USED FOR DIMAL    30013760
                        *                                                    30013770
                        *-------------------------------------------         30013780
                        *     RETURN HERE AFTER INTERRUPT AND CHECK THE      30013790
                        *     SWITCHES FOR HALT AND LOAD                     30013800
                        *-------------------------------------------         30013810
                        *                                                    30013820
055A 0 10A0             MRBS5 SLT    32                                      30013830
055B 0 C0B0                   LD     MTABL      LD SW ENTRY                  30013840
055C 0 180E                   SRA    14         SET TO LOOK AT FUNC SWS      30013850
055D 0 4C20 0564              BSC  L MRBS6,Z    BR UNLESS FUNC 0             30013860
                        *                                                    30013870
055F 0 C0AC                   LD     MTABL      LD SW ENTRY                  30013880
0560 0 100F                   SLA    15         LOOK AT HALT SW              30013890
0561 0 4820                   BSC    Z                                       30013900
0562 0 C0F3                   LD     MMES3      PRINT MSG IF HALT            30013910
0563 0 18D0                   RTE    16                                      30013920
                        *                                                    30013930
0564 0 6301             MRBS6 LDX    3 1        SET MSG NO.                  30013940
0565 0 6205                   LDX    2 /0005    SET WD CNTL                  30013950
0566 0 C0ED                   LD     MMES1                                   30013960
0567 0 4400 04F3              BSI  L MLOG                                    30013970
                        *                                                    30013980
0569 0 C400 020F              LD   L MSW2       LD MONITOR SW 2              30013990
0568 0 1890                   SRT    16                                      30014000
056C 0 D400 020F              STO  L MSW2       RESET SW2                    30014010
                        *                                                    30014020
056E 0 1099                   SLT    25                                      30014030
                        *                                                    30014040
056F 0 4C02 0581              BSC  L LOAD,C     GO RELOAD                    30014050
                        *                                                    30014060
0571 0 1001                   SLA    1                                       30014070
0572 0 4C10 0220              BSC  L MXEQ,-     BR IF NOT DELAY              30014080
                        *                                                    30014090
0574 0 6700 041F              LDX  L3 DELAY                                  30014100
0576 0 6F00 0015              STX  L3 ILIR      SET FOR DELAY                30014110
0578 0 7006                   MDX    MRBSF                                   30014120
                        *                                                    30014130
                        *-------------------------------------------         30014140
                        *     COME HERE IF THE PROGRAM IDENTIFIED IN         30014150
                        *     SWITCHES 4-7 IS NOT IN CORE. PRINT SWITCHES    30014160
                        *     INVALID MESSAGE.                               30014170
                        *-------------------------------------------         30014180
                        *                                                    30014190
0579 0 10A0             MRBSE SLT    32                                      30014200
057A 0 C0DA                   LD     MMES1&1    PID NO GOOD                  30014210
057B 0 6201                   LDX    2 /0001    SET WD CNTL                  30014220
057C 0 6301                   LDX    3 1        SET MSG NO.                  30014230
057D 0 4400 04FC              BSI  L MERR       LOG MES - SWS INVLD          30014240
                        *                                                    30014250
057F 0 4C00 0220        MRBSF BSC  L MXEQ       GO TO SUPERVISOR             30014260
                        *                                                    30014270
                        ********************************************         30014280
                        *             LOAD NEXT PROGRAM                      30014290
```



```
                        ********************************************         30014300
                        *                                                    30014310
0581 0 4C28 058A        LOAD  BSC  L  LOAD1,EZ   BR IF CONTINUE LOAD         30014320
0583 0 1810                   SRA     16                                     30014330
0584 0 0409 050D              STO  L  PGMN       RESET PRGM NUMBER            30014340
0586 0 6700 05DC              LDX  L3 /05DC                                  30014350
0588 0 6F00 015C              STX  L3 NLOC       RESET RELOCATION             30014360
                        *                                                    30014370
058A 0 4400 02F8        LOAD1 BSI  L  LOGI       GO PRINT CD MSG              30014380
058C 0 0510                   DC      MTABLE&4                               30014390
                        *                        KEEP  LOAD2  AT /0589        30014400
058D 0 6700 017A        LOAD2 LDX  L3 ILO        REQUIRED BY LOADER           30014410
058F 0 6078                   LDX     LOADR      LOAD NEXT PRGM               30014420
                        *                                                    30014430
                        *-------------------------------------------         30014440
                        *     PRINT  LOADER ERROR MESSAGES.                  30014450
                        *-------------------------------------------         30014460
                        *                                                    30014470
0590 0 6304             CKSUM LDX    3 4          SET MSG NUMBER             30014480
0591 0 C0C5                   LD      MMES4                                  30014490
0592 0 7002                   MDX     LDERM      PRINT CKSUM MSG             30014500
                        *                                                    30014510
0593 0 6303             OVCR  LDX    3 3          SET MSG NUMBER             30014520
0594 0 C0C3                   LD      MMES7                                  30014530
0595 0 1890             LDERM SRT     16                                     30014540
0596 0 6200                   LDX    2 0                                     30014550
0597 0 4400 04FC              BSI  L  MERR       GO PRINT MSG                30014560
0599 0 4C00 0220              BSC  L  MXEQ                                   30014570
                        *                                                    30014580
                        ********************************************         30014590
                        *             MONITOR ALPHA PHRASES                  30014600
                        ********************************************         30014610
                        *                                                    30014620
059B 0 9A92             ASIVD DC     /9A92      SW    SWS INVLD             30014630
059C 0 9A21                   DC     /9A21      S                           30014640
059D 0 2276             AIVD  DC     /2276      IN    INVLD                 30014650
059E 0 8600                   DC     /8600      V                           30014660
059F 0 5E32             ALD   DC     /5E32      LD    LD                    30014670
                              DC     /FFFF                                  30014680
05A1 0 0536             AEND  DC     /0536      E     END                   30014690
05A2 0 7632                   DC     /7632      ND                          30014700
05A3 0 FFFF                   DC     /FFFF                                  30014710
05A4 0 1F5A             ACKSM DC     /1F5A      CK    CKSUM                 30014720
05A5 0 9AB2                   DC     /9AB2      SU                          30014730
05A6 0 7200                   DC     /7200      M                           30014740
05A7 0 FFFF                   DC     /FFFF                                  30014750
05A8 0 52B6             AOVCR DC     /52B6      OV    OVR CORE              30014760
05A9 0 6221                   DC     /6221      R                           30014770
05AA 0 1F52                   DC     /1F52      CO                          30014780
05AB 0 6236                   DC     /6236      RE                          30014790
05AC 0 FFFF                   DC     /FFFF                                  30014800
05AD 0 059A             ASTRT DC     /059A      S     START                 30014810
05AF 0 9F3E                   DC     /9E3F      TA                          30014820
05AF 0 629E                   DC     /629E      RT                          30014830
05B0 0 FFFF                   DC     /FFFF                                  30014840
05B1 0 9A92             ASWS  DC     /9A92      SW    SWS                   30014850
05B2 0 9A21                   DC     /9A21      S                           30014860
05B3 0 2156             APID  DC     /2156      P                           30014870
05B4 0 2232                   DC     /2232      ID                          30014880
05B5 0 FFFF                   DC     /FFFF                                  30014890
05B6 0 263E             AHALT DC     /263F      HA    HALT                  30014900
05B7 0 5E9E                   DC     /5E9E      LT                          30014910
05B8 0 FFFF                   DC     /FFFF                                  30014920
05B9 0 76B2             ADRLD DC     /76B2      NU    NUM  PID  ADRS RELF   30014930
05BA 0 7221                   DC     /7221      M                           30014940
05BB 0 2156                   DC     /2156      P                           30014950
05BC 0 2232                   DC     /2232      ID                          30014960
05BD 0 2121                   DC     /2121                                  30014970
```

```
05BE 0 3E32                 DC      /3E32       AD                  30014980
05BF 0 629A                 DC      /629A       RS                  30014990
05C0 0 2162                 DC      /2162        R                  30015000
05C1 0 365E                 DC      /365E       FL                  30015010
05C2 0 1221                 DC      /1221       F                   30015020
05C3 0 FFFF                 DC      /FFFF                           30015030
                     *                                              30015040
                     ********************************************     30015050
                     *               LOADER/MONITOR INTERFACE       30015060
                     ********************************************     30015070
                     *                                              30015080
0156                         ORG     /156                           30015090
0156 0 4C00 0219             BSC  L  INLIZ       BLANK CD RET TO MONITOR 30015100
0158 0 4C00 0590             BSC  L  CKSUM                          30015110
015A 0 4C00 0593             BSC  L  OVCR                           30015120
015C 0 05DC          NLOC    DC      /5DC        NEXT AVAILABLE LOCATION 30015130
015D 0 0000          RELF    DC      /0000       RELOCATION FACTOR  30015140
015E 0 05DC                  DC      /5DC        SET BASE ADDRS     30015150
                     *                                              30015160
0078 0               LOADR   EQU     /0078       START LOAD ADDRS   30015170
0028 0               MFSO    EQU     /0028       MFSO # LOADER INPUT AREA 30015180
05DC                         ORG     /5DC                           30015190
05DC   0580                  END     LOAD2                          30015200
  NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```

```
ILT1    045B  0009 001A 046A
ILT2    046C  000A 001B 047B
ILT3    047D  000B 001C 048C
ILT4    048E  001D 049C 0542 0549
ILT5    03F9  000D 0414 0419
IL0     017A  01FC 0453 058D
IL1     018A  0464
IL2     019A  0475
IL3     01AA  0486
IL4     01BA  0496
IL5     01BE  0401
INLIZ   0219  0156 021D 0291 0383
IOBSY   02F5  0167 0287 0293 02BA 02FD 0305 0361
IXFVC   0019  021A
K0001   027C  0297
K0009   0209  01DA
K007E   0274  024E 0296 0299
K007F   0207  0222
K0080   0206  01F1
K8000   0205  01E4 0231 0235 04CB 0524
LDERM   0595  0592
LEND    035C  0350 0356 03A4
LINE    02F7  02C9 0323
LOAD    0581  0447 056F
LOADR   0078  01FE 058F
LOAD1   058A  0581
LOAD2   058D  05DC
LOG     0163  04F7
LOGBY   0167
LOGI    02F8  0163 026E 029C 02FB 058A
LOGR    0289  037B
LOGT    03D0  022A 0360 0362 036B 036C 036E 0371 0374 0376 037D 037E 038A 03D2
LOG10   0349  034F 03CE
LOG11   034B  035B
LOG12   0351  0346 0349
LOG4    0305  02EA
LOG5    030A  02BD 0309
LOG7    0315  0317
LOG8    0334  0327 032D
LOG9    0345  033E
MALPH   050A  04F4 04FD
MCDSW   04DA  0385 04C7 04C8 04CF 04D0 04EF
MCINT   04C6  0189 022D 04D7
MCIST   04AE  04CD 04D2
MCI1    04CA  04D5
MCI2    04D2  04A0 04E1 04EE 04F2
MCX2    04AF  04CE 04D3
MEND    0426  0164
MERR    04FC  04C3 0504 057D 0597
MESO    0028  0315 0318 035E 03D0
MKBR    049E  04DD
MLOG    04F3  01FA 0436 04FA 0567
MLOG2   0507  04F5 04F6 04F9 04FE 04FF 0502
MLSCF   0213  01CE 023D 04EC
MMBSY   0216  02EC
MMESF   0449  0433
MMESO   0200  01F9
MMES1   0554  0566 057A
MMES3   0556  0562
MMES4   0557  0591
MMES7   0558  0594
MMR     04E2  04DC
MMRBS   04EB  018C 028D 04E5 04E9
MMR1    04EF  04E3
MPID    020A
MPIDT   01CE  01E9 0237 0529
MRBS    0519  04EB 052D 054D
MRBSB   0542
```



```
MRBSC   054B  0540
MRBSD   054F  0014 0550
MRBSE   0579  052B
MRBSF   057F  0578
MRBS3   0536  052F
MRBS4   0539  0532
MRBS5   055A  054B
MRBS6   0564  055D
MRSRT   0280  0004
MSW0    020D  0166 0220 0225 0255 0267 02B1 02CD 042A
MSW0X   027D  0221 0244 0247
MSW1    020E
MSW2    020F  053D 0569 056C
MSW3    0210
MTABL   050C  01D3 01D7 01DF 01ED 0431 04B5 04B9 051E 0530 0533 053C 0552 055B
              055F 058C
MTWR    04DF  04DE
MXEQ    0220  023C 02EE 0572 057F 0599
MXEQ1   0233  0273
MXEQ2   023D  0168 0239 023A 0265 02A5 02C1 02F9 0427
MXEQ3   0252  025A 0263
MXEQ4   0254  0249
MXEQ5   0258  0241 0253
MXEQ6   0261  0259
MXEQ7   0271  023F 0256 025D 026D 02A0 02A3 02E3 043B 043F 04C4
NEGS    03ED  03BB
NLOC    015C  0445 0588
ORG0    0018  021E
OVCR    0593  015A
PGMN    050D  01D0 01E1 0438 0441 0584
PIDWS   02F0  0302 0304 030E 0310 0329 032C 0331
RDBS    0552  01EB 051D
RDBSW   041C  040D
RELF    015D  01D2
RQKB    01BC  028F 04E7 04F0
RQTY    01BB  0368 04DF
RSTX    02BF  02B6 0308
RTNSW   0165  0227 026A
SADRS   041E  0415 041C 041F
SAQ     0418  0403 040E 0424
SELCT   0203  01F5 01F6 0230
SMSG    0293  0275
SMSGA   0275  0250 029D 02A1
SMSG1   02A1  0295
SS0     0458  044E
SS1     0469  045F
SS2     047A  0470
SS3     0488  0481
SS4     0498  0492
START   0161
STOP    0404  03FF 0404 0416
STOP1   0406  0408
STPID   027A  029B
STPSW   0412  0280 0405 0406 0409 040C
STRSW   027B  0223 0229 024B
STRT    0264  0161
SVKB    01BD  049E
TABL    03DA  0311
TEMPB   0202  01DB 01E8
TEN     03D7  03C2
TERM    03F0  0379
TERMX   0218  025C
TLOOP   037D  038F
TYP     0362  0364
TYPI    0214  02A7 0281 02CD 0381
TYP1    036C  0377 0388 038E
TYP2    0376  0370
TYP3    037F  038C
```

```
TYP4    0385  037F
TYP5    0390  0366 0391
UTLTY   0014  0544 0546
WC      03F2  0341
WCNT    0308  03A9 03B1 03B7 03B8 03BE 03C9
XFVC    0008  021B
XLECT   0204  01E6 01F3 0232 0233 0236 02BB 051B
XSC1    04AC  04B7
XS1     0455  04AC
X30     0456  044D
X31     0467  045E
X32     0478  046F
X33     0489  0480
X34     0499  0491
X8000   0512
ZEROS   0208  0270
END OF ASSEMBLY
```

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NOTE - - DO NOT RUN THIS PROGRAM IN OVERLAP MODE.

1. PURPOSE

THE PURPOSE OF THIS PROGRAM IS TO PREPARE THE 2315 CE DISK PACK FOR USE BY THE DISK DIAGNOSTIC TEST PROGRAM. THIS PROGRAM IS RUN NORMALLY AT INSTALLATION TIME, AND WHEN THE PACK DATA HAS BEEN DESTROYED OR CHANGED. IN THIS PROGRAM ALL FILE ADDRESSES AND THE PROPER SECTOR PATTERNS ARE WRITTEN. THE EXCEPTIONS ARE CYLINDERS 90-110 INCLUSIVE.

THE PROGRAM PERFORMS THE FOLLOWING FUNCTIONS ON THE C.E. 2315 DISK PACK.

1. WRITES SECTOR IDENTIFICATION ADDRESS (SID) AND PROPER PATTERNS ON ALL CYLINDERS EXCEPT 90 THRU 110 INCLUSIVE. PROPER PATTERNS ARE -- 1313 ON SECTORS 0,2,5 AND 7 AND E5E5 ON SECTORS 1,3,4 AND 6.

2. READS AND VERIFIES EVERY SECTOR IDENTIFICATION ADDRESS WRITTEN. ANY MISSING OR ERRONEOUS SECTOR IDENTIFICATION ADDRESS CAUSES THE PROGRAM TO TERMINATE AND RESTART THE ENTIRE INITIALIZATION PROCESSES AGAIN.

3. WRITES THE SID, THE C.E. IDENTIFICATION 'CEDC', THE CYLINDER ERROR TABLE AND THE PROPER SECTOR PATTERN ON CYLINDER 199 SECTORS 3 AND SECTOR 7. THE CYLINDER ERROR TABLE CONTAINS ALL THE SECTOR ADDRESSES FOR EACH CYLINDER THAT HAS UNREADABLE AREAS. (EITHER ADDRESS OR DATA) WHEN A BAD SECTOR IS FOUND, ALL THE OTHER SECTOR ID'S IN THAT CYLINDER ARE ALSO RECORDED IN THE CYLINDER ERROR TABLE.

2. REQUIREMENTS

2.1*** PROGRAM REQUIREMENTS

1130 DIAGNOSTIC MONITOR II

2.2*** EQUIPMENT REQUIREMENTS

1. AN 1131 CPU WITH PROGRAM INPUT FROM CARD, PAPERTAPE READER OR DISK.
2. A DISK STORAGE DRIVE AND A 2315 CE DISK PACK.
3. AT LEAST 2350 AVAILABLE POSITIONS OF CORE STORAGE FOR THIS PROGRAM.

2.3*** EQUIPMENT SETUP

1. TURN POWER ON.
2. PLACE THE 2315 CE DISK PACK IN THE DISK DRIVE TO BE TESTED.
3. WAIT LONG ENOUGH FOR THE MACHINE TO BECOME READY. MACHINE MUST BE READY PRIOR TO EXECUTING PROGRAM.

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 CONTROL OPTIONS.
5. SELECT DRIVE TO BE RUN FROM TABLE AT 3.2.3.1.
6. IF WAIT 30CE OCCURS, SELECT CONTROL AS PER SECTION 3.2.4.2.
   NOTE -- THIS WAIT LOOP IS A SAFETY LOOP TO PREVENT INITIALIZING A DIMAL PACK OR CUSTOMER PACK UNINTENTIONALLY. E0862/E0863 CAN OCCUR ON A VIRGIN PACK OR ON AN ERROR CONDITION. THE PROGRAM WILL THEN BRANCH TO THE 30CE WAIT. THEREFORE, CHECK PRINTOUTS BEFORE PROCEEDING. ANALYZE ERROR ADDRESSES, IF ERROR OCCURED, BEFORE PROCEEDING WITH INITIALIZATION.

******

3.2*** PROGRAM OPERATION.

NOTE--DO NOT RUN THIS PROGRAM IN OVERLAP MODE.

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	'SEEK-WRITE-READ' ADDRESSES AND TEST PATTERNS	• NORMAL ROUTINES-
2	'REVERSE READ' VERIFIES EACH VALID DISK ADDRESS	• THE PROGRAM STARTS WITH • ROUTINE 1, RUNS EACH • ROUTINE IN SEQUENCE • THEN TERMINATES AFTER
3	WRITE CE HISTOK DATA ON CE CYLINDER SECTOR 3 AND 7.	• ROUTINE 3.

NOTE

IF A COMPLETE PASS OF THE PROGRAM WITH A NORMAL TERMINATION IS NOT ALLOWED AND IS NOT THE FINAL RUN, THE DISK PACK WILL NOT OPERATE PROPERLY WITH THE DIAGNOSTIC TEST PROGRAM. IT IS RECOMMENDED THAT THE LOOP ROUTINE FUNCTION NOT BE USED WITH THIS PROGRAM.

   C. PRESS INT REQ KEY ON CONSOLE.

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

3.2.3 DISK UNIT SELECTION - FUNCTION 2

ANY SINGLE DISK DRIVE MAY BE SELECTED AND TESTED BY TURNING ON THE PROPER CONSOLE BIT.

1. TO SELECT DISK

   A. SET SWITCHES 0-7 TO 81.
   B. SET SWITCHES 12-15 FOR DESIRED DRIVE UNIT.

SW	DRIVE UNIT
ALL OFF	MAIN DRIVE
15	FIRST DRIVE
14	SECOND DRIVE
13	THIRD DRIVE
12	FOURTH DRIVE

NOTE -- SELECTING A DISK THAT IS NOT ATTACHED TO THE SYSTEM WILL NOT CAUSE AN E0802 (NOT RDY) MESSAGE BUT WILL CAUSE AN E0801 (LOST INTERRUPT MESSAGE.)

2. PRESS INTERRUPT REQUEST KEY.

3. INITIALIZING MORE THAN ONE DISK PACK PER PROGRAM LOAD WILL REQUIRE SELECTING THE NEW DISK UNIT (SW FNC 2) PRIOR TO RESTARTING THIS PROGRAM.

4. TO RESTART -- PRESS IMMEDIATE STOP, RESET AND START. SELECT NEW DISK UNIT VIA CONSOLE ENTRY FNC 2 AND RESTART PROGRAM WITH MONITOR RESTART CONSOLE SWITCH B8 AND INT REQ BUTTON.

**

3.2.4 MISCELLANEOUS CONTROL - FUNCTION 3

1. SET SWITCHES 0-7 TO C1.
2. SET SWITCHES 8-15 AS DESIRED.

SW	FUNCTION
12 13	BOTH BITS 12 AND 13 TOGETHER SIGNIFIES THAT..... THE CE RECOGNIZES THAT THE DISK IS EITHER A DIMAL, VIRGIN, OR CUSTOMER PACK AND IT IS TO BE INITIALIZED.
14	BYPASS RETURNING ARM TO HOME BETWEEN RTNS.
15	SEMI-AUTO I/O AREA SCAN. DISPLAYS ONE WORD IN THE ACCUMULATOR EACH TIME THE START KEY IS PRESSED AFTER AN E0806 MESSAGE. THE COUNT IS DISPLAYED ON THE FIRST WAIT. (30DA) SCAN RT EXITS AFTER I/O WORD 321 OR FNC 3 BIT 15 OFF + CONSOLE INTERRUPT IS PRESSED.

3. PRESS INT REQ KEY ON CONSOLE.

**

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
3033	WAIT FOR DISK UNIT SELECTION	SEL DISK (FNC 2)
30CE	THIS IS A SAFETY WAIT TO NOTIFY THE CE THAT THIS IS A DIMAL, CUSTOMER OR VIRGIN PACK.	SEE 3.2.4 FOR CONTROLS IN ORDER TO PROCEED WITH INITIALIZATION... FUNCTION 3 BITS 12-13
30ED	THIS SIGNIFIES THE END OF THE PROGRAM. THIS WAIT IS NECESSARY FOR A DIMAL PACK TO PREVENT THE PROGRAM FROM RETURNING TO THE DISK VIA THE MONITOR LOAD TO LOOK FOR THE NEXT PROGRAM CONTROL	PRESS IMMEDIATE STOP, RESET AND START TO RECOVER FROM THIS INTENTIONAL PROGRAM END LOOP TRAP.

******

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
30DA	DISPLAY I/O AREA WORD	PRESS START FOR NXT WD. FNC 3 B15 OFF + CNSL NTRPT TO END DISPLAY.

THIS PROGRAM HAS ONE HANGUP WAIT 70FF. THIS OCCURS ON AN UNEXPECTED INTERRUPT OR IF THE INTERRUPT DOES NOT RESET.

******

3.4*** PROGRAM TERMINATION

IF LOOP PROGRAM HAS NOT BEEN SPECIFIED THE PROGRAM WILL TERMINATE AN A0801 MESSAGE WILL INDICATE PROGRAM TERMINATION. AN A08ED WILL INDICATE A NONSCHEDULED TERMINATION. GENERALLY THE RESULT OF ILLEGAL OPERATION PROCEDURES. RECHECK CAREFULLY.

NOTE

IF THE PROGRAM IS NOT ALLOWED TO MAKE A NORMAL TERMINATION, THE DISK PACK WILL NOT BE ACCEPTED BY THE FUNCTION TEST.

******

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 08 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.

A0800 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.

A0801 OORR AAAA PASS= SEEKS RESKS
WRITE SFTER HRDER
READS SFTER HRDER

COMPLETE PASS OF PROGRAM AND STATISTICAL INFORMATION. THE STATISTICAL INFORMATION IS A TOTAL FOR ALL OF THE PASSES INDICATED BY THE PROGRAM PASS COUNT. ALL DATA IS GIVEN IN THE DECIMAL FORM.

A0803 OORR AAAA SEL FILE

SELECT DISK UNIT PROGRAM IS TO OPERATE WITH. (SEE 3.2.3-1)

A0804 OORR AAAA

THIS MESSAGE IS ALWAYS PRECEEDED BY TWO E0808 MESSAGES. THE TWO E0808 MESSAGES INDICATE THAT THE WRONG ADDRESS WAS READ TWICE AFTER THE INITIAL SEEK. HOWEVER, REZEROING THE ARM AND RESEEKING THE PROPER ADDRESS WAS OBTAINED. THE PROGRAM COUNTS THIS AS ONE SEEK ERROR.

A08DC OORR AAAA INITL DIMAL PACK - .

THIS MESSAGE IS ACCOMPANIED WITH A 30CE WAIT. IT IS TO INFORM THE C.E. OF THE 30CE INITIALIZATION WAIT CONDITIONS. SEE 3.2.4 BEFORE PROCEEDING.

A08ED OORR AAAA RT =N/A (OR) ARM NOT HOME (OR) END INITL OK

END OF DISK DIAGNOSTIC. AN 'A08ED' FOLLOWING AN 'E0803' INDICATES THAT THE ACCESS ARM DID NOT GO TO HOME DURING INITIALIZATION OF PROGRAM. 'A08ED' ALONE MEANS A ROUTINE WAS SELECTED WHICH IS NOT AVAILABLE.

A08AD OORR AAAA ADDR RECORDED IN ERR TBL

THIS IS THE CYLINDER ERROR TABLE (CET) PRINTOUT. THE ADDRESSES HERE ARE IN ERROR. ONE BAD SID (SECTOR ID) WILL CAUSE ALL EIGHT ADDRESSES FOR SAID CYLINDER TO BE INCLUDED IN CET. FOUR LINES OF CET OUTPUT EQUAL A BAD PACK. (SEE E0866) ADR0 TO ADR7 ARE THE BAD ADDRESSES (SECTORS 0-7) OF SAID CYLINDER. SEE COMMENTS.

******

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 DISK DSW

BIT	DESCRIPTION
0	ANY ERROR
1	OP COMPLETE
2	NOT READY
3	BUSY
4	CARRIAGE HOME
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	SECTOR HI COUNT
15	SECTOR LO COUNT

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

E0801 OORR AAAA INST DSW FROM TO READ

INTERRUPT WAS LOST. PROGRAM AUTOMATICALLY RETRIES TO EXECUTE ROUTINE.

NOTE

SELECTING A FILE UNIT THAT IS NOT ATTACHED TO THE SYSTEM WILL NOT CAUSE AN 'E0802' (NOT READY), RESSAGE, BUT WILL CAUSE AN 'E0801' (LOST INTERRUPT) MESSAGE.

E0802 OORR AAAA INST DSW NOT RDY

FILE NOT READY, BUSY, OP COMPLT OR ANY ERROR IS ON.

E0803 OORR AAAA INST DSW

HOME BIT IN DSW FAILED, OR MECHANICAL RESTRICTION IN ACCESS ARM. SEEK-1 CYLINDER WAS GIVEN 203 TIMES AND ARM IS NOT AT HOME YET, OR DSW DOES NOT HAVE BIT 4 ON. DSW SHOULD BE 080X. X EQUALS 0 - 3.

E0804 OORR AAAA INST DSW ADDR RECORDED IN ERR TBL

DESIRED ADDRESS IS IN THE TABLE OF BAD ADDRESSES. NEXT CYLINDER IS TRIED.

E0805 OORR AAAA INST DSW DSW ERR

DSW HAS BIT/BITS ON THAT SHOULD NOT BE ON AT THIS TIME. BRANCH TO MONITOR END ROUTINE.

E0806 OORR AAAA INST DSW ADDR DATA

DSW ERROR BIT/BITS ON AFTER A READ OR WRITE. SOFT RD/WR ERROR.

NOTE ... SEE FNC 3 (3.2.4) TO SCAN I/O AREA)

E0807 OORR AAAA INST DSW ADDR DATA

HARD READ OR WRITE ERROR. INDICATES TEN SOFT READ/WRITE RETRIES WITH FAILURE STILL PRESENT. DSW INDICATES ERROR BITS. SEE E0806.

E0808 OORR AAAA INST DSW FROM TO READ

ACTUAL ADDRESS READ, AND THE DESIRED ADDRESS DO NOT AGREE. (READ, READ-CHECK FUNCTIONS ONLY). FIRST E0808 WILL CAUSE A RE-READ OF THE DESIRED ADDRESS. SECOND E0808 WILL CAUSE A RE-ZERO OF THE ARM AND A RE-SEEK AND A READ OF THE DESIRED ADDRESS.

E0809 OORR AAAA INST DSW FROM TO READ

THIS MESSAGE WILL ALWAYS BE PRECEEDED BY TWO E0808 MESSAGES. THE ACTUAL AND THE DESIRED ADDRESSES STILL DO NOT AGREE. (SEE E0808 MESSAGE.) THE ACTUAL ADDRESSES OF THE TWO E0808 MESSAGES ARE THE SAME. THEREFORE, A SEEK ERROR MOST LIKELY OCCURED. HOWEVER, THERE IS STILL A POSSIBILITY OF A READ, WRITE, OR DISK PACK RECORDED DATA ERROR OR ERRORS.

E0815 OORR AAA INST DSW FROM TO READ

THIS MESSAGE WILL ALWAYS BE PRECEEDED BY TWO E0808 MESSAGES. THE ACTUAL AND THE DESIRED ADDRESSES STILL DO NOT AGREE. (SEE E0808 MESSAGE.) THE ACTUAL ADDRESS OF THE TWO E0808 MESSAGES ARE NOT THE SAME. THEREFORE, A READ ERROR MOST LIKELY OCCURED. HOWEVER, THERE IS STILL A POSSIBILITY OF A SEEK, WRITE, OR DISK PACK RECORDED DATA ERROR OR ERRORS.

E0820 OORR AAAA INST DSW FROM TO READ

WRONG ADDRESS READ, DESIRED AND ACTUAL ADDRESS DO NOT AGREE. THIS IS A SECTOR ERROR.

E0821 OORR AAAA INST DSW FROM TO READ

READ SUBROUTINE ERROR RETURN. DSW, ADDRESS, OR DATA MAY BE IN ERROR CHECK PRINTOUTS CAREFULLY.

E0860 OORR AAAA INST DSW FROM TO READ

WRITE ERROR RETURN. THIS OCCURS IN ROUTINE NO. 01, WHICH PLACES THE PROPER PATTERN ON THE DISK.

E0861 OORR AAAA INST DSW FROM TO READ

READ ERROR RETURN. THIS OCCURS IN ROUTINE NO. 01, WHICH VERIFIES THE PROPER PATTERN ON THE DISK.

E0862 OORR AAAA INST DSW FROM TO READ

ERROR OCCURED ON READING SECTOR 0 OF CE TRACK. THIS READ TESTS FOR A DIMAL PACK. PROGRAM TRIED TWO TIMES TO READ THIS SECTOR. CE MAY PROCEED AFTER CHECKING PRINTOUTS (SEE 3.1 #6) AS THE PROGRAM WILL BRANCH TO THE 30CE WAIT FOR INITIALIZATION CONTROL. RE-READ IS VIA A RE-SEEK OPERATION. ADDRESS DESIRED + ACTUAL DO NOT AGREE.

E0863 OORR AAAA INST DSW FROM TO READ

ERROR OCCURED ON READING SECTOR 7 OF CE TRACK. THIS READ TESTS FOR A CE PACK. PROGRAM TRIED TWO TIMES TO READ THIS SECTOR. CE MAY PROCEED AFTER CHECKING PRINTOUTS (SEE 3.1 #6) AS THE PROGRAM WILL BRANCH TO THE 30CE WAIT FOR INITIALIZATION CONTROL. RE-READ IS VIA A RE-SEEK OPERATION. ADDRESS DESIRED + ACTUAL DO NOT AGREE.

E0866 OORR AAAA INITL BAD PACK

FOUR OR MORE CYLINDERS HAVE BAD SECTORS. THIS PACK IS THEREFORE BAD, ACCORDING TO THE DESIGN SPECIFICATIONS. DOES NOT CONTAIN 200 GOOD CYLINDERS.

E0875 OORR AAAA INST DSW FROM TO READ

TRIED TWICE TO SEEK CE CYLINDER BY REZEROING ARM. FAILED TWICE. PROGRAM BRANCHED TO MONITOR END.

E0877 OORR AAAA CE CYL BAD

THIS MESSAGE INDICATES THAT THE DESIGNATED 'CE' CYLINDER (199) ADDRESS 0638 IS BAD. IT WILL BE NECESSARY TO PATCH THE PROGRAM. CHANGE ADDRESS (0638) TO SOME OTHER UNUSED ADDRESS. SUGGESTED ALTERNATE ADDRESS IS 0630 (CYLINDER 198). REFER TO LISTING FOR THE CORE ADDRESS OF THE DISK ADDRESS CONSTANT. PATCH THAT CORE ADDRESS WITH '0630'. CORE ADDRESS IS FOUND IN LISTING AT LABEL 'DCT' MINUS 40. 'DCT' IS FOUND IN CROSS REFERENCE LIST AT THE END OF THE LISTING.

E08CE OORR AAAA INST DSW FROM TO READ

ERROR IN WRITING CE DISK SECTORS 3 AND 7. THESE SECTORS CONTAIN SECTOR ID, 'CEDC' ID WORD, NUMBER OF ERROR SECTORS, CYLINDER ADDRESS ERROR TABLE, AND THE PROPER PATTERN.

4.3*** SPECIAL NOTES

NOTE A. HARD WRITE (OR READ) ERRORS - A SOLID FAILURE TO WRITE ON THE DISK.
IF THE TEST PROGRAM DETECTS THAT IT CANNOT WRITE ON THE DISK, IT WILL REPEAT THE OPERATION NINE TIMES. IF ALL TEN ATTEMPTS TO WRITE END IN A FAILURE, THE PROBLEM IS DEFINED AS A 'HARD WRITE(OR READ) ERROR.'

NOTE B. SOFT WRITE (OR READ) ERROR - AN INTERMITTANT FAILURE TO WRITE ON THE DISK.
IF THE TEST PROGRAM DETECTS THAT IT CANNOT WRITE ON THE DISK, IT WILL REPEAT THE OPERATION UP TO NINE TIMES. IF ONE OF THE TRIALS IS SUCCESSFUL, THE PROBLEM IS CALLED A 'SOFT WRITE (OR READ) ERROR.'

NOTE C. DISK ADDRESSES ARE GIVEN IN DECIMAL FORM IN ALL MESSAGES. I.E. A FROM, TO, READ ALL APPEAR IN THE FORM 'CCCS' WHERE 'CCC' IS THE CYLINDER VALUE IN DECIMAL AND 'S' IS THE SECTOR VALUE IN DECIMAL. SECTOR 'S' IS ACTUALLY SECTORS AND HEAD.

5. COMMENTS

5.1*** DISK ADDRESSING SCHEME

THE FOLLOWING IS THE FORMAT FOR THE DISK ADDRESSING SCHEME --

HEX WD	N	N	N	N
BITS	0 1 2 3	4 5 6 7	8 9 10 11	12 13 14 15
CODE	X X X X	X C C C	C C C C	C H S S
CYL. POS CNT		1 0 0	0 0 0 0	0
READ		2 6 3	1 0 0 0	0
DOWN		8 4 2	6 8 4 2	1

C = CYLINDER H = HEAD S = SECTOR X = NOT USED

THE LOWEST CYLINDER ADDRESS IN HEX = 0000
THE HIGHEST CYLINDER ADDRESS IN HEX = 0657
THE ADDRESSES ARE CYLINDER 0, HEAD 0, SECTOR 0 TO CYLINDER 202, HEAD 1, SECTOR 3.

THE ABOVE ADDRESSING FORMAT IS USED FOR ALL THE SECTOR IDENTIFICATION WORDS (CALLED SID). IT APPEARS ON THE DISK AND AS THE FIRST WORD OF DATA TO BE READ OR WRITTEN TO OR FROM CORE. IT IS THE SECOND WORD OF THE FIELD ADDRESSED BY THE IOCC. (THE FIRST WORD OF SAID FIELD IS THE WORD COUNT)

A. TO CONVERT HEX DISK ADDRESS WORD TO DECIMAL. PERFORM THE FOLLOWING USING SECTION 'B' BELOW

1. FIND CORRESPONDING C.V. FOR EACH N IN THE ADDRESS.
2. ADD THE C.V.'S TOGETHER.
3. C.V. TOTAL IS THE ACTUAL CYLINDER NUMBER IN DECIMAL.
4. FIND CORRESPONDING S.N. FOR UNITS N OF HEX ADDRESS.
5. S.N. IS THE ACTUAL DECIMAL HEAD - SECTOR NUMBER.

EXAMPLE --

CONVERT 03BD TO DECIMAL CYLINDER AND SECTOR NUMBERS.

SOLUTION -- FROM TABLE

0 3 B D	C.V.	S.N.	
. . .			
. . .			
. . . . .	1	5	
. .			
. . . . .	22		
.			
. . . . .	96		
	---	---	
CYLINDER	119	5	SECTOR

B. HEX TO DEC ADDRESS CONVERSION

DISK ADDRESS WORD IN HEX

ZERO NOT USED . . . . . 0 N N N

C.V. = CYLINDER VALUE

S.N. = SECTOR NUMBER

NNN = HEX ADDRESS FROM 000 TO 657

N	C.V.
0	00
1	32
2	64
3	96
4	128
5	160
6	192

N	C.V.
0	0
1	2
2	4
3	6
4	8
5	10
6	12
7	14
8	16
9	18
A	20
B	22
C	24
D	26
E	28
F	30

N	C.V. + S.N.
0	0 + 0
1	0 + 1
2	0 + 2
3	0 + 3
4	0 + 4
5	0 + 5
6	0 + 6
7	0 + 7
8	1 + 0
9	1 + 1
A	1 + 2
B	1 + 3
C	1 + 4
D	1 + 5
E	1 + 6
F	1 + 7

5.2*** ROUTINES

IT IS THE INTENT OF THIS SECTION TO DESCRIBE THE FUNCTIONS OF EACH TEST ROUTINE AND THE DISK SUPERVISOR ROUTINES. THE FOLLOWING ARE THE IMPORTANT DISK SUPERVISOR ROUTINES-

PROGRAM LISTING LABEL	FUNCTION
DCARM	RETURN ARM TO HOME
DEXEQ	SETUP AND EXECUTE THE IOCC.
DCABP	BYPASS CYLINDERS 90 THRU 110.
DCRDY	FILE READY, NOT BUSY AND NO ERRORS.
DCDSW	SENSE DSW AND SAVE IT.
DCRTN	ROUTINE NUMBER AND PROGRAM CONTROL ROUTINE.
DCSK	SEEK SUBROUTINE.
DCWR	WRITE SUBROUTINE.
DCRD	READ SUBROUTINE.
CDTRT	COMMON DATA TRANSFER ROUTINE.
NTRPT	INTERRUPT ROUTINE.
START	MONITOR CONTROL RETURN.
END	MONITOR END ENTRY.

THE DISK SUPERVISOR ROUTINES ARE THE INTERFACE BETWEEN THE DIAGNOSTIC MONITOR AND THE TEST ROUTINES. THESE ROUTINES DO THE BASIC TESTING, CHECKING AND CONTROLLING FOR THE USING ROUTINES WHICH MAY INCLUDE OTHER SUPERVISOR ROUTINES AS WELL AS TEST ROUTINES. THEREFORE, THE ERROR MESSAGES OF SUPERVISOR ROUTINES POINT TO BASIC OR GENERAL PROBLEMS AND SHOULD NOT BE DISREGARDED OR NOTICED CASUALLY. IN SHORT, ALL ERROR MESSAGES SHOULD BE CAREFULLY ANALYZED TO SEE HOW THEY RELATE TO EACH OTHER.

NOTE

AN UNSCHEDULED INTERRUPT WILL CAUSE A PROGRAM HANG CONDITION. SEE THE INTERRUPT ROUTINE.

AGAIN IT MUST BE SAID, 'ALL ERROR MESSAGES MUST BE ANALYZED TO FIND THEIR ASSOCIATION WITH EACH OTHER.'

6. APPENDIX

NOTE
ROUTINES ARE NOT DESIGNED TO LOOP IN THE INITIALIZATION PROGRAM.

ROUTINE 01 WRITE SECTOR IDENTIFICATION ON CYLINDERS 000 (0000) THRU 089 (02C8) AND 111 (0378) THRU 202 (0650) WRITES ALTERNATE WORST CASE PATTERNS ON ALL CYLINDERS AND USES 2 SECTORS TO LOG ALL CYLINDERS THAT ARE BAD. THE CYLINDER ERROR TABLE (C.E.T.)IS LOCATED ON SECTOR ID 063B AND 063F.

ROUTINE 02 VERIFIES CORRECT ADDRESSES ON ALL CYLINDERS (EXCEPT 90 - 110 INCLUSIVE). THIS IS A REVERSE READ. STARTS AT CYLINDER 202 AND READS TO HOME ADDRESS 0000 (HEX).

NOTE

OUT OF SEQUENCE ERRORS IN ROUTINE 2 WILL CAUSE THE INITIALIZATION PROGRAM TO BE RESTARTED. THESE TYPEOUTS COULD INDICATE IMPROPER SEEK AND WRITING OF THE SECTOR ADDRESS, THEREFORE TO ENSURE PROPER INITIALIZATION THE PROGRAM IS AUTOMATICALLY RESTARTED. IF ERROR MESSAGES WITH ROUTINE 2 DESIGNATED KEEP REOCCURRING, THIS INDICATES IMPROPER SEEK INCREMENTING FROM CYLINDER 0 TO 202. INVESTIGATE SEEK ERRORS BEFORE TRYING TO INITIALIZE THE PACK.

ROUTINE 03 WRITE THE CE SECTORS WHICH CONTAIN THE CYLINDER ERROR TABLE DATA. THE CE SECTORS ARE IDENTIFIED BY THE WORD ' CEDC ' FOLLOWING THE SECTOR ID. THE SECTOR PATTERNS ARE -- 1313 ON SECTORS 0,2,5, AND 7 AND E5E5 ON SECTORS 1,3,4, AND 6. THE C.E.T. IS PRINTED AT THE END OF THE PROGRAM IF THERE ARE ENTRIES IN IT.

NOTE

IF AN ERROR OCCURS DURING THIS ROUTINE IT INDICATES IMPROPER CE DATA SECTOR, AN ALTERNATE SHOULD BE SELECTED VIA PATCH CARDS. IF PATCH IS USED, PACK SHOULD INDICATE SAME. THE 2310 PROGRAM MUST BE PATCHED THE SAME AS THE 2315 PROGRAM IF THE 2310 PROGRAM IS TO BE RUN. SEE DM DOCUMENTATION FOR PATCH DETAILS.

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

```
0000                ORG     *&/05DC                                         30800020
            ****************************************************** 30800030
            *                                                      30800040
            *  THIS ENGINEERING CHANGE REFLECTS MAJOR              30800050
            *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS        30800060
            *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.      30800070
            *                                                      30800080
            *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.      30800090
            *                                                      30800100
            *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966         30800110
            *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC           30800120
            *  MONITOR II.                                         30800130
            *                                                      30800140
            ****************************************************** 30800150
            *                                                      30800160
            *.......................................*              30800170
            *                                       *              30800180
            *                 1130-2310 FILE DIAGNOSTIC*           30800190
            *                 TEST.  PROGRAM RELOCAT-  *           30800200
            *                 ABLE.  NORMAL ADDR 05DC. *           30800210
            *                 SEE WRITEUP FOR DETAILS. *           30800220
            *                                       *              30800230
            *.......................................*              30800240
            *                                                      30800250
            *                                                      30800260
            *      *****     PROGRAM CONTROL      *****            30800270
            *      *****     CONDITION WAITS      *****            30800280
            *                                                      30800290
            *                                                      30800300
            *    WAIT1    -------    CE WAIT NUMBER 1    *         30800310
            *                                                      30800320
            *                                                      30800330
            *                WAIT1 -- IS TO LET THE                30800340
            *                CE KNOW THAT A DIMAL,                 30800350
            *                CUSTOMER, OR VIRGIN PACK              30800360
            *                IS TO BE INITIALIZED.                 30800370
            *                THIS WAIT ALLOWS THE CE TO            30800380
            *                MAKE THE DECISION WHETHER             30800390
            *                THIS PACK IS OR IS NOT TO             30800400
            *                BE INITIALIZED.                       30800410
            *                                                      30800420
            *                                                      30800430
            *    WAIT2    -------    END IF JOB WAIT     *         30800440
            *                                                      30800450
            *                                                      30800460
            *                WAIT2 -- INDICATES THAT               30800470
            *                THE END OF THE INITIAL-               30800480
            *                IZATION PROGRAM HAS BEEN              30800490
            *                REACHED.   NOTE -- IF THIS            30800500
            *                PROGRAM WAS LOADED FROM               30800510
            *                THE DISK VIA DIMAL, DO NOT            30800520
            *                TRY TO PROCEED WITHOUT RE-            30800530
            *                LOADING DISK DIMAL PGMS.              30800540
            *                TO RECOVER FROM THIS WAIT,            30800550
            *                PRESS STOP-RESET-START IN             30800560
            *                THAT ORDER.  THIS WILL RE-            30800570
            *                TURN CONTROL TO THE                   30800580
            *                MONITOR.                              30800590
            *                                                      30800600
            *                                                      30800610
            *                                                      30800620
            *                                                      30800630
            *      *****     ERROR TRAP 01        *****            30800640
            *      *****     PROGRAM HANGUP       *****            30800650
            *                                                      30800660
            *                                                      30800670
            *                                                      30800680
            *                                                      30800690
```



```
                  *    NTER    -------     INTERRUPT ERROR TRAP         30800700
                  *                                                     30800710
                  *                                                     30800720
                  *                  ALL SCHEDULED INTERRUPTS           30800730
                  *                  SET A TRANSFER VECTOR IN           30800740
                  *                  THE INTERRUPT ROUTINE.             30800750
                  *                  IF SAID VECTOR WORD IS             30800760
                  *                  BLANK, THE HANGUP WILL             30800770
                  *                  OCCUR.    THE CAUSE MAY BE         30800780
                  *                  ONE OF TWO CONDITIONS.             30800790
                  *                  1-- AN UNSCHEDULED INTER-          30800800
                  *                  RUPT ON THIS LEVEL WITH            30800810
                  *                  THIS ILSW BIT, OR  2--             30800820
                  *                  A DOUBLE OR NON-RESETABLE          30800830
                  *                  INTERRUPT.      CONDITION          30800840
                  *                  TWO WILL BE INDICATED BY           30800850
                  *                  HAVING INTERRUPT LEVEL BIT         30800860
                  *                  STILL ON IN THE CONSOLE            30800870
                  *                  LITES.   THE TRANSFER              30800880
                  *                  VECTOR IS ZEROED AFTER THE         30800890
                  *                  ADDRESS IS SET IN THE              30800900
                  *                  MLSCF TABLE.                       30800910
                  *                                                     30800920
                  *                                                     30800930
                  *                                                     30800940
                  *                                          *          30800950
                  *..........................................*          30800960
                  *                  EQUATE TABLE - ENTRY    *          30800970
                  *..........................................*          30800980
                  *                                          *          30800990
0160              BEGIN EQU    /160       BEGIN RT                      30801000
0161              START EQU    /161       MONITOR RT                    30801010
0162              ERROR EQU    /162       ERROR-PRINT RT                30801020
0163              LOG   EQU    /163       STATUS- PRINT RT              30801030
0164              END   EQU    /164       MONITOR END RT                30801040
                  *                                          *          30801050
                  *..........................................*          30801060
                  *                  EQUATE TABLE - CONTROL  *          30801070
                  *..........................................*          30801080
                  *                                          *          30801090
0165              RTNSW EQU    /165       RT START SWITCH               30801100
0166              ERLCK EQU    /166       LOCK ON ERROR CTRL            30801110
0167              LOGBY EQU    /167       I/O TW BUSY SWITCH            30801120
                  *                                          *          30801130
                  *..........................................*          30801140
                  *                  EQUATE TABLE - XFER VECT *         30801150
                  *..........................................*          30801160
                  *                                          *          30801170
017A              IL0   EQU    /17A       INTERRUPT LEVEL 0             30801180
018A              IL1   EQU    /18A       INTERRUPT LEVEL 1             30801190
019A              IL2   EQU    /19A       INTERRUPT LEVEL 2             30801200
01AA              IL3   EQU    /1AA       INTERRUPT LEVEL 3             30801210
01BA              IL4   EQU    /1BA       INTERRUPT LEVEL 4             30801220
01CA              RQTY  EQU    /1CA       CNSL PRNTR REQUEST            30801230
01DA              RQKB  EQU    /1DA       KEYBOARD REQUEST              30801240
01EA              SVKB  EQU    /1EA       KB SERVICE REQUEST            30801250
                  *                                          *          30801260
                  *..........................................*          30801270
                  *                  PROGRAM CONTROL TABLE   *          30801280
                  *..........................................*          30801290
                  *                                          *          30801300
05DC 0 0308       PID   DC     /0308      PROGRAM ID                    30801310
05DD 0 0000       RID   DC     0          ROUTINE ID                    30801320
05DE 0 0000       RAD   DC     0          ROUTINE ADDRESS               30801330
05DF 0 0000       SW0   DC     0          PROG CTRL FLD                 30801340
05E0 0 0000       SW1   DC     0          ROUT CTRL FLD                 30801350
05E1 0 FFFF       SW2   DC     /FFFF      FILE CTRL FIELD               30801360
05E2 0 0000       SW3   DC     0          OPEN CTRL FLD                 30801370
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05E3 1 0671              DC      DCTL2     LOOP NO RESET                    30801380
05E4 1 05EC              DC      INITL     INITL/RESTART ADDRS      PM      30801390
05E5 0 0000    MLSCF DC      0         INITL-LOG BUSY           PM      30801400
05E6 0 0000    LIV   DC      0         LOST INTERRUPT ADDR      PM      30801410
05E7 0 0000    MLN   DC      0         MAIN LINE ENTRY          PM      30801420
05E8 0 FFFF    TERM  DC      /FFFF     TERMINATOR                       30801430
                     *                                                  30801440
                     *-------------------------------------------*      30801450
                     *              INITIALIZATION ROUTINE       *      30801460
                     *-------------------------------------------*      30801470
                     *                                           *      30801480
                     *********************************************      30801490
05E9 0 4480 0160 EXEQD BSI   I  BEGIN    BR FOR INIT              * SE   30801500
05EA 1 05DC            DC      PID       DISK ID ADDR             *      30801510
                     *********************************************      30801520
                     *                                                  30801530
                     *-------------------------------------------*      30801540
                     *              RESTART ROUTINE              *      30801550
                     *-------------------------------------------*      30801560
                     *                                           *      30801570
                     *                                           *      30801580
                     *-------------------------------------------*      30801590
                     *              INITIALIZATION RT            *      30801600
                     *-------------------------------------------*      30801610
                     *                                                  30801620
05EC 1 6700 0972 INITL LDX   L3 DCT      SET X3 CTRL ADDR         SE     30801630
05EE 0 C0F2            LD      SW2       GET FILE CTRL WORD               30801640
05EF 0 F0F8            EOR     TERM      CHECK FOR ENTRY                  30801650
05F0 1 4C20 0607       BSC  L  FILEX,Z   BR TO PROCEED                    30801660
                     *                                                  30801670
05F2 1 6600 0AFD       LDX  L2 SELDU     GET ALPHA PHRASE                 30801680
05F4 0 4328            BSI     3 FORMO-DCT BR TO MSAG FORM 0      MC     30801690
05F5 0 A003            DC      /A003     -- MSAG # --                     30801700
05F6 0 3033            WAIT X  /33       WAIT FOR SWITCHES                30801710
05F7 1 6500 05EC       LDX  L1 INITL     GET ENTRY ADDR                   30801720
05F9 1 6D00 05E7       STX  L1 MLN       SET IT IN MLSCF                  30801730
05FB 0 4480 0161       BSI  I  START     RETURN TO MONITOR        XM      30801740
                     *                                           *      30801750
                     *-------------------------------------------*      30801760
                     *              RESTART LOOP CTRL RT         *      30801770
                     *-------------------------------------------*      30801780
                     *                                                  30801790
05FD 1 6700 0972 RLPGM LDX   L3 DCT      SET X3 CTRL ADDR         SE     30801800
05FF 0 C300            LD      3 0       RESET A REG                      30801810
0600 0 D319            STD     3 25      RESET RT CTRL                    30801820
0601 0 C0DF            LD      SW2       GET SW2 DATA                     30801830
0602 1 F400 0655       EOR  L  HLDSK     TEST WITH LAST DATA              30801840
0604 0 4820            BSC     Z         SKIP IF EQUAL                    30801850
0605 0 70E6            MDX     INITL     BR TO INITIALIZATION     SX      30801860
0606 0 706A            MDX     DCTL2     BR TO LOOP CONTROL       SX      30801870
                     *                                           *      30801880
                     *-------------------------------------------*      30801890
                     *              FILE SEL & SETUP TR          *      30801900
                     *-------------------------------------------*      30801910
                     *                                                  30801920
0607 1 6700 0972 FILEX LDX   L3 DCT      SET X3 CTRL ADDR         SE     30801930
0609 0 10A0            SLT     32        CLEAR A & Q REG                  30801940
060A 1 C400 05E1       LD   L  SW2       GET FILE SEL DATA                30801950
060C 0 E3F1            AND     3 -15     PASS ONLY GOOD BITS              30801960
060D 1 D400 0655       STO  L  HLDSK     SAVE IT IN SEL TBL               30801970
                     *                                                  30801980
060F 0 4820            BSC     Z         TEST FOR MAIN FILE               30801990
0610 0 7001            MDX     *&1       SKIP NOT MAIN FILE               30802000
0611 0 700C            MDX     FILE0     BR TO MAIN FILE SUR              30802010
0612 0 4804            BSC     E         SKIP FOR NXT TEST                30802020
0613 0 7014            MDX     FILE1     BR TO FILE SETUP RT              30802030
0614 0 1801            SRA     1         SHIFT FOR NXT TEST               30802040
0615 0 4804            BSC     E         SKIP FOR NXT TEST                30802050
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0616 0 701B              MDX     FILE2     BR TO FILE SETUP RT              30802060
0617 0 1801              SRA     1         SHIFT FOR NXT TEST               30802070
0618 0 4804              BSC     E         SKIP FOR NXT TEST                30802080
0619 0 7022              MDX     FILE3     BR TO FILE SETUP RT              30802090
061A 0 1801              SRA     1         SHIFT FOR NXT TEST               30802100
061B 0 4804              BSC     E         SKIP FOR NXT TEST                30802110
061C 0 7029              MDX     FILE4     BR TO FILE SETUP RT              30802120
061D 0 7000              MDX     FILE0     BR MAIN FILE Q. CTRL             30802130
                     *                                           *      30802140
                     *                      FILE 0 SEL RT        *      30802150
                     *                                           *      30802160
061E 1 C400 0650 FILE0 LD    L  MFST      GET AREA CODE                    30802170
0620 1 D400 070E       STO   L  DVA       SAVE IT                          30802180
0622 0 D305            STO   3  5         SAVE IT                          30802190
0623 1 6600 070F       LDX   L2 NTRPT     GET NTRPT ADDR                   30802200
0625 0 6E00 019A       STX   L2 IL2       SET ADDR IN MON TBL              30802210
0627 0 702E            MDX      SACTL     BR TO SETUP                      30802220
                     *                                           *      30802230
                     *                      FILE 1 SEL RT        *      30802240
                     *                                           *      30802250
0628 1 C400 0651 FILE1 LD    L  MFST&1    GET AREA CODE                    30802260
062A 1 D400 070E       STO   L  DVA       SAVE IT                          30802270
062C 0 D305            STO   3  5         SAVE IT                          30802280
062D 1 6600 070F       LDX   L2 NTRPT     GET NTRPT ADDR                   30802290
062F 0 6E00 0199       STX   L2 IL2-1     SET ADDR IN MON TBL              30802300
0631 0 7024            MDX      SACTL     BR TO SETUP                      30802310
                     *                                           *      30802320
                     *                      FILE 2 SEL RT        *      30802330
                     *                                           *      30802340
0632 1 C400 0652 FILE2 LD    L  MFST&2    GET AREA CODE                    30802350
0634 1 D400 070E       STO   L  DVA       SAVE IT                          30802360
0636 0 D305            STO   3  5         SAVE IT                          30802370
0637 1 6600 070F       LDX   L2 NTRPT     GET NTRPT ADDR                   30802380
0639 0 6E00 0198       STX   L2 IL2-2     SET ADDR IN MON TBL              30802390
063B 0 701A            MDX      SACTL     BR TO SETUP                      30802400
                     *                                           *      30802410
                     *                      FILE 3 SEL RT        *      30802420
                     *                                           *      30802430
063C 1 C400 0653 FILE3 LD    L  MFST&3    GET AREA CODE                    30802440
063E 1 D400 070E       STO   L  DVA       SAVE IT                          30802450
0640 0 D305            STO   3  5         SAVE IT                          30802460
0641 1 6600 070F       LDX   L2 NTRPT     GET NTRPT ADDR                   30802470
0643 0 6E00 0197       STX   L2 IL2-3     SET ADDR IN MON TBL              30802480
0645 0 7010            MDX      SACTL     BR TO SETUP                      30802490
                     *                                           *      30802500
                     *                      FILE 4 SEL RT        *      30802510
                     *                                           *      30802520
0646 1 C400 0654 FILE4 LD    L  MFST&4    GET AREA CODE                    30802530
0648 1 D400 070E       STO   L  DVA       SAVE IT                          30802540
064A 0 D305            STO   3  5         SAVE IT                          30802550
064B 1 6600 070F       LDX   L2 NTRPT     GET NTRPT ADDR                   30802560
064D 0 6E00 0196       STX   L2 IL2-4     SET ADDR IN MON TBL              30802570
064F 0 7006            MDX      SACTL     BR TO SETUP                      30802580
                     *                                           *      30802590
                     *-------------------------------------------*      30802600
                     *              SW2 FILE SELECT TBL          *      30802610
                     *-------------------------------------------*      30802620
                     *                                                  30802630
0650 0 2000    MFST  DC      /2000     PRTY 1 CSL 0 ILSW 0              30802640
0651 0 8800          DC      /8800          2     1     1               30802650
0652 0 9000          DC      /9000          3     1     2               30802660
0653 0 9800          DC      /9800          4     1     3               30802670
0654 0 A000          DC      /A000          5     1     4               30802680
0655 0 0000    HLDSK DC      0         SW2 HOLD DATA WD                 30802690
                     *                                                  30802700
                     *              SET IL AREA CODE CTRLS              30802710
                     *                                                  30802720
0656 0 C327    SACTL LD      3 39      GET SENSE RESET                  30802730
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0657 0 EB05             OR    3 5          OR IN A.C.                    30802740
0658 0 D3BB             STO   3 -69        SAVE IT                       30802750
0659 0 C326             LD    3 38         GET SENSE INST                30802760
065A 0 EB05             OR    3 5          OR IN A.C.                    30802770
065B 0 D3BD             STO   3 -67        SAVE IT                       30802780
                        *                                                30802790
065C 1 6500 05FD        LDX   L1 RLPGM     GET RESTRT ADDR               30802800
065E 1 6D00 05E4        STX   L1 MLSCF-1   SET IN PGM CTL TBL             30802810
                        *                                                30802820
0660 0 700A             MDX      DCTRL     BR TO START EXEQ PGM          30802830
                        *                                                30802840
                        *     ****     ** PSEUDO REQ/REL DEVICE  ***     30802850
                        *                                                30802860
0661 0 0000             RELDV DC      0     ENTRY / EXIT                  30802870
0662 1 7402 0661        MDX   L  RELDV,2    ADV EXIT ADDR                 30802880
0664 1 4C80 0661        BSC   I  RELDV      BR TO USER                    30802890
                        *                                                30802900
                        *                                                30802910
0666 0 0000             REQDV DC      0     ENTRY / EXIT                  30802920
0667 1 7404 0666        MDX   L  REQDV,4    ADV EXIT ADDR                 30802930
0669 1 4C80 0666        BSC   I  REQDV      BR TO USER                    30802940
                        *                                                30802950
                        *                                             *  30802960
                        *.........................................*     30802970
                        *                MAINLINE PROGRAM CTRL    *     30802980
                        *.........................................*     30802990
                        *                                             *  30803000
066B 0 6116             DCTRL LDX   1 22     SET CLEAR LOOP XTNT  SE       30803010
066C 0 1010                   SLA      16    CLR ACCUM                     30803020
066D 1 D500 0977        DCTL1 STO   L1 DCT&5 RESET DCT FIELD               30803030
066F 0 71FF                   MDX    1 -1    DEC LOOP CTRL .               30803040
0670 0 70FC                   MDX      DCTL1 BR LOOP                       30803050
                        *                                                30803060
0671 1 6700 0972        DCTL2 LDX   L3 DCT   SET X3 ADDR CTRL     SE      30803070
                        *                                                30803080
0673 0 C300                   LD    3 0      CLR A REG                     30803090
0674 1 D400 0874              STO   L  DCARM-1 CLEAR CTRL CTR              30803100
0676 0 D30A                   STO    3 10    SET PRESENT ADDR              30803110
0677 0 C3F8                   LD     3 -8    GET SCI OF ONE                30803120
0678 0 D30B                   STO    3 11    SET DESIRED ADDR              30803130
                        *                                                30803140
0679 0 43AE                   BSI    3 -82   BR TO SEEK SUB RT     SC      30803150
                        *                                                30803160
067A 0 4380                   BSI    3 -128  DCARM RT             SC      30803170
                        *                                                30803180
067B 1 4C00 06A3              BSC   L  DMLCK  BR TO DIMAL CK RTN            30803190
                        *                                                30803200
067D 1 C400 05E0        DCTL3 LD    L  SW1    GET FNC SW 1 INFO            30803210
067F 1 4C20 069A              BSC   L  DCTL5,Z BR IF RT NUM PRESENT         30803220
                        *                                                30803230
0681 1 7401 098B              MDX   L  DCT&25,1 ADD ONE TO RT NUMBER        30803240
                        *                                                30803250
0683 1 6680 098B        DCTL4 LDX   I2 DCT&25  GET RT NUMBER               30803260
0685 1 6E00 05DD              STX   L2 RID     SET RT NUM IN MLSCF          30803270
0687 1 C600 069D              LD    L2 DDSA-1  GET ROUTINE ADDR             30803280
0689 1 D400 05DE              STO   L  RAD     SET ADDR IN MLSCF            30803290
068B 0 D400 0165              STO   L  RTNSW   SET RT NO. PRNT ADDR         30803300
068D 1 D400 0695              STO   L  DCTL6-1 SET RT PIVOT ADDR            30803310
068F 1 6600 0696              LDX   L2 DCTL6   GET ENTRY ADDR               30803320
0691 1 6E00 05E5              STX   L2 MLSCF   SET ADDR IN CTRL FLD         30803330
0693 0 4480 0161              BSI   I  START   BR TO MONITOR         XM     30803340
                        *                                                30803350
0695 0 0000             DC      0     RT PIVOT ADDR HOLDER               30803360
0696 1 6700 0972        DCTL6 LDX   L3 DCT   SET X3 CTRL ADDR     SE      30803370
0698 1 4C80 0695              BSC   I  DCTL6-1 BR TO RT ENTRY                30803380
                        *                                                30803390
069A 0 E3FD             DCTL5 AND     3 -3    PASS MAX RT CNT              30803400
069B 0 D319                   STO     3 25    SET RT NUMBER IN DCT         30803410
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069C 0 70E6             MDX      DCTL4     BR TO CONTINUE                30803420
                        *                                             *  30803430
                        *.........................................*     30803440
                        *                DISK DIAG START ADDR     *     30803450
                        *.........................................*     30803460
                        *                                             *  30803470
069D 1 06EA                DC       DCEOD     NO RT-RETURN TO MON         30803480
069E 1 0CB0             DDSA DC       F01AA     DISK TEST #  1              30803490
069F 1 0D04                DC       F02AA     DISK TEST #  2              30803500
06A0 1 0D2F                DC       F03AA     DISK TEST #  3              30803510
06A1 1 06EA                DC       DCEOD     NO RT-RETURN TO MON         30803520
06A2 1 06EA                DC       DCEOD     NO RT-RETURN TO MON         30803530
                        *                                             *  30803540
                        *.........................................*     30803550
                        *             DIMAL-CUST-CE PACK CK RT    *     30803560
                        *.........................................*     30803570
                        *                                             *  30803580
06A3 0 C3D8             DMLCK LD      3 -40     GET CE HIST TRK        SE   30803590
06A4 0 D30B                   STO     3 11      SET DESIRED ADDR            30803600
06A5 0 43AE                   BSI     3 -82     BR TO SEEK SUB RTN     SC   30803610
                        *                                                30803620
06A6 0 C3E5                   LD      3 -27     GET WORD COUNT              30803630
06A7 0 D30D                   STO     3 13      SET WORD COUNT              30803640
06A8 0 43A8                   BSI     3 -88     BR TO READ SUB RTN     SC   30803650
06A9 0 701C                   MDX       DMLE1   BR TO RD ERR RTRN RT        30803660
                        *                                                30803670
06AA 1 C400 0B04              LD    L   DCDA&2  GET SECOND DATA WORD         30803680
06AC 0 F018                   EOR       DMLXT   TEST FOR DIMAL IND          30803690
06AD 1 4C18 06B9              BSC   L   DMLIC,&- BR IF DIMAL PATTERN         30803700
                        *                                                30803710
06AF 0 C3D8                   LD      3 -40     GET CE HIST TRK             30803720
06B0 0 EBF9                   OR      3 -7      SET IN CE SECT ADDR         30803730
06B1 0 D30B                   STO     3 11      SET ADDR IN CTRL TBL        30803740
06B2 0 43A8                   BSI     3 -88     BR TO READ SUB RTN     SC   30803750
06B3 0 7016                   MDX       DMLE2   BR TO RD ERR RTRN RT        30803760
                        *                                                30803770
06B4 1 C400 0B04              LD    L   DCDA&2  GET SECOND DATA WORD         30803780
06B6 0 F3C7                   EOR     3 -57     TEST FOR CE PACK IND        30803790
06B7 1 4C18 067D              BSC   L   DCTL3,&- BR TO INIT IF CE IND SX     30803800
                        *                                                30803810
06B9 1 C400 05E2        DMLIC LD      L  SW3    GET SW 3 FUNCTION           30803820
06BB 0 E3F4                   AND     3 -12     PASS BITS 12 & 13           30803830
06BC 0 F3F4                   EOR     3 -12     TEST FOR BITS 12 & 13       30803840
06BD 1 4C18 067D              BSC   L   DCTL3,&- BR TO INIT IF SW 3 F SX     30803850
                        *                                                30803860
06BF 1 6600 0AC8              LDX   L2  DPMSG   GET ALPHA MSG ADDR          30803870
06C1 0 4328                   BSI     3 FORMO-DCT BR TO MSAG FORM 0  M C    30803880
06C2 0 A0DC                   DC      /A0DC     -- MSAG # --                30803890
                        *                                                30803900
06C3 0 30CE             WAIT1 DC      /30CE     WAIT FOR CE GO AHEAD        30803910
06C4 0 70F4                   MDX       DMLIC   LOOP TO RE-CHECK            30803920
                        *                                                30803930
                        *                                                30803940
06C5 0 ABCD             DMLXT DC      /ABCD     DIMAL IND XTNT              30803950
                        *                                                30803960
                        *                                                30803970
06C6 0 4339             DMLE1 BSI     3 FORM2-DCT BR TO MSAG FORM 2     MC   30803980
06C7 0 E062                   DC      /E062     -- MSAG # --                30803990
06C8 1 06A3                   DC        DMLCK   ERR LOOP ADDR               30804000
06C9 0 70EF                   MDX       DMLIC   BR TO CE WAIT               30804010
                        *                                                30804020
06CA 0 4339             DMLE2 BSI     3 FORM2-DCT BR TO MSAG FORM 2     MC   30804030
06CB 0 E063                   DC      /E063     -- MSAG # --                30804040
06CC 1 06A3                   DC        DMLCK   ERR LOOP ADDR               30804050
06CD 0 70EB                   MDX       DMLIC   BR TO CE WAIT               30804060
                        *                                             *  30804070
                        *.........................................*     30804080
                        *                TEST RETURN CONTROL      *     30804090
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                        *.....................................*                30804100
                        *                                     *                30804110
06CE 1 C400 05E2        DCRTN LD    L  SW3       GET SW FNC 3 DATA     SE    30804120
06D0 0 1801                   SRA      1         SHIFT TO TEST BIT 14         30804130
06D1 1 4C04 06D4              BSC   L  DCNHM,E    BR IF B14 IS A ONE           30804140
06D3 0 4380                   BSI    3 -128      BR TO DCARM RT        SC     30804150
06D4 1 C400 05E0        DCNHM LD    L  SW1       GET SW FNC 1 DATA            30804160
06D6 1 4C20 069A              BSC   L  DCTL5,7    BR IF RT NUM PRESENT         30804170
                        *                                                      30804180
06D8 0 C319                   LD     3 25        GET ROUTINE ID NUM           30804190
06D9 0 F3FD                   EOR    3 -3        TEST FOR LAST RT             30804200
06DA 1 4C20 067D              BSC   L  DCTL3,Z    BR TO CONTINUE TESTS         30804210
                        *                                                      30804220
06DC 1 7401 098A              MDX   L  DCT&24,1   ADD TO PROG PASS CNT          30804230
06DE 0 1000                   NOP      0         SAFTY NOP                    30804240
                        *                                                      30804250
                        *                                                      30804260
06DF 0 1010                   SLA      16        CLR ACC                      30804270
06E0 0 D319                   STO    3 25        CLR RT ID NUMBER             30804280
                        *                                                      30804290
06E1 0 4377                   BSI    3 FORM5-DCT BR TO MSAG FORM 5     MC    30804300
06E2 0 A001                   DC       /A001     -- MSAG # --                 30804310
06E3 0 4380                   BSI    3 -128      DCARM RTN             SC     30804320
06E4 1 6600 0AD2              LDX   L2 NDMSG     GET END INITL MSG            30804330
06E6 0 7005                   MDX      DCEOD&2   BR TO EOJ MSG RTN            30804340
                        *                                                      30804350
06E7 1 6600 0AAF        DCANH LDX   L2 ARMNH     GET MSAG REMARK              30804360
06E9 0 7002                   MDX      DCEOD&2   BR TO MSAG XFER              30804370
                        *                                                      30804380
06EA 1 6600 0AAA        DCEOD LDX   L2 NORTN     GET REMARK ADDR              30804390
06EC 0 4328                   BSI    3 FORMO-DCT BR TO MSAG FORM 0     MC    30804400
06ED 0 A0ED                   DC       /A0ED     -- MSAG # --                 30804410
06EE 0 7000                   MDX      DCRND     BR TO END PROGRAM            30804420
                        *                                                      30804430
06EF 0 1000             DCRND NOP      0         STOP NOP                     30804440
06F0 0 30ED             WAIT2 DC       /30ED     INIT END WAIT                30804450
                        *                                                      30804460
                        *                        SEE BEGINNING OF THE         30804470
06F1 0 70FD                   MDX      DCRND     LISTING FOR DETAILS          30804480
                        *                        WAIT BR LOOP                 30804490
                        *                                                      30804500
                        *.....................................*                30804510
                        *                                     *                30804520
                        *          LOST INTERRUPT RT          *                30804530
                        *.....................................*                30804540
                        *                                     *                30804550
06F2 1 6700 0972        DLNRT LDX   L3 DCT       SET X3 CTRL ADDR      SE    30804560
06F4 0 C31B                   LD     3 27        GET TIMER CNT                30804570
06F5 0 83FF                   A      3 -1        ADD &1 TO CNT                30804580
06F6 0 D31B                   STO    3 27        SAVE NEW CNT                 30804590
06F7 0 F31C                   EOR    3 28        TEST FOR LIMIT               30804600
06F8 0 4820                   BSC      Z         Q. EQ TO LIMIT               30804610
06F9 0 7008                   MDX      DLNR1     NO, PROCEED                  30804620
                        *                                                      30804630
06FA 0 0BBA                   XIO    3 -70       SENSE DSW                    30804640
06FB 0 D308                   STO    3 8         SET DSW IN DCT               30804650
06FC 0 4339                   BSI    3 FORM2-DCT BR TO MSAG FORM 2     MC    30804660
06FD 0 E001                   DC       /E001     -- MSAG # --                 30804670
06FE 0 0000                   DC       0         NO ERROR LOOP ADDR           30804680
                        *                                                      30804690
06FF 0 1010                   SLA      16        CLEAR ACCUM                  30804700
0700 0 D31B                   STO    3 27        CLEAR LOST NTRPT CTR         30804710
0701 0 438E                   BSI    3 -114      RELEASE RT            SC     30804720
0702 0 4386                   BSI    3 -122      BR TO RE-ZERO ARM     SC     30804730
0703 1 4C00 0683              BSC   L  DCTL4     BR TO RE-TRY RTN      SX     30804740
                        *                                                      30804750
0705 0 C31D             DLNR1 LD     3 29        GET NXT MLN ENTRY            30804760
0706 1 4C18 070C              BSC   L  DLAND,&-   BR 0 - NTRPT OCCURED         30804770
0708 1 6700 06F2              LDX   L3 DLNRT     GET LST NTRPT RT ADR
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070A 1 6F00 05E6                STX   L3 LIV       SET IT IN MLSCF
070C 0 4480 0161        DLAND BSI   I  START      BR TO MONITOR          XM    30804780
                        *                                                      30804790
                        *                                                      30804800
                        *.....................................*                30804810
                        *                                     *                30804820
                        *          DISK INTERRUPT ROUTINE     *                30804830
                        *.....................................*                30804840
                        *                                     *                30804850
070E 0 2000             DVA   DC       /2000     DISK AREA CODE ID            30804860
                        *                                                      30804870
070F 0 0000             NTRPT DC       0                                      30804880
0710 1 6700 0972              LDX   L3 DCT       SET X3 CTRL ADDR       SE    30804890
                        *                                                      30804900
0712 0 0BBA                   XIO    3 -70       SENSE RESET DSW              30804910
0713 0 D308                   STO    3 8         SAVE IT IN TBL               30804920
                        *                                                      30804930
0714 0 C31D                   LD     3 29        GET RETURN ADDR              30804940
0715 1 D400 05E7              STO   L  MLN       SET IT IN MLSCF              30804950
0717 1 4C18 0721              BSC   L  NTRER,&-   BR TO ERR RT IF ZERO         30804960
                        *                                                      30804970
0719 0 1010             NTRST SLA      16        CLR ACCUM                    30804980
071A 0 D306                   STO    3 6         CLR FUNCTION                 30804990
071B 0 D31B                   STO    3 27        CLR LST NTRPT CTR            30805000
071C 0 D31D                   STO    3 29        CLR NTRUPT ADDR DCT          30805010
071D 1 D400 05E6              STO   L  LIV       CLR LST NTRPT RT XFR         30805020
                        *                                                      30805030
071F 1 4C80 070F        NTRXT BSC   I  NTRPT      EXIT TO MONITOR        SX    30805040
                        *                                                      30805050
0721 0 70FF             NTRER MDX      NTRER      NO ML MLSCF ADDR       PH    30805060
                        *                                                      30805070
                        *.....................................*                30805080
                        *                                     *                30805090
                        *          LOCK ON FNC CHECK RT       *                30805100
                        *.....................................*                30805110
                        *                                     *                30805120
0722 0 0000             LCKAF DC       0          ENTRY ADDR             SE    30805130
0723 1 6680 0722              LDX   I2 LCKAF      GET LOOP ADDR                30805140
                        *                                                      30805150
0725 1 C400 05DF              LD    L  SWO        GET FNC 0                    30805160
0727 0 EC00 0166              OR    L  ERLCK      OR IN MONITOR CTRL           30805170
0729 0 1805                   SRA      5          SHIFT FOR BIT 10             30805180
072A 1 4C00 072C              BSC   L  *          BR TO NSI                    30805190
072C 1 7401 0722              MDX   L- LCKAF,1    ADD FOR RETURN ADDR          30805200
072E 1 4C80 0722              BSC   I  LCKAF      RETURN TO USER         SX    30805210
                        *                                                      30805220
                        *.....................................*                30805230
                        *                                     *                30805240
                        *          READ WRITE ADDR CK RT      *                30805250
                        *.....................................*                30805260
                        *                                     *                30805270
0730 0 0000             RWACK DC       0          ENTRY                        30805280
0731 1 C400 0DCA              LD    L  CYLEX      GET CYL ERR CNT        SE    30805290
0733 1 4C18 073E              BSC   L  RWCKX,&-   BR OUT IF ZERO               30805300
0735 1 6580 0DCA              LDX   I1 CYLEX      GET LOOP COUNT               30805310
0737 1 C500 0DDD        RWCKA LD     L1 CYLET-1    GET LAST ADDR                30805320
0739 0 F30B                   EOR    3 11        TEST AGAINST DESIRED         30805330
073A 1 4C18 0740              BSC   L  RWCKT,&-   BR IF EQ -- BAD ADDR         30805340
073C 0 71FF                   MDX    1 -1        DEC CTRL                     30805350
073D 0 70F9                   MDX      RWCKA     LOOP                         30805360
                        *                                                      30805370
073E 1 4C80 0730        RWCKX BSC   I  RWACK      RETURN TO USER         SX    30805380
                        *                                                      30805390
0740 1 6600 0A9D        RWCKT LDX   L2 ARIET      GET ALPHA STQTEMENT          30805400
0742 1 6E00 0A1D              STX   L2 REMRK      SET IT IN TWOPA              30805410
0744 1 7404 09A6              MDX   L  FORM1&3,4   ADD TO PRINT CTRL            30805420
0746 0 C30B                   LD     3 11        GET DESIRED ADDR             30805430
0747 0 4399                   BSI    3 -103      BR TO CONVERT IT       SC    30805440
0748 1 D400 0A20              STO   L  MSG&2      SET ADDR IN TWOPA            30805450
074A 0 4331                   BSI    3 FORM1-DCT BR TO MSAG FORM 1      MC
074B 0 E004                   DC       /E004     -- MSAG # --
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074C 0 0000            DC      0           NO ERR LOOP ADDR                30805460
074D 1 74FC 09A6       MDX  L  FORM1&3,-4  SET PRNT CTL TO STD             30805470
                       *                                                   30805480
074F 0 C319            LD      3 25        GET RT EXEQ NUMBER              30805490
0750 0 F3FD            EOR     3 -3        TEST FOR RT 3                   30805500
0751 1 4C18 0760       BSC  L  RWRT3,&-    BR TO SET RT 3 RETRN SX         30805510
                       *                                                   30805520
0753 0 C30B            LD      3 11        GET CURRENT ADDR                30805530
0754 0 1803            SRA     3           SHIFT RIGHT HD-SECT             30805540
0755 0 1003            SLA     3           SHIFT LEFT HD-SECT              30805550
0756 1 4C18 06CE       BSC  L  DCRTN,&-    END RT BR IF ZERO               30805560
0758 0 93F8            S       3 -8        DEC DISK ADDR BY 1              30805570
0759 0 EBF9            OR      3 -7        SET HI SECT  ADDR               30805580
075A 0 D30B            STO     3 11        SET IN DESIRED ADDR             30805590
075B 1 6580 0D2E       LDX     I1 F02XB    GET CURRENT CTRL CNT            30805600
075D 0 71F9            MDX     1 -7        DEC FOR ONE TOT CYL             30805610
075E 1 6400 0D14       LDX  L  F02AC&5     BR TO CONTINUE RT 2  SX         30805620
                       *                                                   30805630
0760 1 6600 0AD9  RWRT3 LDX  L2 CECAB      GET MSAG REMARK                 30805640
0762 1 6E00 0A1C       STX  L2 ALPHA       SET IN TWOPA                    30805650
0764 0 4328            BSI     3 FORM0-DCT BR TO MSAG FORM 0     MC        30805660
0765 0 E077            DC      /E077       -- MSAG # --                    30805670
0766 0 0000            DC      0           NO ERR LOOP ADDR                30805680
                       *                                                   30805690
0767 0 4396            BSI     3 -106      BR TO MONITOR END     PX        30805700
                       *                                                   30805710
                       *                                          *        30805720
                       *.........................................*        30805730
                       *          DISK WRITE ROUTINE             *        30805740
                       *.........................................*        30805750
                       *                                          *        30805760
0768 0 7004            DCWR  MDX      DCW10    BR / NOP SWITCH       SE    30805770
                       *                                                   30805780
0769 0 40C6            BSI      RWACK          RD/WR ADDR CK RT      SC    30805790
                       *                                                   30805800
076A 0 1010            SLA      16             CLR A REG                   30805810
076B 0 D3E0            STO   3 -32             RESET SFT ERR CNTR          30805820
076C 0 D3DE            STO   3 -34             RESET HRD ERR CNTR          30805830
                       *                                                   30805840
076D 0 C323            DCW10 LD   3 35         GET WRITE FUNCTION          30805850
076E 0 D306            STO   3 6               SET IT IN DCT               30805860
076F 0 D3DF            STO   3 -33             MEM FNC HOLDER              30805870
0770 0 C30B            LD    3 11              GET DESIRED ADDR            30805880
0771 1 D400 0803       STO   L DCDA&1          SET IT IN I/O ADDR          30805890
                       *                                                   30805900
0773 0 406D            BSI      CDTRT          CMN DATA XFER RT      SC    30805910
                       *                                                   30805920
0774 1 7401 0983       MDX   L  DCT&17,1       ADD TO TOTAL WR CTR         30805930
0776 0 1000            NOP      0              SAFTY NOP                   30805940
                       *                                                   30805950
0777 1 4400 080A       BSI   L  CDTSN          BR TO CK DSW WORD     SC    30805960
0779 0 7002            MDX      DCWEL          WRITE ERR BR RETURN         30805970
                       *                                                   30805980
077A 1 7401 091D       MDX   L  DWR,1          ADD TO EXIT RTN OK          30805990
077C 0 C315            DCWEL LD   3 21         GET TOT HRD WR ERRS         30806000
077D 0 83DE            A     3 -34             ADD NEW HRD ERRS            30806010
077E 0 D315            STO   3 21              SAVE NEW TOTAL              30806020
077F 0 C314            LD    3 20              GET TOT SFT WR ERRS         30806030
0780 0 83E0            A     3 -32             ADD NEW SFT ERRS            30806040
0781 0 D314            STO   3 20              SAVE NEW TOTAL              30806050
                       *                                                   30806060
0782 1 4400 0722       BSI   L  LCKAF          BR TO LOOP ANY FNC    SC    30806070
0784 1 0768            DC       DCWR           LOOP ADDR                   30806080
0785 1 4C80 091D       DCWBB BSC  I  DWR       EXIT TO CALL RT       SX    30806090
                       *                                          *        30806100
                       *.........................................*        30806110
                       *          DISK READ ROUTINE              *        30806120
                       *.........................................*        30806130
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                       *                                          *        30806140
0787 0 7001            DCRD  MDX      DCR10    BR / NOP SWITCH       SE    30806150
                       *                                                   30806160
0788 0 40A7            BSI      RWACK          RD/WR ADDR CK RT      SC    30806170
                       *                                                   30806180
0789 0 1010            DCR10 SLA      16       CLR A REG                   30806190
078A 0 D3EB            STO   3 -21             RESET SK-RD SW1             30806200
078B 0 D3E0            STO   3 -32             RESET SFT ERR CNTR          30806210
078C 0 D3DE            STO   3 -34             RESET HRD ERR CNTR          30806220
078D 0 C324            DCR12 LD   3 36         GET READ FUNCTION           30806230
078E 0 D306            STO   3 6               SET IT IN DCT               30806240
078F 0 D3DF            STO   3 -33             MEM FNC HOLDER              30806250
0790 0 C31A            LD    3 26              GET RD / RD-CK MOD          30806260
0791 1 4C30 0796       BSC   L  DCR16,Z-       BR BY ADDR CLR IF &         30806270
0793 0 1010            SLA      16             CLR ACC                     30806280
0794 1 D40C 0B03       STO   L  DCDA&1         CLR READ I/O ADDR           30806290
                       *                                                   30806300
0796 0 404A            DCR16 BSI      CDTRT    CMM DATA XFER RT      SC    30806310
                       *                                                   30806320
0797 1 7401 0984       MDX   L  DCT&18,1       ADD TO TOTAL RD CTR         30806330
0799 0 1000            NOP      0              SAFTY NOP                   30806340
                       *                                                   30806350
079A 0 406F            BSI      CDTSN          BR TO CK DSW & OPCMP  SC    30806360
079B 0 703A            MDX      DCREL          READ ERR BR RETURN          30806370
                       *                                                   30806380
079C 1 C400 0B03       LD    L  DCDA&1         GET ACTUAL ADDR             30806390
079E 0 D30C            STO   3 12              SET ADDR IN DCT             30806400
079F 0 F30B            EOR   3 11              CK ACTUAL EQ DESIRED        30806410
07A0 1 4C18 07CB       BSC   L  DCRGA,&-       BR IF ADDR IS OK            30806420
                       *                                                   30806430
07A2 0 C3EB            LD    3 -21             GET SW 1                    30806440
07A3 1 4C10 07B6       BSC   L  DCR21,-        BR IF NOT 3RD  RE-RD        30806450
                       *                                                   30806460
07A5 0 C023            LD       DCRE1          GET FIRST E008 AAR          30806470
07A6 0 F023            EOR      DCRE2          COMP 2ND E008 AAR           30806480
07A7 1 4C20 07B2       BSC   L  DCR20,Z        BR IF E008 RDS UNEQ         30806490
                       *                                                   30806500
07A9 0 4339            BSI   3  FORM2-DCT      BR TO MSAG FORM 2     MC    30806510
07AA 0 E009            DC       /E009          -- MSAG # --                30806520
07AB 1 0787            DC       DCRD           ERROR LOOP ADDR             30806530
                       *                                                   30806540
07AC 0 1010            SLA      16             CLR A REG                   30806550
07AD 0 D3E0            STO   3 -32             RESET SFT ERR CNTR          30806560
07AE 1 7401 0985       DCR19 MDX   L  DCT&19,1  ADD & 1 TO RESK CNT         30806570
07B0 0 1000            NOP      0              SAFTY NOP                   30806580
07B1 0 7024            MDX      DCREL          RD ERR BR RETURN            30806590
                       *                                                   30806600
07B2 0 4339            DCR20 BSI   3  FORM2-DCT BR TO MSAG FORM 2     MC    30806610
07B3 0 E015            DC       /E015          -- MSAG # --                30806620
07B4 1 0787            DC       DCRD           ERROR LOOP ADDR             30806630
07B5 0 70F8            MDX      DCR19          RD ERR BR RETURN            30806640
                       *                                                   30806650
07B6 0 4339            DCR21 BSI   3  FORM2-DCT BR TO MSAG FORM 2     MC    30806660
07B7 0 E008            DC       /E008          -- MSAG # --                30806670
07B8 0 0000            DC       0              NO ERROR LOOP ADDR          30806680
                       *                                                   30806690
07B9 0 C3EB            LD    3 -21             GET SW 1                    30806700
07BA 1 4C20 07C4       BSC   L  DCR23,Z        BR IF 2ND E008 PASS         30806710
                       *                                                   30806720
07BC 0 C30C            LD    3 12              GET 1ST AAR OF E008         30806730
07BD 0 D00B            STO      DCRE1          SAVE IT                     30806740
07BE 0 C3CD            DCR22 LD   3 -51         GET 4000 HEX                30806750
07BF 0 D3EB            STO   3 -21             SET SW 1 & OR -             30806760
                       *                                                   30806770
07C0 0 C3E0            LD    3 -32             GET SFT RD TEMP CNT         30806780
07C1 0 83FF            A     3 -1              ADD ONE TO ERROR CNT        30806790
07C2 0 D3E0            STO   3 -32             SAVE NEW COUNT              30806800
                       *                                                   30806810
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07C3 0 70C9          MDX     DCR12       BR TO RE-READ ADDR                30806820
                     *                                                     30806830
07C4 0 C30C          DCR23 LD    3 12    GET 2ND AAR OF E008               30806840
07C5 0 D004                  STO   DCRE2  SAVE IT                           30806850
07C6 0 4386                  BSI   3 -122 BR TO RE-ZERO ARM &  SC           30806860
                     *                    RE-SEEK DESIRED ADR               30806870
07C7 0 C3BF                  LD    3 -65  GET 8000 HEX                      30806880
07C8 0 70F6                  MDX   DCR22&1 BR TO SET SW 1                   30806890
                     *                                                     30806900
07C9 0 0000          DCRE1 DC    0       E008 AAR 1                        30806910
07CA 0 0000          DCRE2 DC    0       E008 AAR 2                        30806920
                     *                                                     30806930
07CB 0 C3EB          DCRGA LD    3 -21   GET SW1                           30806940
07CC 1 4C10 07D1             BSC  L DCROK,- BR IF RD ADDR OK                30806950
07CE 0 C3E0                  LD    3 -32  GET SFT RD ERR TEMP               30806960
07CF 0 93FE                  S     3 -2    COUNT & CORRECT IT               30806970
07D0 0 D3E0                  STO   3 -32  SAVE CORRECTED CNT                30806980
07D1 1 7401 091A     DCROK MDX  L DRD,1   ADD TO EXIT RT OK                 30806990
07D3 0 C30C                  LD    3 12   GET ACTUAL DISK ADDR              30807000
07D4 0 D30A                  STO   3 10   SET IT IN DCT PRESNT              30807010
07D5 0 D309                  STO   3 9    SET IT IN LAST GOOD               30807020
07D6 0 C317          DCREL LD    3 23    GET TOT HRD RD ERRS               30807030
07D7 0 83DE                  A     3 -34  ADD NEW HRD ERRS                  30807040
07D8 0 D317                  STO   3 23   SAVE NEW TOTAL                   30807050
07D9 0 C316                  LD    3 22   GET TOT SFT RD ERRS               30807060
07DA 0 83E0                  A     3 -32  ADD NEW SFT ERRS                  30807070
07DB 0 D316                  STO   3 22   SAVE NEW TOTAL                   30807080
                     *                                                     30807090
07DC 1 4400 0722             BSI  L LCKAF BR TO LOOP ANY FNC   SC          30807100
07DE 1 0787                  DC     DCRD  LOOP ADDR                        30807110
07DF 1 4C80 091A     DCRBB BSC  I DRD     EXIT TO CALL RT        SX        30807120
                     *.....................................*               30807130
                     *              COMMON RD / WR ROUTINE *               30807140
                     *.....................................*               30807150
                     *                                     *               30807160
07E1 0 0000          CDTRT DC    0       ENTRY                             30807170
07E2 0 1010                  SLA   16     CLR ACC                   SE     30807180
07E3 0 D30E                  STO   3 14   CLR RETRY CTR                    30807190
                     *                                                     30807200
07E4 0 4388          CDTBC BSI   3 -120   DCRDY RT                  SC     30807210
                     *                                                     30807220
07E5 0 C30D                  LD    3 13   GET WORD COUNT                   30807230
07E6 1 D400 0802             STO  L DCDA  SET IT IN I/O FLD                 30807240
07E8 0 C3DF                  LD    3 -33  GET MEM HLD FNC                   30807250
07E9 0 D306                  STO   3 6    SET IT IN DCT FNC WD              30807260
07EA 0 C30B                  LD    3 11   GET DESIRED ADDR                  30807270
07EB 0 100D                  SLA   13     CLR CYL NUMBER                   30807280
07EC 0 180D                  SRA   13     CLR CYL NUMBER                   30807290
07ED 0 EB1A                  OR    3 26   RD/RD CK MODIFIER                30807300
07EE 0 D307                  STO   3 7    SET ADJ MOD IN DCT               30807310
07EF 0 C301                  LD    3 1    GET I/O ADDR                     30807320
07F0 0 D304                  STO   3 4    SET IT IN DCT                    30807330
                     *                                                     30807340
07F1 0 4392          CDTRC BSI   3 -110   DCDSW RT                  SC     30807350
                     *                                                     30807360
07F2 0 E3C5                  AND   3 -59  TEST BITS                        30807370
07F3 1 4C18 07FF             BSC  L CDTSE,&- BR ZERO TO CONTINUE           30807380
                     *                                                     30807390
07F5 1 6600 0ABE             LDX  L2 DSWER GET ALPHA PHRASE                30807400
07F7 1 6E00 0A1D             STX  L2 REMRK SET IT IN TWOPA                 30807410
07F9 0 4331                  BSI   3 FORM1-DCT BR TO MSAG FORM 1    MC     30807420
07FA 0 E005                  DC     /E005  -- MSAG # --                    30807430
07FB 1 07F1                  DC     CDTRC  ERR LOOP ADDR                   30807440
                     *                                                     30807450
07FC 0 0BBA                  XIO   3 -70  SENSE RESET DSW                  30807460
07FD 0 D308                  STO   3 8    SET DSW IN DCT                   30807470
07FE 0 4396                  BSI   3 -106 BR TO MONITOR END RT SX          30807480
                     *                                                     30807490
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07FF 0 C3B7          CDTSE LD    3 -73   GET RETURN ADDR                   30807500
0800 0 D31D                  STO   3 29   SET IT IN DCT                    30807510
                     *                                                     30807520
0801 0 4382                  BSI   3 -126  BR TO EXEQ RT             SC     30807530
                     *                                                     30807540
0802 0 439C                  BSI   3 -100  MONITOR START RT          XM     30807550
                     *                                                     30807560
0803 1 6700 0972     CDTNR LDX   L3 DCT   SET X3 CTRL ADDR           SE     30807570
0805 0 C300                  LD    3 0    GET ZERO XTNT                     30807580
0806 0 D307                  STO   3 7    CLR MODIFIER                      30807590
                     *                                                     30807600
0807 0 438E                  BSI   3 -114  RELEASE RT                SC     30807610
                     *                                                     30807620
0808 1 4C80 07E1             BSC  I CDTRT EXIT TO CALL RT            SX     30807630
                     *                                                  *  30807640
                     *    ****        ** CHECK DSW RD/WR **           *  30807650
                     *                                                  *  30807660
080A 0 0000          CDTSN DC    0       ENTRY                             30807670
080B 0 C308                  LD    3 8    GET DSW IN DCT            SE     30807680
080C 0 E3C5                  AND   3 -59  PASS TEST BITS                    30807690
080D 0 F3CD                  EOR   3 -51  TEST ALL FOR OK                   30807700
080E 1 4C18 082A             BSC  L CDTGX,&- BR ZERO ALL OK                 30807710
                     *                                                     30807720
0810 1 C400 0B03             LD   L DCDA&1 GET ACTUAL ADDR                  30807730
0812 0 D30C                  STO   3 12   SET IT IN TBL                     30807740
                     *                                                     30807750
0813 0 4367                  BSI   3 FORM4-DCT BR TO MSAG FORM 4     MC     30807760
0814 0 E006                  DC     /E006  -- MSAG # --                    30807770
0815 0 0000                  DC     0      NO ERR LOOP ADDR                30807780
                     *                                                     30807790
0816 1 C400 05E2             LD   L SW3   GET SW FNC THREE                  30807800
0818 0 4804                  BSC    E     SKIP IF 15 NOT ON                 30807810
0819 0 7014                  MDX    DSPLA BR TO DISPLAY IOA RT              30807820
                     *                                                     30807830
081A 1 7401 0952     CDTLK MDX  L DCT-32,1 ADD TO SFT ERR HOLDR             30807840
                     *                                                     30807850
                     *                                                     30807860
081C 0 1000                  NOP    0     SAFTY NOP                         30807870
081D 0 C30E                  LD    3 14   GET ERR TRY CTR                   30807880
081E 0 83FF                  A     3 -1   ADD TO TRY CTR                   30807890
081F 0 D30E                  STO   3 14   SAVE CTR TOTAL                   30807900
0820 0 F3F6                  EOR   3 -10  TEST FOR TENTH TRY                30807910
0821 1 4C20 07E4             BSC  L CDTBC,Z LOOP TO RETRY AUTO              30807920
                     *                                                     30807930
0823 1 7401 0950             MDX  L DCT-34,1 ADD TO HRD ERR HOLDR           30807940
0825 0 1000                  NOP    0     SAFTY NOP                         30807950
                     *                                                     30807960
0826 0 4367                  BSI   3 FORM4-DCT BR TO MSAG FORM 4     MC     30807970
0827 0 E007                  DC     /E007  -- MSAG # --                    30807980
0828 1 07E2                  DC     CDTRT&1 ERR LOOP ADDR                  30807990
                     *                                                     30808000
0829 0 7002                  MDX    CDTGX&2 EXIT TO ERR ADDR         SX    30808010
                     *                                                     30808020
082A 1 7401 080A     CDTGX MDX  L CDTSN,1 ADD TO EXIT CTRL                  30808030
082C 1 4C80 080A             BSC  I CDTSN EXIT GOOD I/O OP           SX     30808040
082E 0 690D          DSPLA STX   1 DSPX1&1 SAVE X1 CONTENTS                 30808050
082F 0 6500 FEBF             LDX   L1 -321 SET X1 CONTROL COUNT             30808060
                     *                                                     30808070
0831 1 C400 05E2     DSPLP LD   L SW3     GET SW FNC 3 DATA                 30808080
0833 0 4804                  BSC    E     SKIP IF BIT 15 OFF                30808090
0834 0 7001                  MDX    *&1   GO TO DISPLAY LOGIC               30808100
0835 0 7005                  MDX    DSPX1 BR TO RESET X1                    30808110
                     *                                                     30808120
0836 1 C500 0C43             LD   L1 DCDA&321 GET I/O AREA WORD             30808130
0838 0 30DA                  DC     /30DA WAIT TO LOOK AT IT                30808140
                     *                                                     30808150
                     *                                                     30808160
0839 0 7101                  MDX    1 1   DEC X1 FOR NXT WORD               30808170
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083A 0 70F6              MDX     DSPLP       DISPLAY LOOP                30808180
                         *                                               30808190
083B 0 6500 0000    DSPX1 LDX  L1 0           RESTORE X1                  30808200
083D 0 70DC              MDX     CDTLK       BR OUT TO CONTINUE          30808210
                         *                                       *       30808220
                         *.....................................*       30808230
                         *                DISK SEEK ROUTINE    *       30808240
                         *.....................................*       30808250
                         *                                       *       30808260
083E 0 4388         DCSK BSI    3 -120       DCRDY RT              SEC   30808270
083F 0 C300              LD     3 0          CLR ACC                     30808280
0840 0 D302              STO    3 2          CLR SEEK INCREMENT          30808290
                         *                                               30808300
0841 0 C30A              LD     3 10         GET PRESENT ADDR            30808310
0842 0 EBF9              OR     3 -7         SET HD-SECT TO MAX          30808320
0843 0 930B              S      3 11         SUB DESIRED ADDR            30808330
0844 0 1883              SRT    3            CLR HEAD-SECTOR BITS        30808340
0845 1 4C98 0920         BSC  I DSK,&-       BR OUT IF DIFF ZERO   SX    30808350
                         *                                               30808360
0847 1 4C10 0851         BSC  L DSK10,-      Q- DIRECTION NEG            30808370
0849 0 F3C2              EOR    3 -62        YES- EOR TO GEN PLUS        30808380
084A 0 83FF              A      3 -1         ADD ONE TO CORRECT          30808390
084B 0 D304              STO    3 4          SAVE DIFF - INCR            30808400
084C 0 D302              STO    3 2          SAVE DIFF - INCR            30808410
084D 0 C321              LD     3 33         GET SK IN FUNCTION          30808420
084E 0 D306              STO    3 6          SET IT IN DCT               30808430
084F 0 D3DF              STO    3 -33        SET MEM FNC HLDR            30808440
0850 0 7004              MDX      DSK20      BR TO CONT                  30808450
                         *                                               30808460
0851 0 D304         DSK10 STO    3 4          SAVE DIFF - INCR            30808470
0852 0 D302              STO    3 2          SAVE DIFF - INCR            30808480
0853 0 C322              LD     3 34         GET SK OUT FUNCTION         30808490
0854 0 D306              STO    3 6          SET IT IN DCT               30808500
                         *                                               30808510
0855 0 C388         DSK20 LD     3 -72        GET RETURN ADDR - SK        30808520
0856 0 D08A              STO      CDTRT      SET IN CDT CMN RTRN         30808530
0857 0 7099              MDX      CDTRC      BR TO SET I/O EXEQ          30808540
                         *                                               30808550
0858 1 7401 0982    DSK30 MDX  L DCT&16,1     ADD TO SEEK OPCMP CT        30808560
085A 0 1000              NOP      0          SAFTY NOP                   30808570
                         *                                               30808580
085B 0 C30B              LD     3 11         GET DESIRED ADDR            30808590
085C 0 D30A              STO    3 10         SET IT IN PRESENT           30808600
                         *                                               30808610
085D 1 4400 0722         BSI  L LCKAF        BR TO LOOP ANY FNC    SC    30808620
085F 1 083E              DC       DCSK       LOOP ADDR                   30808630
0860 1 4C80 0920         BSC  I DSK          EXIT TO CALL RT       SX    30808640
                         *                                       *       30808650
                         *.....................................*       30808660
                         *              CHANNEL BUSY ROUTINE     *       30808670
                         *.....................................*       30808680
                         *                                               30808690
0862 1 6700 08CE    CHNBZ LDX  L3 CHNRQ       GET CHNRQ ADDR        SE    30808700
0864 1 6F00 05E7         STX  L3 MLN          SET IT IN MLSCF             30808710
0866 0 4480 0161         BSI  I  START        BR TO MONITOR         XM    30808720
                         *                                       *       30808730
                         *.....................................*       30808740
                         *              SEEK ADJ CYL 089 / 111   *       30808750
                         *.....................................*       30808760
                         *                                               30808770
0868 0 C30B         SKADJ LD     3 11         GET DESIRED ADDR      SE    30808780
0869 0 930C              S      3 12         SUB PRESENT ADDR            30808790
086A 0 4808              BSC      &          SKIP IF POSITIVE            30808800
086B 0 7003              MDX      SKOUT      BR TO NEGATIVE RT           30808810
                         *                                               30808820
086C 0 C3E2              LD     3 -30        GET CYL 111                 30808830
086D 0 D30B              STO    3 11         SET ADDR                    30808840
086E 0 7002              MDX      SKOUT&2    BR TO BR BACK               30808850
```



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                         *                                               30808860
086F 0 C3E3         SKOUT LD     3 -29        GET CYL 089                 30808870
0870 0 D30B              STO    3 11         SET ADDR                    30808880
0871 1 4C00 08B5         BSC  L DCBPR        BR TO USER RT         SX    30808890
                         *                                               30808900
0874   0000              BSS  E              SET XFER X3 EVEN ADD        30808910
                         *                                       *       30808920
                         *.....................................*       30808930
                         *              ARM TO HOME ROUTINE      *       30808940
                         *.....................................*       30808950
                         *                                       *       30808960
0874 0 0000              DC     0            DCARM SEEK CNT              30808970
0875 0 C3FF         DCARM LD     3 -1         GET CYL INCR          SE    30808980
0876 0 D304              STO    3 4          PUT IN INCREMENT            30808990
                         *                                               30809000
0877 0 C322         DARM  LD     3 34         GET SEEK --OUT--OP          30809010
0878 0 D306              STO    3 6          SET IT IN DCT               30809020
0879 0 C3B6              LD     3 -74        GET RETURN ADDR             30809030
087A 0 D31D              STO    3 29         SET IT IN DCT               30809040
                         *                                               30809050
087B 0 4388              BSI    3 -120       DCRDY RT              SC    30809060
                         *                                               30809070
087C 0 4392              BSI    3 -110       DCDSW RT              SC    30809080
087D 0 1004              SLA      4          SHIFT FOR B4                30809090
087E 1 4C28 0892         BSC  L DARTH,Z&     BR IF ARM AT HOME           30809100
                         *                                               30809110
0880 0 C0F3              LD       DCARM-1    GET SEEK CNT                30809120
0881 0 83FF              A      3 -1         ADD &1 TO CNT               30809130
0882 0 D0F1              STO      DCARM-1    SAVE NEW CNT                30809140
0883 0 F3E7              EOR    3 -25        TEST WITH 204               30809150
0884 1 4C20 088C         BSC  L DARMX,Z      BR IF NOT EQ 204            30809160
                         *                                               30809170
0886 1 D400 0A1D         STO  L REMRK        RESET REMRK WD TWOPA        30809180
0888 0 4331              BSI    3 FORM1-DCT  BR TO MSAG FORM 1     MC    30809190
0889 0 E003              DC       /E003      -- MSAG # --                30809200
088A 0 0000              DC       0          NO ERR LOOP ADDR            30809210
                         *                                               30809220
088B 0 43A5              BSI    3 -91        BR TO END PROG        SC    30809230
                         *                                               30809240
088C 0 4382         DARMX BSI    3 -126       DEXEQ RT              SC    30809250
                         *                                               30809260
088D 0 439C              BSI    3 -100       MONITOR START RT      XM    30809270
                         *                                               30809280
088E 1 6700 0972    DARTN LDX  L3 DCT        SET X3 CTRL ADDR            30809290
0890 0 438E              BSI    3 -114       RELEASE RT            SC    30809300
0891 0 70E5              MDX      DARM       LOOP                        30809310
                         *                                               30809320
0892 0 10A0         DARTH SLT      32         CLEAR A AND Q               30809330
0893 0 D309              STO    3 9          CLR LAST ADDR               30809340
0894 0 DB0A              STD    3 10         CLR DESIRED & PRESNT        30809350
0895 0 D30C              STO    3 12         CLR ACTUAL ADDR             30809360
0896 0 D31D              STO    3 29         CLR NTRPT RTRN ADDR         30809370
0897 0 D0DC              STO      DCARM-1    RESET SEEK CNTR             30809380
0898 0 6500 0BB8         LDX  L1 3000         SET DELAY XTNT              30809390
089A 0 4390              BSI    3 -112       DELAY RT - 20 MS      SC    30809400
                         *                                               30809410
                         *                                               30809420
089B 1 4C80 08F2         BSC  I ARM          EXIT TO CALL RT       SX    30809430
                         *                                       *       30809440
                         *.....................................*       30809450
                         *              COMMON EXEQUTE I/O RT    *       30809460
                         *.....................................*       30809470
                         *                                       *       30809480
089D 0 438A         DEXEQ BSI    3 -118       REQUEST DEVICE        SC    30809490
                         *                                       *       30809500
                         *     ****    **   ** MAIN LINE MUST RELEASE*   30809510
                         *                                       *       30809520
089E 0 C3B9              LD     3 -71        GET NTRPT TIMR ADDR         30809530
```

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089F 1 D400 05E6          STO  L  LIV          SET IN MLSCF TBL                30809540
                          *                                                    30809550
08A1 0 C305               LD     3 5           GET AREA CODE                   30809560
08A2 0 EB06               OR     3 6           SET IN FUNCTION                 30809570
08A3 0 EB07               OR     3 7           SET IN MODIFIER                 30809580
08A4 0 1890               SRT      16          PUT XIO IN Q REG                30809590
                          *                                                    30809600
08A5 0 C304               LD     3 4           GET ADDR / INCREMENT            30809610
                          *                                                    30809620
08A6 0 D803               STD      DEXIO       SET IOCC WORD                   30809630
                          *                                                    30809640
08A7 0 0802               XIO      DEXIO       DO I/O COMMAND                  30809650
                          *                                                    30809660
08A8 1 4C80 08F4          BSC  I   EXQ         EXIT RETURN              SX     30809670
                          *                                                    30809680
08AA   0002               DEXIO BSS  E  2       IOCC WORD                PM     30809690
                          *                                          *         30809700
                          *.........................................*         30809710
                          *              ADDR BYPASS CK RT          *         30809720
                          *.........................................*         30809730
                          *                                          *         30809740
08AC 0 C30B               DCABP LD     3 11     GET DESIRED ADDR         SE     30809750
08AD 0 93EC                     S      3 -20     SUB CYL 90                      30809760
08AE 1 4C28 08B5                BSC  L DCBPR,Z&  BR IF LESS THAN                 30809770
                          *                                                    30809780
08B0 0 C30B                     LD     3 11     GET DESIRED ADDR                30809790
08B1 0 93EA                     S      3 -22     SUB CYL 110                     30809800
08B2 1 4C30 08B5                BSC  L DCBPR,Z-  BR IF GREATER THAN              30809810
                          *                                                    30809820
08B4 0 70B3                     MDX    SKADJ     BR TO GET CYL &/-               30809830
                          *                                                    30809840
08B5 1 4C80 08F6          DCBPR BSC  I   ABP      EXIT TO CALL RT          SX     30809850
                          *                                          *         30809860
                          *.........................................*         30809870
                          *            RE-ZERO TO RE-SEEK RT        *         30809880
                          *.........................................*         30809890
                          *                                          *         30809900
08B7 0 C30B               DRESK LD     3 11     GET DESIRED ADDR         SE     30809910
08B8 0 D3DC                     STO    3 -36     SAVE IT                         30809920
08B9 1 7401 0985                MDX  L DCT&19,1  ADD TO SEEK ERR CNT             30809930
08BB 0 1000                     NOP    0         SAFTY NOP                       30809940
                          *                                                    30809950
08BC 0 4380               BSI    3 -128         DCARM RT                 SC     30809960
                          *                                                    30809970
08BD 0 C3DC               LD     3 -36          GET SAVED ADDR                  30809980
08BE 0 D30B               STO    3 11           SET IT IN DCT                   30809990
                          *                                                    30810000
                          *                                                    30810010
08BF 0 43AE               BSI    3 -82          DCSK RT                  SC     30810020
                          *                                                    30810030
08C0 1 4C80 08F8          BSC  I RSK            EXIT TO CALL RT          SX     30810040
                          *                                          *         30810050
                          *.........................................*         30810060
                          *            RDY-NOTBUSY-OK CK RT         *         30810070
                          *.........................................*         30810080
                          *                                          *         30810090
08C2 0 4392               DCRDY BSI    3 -110     DCDSW RT                 SEC    30810100
08C3 0 180C                     SRA      12       SHIFT FOR B0-B3                 30810110
08C4 1 4C98 08FA                BSC  I RDY,&-     EXIT                     SX     30810120
                          *                                                    30810130
08C6 1 6600 0AC3                LDX  L2 NTRDY     GET ALPHA PHRASE                30810140
08C8 1 6E00 0A1D                STX  L2 REMRK     SET IT IN TWOPA                 30810150
08CA 0 4331                     BSI    3 FORM1-DCT BR TO MSAG FORM 1           MC     30810160
08CB 0 E002                     DC     /E002      -- MSAG # --                    30810170
08CC 0 0000                     DC     0          NO ERR LOOP ADDR                30810180
08CD 0 70F4                     MDX    DCRDY      BR TO PRINT AGAIN               30810190
                          *                                          *         30810200
                          *.........................................*         30810210
```



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                          *                CHANNEL REQUEST RT        *         30810220
                          *.........................................*         30810230
                          *                                          *         30810240
08CE 1 4400 0666          CHNRQ BSI  L  REQDV    CHANNEL REQUEST RT       SEC    30810250
08D0 1 0862                     DC      CHNBZ    BUSY RT ADDR                    30810260
08D1 0 0000               CHNSA DC      0        DDEF ADDR                       30810270
08D2 1 070E                     DC      DVA      DEVICE REF ADDR                 30810280
08D3 1 05E8                     DC      TERM     ADDR OF/FFFF                    30810290
08D4 1 4C80 08FC                BSC  I  REQ      EXIT TO CALL RT          SX     30810300
                          *                                                    30810310
                          *                                          *         30810320
                          *.........................................*         30810330
                          *                FILL I/O AREA RT          *         30810340
                          *.........................................*         30810350
                          *                                          *         30810360
08D6 0 6500 FEC0          DFILL LDX  L1 -320     SET PASS CTRL            SE     30810370
08D8 1 D500 0C44                STO  L1 DCDA&322 RESET IOA WITH ACC              30810380
08DA 0 7101                     MDX    1 1       DEC CTRL                        30810390
08DB 0 70FC                     MDX    DFILL&2   LOOP                            30810400
08DC 1 4C80 08FE                BSC  I FLX       EXIT                     SX     30810410
                          *                                          *         30810420
                          *.........................................*         30810430
                          *              CHANNEL RELEASE RT          *         30810440
                          *.........................................*         30810450
                          *                                          *         30810460
08DE 1 4400 0661          CHNRL BSI  L  RELDV    CHANNEL RELEASE RT       SEC    30810470
08E0 0 0000               CHNRA DC      0        DDEF ADDR                       30810480
08E1 1 05E8                     DC      TERM     ADDR OF /FFFF                   30810490
08E2 1 4C80 0900                BSC  I  REL      EXIT TO CALL RT          SX     30810500
                          *                                          *         30810510
                          *.........................................*         30810520
                          *              DISK DELAY ROUTINE          *         30810530
                          *.........................................*         30810540
                          *                                          *         30810550
08E4 0 71FF               DCDLA MDX    1 -1      DEC NDX CNT              SE     30810560
08E5 0 70FE                     MDX      *-2      LOOP IF NOT ZERO                30810570
08E6 0 C3C0                     LD     3 -64      GET ADDR OF RETURN              30810580
08E7 1 D400 05E7                STO  L MLN       SET ADDR IN MLSCF               30810590
08E9 0 439C                     BSI    3 -100    BR TO MON START          XM     30810600
08EA 1 6700 0972          DLABB LDX  L3 DCT      SET X3 CTRL ADDR                30810610
08EC 1 4C80 0902                BSC  I DLA       EXIT TO CALL RT          SX     30810620
                          *                                          *         30810630
                          *.........................................*         30810640
                          *              READ DSW ROUTINE            *         30810650
                          *.........................................*         30810660
                          *                                          *         30810670
08EE 0 0BBC               DCDSW XIO    3 -68     READ DSW                 SE     30810680
08EF 0 D308                     STO    3 8       SAVE DSW                        30810690
08F0 1 4C80 0904                BSC  I DSW       RETURN TO CALL RT        SX     30810700
                          *                                          *         30810710
                          *.........................................*         30810720
                          *            X3 - COMMON XFER TABLE        *         30810730
                          *.........................................*         30810740
                          *                                          *         30810750
08F2   0000                     BSS  E                                         30810760
08F2 0 0000               ARM   DC      0                  -128                30810770
08F3 0 7081                     MDX     DCARM                    SC            30810780
                          *                                                    30810790
08F4 0 0000               EXQ   DC      0                  -126                30810800
08F5 0 70A7                     MDX     DEXEQ                    SC            30810810
                          *                                                    30810820
08F6 0 0000               ABP   DC      0                  -124                30810830
08F7 0 70B4                     MDX     DCABP                    SC            30810840
                          *                                                    30810850
08F8 0 0000               RSK   DC      0                  -122                30810860
08F9 0 70BD                     MDX     DRESK                    SC            30810870
                          *                                                    30810880
08FA 0 0000               RDY   DC      0                  -120                30810890
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08FB 0 70C6          MDX    DCRDY                    SC   30810900
                     *                                    30810910
08FC 0 0000     REQ  DC     0                  -118       30810920
08FD 0 70D0          MDX    CHNRQ                    SC   30810930
                     *                                    30810940
08FE 0 0000     FLX  DC     0                  -116       30810950
08FF 0 70D6          MDX    DFILL                    SC   30810960
                     *                                    30810970
0900 0 0000     REL  DC     0                  -114       30810980
0901 0 70DC          MDX    CHNRL                    SC   30810990
                     *                                    30811000
0902 0 0000     DLA  DC     0                  -112       30811010
0903 0 70E0          MDX    DCDLA                    SC   30811020
                     *                                    30811030
0904 0 0000     DSW  DC     0                  -110       30811040
0905 0 70E8          MDX    DCDSW                    SC   30811050
                     *                                    30811060
0906 0 0000     HNG  DC     0                  -108       30811070
0907 0 70FF          MDX    *-1                      SC   30811080
                     *                                    30811090
0908 0 0000     MEND DC     0                  -106       30811100
0909 0 4480 0164     BSI  I END                    PXM   30811110
                     *                                    30811120
090B 0 0000     ARC  DC     0                  -103       30811130
090C 1 4C00 0A60     BSC  L DSKAC                     SC   30811140
                     *                                    30811150
090E 0 0000     STRT DC     0                  -100       30811160
090F 0 4480 0161     BSI  I START                  SC   30811170
                     *                                    30811180
0911 0 0000     RTN  DC     0                   -97       30811190
0912 1 4C00 06CE     BSC  L DCRTN                     SC   30811200
                     *                                    30811210
0914 0 0000     REST DC     0                   -94       30811220
0915 1 4C00 066B     BSC  L DCTRL                     SC   30811230
                     *                                    30811240
0917 0 0000     DEND DC     0                   -91       30811250
0918 1 4C00 06E7     BSC  L DCANH                     SC   30811260
                     *                                    30811270
091A 0 0000     DRD  DC     0                   -88       30811280
091B 1 4C00 0787     BSC  L DCRD                      SC   30811290
                     *                                    30811300
091D 0 0000     DWR  DC     0                   -85       30811310
091E 1 4C00 0768     BSC  L DCWR                      SC   30811320
                     *                                    30811330
0920 0 0000     DSK  DC     0                   -82       30811340
0921 1 4C00 083E     BSC  L DCSK                      SC   30811350
                     *                                    30811360
0923 0 0000     EMF  DC     0                   -79       30811370
0924 1 4C80 0923     BSC  I EMF                       SC   30811380
                     *                                *   30811390
                     *----------------------------------*  30811400
                     *          X3 - COMMON XTNT REF TBL *  30811410
                     *----------------------------------*  30811420
                     *                                *   30811430
0926 1 066B          DC     DCTRL                     -76  30811440
0927 1 0671          DC     DCTL2                     -75  30811450
0928 1 088E          DC     DARTN                     -74  30811460
0929 1 0803          DC     CDTNR                     -73  30811470
092A 1 0858          DC     DSK30                     -72  30811480
092B 1 06F2          DC     DLNRT                     -71  30811490
092C 0 0000          DC     /0000                     -70  30811500
092D 0 0701          DC     /0701                     -69  30811510
092E 0 0000          DC     /0000                     -68  30811520
092F 0 0700          DC     /0700                     -67  30811530
0930 0 0658          DC     /0658                     -66  30811540
0931 0 8000          DC     /8000                     -65  30811550
0932 1 08EA          DC     DLABB                     -64  30811560
0933 0 0100          DC     /0100                     -63  30811570
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0934 0 FFFF          DC     /FFFF                     -62  30811580
0935 0 FFFC          DC     /FFFC                     -61  30811590
0936 0 F0FF          DC     /F0FF                     -60  30811600
0937 0 F7FC          DC     /F7FC                     -59  30811610
0938 0 E5E5          DC     /E5E5     PATTERN ZERO    -58  30811620
0939 0 CEDC          DC     /CEDC                     -57  30811630
093A 0 C800          DC     /C800                     -56  30811640
093B 0 0700          DC     /0700                     -55  30811650
093C 0 7000          DC     /7000                     -54  30811660
093D 0 6400          DC     /6400                     -53  30811670
093E 0 4800          DC     /4800                     -52  30811680
093F 0 4000          DC     /4000                     -51  30811690
0940 0 0000          DC     /0000                     -50  30811700
0941 0 0657          DC     /0657     MAX DISK ADDR   -49  30811710
0942 0 1313          DC     /1313     PATTERN ONE     -48  30811720
0943 0 1u00          DC     /1000     NOP INST        -47  30811730
0944 0 0800          DC     /0800     BIT PATTERN     -46  30811740
0945 0 07D0          DC     /07D0     TIME CONSTANT   -45  30811750
0946 0 0000          DC     /0000     DISK ADDRESSES  -44  30811760
0947 0 0008          DC     /0008     DISK ADDRESSES  -43  30811770
0948 0 0010          DC     /0010     DISK ADDRESSES  -42  30811780
0949 0 0018          DC     /0018     DISK ADDRESSES  -41  30811790
094A 0 0638          DC     /0638     DISK ADDRESSES  -40 CE 30811800
094B 0 0640          DC     /0640     DISK ADDRESSES  -39  30811810
094C 0 0648          DC     /0648     DISK ADDRESSES  -38  30811820
094D 0 0650          DC     /0650     DISK ADDRESSES  -37  30811830
094E 0 0000          DC     0         DISK WORK AREA  -36  30811840
094F 0 0000          DC     0         DISK WORK AREA  -35  30811850
0950 0 0000          DC     0         DISK WORK AREA  -34  30811860
0951 0 0000          DC     0         DISK WORK AREA  -33  30811870
0952 0 0000          DC     0         DISK WORK AREA  -32  30811880
0953 0 0000          DC     0         DLA XTNT HLDR   -31  30811890
0954 0 0378          DC     /0378                     -30  30811900
0955 0 02CF          DC     /02CF                     -29  30811910
0956 0 0190          DC     400                       -28  30811920
0957 0 0141          DC     321                       -27  30811930
0958 0 0000          DC     0                         -26  30811940
0959 0 00CC          DC     204                       -25  30811950
095A 0 00C8          DC     200                       -24  30811960
095B 0 0000          DC     0                         -23  30811970
095C 0 0377          DC     /0377                     -22  30811980
095D 0 0000          DC     0                         -21  30811990
095E 0 02D0          DC     /02D0                     -20  30812000
095F 0 0018          DC     24                        -19  30812010
0960 0 0017          DC     23                        -18  30812020
0961 0 001F          DC     31                        -17  30812030
0962 0 0010          DC     16                        -16  30812040
0963 0 000F          DC     15                        -15  30812050
0964 0 000E          DC     14                        -14  30812060
0965 0 000D          DC     13                        -13  30812070
0966 0 000C          DC     12                        -12  30812080
0967 0 000B          DC     11                        -11  30812090
0968 0 000A          DC     10                        -10  30812100
0969 0 0009          DC     9                          -9  30812110
096A 0 0008          DC     8                          -8  30812120
0968 0 0007          DC     7                          -7  30812130
096C 0 0006          DC     6                          -6  30812140
096D 0 0005          DC     5                          -5  30812150
096E 0 0004          DC     4                          -4  30812160
096F 0 0003          DC     3                          -3  30812170
0970 0 0002          DC     2                          -2  30812180
0971 0 0001          DC     1                          -1  30812190
                     *                                *   30812200
                     *----------------------------------*  30812210
                     *          X3 - DISK CTRL TABLE    *  30812220
                     *----------------------------------*  30812230
                     *                                *   30812240
0972 0 0000     DCT  DC     /0000     ZERO CONSTANT    0  30812250
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0973 1 0B02          DC      DCDA       READ DATA AREA FLD 1      30812260
0974 0 0000          DC      0          SEEK INCR CALC HLD 2      30812270
0975 0 0000          DC      0          SK - WR - RD SWCTL 3      30812280
0976 0 0000          DC      0          I/O AREA / CYL INC 4      30812290
0977 0 0000          DC      0          AREA CODE          5      30812300
0978 0 0000          DC      0          FUNCTION           6      30812310
0979 0 0000          DC      0          MODIFIER           7      30812320
097A 0 0000          DC      0          LAST DSW READ      8      30812330
097B 0 0000          DC      0          LAST GOOD CYL READ 9      30812340
097C 0 0000          DC      0          PRESENT CYL       10      30812350
097D 0 0000          DC      0          DESIRED CYL HDDR  11      30812360
097E 0 0000          DC      0          ACTUAL ADDR READ  12      30812370
097F 0 0000          DC      0          CURRENT WORD CNT  13      30812380
0980 0 0000          DC      0          RD-WR ERR TRY CTR 14      30812390
0981 0 0000          DC      0          SEEK ERR TRY CTR  15      30812400
0982 0 0000          DC      0          TOTAL SEEKS       16      30812410
0983 0 0000          DC      0          TOTAL WRITES      17      30812420
0984 0 0000          DC      0          TOTAL READS       18      30812430
0985 0 0000          DC      0          TOTAL SEEK ERRORS 19      30812440
0986 0 0000          DC      0          TOT SFT WR ERRORS 20      30812450
0987 0 0000          DC      0          TOT HRD WR ERRORS 21      30812460
0988 0 0000          DC      0          TOT SFT RD ERRORS 22      30812470
0989 0 0000          DC      0          TOT HRD RD ERRORS 23      30812480
098A 0 0000          DC      0          TOT PROG PASSES   24      30812490
098B 0 0000          DC      0          ROUTINE EXEQ NUM  25      30812500
098C 0 0000          DC      0          RD-RDCK MODE CODE 26      30812510
098D 0 0000          DC      0          LOST TIME DLA CTR 27      30812520
098E 0 0FFF          DC      /0FFF      LOST TIME DLA XNT 28      30812530
098F 0 0000          DC      0          NTRUPT RTRN ADDR  29      30812540
0990 0 0000          DC      0          WD NUM OF PAT ERR 30      30812550
0991 0 0000          DC      0          DESIRED PATTERN   31      30812560
0992 0 0000          DC      0          ACTUAL PATTERN    32      30812570
0993 0 0400          DC      /0400      DISK SEEK --IN--  33      30812580
0994 0 0404          DC      /0404      DISK SEEK --OUT-- 34      30812590
0995 0 0500          DC      /0500      DISK WRITE DATA   35      30812600
0996 0 0600          DC      /0600      DISK READ DATA    36      30812610
0997 0 0680          DC      /0680      DISK READ CHECK   37      30812620
0998 0 0700          DC      /0700      DISK SENSE NORSET 38      30812630
0999 0 0701          DC      /0701      DISK SENSE RESET  39      30812640
                     *                                            30812650
                     *.....................................*      30812660
                     *          X3 - MSAG REF TBL          *      30812670
                     *.....................................*      30812680
                     *                                     *      30812690
                     *                                     *      30812700
                     *.....................................*      30812710
                     *          SETUP MSAG FORMAT RTNS     *      30812720
                     *.....................................*      30812730
                     *                                     *      30812740
099A 0 0000          FORM0 DC      0          ENTRY ADDR          SE 30812750
099B 1 6580 099A           LDX   I1 FORM0     SAVE ENTRY FOR RTRN   30812760
099D 0 6A7F                STX    2 REMRK     SET PHRASE IN TWOPA   30812770
099E 0 6200                LDX    2 0         GET PRINT CONTROL     30812780
099F 0 6A7A                STX    2 HDSW      CLEAR HEX-DEC CTRL    30812790
09A0 0 6A7A                STX    2 DPCW      SET IT IN TWOPA       30812800
09A1 0 6A7A                STX    2 ALPHA     CLEAR ALPHA ADDR 1    30812810
09A2 0 705C                MDX      MCALL     BR TO MSG CTRL RT     30812820
                     *                                            30812830
09A3 0 0000          FORM1 DC      0          ENTRY ADDR          SE 30812840
09A4 1 6580 09A3           LDX   I1 FORM1     SAVE ENTRY FRO RTRN   30812850
09A6 0 6203                LDX    2 3         GET PRINT CONTROL     30812860
09A7 0 6A73                STX    2 DPCW      SET IT IN TWOPA       30812870
09A8 0 6200                LDX    2 0         SET X2 TO ZERO        30812880
09A9 0 6A70                STX    2 HDSW      CLEAR HEX-DEC CTRL    30812890
09AA 0 7013                MDX      TWFRM     BR TO FINISH SETUP    30812900
                     *                                            30812910
09AB 0 0000          FORM2 DC      0          ENTRY ADDR          SE 30812920
09AC 1 6580 09AB           LDX   I1 FORM2     SAVE ENTRY FOR RTRN   30812930
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09AE 0 6200                LDX    2 0         SET X2 TO ZERO        30812940
09AF 0 6A6A                STX    2 HDSW      CLEAR HEX-DEC CTRL    30812950
09B0 0 621F                LDX    2 31        GET PRINT CONTROL     30812960
09B1 0 6A69                STX    2 DPCW      SET IT IN TWOPA       30812970
09B2 0 C309                LD     3 9         GET LAST ADDR         30812980
09B3 0 4399                BSI    3 -103      BR TO DSK CNVRT RT  SC 30812990
09B4 0 D06B                STO      MSG&2     SET ADDR IN TWOPA     30813000
09B5 0 C30B                LD     3 11        GET DESIRED ADDR      30813010
09B6 0 4399                BSI    3 -103      BR TO DSK CNVRT RT  SC 30813020
09B7 0 D069                STO      MSG&3     SET IN TWOPA          30813030
09B8 0 C30C                LD     3 12        GET ACTUAL ADDR       30813040
09B9 0 4399                BSI    3 -103      BR TO DSK CNVRT RT  SC 30813050
09BA 0 D067                STO      MSG&4     SET IN TWOPA          30813060
09BB 1 6600 0A8A           LDX   L2 FRTRD     GET ALPHA ADDR 2      30813070
09BD 0 6A5F                STX    2 REMRK     SET IN TWOPA          30813080
09BE 1 6600 0A7E     TWFRM LDX   L2 INDSW     GET ALPHA ADDR 1      30813090
09C0 0 6A5B                STX    2 ALPHA     SET IN TWOPA          30813100
09C1 0 C308                LD     3 8         GET DSW               30813110
09C2 0 D05C                STO      MSG&1     SET IT IN TWOPA       30813120
09C3 1 C400 08AB           LD     L DEXIO&1   GET INST             30813130
09C5 0 7038                MDX      MCALL-1   BR TO SET IN MSAG   SX 30813140
                     *                                            30813150
09C6 0 0000          FORM3 DC      0          ENTRY ADDR          SE 30813160
09C7 1 6580 09C6           LDX   I1 FORM3     SAVE ENTRY FOR RTRN   30813170
09C9 0 623F                LDX    2 63        GET PRINT CONTROL     30813180
09CA 0 6A50                STX    2 DPCW      SET IT IN TWOPA       30813190
09CB 0 6208                LDX    2 8         GET HEX-DEC CONTROL   30813200
09CC 0 6A4D                STX    2 HDSW      SET IT IN TWOPA       30813210
09CD 0 C30C                LD     3 12        GET ACTUAL ADDR       30813220
09CE 0 4399                BSI    3 -103      BR TO CNVRT RT      SC 30813230
09CF 0 D050                STO      MSG&2     SET IN TWOPA          30813240
09D0 0 C31E                LD     3 30        GET WD # IN REC       30813250
09D1 0 D04F                STO      MSG&3     SET IN TWOPA          30813260
09D2 0 C31F                LD     3 31        GET DESIRED PATTERN   30813270
09D3 0 D04E                STO      MSG&4     SET IT IN TWOPA       30813280
09D4 0 C320                LD     3 32        GET ACTUAL PATTERN    30813290
09D5 0 D04D                STO      MSG&5     SET IT IN TWOPA       30813300
09D6 1 6600 0A92           LDX   L2 AWEAX     GET ALPHA 2 ADDR      30813310
09D8 0 70E4                MDX      TWFRM-1   BR TO FINISH SETUP  SX 30813320
                     *                                            30813330
09D9 0 0000          FORM4 DC      0          ENTRY ADDR          SE 30813340
09DA 1 6580 09D9           LDX   I1 FORM4     SAVE ENTRY FOR RTRN   30813350
09DC 0 6200                LDX    2 0         SET X2 TO ZERO        30813360
09DD 0 6A3C                STX    2 HDSW      CLEAR HEX-DEC CTRL    30813370
09DE 0 620F                LDX    2 15        GET PRINT CONTROL     30813380
09DF 0 6A3B                STX    2 DPCW      SET IT IN TWOPA       30813390
09E0 0 C30C                LD     3 12        GET ACTUAL ADDR READ  30813400
09E1 0 4399                BSI    3 -103      BR TO ADDR CNVRT RT SC 30813410
09E2 0 D03D                STO      MSG&2     SET IT IN TWOPA       30813420
09E3 1 C400 0B04           LD     L DCDA&2    GET FIRST DATA WD     30813430
09E5 0 D03B                STO      MSG&3     SET IT IN TWOPA       30813440
09E6 1 6600 0A84           LDX   L2 ADATA     GET ALPHA 2 ADDR      30813450
09E8 0 70D4                MDX      TWFRM-1   BR TO FINISH SETUP  SX 30813460
                     *                                            30813470
09E9 0 0000          FORM5 DC      0          ENTRY ADDR          SE 30813480
09EA 1 6580 09E9           LDX   I1 FORM5     SAVE ENTRY FOR RTRN   30813490
09EC 0 6200                LDX    2 0         SET X2 TO ZERO        30813500
09ED 0 6A2F                STX    2 REMRK     SET IT IN TWOPA       30813510
09EE 0 6207                LDX    2 7         GET CTRL XTNT         30813520
09EF 0 6A2A                STX    2 HDSW      SET HEX-DEC CTRL      30813530
09F0 0 6A2A                STX    2 DPCW      SET PRINT CTRL        30813540
09F1 0 C3CB                LD     3 -53       GET BR INST           30813550
09F2 0 D050                STO      CTLOG     SET IT IN STATUS CTL  30813560
09F3 1 6600 0A52           LDX   L2 TWMLP     GET MULTILINE XFER    30813570
09F5 0 6A4E                STX    2 CTLOG&1   STATUS LOOP CTRL      30813580
09F6 1 6600 0ADF           LDX   L2 STAT1     GET ALPHA ADDR        30813590
09F8 0 6A23                STX    2 ALPHA     SET IT IN TWOPA       30813600
09F9 0 C313                LD     3 19        GET RESK COUNT        30813610
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09FA 0 D025            STO    MSG&2     SET IT IN TWOPA              30813620
09FB 0 C310            LD   3 16        GET SEEK COUNT DATA          30813630
09FC 0 D022            STO    MSG&1     SET IT IN TWOPA              30813640
09FD 0 C318            LD   3 24        GET PASS COUNT               30813650
09FE 0 D01F            STO    MSG       SET IT IN TWOPA              30813660
09FF 0 702E     MCALL  MDX    CALLM     BR TO MSAG CTRL RT    SX     30813670
                *                                                   30813680
0A00 1 6600 0A0D FRM5A LDX  L2 FRM5B     LINE THREE SETUP      SE     30813690
0A02 0 6A54            STX    2 TWMLB&1 GET NEW MLP RTRN             30813700
0A03 1 6600 0AE9       LDX  L2 STAT2     GET ALPHA ADDR               30813710
0A05 0 6A16            STX    2 ALPHA   SET IT IN TWOPA              30813720
0A06 0 C311            LD   3 17        GET WRITE COUNT              30813730
0A07 0 D016            STO    MSG       SET IT IN TWOPA              30813740
0A08 0 C314            LD   3 20        GET WR SFT ERRS              30813750
0A09 0 D015            STO    MSG&1     SET IT IN TWOPA              30813760
0A0A 0 C315            LD   3 21        GET WR HRD ERRS              30813770
0A0B 0 D014            STO    MSG&2     SET IT IN TWOPA              30813780
0A0C 0 7031            MDX    TWLOG&1   BR TO LOG CALL         SX     30813790
                *                                                   30813800
0A0D 1 6600 0A58 FRM5B LDX  L2 TWMLR     GET MLP RESET ADDR    SE     30813810
0A0F 0 6A47            STX    2 TWMLB&1 SET RESET ADDR MLP           30813820
0A10 1 6600 0AF3       LDX  L2 STAT3     GET ALPHA ADDR               30813830
0A12 0 6A09            STX    2 ALPHA   SET IT IN TWOPA              30813840
0A13 0 C312            LD   3 18        GET READ COUNT               30813850
0A14 0 D009            STO    MSG       SET IT IN TWOPA              30813860
0A15 0 C316            LD   3 22        GET RD SFT ERRS              30813870
0A16 0 D008            STO    MSG&1     SET IT IN TWOPA              30813880
0A17 0 C317            LD   3 23        GET RD HRD ERRS              30813890
0A18 0 70F2            MDX    FRM5B-2   BR TO LOG CALL          SX    30813900
                *                                                   30813910
                *.....................................*              30813920
                *          TW MESSAGE OUTPUT AREA     *              30813930
                *.....................................*              30813940
                *                                     *              30813950
0A19 0 0000     TWOPA  DC              MESSAGE NUMBER               30813960
0A1A 0 0000     HDSW   DC              HEX / DEC SW                 30813970
0A1B 0 0000     DPCW   DC              DATA ID                      30813980
0A1C 0 0000     ALPHA  DC              ALPHA 1                      30813990
0A1D 0 0000     REMRK  DC              ALPHA 2                      30814000
0A1E 0 0000     MSG    DC              M                            30814010
0A1F 0 0000            DC              E                            30814020
0A20 0 0000            DC              S                            30814030
0A21 0 0000            DC              S                            30814040
0A22 0 0000            DC              A                            30814050
0A23 0 0000            DC              G                            30814060
0A24 0 0000            DC              E                            30814070
0A25 0 0000            DC                                           30814080
0A26 0 0000            DC              D                            30814090
0A27 0 0000            DC              A                            30814100
0A28 0 0000            DC              T                            30814110
0A29 0 0000            DC              A                            30814120
0A2A 0 0000            DC                                           30814130
0A2B 0 0000            DC              W                            30814140
0A2C 0 0000            DC              D                            30814150
0A2D 0 8100     CCRTN  DC      /8100    S                            30814160
                *                                                   30814170
                *.....................................*              30814180
                *          MESSAGE CALL CTRL RTS      *              30814190
                *.....................................*              30814200
                *                                     *              30814210
0A2E 0 C100     CALLM  LD     1 0       GET MSAG NUM          SE     30814220
0A2F 0 D0E9            STO    TWOPA     SET IT IN TW OPA TBL         30814230
0A30 0 180C            SRA    12        SHIFT FOR ERR RT CK          30814240
0A31 0 F3F2            EOR    3 -14     TEST FOR ERR IND             30814250
0A32 1 4C20 0A3D       BSC  L TWLOG,Z   BR TO LOG CALL RT            30814260
0A34 0 7101            MDX    1 1       ADD FOR LOOP ADDR            30814270
0A35 0 C100            LD     1 0       GET ERROR ADDR               30814280
0A36 0 D004            STO    TWERR&3   SET IT IN CALL SEQ           30814290
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0A37 0 6927            STX    1 TWX1H   SAVE  INDEX 1 DATA           30814300
                *                                                   30814310
                *                ERROR RT CALL SEQ                  *30814320
                *                                                   30814330
0A38 0 4480 0162 TWERR BSI  I  ERROR     BR TO MON ERR RT      SA     30814340
0A3A 1 0A19            DC      TWOPA     OPA STRING                   30814350
0A3B 0 0000            DC      0         LOOP ON ERR ADDR             30814360
0A3C 0 7008            MDX     TWRTN     BR TO MSG RTRN CTRL   SE     30814370
                *                                                   30814380
                *                LOG RT CALL SEQ                    *30814390
                *                                                   30814400
0A3D 0 6921     TWLOG  STX    1 TWX1H   SAVE  INDEX 1 DATA           30814410
0A3E 0 4480 0163       BSI  I  LOG       BR TO MONITOR LOG            30814420
0A40 1 0A19            DC      TWOPA     OPA STRING                   30814430
0A41 1 6700 0972       LDX  L3 DCT       SET XR3 CONTROL ADDR         30814440
                *                                                   30814450
0A43 0 1000     CTLOG  NOP             LOG - STATUS                 30814460
0A44 0 1000            NOP             LOOP CONTROL                 30814470
                *                                                   30814480
                *                MSAG RETRN CTRL RT                 *30814490
                *                                                   30814500
0A45 1 6700 0972 TWRTN LDX  L3 DCT       SET X3 CTRL ADDR      SE     30814510
                *                                                   30814520
0A47 1 6600 0A4C       LDX  L2 TWEND     GET ENTRY ADDR               30814530
0A49 1 6E00 05E5       STX  L2 MLSCF     SET IT IN CTRL TBL           30814540
0A4B 0 439C            BSI    3 -100     BR TO MONITOR START   SX     30814550
                *                                                   30814560
0A4C 1 6700 0972 TWEND LDX  L3 DCT       SET X3 CTRL ADDR      SE     30814570
                *                                                   30814580
0A4E 1 6580 0A5F       LDX  I1 TWX1H     GET X1 ENTRY ADDR            30814590
0A50 0 4D00 0001       BSC  L1 1         RETURN TO USER        SX     30814600
                *                                                   30814610
0A52 0 C3D2     TWMLP  LD     3 -46      GET CTRL WORD                30814620
0A53 0 1004            SLA      4       SHIFT FOR MLP CTRL           30814630
0A54 0 E8C6            OR       DPCW    OR IN CTRL COUNT             30814640
0A55 0 D0C5            STO      DPCW    SET IN FINAL CTRL            30814650
0A56 1 4C00 0A00 TWMLB BSC  L   FRM5A    RETURN TO NEXT RT            30814660
                *                                                   30814670
0A58 1 6600 0A00 TWMLR LDX  L2 FRM5A     GET BASIC ADDR               30814680
0A5A 0 6AFC            STX    2 TWMLB&1 SET IN MLB RETURN            30814690
0A5B 0 C3D1            LD     3 -47     GET NOP INST                 30814700
0A5C 0 D0E6            STO      CTLOG   CLEAR MLP CTRL XFER          30814710
0A5D 0 D0E6            STO      CTLOG&1 CLEAR MLP CTRL XFER          30814720
0A5E 0 70E6            MDX      TWRTN   RETURN TO NORMAL CTL         30814730
                *                                                   30814740
0A5F 0 0000     TWX1H  DC       0       X1 ENTRY HOLD ADDR           30814750
                *                                                   *30814760
                *.....................................*              30814770
                *          ADDR CNVRT RT              *              30814780
                *.....................................*              30814790
                *                                     *              30814800
0A60 0 18D0     DSKAC  RTE      16      SET Q DATA IN A              30814810
0A61 0 1010            SLA      16      CLR Q DATA IN A              30814820
0A62 0 18D0            RTE      16      RESET Q TO ZERO              30814830
0A63 0 18D3            RTE      19      SHIFT A DATA                 30814840
0A64 0 180D            SRA      13      ADJ SECT-HEAD                30814850
0A65 0 D014            STO      HCAP1   SAVE IT                      30814860
0A66 0 1010            SLA      16      CLR A REG                    30814870
0A67 0 ABF6            D      3 -10     DIVIDE FOR BASE 10           30814880
0A68 0 18D0            RTE      16      SET QUOTIENT INTO Q          30814890
0A69 0 D011            STO      HCAP2   SAVE REMAINDER               30814900
0A6A 0 1010            SLA      16      CLEAR A REG                  30814910
0A6B 0 ABF6            D      3 -10     DIVIDE FOR BASE 10           30814920
0A6C 0 18D0            RTE      16      SET QUOTIENT INTO Q          30814930
0A6D 0 D00E            STO      HCAP3   SAVE REMAINDER               30814940
0A6E 0 1010            SLA      16      CLEAR A REG                  30814950
0A6F 0 ABF6            D      3 -10     DIVIDE FOR BASE 10           30814960
0A70 0 18D0            RTE      16      SEG QUOTIENT INTO Q          30814970
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0A71 0 1004              SLA     4          SHIFT TO BUILD ADDR          30814980
0A72 0 E809              OR      HCAP3      OR IN TENS CYL ADDR          30814990
0A73 0 1004              SLA     4          SHIFT AGAIN                  30815000
0A74 0 E806              OR      HCAP2      OR IN UNITS CYL ADDR         30815010
0A75 0 1004              SLA     4          SHIFT AGAIN                  30815020
0A76 0 E803              OR      HCAP1      OR IN HEAD-SECT              30815030
0A77 0 0005              STO     HCAP4      SAVE FINAL ADDR              30815040
                         *                                               30815050
0A78 1 4C80 090B         BSC  I  ARC        BR TO USER                   30815060
                         *                                               30815070
0A7A 0 0000              HCAP1 DC   0       HEAD-SECTOR                  30815080
0A7B 0 0000              HCAP2 DC   0       UNITS CYL ADDR               30815090
0A7C 0 0000              HCAP3 DC   0       TENS CYL ADDR                30815100
0A7D 0 0000              HCAP4 DC   0       TOTAL CYL ADDR               30815110
                         *                                               30815120
                         *                                               30815130
                         *.....................................*         30815140
                         *          ALPHA PHRASES TABLE        *         30815150
                         *.....................................*         30815160
                         *                                     *         30815170
0A7E 0 2074              INDSW DC   /2074     INST  DSW                  30815180
0A7F 0 989C                    DC   /989C                                30815190
0A80 0 2121                    DC   /2121                                30815200
0A81 0 3098                    DC   /3098                                30815210
0A82 0 9000                    DC   /9000                                30815220
0A83 0 FFFF                    DC   /FFFF                                30815230
                         *                                               30815240
0A84 0 3C30              ADATA DC   /3C30     ADDR DATA                  30815250
0A85 0 3060                    DC   /3060                                30815260
0A86 0 2130                    DC   /2130                                30815270
0A87 0 3C9C                    DC   /3C9C                                30815280
0A88 0 3C00                    DC   /3C00                                30815290
0A89 0 FFFF                    DC   /FFFF                                30815300
                         *                                               30815310
0A8A 0 1060              FRTRD DC   /1060     FROM  TO  READ             30815320
0A8B 0 5070                    DC   /5070                                30815330
0A8C 0 2121                    DC   /2121                                30815340
0A8D 0 9C50                    DC   /9C50                                30815350
0A8E 0 2121                    DC   /2121                                30815360
0A8F 0 6034                    DC   /6034                                30815370
0A90 0 3C30                    DC   /3C30                                30815380
0A91 0 FFFF                    DC   /FFFF                                30815390
                         *                                               30815400
0A92 0 3C30              AWEAX DC   /3C30     ADDR WD # EXPT ACTL        30815410
0A93 0 3060                    DC   /3060                                30815420
0A94 0 2190                    DC   /2190                                30815430
0A95 0 3021                    DC   /3021                                30815440
0A96 0 34C0                    DC   /34C0                                30815450
0A97 0 2134                    DC   /2134                                30815460
0A98 0 9454                    DC   /9454                                30815470
0A99 0 9C21                    DC   /9C21                                30815480
0A9A 0 3C1C                    DC   /3C1C                                30815490
0A9B 0 9C5C                    DC   /9C5C                                30815500
0A9C 0 FFFF                    DC   /FFFF                                30815510
                         *                                               30815520
0A9D 0 3C30              ARIET DC   /3C30     ADDR RECORDED IN ERR       30815530
0A9E 0 3060                    DC   /3060      TBL                       30815540
0A9F 0 2160                    DC   /2160                                30815550
0AA0 0 341C                    DC   /341C                                30815560
0AA1 0 5060                    DC   /5060                                30815570
0AA2 0 3034                    DC   /3034                                30815580
0AA3 0 3021                    DC   /3021                                30815590
0AA4 0 2074                    DC   /2074                                30815600
0AA5 0 2134                    DC   /2134                                30815610
0AA6 0 6060                    DC   /6060                                30815620
0AA7 0 219C                    DC   /219C                                30815630
0AA8 0 185C                    DC   /185C                                30815640
0AA9 0 FFFF                    DC   /FFFF                                30815650
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                         *                                               30815660
0AAA 0 609C              NORTN DC   /609C     RT # N/A                   30815670
0AAB 0 21C0                    DC   /21C0                                30815680
0AAC 0 748C                    DC   /748C                                30815690
0AAD 0 3C00                    DC   /3C00                                30815700
0AAE 0 FFFF                    DC   /FFFF                                30815710
                         *                                               30815720
0AAF 0 3C60              ARMNH DC   /3C60     ARM NOT HOME               30815730
0AB0 0 7021                    DC   /7021                                30815740
0AB1 0 7450                    DC   /7450                                30815750
0AB2 0 9C21                    DC   /9C21                                30815760
0AB3 0 2450                    DC   /2450                                30815770
0AB4 0 7034                    DC   /7034                                30815780
0AB5 0 FFFF                    DC   /FFFF                                30815790
                         *                                               30815800
0AB6 0 2074              BDPAK DC   /2074     INITL BAD PACK             30815810
0AB7 0 209C                    DC   /209C                                30815820
0AB8 0 5C21                    DC   /5C21                                30815830
0AB9 0 183C                    DC   /183C                                30815840
0ABA 0 3021                    DC   /3021                                30815850
0ABB 0 543C                    DC   /543C                                30815860
0ABC 0 1C58                    DC   /1C58                                30815870
0ABD 0 FFFF                    DC   /FFFF                                30815880
                         *                                               30815890
0ABE 0 3098              DSWER DC   /3098     DSW                        30815900
0ABF 0 9021                    DC   /9021                                30815910
0AC0 0 3460                    DC   /3460     ERR                        30815920
0AC1 0 6021                    DC   /6021                                30815930
0AC2 0 FFFF                    DC   /FFFF                                30815940
                         *                                               30815950
0AC3 0 7450              NTRDY DC   /7450     NOT RDY                    30815960
0AC4 0 9C21                    DC   /9C21                                30815970
0AC5 0 6030                    DC   /6030                                30815980
0AC6 0 A442                    DC   /A442                                30815990
0AC7 0 FFFF                    DC   /FFFF                                30816000
                         *                                               30816010
0AC8 0 2074              DPMSG DC   /2074     INITL DIMAL PACK-.         30816020
0AC9 0 209C                    DC   /209C                                30816030
0ACA 0 5C21                    DC   /5C21                                30816040
0ACB 0 3020                    DC   /3020                                30816050
0ACC 0 703C                    DC   /703C                                30816060
0ACD 0 5C21                    DC   /5C21                                30816070
0ACE 0 543C                    DC   /543C                                30816080
0ACF 0 1C58                    DC   /1C58                                30816090
0AD0 0 8486                    DC   /8486                                30816100
0AD1 0 FFFF                    DC   /FFFF                                30816110
                         *                                               30816120
0AD2 0 3474              NDMSG DC   /3474     END INITL OK               30816130
0AD3 0 3021                    DC   /3021                                30816140
0AD4 0 2074                    DC   /2074                                30816150
0AD5 0 209C                    DC   /209C                                30816160
0AD6 0 5C21                    DC   /5C21                                30816170
0AD7 0 5058                    DC   /5058                                30816180
0AD8 0 FFFF                    DC   /FFFF                                30816190
                         *                                               30816200
0AD9 0 1C34              CECAB DC   /1C34     CE CYL BAD                 30816210
0ADA 0 211C                    DC   /211C                                30816220
0ADB 0 A45C                    DC   /A45C                                30816230
0ADC 0 2118                    DC   /2118                                30816240
0ADD 0 3C30                    DC   /3C30                                30816250
0ADE 0 FFFF                    DC   /FFFF                                30816260
                         *                                               30816270
0ADF 0 543C              STAT1 DC   /543C     PASS# SEEKS RESKS          30816280
0AE0 0 9898                    DC   /9898                                30816290
0AE1 0 C021                    DC   /C021                                30816300
0AE2 0 9834                    DC   /9834                                30816310
0AE3 0 3458                    DC   /3458                                30816320
0AE4 0 9821                    DC   /9821                                30816330
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0AE5 0 6034              DC      /6034                                  30816340
0AE6 0 9858              DC      /9858                                  30816350
0AE7 0 9800              DC      /9800                                  30816360
0AE8 0 FFFF              DC      /FFFF                                  30816370
                         *                                              30816380
0AE9 0 9060     STAT2    DC      /9060     WRITE SFTER HRDER            30816390
0AEA 0 209C              DC      /209C                                  30816400
0AEB 0 3421              DC      /3421                                  30816410
0AEC 0 9810              DC      /9810                                  30816420
0AED 0 9C34              DC      /9C34                                  30816430
0AEE 0 6021              DC      /6021                                  30816440
0AEF 0 2460              DC      /2460                                  30816450
0AF0 0 3034              DC      /3034                                  30816460
0AF1 0 6000              DC      /6000                                  30816470
0AF2 0 FFFF              DC      /FFFF                                  30816480
                         *                                              30816490
0AF3 0 6034     STAT3    DC      /6034     READS SFTER HRDER            30816500
0AF4 0 3C30              DC      /3C30                                  30816510
0AF5 0 9821              DC      /9821                                  30816520
0AF6 0 9810              DC      /9810                                  30816530
0AF7 0 9C34              DC      /9C34                                  30816540
0AF8 0 6021              DC      /6021                                  30816550
0AF9 0 2460              DC      /2460                                  30816560
0AFA 0 3034              DC      /3034                                  30816570
0AFB 0 6000              DC      /6000                                  30816580
0AFC 0 FFFF              DC      /FFFF                                  30816590
                         *                                              30816600
0AFD 0 9834     SELDU    DC      /9834     SEL FILE                     30816610
0AFE 0 5C21              DC      /5C21                                  30816620
0AFF 0 1020              DC      /1020                                  30816630
0B00 0 5C34              DC      /5C34                                  30816640
0B01 0 FFFF              DC      /FFFF                                  30816650
                         *                                      *       30816660
                         *.....................................*       30816670
                         *          DISK IOCC AND CE HIST      *       30816680
                         *.....................................*       30816690
                         *                                      *       30816700
0B02 0 0000     DCDA     DC                WORD COUNT                   30816710
0B03 0 0000              DC                DATA FIRST WORD              30816720
0B04   0140              BSS     320       REMAINING AREA               30816730
0C44   0050              BSS     80        SAFTY AREA FOR RD ERR        30816740
                         *                                              30816750
0C94 0 FFFF     DCE      DC      /FFFF     DISK HISTORY DATA            30816760
0C95 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816770
0C96 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816780
0C97 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816790
0C98 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816800
0C99 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816810
0C9A 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816820
0C9B 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816830
0C9C 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816840
0C9D 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816850
0C9E 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816860
0C9F 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816870
0CA0 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816880
0CA1 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816890
0CA2 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816900
0CA3 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816910
0CA4 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816920
0CA5 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816930
0CA6 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816940
0CA7 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816950
0CA8 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816960
0CA9 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816970
0CAA 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816980
0CAB 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30816990
0CAC 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30817000
0CAD 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30817010
```



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0CAE 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30817020
0CAF 0 FFFF              DC      /FFFF     DISK HISTORY DATA            30817030
                         *                                              30817040
                         *.....................................*       30817050
                         *                                      *       30817060
                         *        ** START INITIALIZATION **    *       30817070
                         *                                      *       30817080
                         *.....................................*       30817090
                         *#####################################*       30817100
                         *                                              30817110
                         *.....................................*       30817120
                         *                                      *       30817130
                         *          BEGIN RT F01 WR ADDR-PAT    *       30817140
                         *                                      *       30817150
                         *.....................................*       30817160
0CB0 0 C3E5     F01AA    LD      3 -27     GET WORD COUNT               SE 30817170
0CB1 0 D30D              STO     3 13      SET WORD COUNT                  30817180
0CB2 0 C300              LD      3 0       CLR ACC                         30817190
0CB3 1 D400 0DCA         STO   L CYLEX     CLR CTR                         30817200
0CB5 1 D400 0CD6         STO   L CYLEC     CLR CTR                         30817210
0CB7 0 C300              LD      3 0       DESIRED CYLINDER AND            30817220
0CB8 0 D308              STO     3 11      SECTOR SET TO 000               30817230
                         *.....................................*       30817240
                         *                                      *       30817250
                         *          SELECTION OF NEXT SECTOR    *       30817260
                         *                                      *       30817270
                         *.....................................*       30817280
0CB9 0 4384     F01AB    BSI     3 -124    BR TO CK BYPASS CYL          SC 30817290
0CBA 0 43AE     F01SK    BSI     3 -82     SEEK NEXT SECTOR             SC 30817300
0CBB 1 4C00 0DCB         BSC   L PATRT     BR TO SETUP PATTERN             30817310
0CBD 0 43AB     F01WR    BSI     3 -85     WRITE SECTOR ID              SC 30817320
0CBE 0 700E              MDX     F01AE     ERROR RETURN ADDRESS            30817330
                         *.....................................*       30817340
                         *                                      *       30817350
                         *          IF ID IS OK, GEN NEW        *       30817360
                         *          SECTOR ADDRESS AND          *       30817370
                         *          CONTINUE TEST               *       30817380
                         *.....................................*       30817390
0CBF 0 43A8     F01RD    BSI     3 -88     BR TO RD RT                  SC 30817400
0CC0 0 7010              MDX     F01AF     RD ERR RETURN                   30817410
                         *                                              30817420
0CC1 1 7401 097D F01AC   MDX   L DCT&11,1  INCREMENT SECTOR ADR            30817430
0CC3 0 C3BE              LD      3 -66     GET DISK MAX CTRL               30817440
0CC4 0 F308              EOR     3 11      TEST CURRENT ADDR               30817450
0CC5 0 4820              BSC     Z         BR OUT IF ZERO                  30817460
0CC6 0 70F2              MDX     F01AB     CONTINUE TEST                   30817470
                         *                                              30817480
0CC7 0 C3D1              LD      3 -47     GET NOP INST                    30817490
0CC8 1 D400 0768         STO   L DCWR      SET BR/NOP SW TO NOP            30817500
0CCA 1 D400 0787         STO   L DCRD      SET BR/NOP SW TO NOP            30817510
                         *                                              30817520
0CCC 0 439F              BSI     3 -97     BR TO RT RTRN CTRL           SX 30817530
                         *.....................................*       30817540
                         *                                      *       30817550
                         *          ERR ANALYSISS & LOGGING     *       30817560
                         *                                      *       30817570
                         *.....................................*       30817580
0CCD 0 4339     F01AE    BSI     3 FORM2-DCT BR TO MSAG FORM 2            MC 30817590
0CCE 0 E060              DC      /E060     -- MSAG # --                    30817600
0CCF 1 0CBD              DC      F01WR     ERROR LOOP RE-WRITE             30817610
0CD0 0 70EE              MDX     F01RD     BR TO RD CK                     30817620
                         *                                              30817630
0CD1 0 4339     F01AF    BSI     3 FORM2-DCT BR TO MSAG FORM 2            MC 30817640
0CD2 0 E061              DC      /E061     -- MSAG # --                    30817650
0CD3 1 0CBF              DC      F01RD     ERR LOOP ADDR                   30817660
0CD4 0 4002              BSI     CETRT     BR TO CYL ERR TBL RT         SC 30817670
0CD5 0 70EB              MDX     F01AC     BR TO CONTINUE                  30817680
                         *.....................................*       30817690
```

```
                *
                *                ERROR CONTROL ROUTINE                *
                *                                                     *
                *.....................................................*
0CD6 0 0000     CYLEC DC      0          CYL ERR CTR
                *
0CD7 0 0000     CETRT DC      0          SAVE ENTRY
0CD8 0 C0FD           LD      CYLEC      TEST                              SE
0CD9 0 F3FD           EOR   3 -3         FOR
0CDA 1 4C18 0CF6      BSC   L DSKNG,&-   MAX ERR TEST
0CDC 1 7401 0CD6      MDX   L CYLEC,1    CNT
                *
0CDE 1 C400 0DCA CKCET LD    L CYLEX     GET ERR CNT
0CE0 0 4820           BSC     Z          SKIP IF ZERO
0CE1 0 7002           MDX     *&2        BR TO SET ERR CTRL
0CE2 0 6100           LDX   1 0          SET CNT TO ZERO
0CE3 0 7002           MDX     *&2        BR TO SETUP RT
0CE4 1 6580 0DCA      LDX   I1 CYLEX     SET IN ERR CTRL CNT
                *
0CE6 0 6208     SETUP LDX     2 8        SET X3 CTRL TO 8
0CE7 0 C30B           LD      3 11       GET INITIAL ADDR
0CE8 0 1803           SRA     3          CLR HD/SECT
0CE9 0 1003           SLA     3          CLR HD/SECT
0CEA 1 D500 0DDE CSADR STO    L1 CYLET   PUT SECT ADDR IN CET
0CEC 0 7101           MDX     1 1        ADV CYL ERR TBL CTRL
0CED 0 83FF           A       3 -1       ADV SECT ADDR
0CEE 0 72FF           MDX     2 -1       DEC ADDR C-S CTRL
0CEF 0 70FA           MDX       CSADR    BR TO LOOP
0CF0 0 93FF           S       3 -1       RE-ADJ ADDR CTRLS
0CF1 0 D30B           STO     3 11       SET IN PROPER ADDR
0CF2 1 7408 0DCA      MDX   L CYLEX,8    INCREMENT ERR CNTR
0CF4 1 4C80 0CD7      BSC   I CETRT      RETURN TO CALL RT                 SX
                *                                                     *
                *.....................................................X
                *                SET BAD PACK ERR SWITCH              *
                *                                                     *
                *.....................................................X
0CF6 0 C3D1     DSKNG LD      3 -47      GET NOP INST                      SE
0CF7 1 D400 0D72      STO   L DNGSW      SET BR INST TO NOP
0CF9 0 70E4           MDX     CKCET      BR TO SETUP                       SX
                *
                *
                *                CE DATA ERR ROUT
                *
0CFA 0 0000     CETYP DC      0          SAVE ENTRY
0CFB 0 4339           BSI     3 FORM2-DCT BR TO MSAG FORM 2                MC
0CFC 0 E0CE           DC      /E0CE      -- MSAG # --
0CFD 0 0000           DC      0          NO ERR LOOP ADDR
0CFE 1 4C80 0CFA      BSC   I CETYP      RETURN TO MAIN LINE
                *
0D00 0 40F9     CESX3 BSI     CETYP      BR TO TYPE ERR MSAG
0D01 0 7070           MDX     DNGSW      BR TO CONTINUE
                *
0D02 0 40F7     CESX7 BSI     CETYP      BR TO TYPE ERR MSAG
0D03 0 7055           MDX     CEXA7      BR TO CONTINUE
                *.....................................................*
                *                                                     *
                *                BEGIN ROUTINE 2                      *
                *                                                     *
                *.....................................................*
0D04 0 C3FF     F02AA LD      3 -1       SET WORD COUNT FOR                TE
0D05 0 D30D           STO     3 13       READ TO 001
0D06 0 C3CF           LD      3 -49      DESIRED CYLINDER ADR
0D07 0 D308           STO     3 11       SECTOR SET TO 000
0D08 0 6500 05B0      LDX   L1 1456      NUMBER OF SECTORS
                *.....................................................*
                *                                                     *
                *                SELECTION OF NEXT SECTOR             *
```



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0
                *.....................................................*
0D0A 0 6923     F02AB STX     1 F02XB    SAVE X1 XTANT
0D0B 0 4384           BSI     3 -124     DCABP RT                          SC
0D0C 0 43AE     F02SK BSI     3 -82      DCSK RT                           SC
0D0D 0 43A8           BSI     3 -88      DCRD RT                           SC
0D0E 0 7008           MDX       F02AD    ERROR RETURN ADDRESS
                *.....................................................*
                *                                                     *
                *                IF ID IS OK, GEN NEW                 *
                *                SECTOR ADDRESS AND                   *
                *                CONTINUE TEST                        *
                *                                                     *
                *.....................................................*
0D0F 1 74FF 097D F02AC MDX   L DCT&11,-1 DECREMENT SECTOR ADR
0D11 0 1000           NOP     0          SAFTY NOP
0D12 1 6580 0D2E      LDX   I1 F02XB     GET X1 XTANT
0D14 0 71FF           MDX     1 -1       DECREMENT XR1 BY 1
0D15 0 70F4           MDX       F02AB    CONTINUE TEST
0D16 0 439F           BSI     3 -97      DCRTN RT                          SX
                *.....................................................*
                *                                                     *
                *                ERR ANALYSISS & LOGGING              *
                *                                                     *
                *.....................................................*
0D17 0 C30B     F02AD LD      3 11       GET DESIRED ADDR
0D18 0 F30C           EOR     3 12       CMP WITH ACTUAL
0D19 0 1803           SRA     3          CLR  SECTOR/HEAD
0D1A 1 4C20 0D22      BSC   L F02AE,Z    BR IF CYL NOT EQ
                *
0D1C 0 C30B           LD      3 11       GET DESIRED ADDR
0D1D 0 F30C           EOR     3 12       CMP WITH ACTUAL
0D1E 0 100C           SLA     12         CLR CYLINDER ADDR
0D1F 1 4C20 0D26      BSC   L F02AF,Z    BR IF SECT/HD NOT EQ
0D21 0 70ED           MDX       F02AC    FALSE ERR CONTINUE
                *
0D22 0 4386     F02AE BSI     3 -122     DRESK RT                          SC
0D23 0 43A8           BSI     3 -88      DCRD RT                           SC
0D24 0 7005           MDX       F02AG    ERR RD RETURN
0D25 0 43A2           BSI     3 -94      RESTART EXIT                      SX
                *
0D26 0 4339     F02AF BSI     3 FORM2-DCT BR TO MSAG FORM 2                MC
0D27 0 E020           DC      /E020      -- MSAG # --
0D28 1 0D0C           DC      F02SK      LOOP ON ERR
0D29 0 43A2           BSI     3 -94      RESTART EXIT                      SX
                *
0D2A 0 4339     F02AG BSI     3 FORM2-DCT BR TO MSAG FORM 2                MC
0D2B 0 E021           DC      /E021      -- MSAG # --
0D2C 0 0000           DC      0          NO ERR LOOP ADDR
0D2D 0 43A2           BSI     3 -94      RESTART EXIT                      SX
                *
0D2E 0 0000     F02XB DC      0          X1 XTANT HOLDER
                *
                *
                *.....................................................*
                *                                                     *
                *                ROUTINE 3 WR CE SECTORS              *
                *                                                     *
                *.....................................................*
0D2F 0 4388     F03AA BSI     3 -120     RDY NBSY RT                       SEC
0D30 0 4380     F03AB BSI     3 -128     DCARM RT                          SC
                *
0D31 0 C3D8     F03AC LD      3 -40      GET DISK ADDR
0D32 0 D30B           STO     3 11       SET ADDR
0D33 0 C3E5           LD      3 -27      GET WC
0D34 0 D30D           STO     3 13       SET WC
0D35 0 43AE           BSI     3 -82      SEEK CYL                          SC
0D36 0 43A8           BSI     3 -88      BR TO READ SUB RT                 SC
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0D37 0 7001            MDX     CESKE     BR TO SEEK ERR RT          30819060
0D38 0 7008            MDX     F03AD     BR TO CONTINUE             30819070
                       *                                            30819080
0D39 0 4386      CESKE BSI   3 -122      BR TO REZERO ARM RT   SC   30819090
                       *                                            30819100
0D3A 0 43A8            BSI   3 -88       BR TO READ SUB RT     SC   30819110
0D3B 0 7001            MDX     SK2ER     BR TO ERR MSAG RT          30819120
0D3C 0 7004            MDX     F03AD     BR TO CONTINUE             30819130
                       *                                            30819140
0D3D 0 4339      SK2ER BSI   3 FORM2-DCT BR TO MSAG FORM 2     MC   30819150
0D3E 0 E075            DC      /E075     -- MSAG # --               30819160
0D3F 1 0D2F            DC      F03AA     BR ERROR LOOP ADDR         30819170
                       *                                            30819180
0D40 0 4396            BSI   3 -106      BR TO MONITOR END RT  SX   30819190
                       *                                            30819200
                       *          CE SECT 7 SETUP                   30819210
                       *                                            30819220
0D41 0 C3D0      F03AD LD    3 -48       GET 1313 PATTERN           30819230
0D42 0 438C            BSI   3 -116      DFILL RT              SC   30819240
0D43 1 C400 0DCA       LD    L CYLEX     GET ERR AMT                30819250
0D45 1 4C18 0D49       BSC   L F03XY,&-  BR NO ERR CNT              30819260
0D47 1 4400 0DBC       BSI   L FIOAX     BR TO SET ERR IN IOA       30819270
                       *                                            30819280
0D49 0 C3F9      F03XY LD    3 -7        GET SECTOR ADDR            30819290
0D4A 0 EBD8            OR    3 -40       OR IN ADDR OF CYL          30819300
0D4B 0 D30B            STO   3 11        SET IN SECT-CYL ADDR       30819310
                       *                                            30819320
0D4C 0 C3C7            LD    3 -57       GET CE ID -- CEDC--        30819330
0D4D 1 D400 0B04       STO   L DCDA&2    SET IN IOA                 30819340
                       *                                            30819350
0D4F 1 C400 0DCA       LD    L CYLEX     GET ERR AMT                30819360
0D51 1 D400 0B05       STO   L DCDA&3    SET IN IOA                 30819370
                       *                                            30819380
0D53 0 C3E5            LD    3 -27       GET WC                     30819390
0D54 0 D30D            STO   3 13        PUT IN DCT TBL             30819400
                       *                                            30819410
0D55 0 43AB            BSI   3 -85       WR CE SECT SEVEN      SC   30819420
0D56 0 70AB            MDX     CESX7     BR TO ERR ROUT             30819430
                       *                                            30819440
0D57 0 43A8            BSI   3 -88       BR TO READ SUB RT     SC   30819450
0D58 0 7017            MDX     CERDE     BR TO RD ERR RT            30819460
                       *                                            30819470
                       *          CE SECT 3 SETUP                   30819480
                       *                                            30819490
0D59 0 C3C6      CEXA7 LD    3 -58       GET PATTERN                30819500
0D5A 0 438C            BSI   3 -116      FILL IOA WITH SAME    SC   30819510
0D5B 1 C400 0DCA       LD    L CYLEX     GET ERR AMT                30819520
0D5D 1 4C18 0D61       BSC   L F03XZ,&-  BR NO ERR CNT              30819530
0D5F 1 4400 0DBC       BSI   L FIOAX     BR TO SET ERR IN IOA       30819540
                       *                                            30819550
0D61 0 C3FD      F03XZ LD    3 -3        GET ADDR                   30819560
0D62 0 EBD8            OR    3 -40       OR IN ADDR OF CYL          30819570
0D63 0 D30B            STO   3 11        PUT IT IN DCT              30819580
                       *                                            30819590
0D64 0 C3C7            LD    3 -57       GET CE ID -- CEDC --       30819600
0D65 1 D400 0B04       STO   L DCDA&2    PUT ID IN IOA              30819610
                       *                                            30819620
0D67 1 C400 0DCA       LD    L CYLEX     GET ERR AMT                30819630
0D69 1 D400 0B05       STO   L DCDA&3    PUT WC IN IOA              30819640
                       *                                            30819650
0D6B 0 43AB            BSI   3 -85       WRITE CE SECT THREE   SC   30819660
0D6C 0 7093            MDX     CESX3     BR TO ERR ROUT             30819670
                       *                                            30819680
0D6D 0 43A8            BSI   3 -88       BR TO READ SUB RT     SC   30819690
0D6E 0 7001            MDX     CERDE     BR TO RD ERR RT            30819700
                       *                                            30819710
0D6F 0 7002            MDX     DNGSW     BR TO CONTINUE             30819720
                       *                                            30819730
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0D70 1 4C00 0760  CERDE BSC  L  RWRT3     BR TO PRNT ERR MSAG  SX   30819740
                  *                                                 30819750
0D72 0 7007       DNGSW MDX      ETEST     BR TO TEST ERR CNT         30819760
0D73 1 6600 0A86        LDX  L2 BDPAK     GET REMARK ADDR            30819770
0D75 1 6E00 0A1C        STX  L2 ALPHA     SET IN MSAG TWOPO          30819780
0D77 0 4328             BSI    3 FORMO-DCT BR TO MSAG FORM 0    MC   30819790
0D78 0 E066             DC      /E066     -- MSAG # --               30819800
0D79 0 0000             DC      0         NO ERR LOOP ADDR           30819810
                  *                                          *      30819820
                  *..........................................*      30819830
                  *          CE ERR TBL TEST RT              *      30819840
                  *..........................................*      30819850
                  *                                          *      30819860
0D7A 0 C04F       ETEST LD       CYLEX     GET ERR CNT           SE   30819870
0D7B 1 4C18 0DBB        BSC  L  DIPND,&-  BR IF ZERO ERR CNT         30819880
                  *                                                 30819890
0D7D 0 C3F1       WRCET LD     3 -15       GET BASIC PRNT CTRL        30819900
0D7E 0 1004             SLA      4        SHIFT FOR TOTAL CTRL       30819910
0D7F 0 EBF1             OR     3 -15      SET PARTIAL CTRL WD        30819920
0D80 1 D400 0A1B        STO  L  DPCW      SET CTRL IN TWOPA          30819930
0D82 0 6500 CBAD        LDX  L1 /CBAD     BAD CYL ERR MSAG NUM       30819940
0D84 1 6D00 0A19        STX  L1 TWOPA     SET ERR MSAG NUM OPA       30819950
0D86 0 6200             LDX    2 0        CLR NDX 2                  30819960
0D87 1 6E00 0A1D        STX  L2 REMRK     CLEAR ALPHA 2              30819970
0D89 1 6600 0A9D        LDX  L2 ARIET     GET ALHPA PHRASE           30819980
0D8B 1 6E00 0A1C        STX  L2 ALPHA     SET IN TWOPA               30819990
                  *                                                 30820000
0D8D 0 C03C             LD       CYLEX    GET TBL ERR CNT            30820010
0D8E 0 D038             STO      ETCNT    SET IT IN CTRL WD          30820020
                  *                                                 30820030
0D8F 0 6200             LDX    2 0        SET X2 CNT CTRL            30820040
0D90 0 6100             LDX    1 0        SET X1 CNT CTRL            30820050
0D91 0 C3F8             LD     3 -8       GET CNT CTRL               30820060
0D92 0 D036       WRCPL STO      TWCNT     SAVE COUNT CTRL            30820070
                  *                                                 30820080
0D93 1 C600 0DDE        LD   L2 CYLET     GET ERR ADDR               30820090
0D95 0 4399             BSI    3 -103     BR TO CNVRT ADDR      SC   30820100
0D96 1 D500 0A1E        STO  L1 MSG       SET DEC ADDR IN OPA        30820110
0D98 0 7101             MDX    1 1        ADV CTRL X1                30820120
0D99 0 7201             MDX    2 1        ADV CTRL X2                30820130
                  *                                                 30820140
0D9A 0 C02E             LD       TWCNT    GET TW DATA WR CNT         30820150
0D9B 0 93FF             S      3 -1       DEC CTRL                   30820160
0D9C 0 4820             BSC      Z        SKIP IF ZERO               30820170
0D9D 0 70F4             MDX      WRCPL    BR LOOP                    30820180
0D9E 0 6A29             STX    2 X2SAV    SAVE X2 INFO               30820190
                  *                                                 30820200
                  *                                          *      30820210
                  *..........................................*      30820220
                  *          PRINT CYL ERR TBL DATA          *      30820230
                  *..........................................*      30820240
                  *                                          *      30820250
                  ********************************************      30820260
0D9F 0 4480 0163  PRTBL BSI  I  LOG       CALL MON LOG RT       SC   30820270
0DA1 1 0A19             DC       TWOPA    TYPE OUTPUT AREA           30820280
                  ********************************************      30820290
                  *                                                 30820300
                  *                                                 30820310
                  *                                                 30820320
0DA2 1 6600 0DA8  LSTRT LDX  L2 LHOLD     GET MLN ENTRY              30820330
0DA4 1 6E00 05E5        STX  L2 MLSCF     SET IN CTRL FOR MON        30820340
                  *                                                 30820350
0DA6 0 4480 0161        BSI  I  START     BR TO MONITOR              30820360
                  *                                                 30820370
0DA8 1 6700 0972  LHOLD LDX  L3 DCT       SET X3 CTRL ADDR           30820380
0DAA 1 6680 0DC8        LDX  I2 X2SAV     GET X2 HOLD INFO           30820390
0DAC 1 C400 0A1B        LD   L  DPCW      GET PRNT CTRL              30820400
0DAE 0 1884             SRT      4        SHIFT FOR SETUP            30820410
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ODAF 0 EBD2              OR    3 -46        OR IN MULTI-LINE CTL       30820420
ODB0 0 1084              SLT     4          SHIFT TO NORMAL            30820430
ODB1 1 D400 0A1B         STO   L DPCW       SET IT BACK IN TWOPA       30820440
ODB3 0 C013              LD      ETCNT      GET CNT FLD                30820450
ODB4 0 93F8              S     3 -8         DEC LOOP CNT               30820460
ODB5 0 D011              STO     ETCNT      SAVE NEW TOTAL             30820470
ODB6 1 4C20 0D90         BSC   L WRCPL-2,Z  TEST IT - NOP IF ZRO       30820480
                         *                                           30820490
ODB8 0 1010              SLA     16         CLR ACC                    30820500
ODB9 1 D400 0A1B         STO   L DPCW       CLEAR CTRL WORD            30820510
                         *                                           30820520
ODBB 0 439F              DIPND BSI   3 -97  BR RETURN             SX   30820530
                         *                                           30820540
                         *                                           30820550
                         *                                           30820560
                         *                                           30820570
                         *                                       *   30820580
ODBC 0 0000              FIOAX DC      0    SET IN RETURN ADDR    SE   30820590
ODBD 1 6580 0DCA               LDX   I1 CYLEX    SET ERR CNT IN X1      30820600
ODBF 1 C500 0DDD         FIOAY LD    L1 CYLET-1   GET FIRSTADDR         30820610
ODC1 1 D500 0B05               STO   L1 DCDA&3    PUT IT IN IOA          30820620
ODC3 0 71FF                    MDX    1 -1        DEC INDEX CTRL         30820630
ODC4 0 70FA                    MDX       FIOAY    BR LOOP                30820640
ODC5 1 4C80 0DBC         FIOAZ BSC   I  FIOAX     RETURN TO MAINLINE  SX 30820650
                         *                                           30820660
                         *                                           30820670
ODC7 0 0000              ETCNT DC      0       LINE CTRL COUNTER      30820680
ODC8 0 0000              X2SAV DC      0        INDEX 2 SAVE INFO     30820690
ODC9 0 0000              TWCNT DC      0        LINE COUNT HOLDER     30820700
ODCA 0 0000              CYLEX DC      0        SECT ERR CNT          30820710
                         *                                       *   30820720
                         *                  END OF WR CE TEST DATA *   30820730
                         *                                         *   30820740
                         *.......................................*   30820750
                         *                                         *   30820760
                         *                  ALTERNATE PATTERN RT   *   30820770
                         *                                         *   30820780
                         *.......................................*   30820790
                         *                                           30820800
                         *                                           30820810
                         *                                           30820820
ODCB 0 C30B              PATRT LD    3 11     GET ADDR             SE   30820830
ODCC 0 100D                    SLA     13     B13 TO B0                 30820840
ODCD 1 4C28 0DDA               BSC   L TST10,Z&  BR IF HEAD 1           30820850
                         *                                           30820860
ODCF 0 C30B              TSTOO LD    3 11     GET ADDR                  30820870
ODD0 0 4804                    BSC     E      SKIP IF ADDR EVEN         30820880
ODD1 0 7004                    MDX     PATE5  BR TO SET E5E5 PAT        30820890
                         *                                           30820900
ODD2 0 C3D0              PAT13 LD    3 -48    GET PATTERN 1313          30820910
ODD3 0 438C                    BSI   3 -116   BR TO FILL IOA       SC   30820920
ODD4 1 4C00 0CBD               BSC   L FO1WR  BR TO WRITE RT       SX   30820930
                         *                                           30820940
ODD6 0 C3C6              PATE5 LD    3 -58    GET PATTERN E5E5          30820950
ODD7 0 438C                    BSI   3 -116   BR TO FILL IOA       SC   30820960
ODD8 1 4C00 0CBD               BSC   L FO1WR  BR TO WRITE RT       SX   30820970
                         *                                           30820980
ODDA 0 C30B              TST10 LD    3 11     GET ADDR                  30820990
ODDB 0 4804                    BSC     E      SKIP IF ADDR EVEN         30821000
ODDC 0 70F5                    MDX     PAT13  BR TO SETUP  PAT E5       30821010
ODDD 0 70F8                    MDX     PATE5  BR TO SETUP  PAT 13       30821020
                         *                                           30821030
ODDE   0140              CYLET BSS   E  320   CYLINDER ERR ACCUM       30821040
                         *                                           30821050
                         *###########################################*30821060
                         *###########################################*30821070
                         *.......................................*   30821080
                         *                                       *   30821090
```



```
                         *                  END OF INITIALIZATION  *   30821100
                         *                                         *   30821110
                         *.......................................*   30821120
                         ***********************************************30821130
                         *###########################################*30821140
                         *                                           30821150
OF1E   0002              OMEGA BSS  E  2                             30821160
OF20   05E9                    END    EXEQD     BR TO BEGIN XFER RT  30821170
 NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```

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

NAME	VALUE	REFERENCES
A8P	08F6	08B5
ADATA	0A84	09E6
ALPHA	0A1C	0762,09A1,09C0,09F8,0A05,0A12,0D75,0D8B
ARC	0908	0A78
ARIET	0A9D	0740,0D89
ARM	08F2	0898
ARMNH	0AAF	06E7
AWEAX	0A92	09D6
BDPAK	0AB6	0D73
BEGIN	0160	05E9
CALLM	0A2E	09FF
CCRTN	0A2D	
CDTBC	07E4	0821
CDTGX	082A	080E,0829
CDTLK	081A	083D
CDTNR	0803	0929
CDTRC	07F1	07FB,0857
CDTRT	07E1	0773,0796,0808,0828,0856
CDTSE	07FF	07F3
CDTSN	080A	0777,079A,082A,082C
CECAB	0AD9	0760
CERDE	0D70	0D58,0D6E
CESKE	0D39	0D37
CESX3	0D00	0D6C
CESX7	0D02	0D56
CETRT	0CD7	0CD4,0CF4
CETYP	0CFA	0CFE,0D00,0D02
CEXA7	0D59	0D03
CHNBZ	0862	08D0
CHNRA	08E0	
CHNRL	08DE	0901
CHNRQ	08CE	0862,08FD
CHNSA	08D1	
CKCET	0CDE	0CF9
CSADR	0CEA	0CEF
CTLOG	0A43	09F2,09F5,0A5C,0A5D
CYLEC	0CD6	0C85,0CD8,0CDC
CYLET	0DDE	0737,0CEA,0D93,0DBF
CYLEX	0DCA	0731,0735,0CB3,0CDE,0CE4,0CF2,0D43,0D4F,0D5B,0D67,0D7A,0D8D,0DBD
DAKM	0877	0891
DAKMX	088C	0884
DARTH	0892	087E
DARTN	088E	0928
DCABP	08AC	08F7
DCANH	06E7	0918
DCARM	0875	0674,0880,0882,0897,08F3
DCBPR	0885	0871,08AE,08B2
DCDA	0B02	06AA,06B4,0771,0794,079C,07E6,0810,0836,08D8,0973,09E3,0D4D,0D51 0D65,0D69,0DC1
DCDLA	08E4	0903
DCDSW	08EE	0905
DCE	0C94	
DCEOD	06EA	069D,06A1,06A2,06E6,06E9
DCNHM	06D4	06D1
DCRBB	07DF	
DCRD	0787	07AB,07B4,07DE,091B,0CCA
DCRDY	08C2	08CD,08FB
DCREL	07D6	079B,07B1
DCRE1	07C9	07A5,07BD
DCRE2	07CA	07A6,07C5
DCRGA	07CB	07A0
DCRND	06EF	06EE,06F1
DCROK	07D1	07CC
DCRTN	06CE	0756,0912
DCR10	0789	0787
DCR12	078D	07C3
DCR16	0796	0791
DCR19	07AE	07B5
DCR20	07B2	07A7
DCR21	07B6	07A3
DCR22	07BE	07C8
DCR23	07C4	07BA
DCSK	083E	085F,0921
DCT	0972	05EC,05F4,05FD,0607,066D,0671,0681,0683,0696,06C1,06C6,06CA,06DC 06E1,06EC,06F2,06FC,0710,074A,0764,0774,0797,07A9,07AE,07B2,07B6 07F9,0803,0813,081A,0823,0826,0858,0888,088E,08B9,08CA,08EA,0A41 0A45,0A4C,0CC1,0CCD,0CD1,0CFB,0D0F,0D26,0D2A,0D3D,0D77,0DA8
DCTL1	066D	0670
DCTL2	0671	05E3,0606,0927
DCTL3	067D	0687,068D,06DA
DCTL4	0683	069C,0703
DCTL5	069A	067F,06D6
DCTL6	0696	068D,068F,0698
DCTRL	066B	0660,0915,0926
DCWBB	0785	
DCWEL	077C	0779
DCWR	0768	0784,091E,0CC8
DCW10	076D	0768
DDSA	069E	0687
DEND	0917	
DEXEQ	089D	08F5
DEXIO	08AA	08A6,08A7,09C3
DFILL	08D6	08D8,08FF
DIPND	0DBB	0D7B
DLA	0902	08EC
DLABB	08EA	0932
DLAND	070C	0706
DLNRT	06F2	0708,092B
DLNR1	0705	06F9
DMLCK	06A3	067B,06C8,06CC
DMLE1	06C6	06A9
DMLE2	06CA	06B3
DMLIC	0689	06AD,06C4,06C9,06CD
DMLXT	06C5	06AC
DNGSW	0D72	0CF7,0D01,0D6F
DPCW	0A1B	09A0,09A7,09B1,09CA,09DF,09F0,0A54,0A55,0D80,0DAC,0DB1,0DB9
DPMSG	0AC8	068F
DRD	091A	07D1,07DF
DRESK	08B7	08F9
DSK	0920	0845,0860
DSKAC	0A60	090C
DSKNG	0CF6	0CDA
DSK10	0851	0847
DSK20	0855	0850
DSK30	0858	092A
DSPLA	082E	0819
DSPLP	0831	083A
DSPX1	083B	082E,0835
DSW	0904	08F0
DSWER	0ABE	07F5
DVA	070E	0620,062A,0634,063E,0648,08D2
DWR	091D	077A,0785
EMF	0923	0924
END	0164	0909
ERLCK	0166	0727
ERROR	0162	0A38
ETCNT	0DC7	0D8E,0DB3,0D85
ETEST	0D7A	0D72
EXEQD	05E9	0F20
EXQ	08F4	08A8
FILEX	0607	05F0
FILE0	061E	0611,061D
FILE1	0628	0613
FILE2	0632	0616

```
FILE3   063C  0619
FILE4   0646  061C
FIOAX   0DBC  0D47,0D5F,0DC5
FIOAY   0DBF  0DC4
FIOAZ   0DC5
FLX     08FE  08DC
FORM0   099A  05F4,06C1,06EC,0764,099B,0D77
FORM1   09A3  0744,074A,074D,07F9,0888,08CA,09A4
FORM2   09AB  06C6,06CA,06FC,07A9,07B2,07B6,09AC,0CCD,0CD1,0CFB,0D26,0D2A,0D3D
FORM3   09C6  09C7
FORM4   09D9  0813,0826,09DA
FORM5   09E9  06E1,09EA
FRM5A   0A00  0A56,0A58
FRM5B   0A0D  0A00,0A18
FRTRD   0A8A  098B
F01AA   0CB0  069E
F01AB   0CB9  0CC6
F01AC   0CC1  0CD5
F01AE   0CCD  0CBE
F01AF   0CD1  0CC0
F01RD   0CBF  0CD0,0CD3
F01SK   0CBA
F01WR   0CBD  0CCF,0DD4,0DD8
F02AA   0D04  069F
F02AB   0D0A  0D15
F02AC   0D0F  075E,0D21
F02AD   0D17  0D0E
F02AE   0D22  0D1A
F02AF   0D26  0D1F
F02AG   0D2A  0D24
F02SK   0D0C  0D28
F02XB   0D2E  075B,0D0A,0D12
F03AA   0D2F  06A0,0D3F
F03AB   0D30
F03AC   0D31
F03AD   0D41  0D38,0D3C
F03XY   0D49  0D45
F03XZ   0D61  0D5D
HCAP1   0A7A  0A65,0A76
HCAP2   0A7B  0A69,0A74
HCAP3   0A7C  0A6D,0A72
HCAP4   0A7D  0A77
HDSW    0A1A  099F,09A9,09AF,09CC,09DD,09EF
HLDSK   0655  0602,060D
HNG     0906
ILO     017A
IL1     018A
IL2     019A  0625,062F,0639,0643,064D
IL3     01AA
IL4     018A
INDSW   0A7E  098E
INITL   05EC  05E4,05F7,0605
LCKAF   0722  0723,072C,072E,0782,07DC,085D
LHOLD   0DA8  0DA2
LIV     05E6  070A,071D,089F
LOG     0163  0A3E,0D9F
LOGBY   0167
LSTRT   0DA2
MCALL   09FF  09A2,09C5
MEND    0908
MFST    0650  061E,0628,0632,063C,0646
MLN     05E7  05F9,0715,0864,08E7
MLSCF   05E5  065E,0691,0A49,0DA4
MSG     0A1E  0748,09B4,09B7,09BA,09C2,09CF,09D1,09D3,09D5,09E2,09E5,09FA,09FC
              09FE,0A07,0A09,0A0B,0A14,0A16,0D96
NDMSG   0AD2  06E4
NORTN   0AAA  06EA
NTRDY   0AC3  08C6
```



```
NTRER   0721  0717,0721
NTRPT   070F  0623,062D,0637,0641,064B,071F
NTRST   0719
NTRXT   071F
OMEGA   0F1E
PATE5   0DD6  0DD1,0DDD
PATRT   0DCB  0CBB
PAT13   0DD2  0DDC
PID     05DC  05EB
PRTBL   0D9F
RAD     05DE  0689
RDY     08FA  08C4
REL     0900  08E2
RELDV   0661  0662,0664,08DE
REMRK   0A1D  0742,07F7,0886,08C8,099D,09BD,09ED,0D87
REQ     08FC  08D4
REQDV   0666  0667,0669,08CE
REST    0914
RID     05DD  0685
RLPGM   05FD  065C
RQKB    01DA
RQTY    01CA
RSK     08F8  08C0
RTN     0911
RTNSW   0165  068B
RWACK   0730  073E,0769,0788
RWCKA   0737  073D
RWCKT   0740  073A
RWCKX   073E  0733
RWRT3   0760  0751,0D70
SACTL   0656  0627,0631,063B,0645,064F
SELDU   0AFD  05F2
SETUP   0CE6
SKADJ   0868  08B4
SKOUT   086F  086B,086E
SK2ER   0D3D  0D3B
START   0161  05FB,0693,070C,0866,090F,0DA6
STAT1   0ADF  09F6
STAT2   0AE9  0A03
STAT3   0AF3  0A10
STRT    090E
SVKB    01EA
SW0     05DF  0725
SW1     05E0  067D,06D4
SW2     05E1  05EE,0601,060A
SW3     05E2  06B9,06CE,0816,0831
TERM    C5E8  05EF,08D3,08E1
TST00   0DCF
TST10   0DDA  0DCD
TWCNT   0DC9  0D92,0D9A
TWEND   0A4C  0A47
TWERR   0A38  0A36
TWFRM   098E  09AA,09D8,09E8
TWLOG   0A3D  0A0C,0A32
TWMLB   0A56  0A02,0A0F,0A5A
TWMLP   0A52  09F3
TWMLR   0A58  0A0D
TWOPA   0A19  0A2F,0A3A,0A40,0D84,0DA1
TWRTN   0A45  0A3C,0A5E
TWX1H   0A5F  0A37,0A3D,0A4E
WAIT1   06C3
WAIT2   06F0
WRCET   0D7D
WRCPL   0D92  0D9D,0DB6
X2SAV   0DC8  0D9E,0DAA

END OF ASSEMBLY
```

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1. PURPOSE

THE 2310B FUNCTION TEST IS DESIGNED TO TEST EACH FUNCTION OF THE DISK FOR COMPLIANCE WITH THE PRODUCT SPECIFICATIONS.

THIS TEST IS WRITTEN TO ACCOMMODATE SYSTEMS WITH ONE OR MORE '13SD' DISK DRIVES. ANY ONE OF THE DRIVES MAY BE SELECTED TO BE TESTED.

2. PREREQUISITES

THIS PROGRAM MUST RUN UNDER CONTROL OF THE 1130 DIAGNOSTIC MONITOR. THE DIAGNOSTIC MONITOR USES 1,500 STORAGE WORDS AND THIS PROGRAM USES 2,596 STORAGE WORDS, SO THAT A 4K MACHINE IS SUPPORTED.

THIS PROGRAM REQUIRES THAT A DISK WHICH IS INITIALIZED BY THE 2315 DISK INITIALIZATION PROGRAM (0308) BE INSTALLED ON THE DISK DRIVE TO BE TESTED PRIOR TO THE EXECUTION OF THE TEST. ANY INITIALIZED PACK WILL BE ACCEPTABLE, INCLUDING AN 1130 DIMAL PACK.

3. USE PROCEDURE

3.1 PROGRAM LOADING

3.1.1 PROGRAM DECK OR PAPER TAPE

TO LOAD THE PROGRAM DECK OR PAPER TAPE, USE THE STANDARD LOADING PROCEDURE AS DESCRIBED IN THE DIAGNOSTIC MONITOR USE PROCEDURE.

3.1.2 USING 1130 DIMAL

1. USING 1130 DIMAL, PUT ONLY ONE COPY OF THE 2310 DISK FUNCTION TEST ON THE DIMAL PACK. SEE DIMAL OPERATING PROCEDURES FOR INSTRUCTIONS.

2. TO EXECUTE ONE OR MORE 2310 FUNCTION TESTS IN OVERLAP, IPL THE DIMAL COLD START LOADER, SELECT PROGRAMS TO BE EXECUTED (2D FOR DISK TEST). LEAVE BIT 15 ON WHEN THE DISK PROGRAM IS BEING LOADED. THIS IS THE MONITOR HALT BIT. SELECT THE DISK TO BE TESTED USING SWITCH FNC 2 BEFORE EXECUTING THE DISK TEST.

3. TO EXECUTE MORE THAN ONE DISK TEST, SELECT PID 2D FOR EACH DISK TO BE TESTED. A COPY OF THE DISK TEST WILL BE LOADED INTO CORE FOR EVERY DISK TO BE TESTED. SELECT A DIFFERENT DISK TO BE TESTED FOR EVERY PROGRAM LOADED, USING SWITCH FNC 2, BEFORE EXECUTING EACH TEST.

3.2 PROGRAM OPERATION

3.2.1 PROGRAM EXECUTION

A. LOAD AND GO MODE

IF BIT SWITCH 15 IS OFF WHILE THE PROGRAM IS LOADED, THE PROGRAM WILL BE EXECUTED WHEN LOADING IS COMPLETED. ALL TESTS WHICH ARE NORMALLY RUN WITH ZEROES IN THE PROGRAM SWITCH OPTIONS WILL BE EXECUTED.

NOTE--LOAD AND GO MODE MUST NOT BE USED WHEN RUNNING MORE THAN ONE DISK TEST IN OVERLAP, OR WHEN THE THE DRIVE TO BE TESTED IS NOT THE CPU DRIVE.

B. PAUSE BEFORE EXECUTION

IF BIT SWITCH 15 IS ON WHILE THE PROGRAM IS LOADED, THE PROGRAM WILL NOT BE EXECUTED WHEN LOADING IS COMPLETE. THIS MODE MUST ALWAYS BE USED WHEN EXECUTING MORE THAN ONE DISK TEST IN OVERLAP, OR WHEN THE DRIVE TO BE TESTED IS NOT THE CPU DRIVE. THE DRIVE TO BE TESTED MUST BE SELECTED USING SW FNC 2. THE FOLLOWING PROCEDURE MUST BE USED TO EXECUTE THE PROGRAM(S).

1. SET UP THE DESIRED OPTIONS AS SPECIFIED IN SECTION 3.2.2. IF NO OPTIONS ARE DESIRED, PROCEED TO THE NEXT STEP.

2. START PROGRAM EXECUTION BY SETTING HEXADECIMAL 0X80 IN THE DATA ENTRY SWITCHES, WHERE X IS THE PROGRAM SEQUENCE NUMBER.

3. DEPRESS CONSOLE INTERRUPT. AFTER A PRINTOUT OCCURS, THE PROGRAM WILL BE EXECUTED.

3.2.2 PROGRAM SWITCH OPTIONS

THE OPERATOR MAY MODIFY THE EXECUTION OF THE PROGRAM ANY TIME BEFORE OR AFTER IT HAS STARTED EXECUTION BY ENTERING PROGRAM CONTROL OPTIONS OR ROUTINE SELECTION OPTIONS.

THE OPTIONS ARE SELECTED AS FOLLOWS.

A. SET BIT SWITCHES ACCORDING TO TABLE 1.

B. DEPRESS CONSOLE INTERRUPT AND WAIT FOR PRINTOUT.

C. IF MORE OPTIONS ARE REQUIRED, REPEAT STEPS A AND B.

TABLE 1. 1130 DISK TEST OPTIONS

DATA ENTRY SWITCH POSITION (X INDICATES NOT USED AND C INDICATES DATA)																DESCRIPTION OF OPTIONS
FUNCTION	PROGRAM SEQUENCE NUMBER	MODIFIERS														
0 1	2 3 4 5 6 7	8	9	10	11	12	13	14	15							
0 0	0 0 P P P P	1	X													RESTART PROGRAM
			X	1												PRINT ALL CMP ERRORS
			X		1											LOOP PROGRAM
			X			1										LOOP ON ERROR
			X				1									BYPASS STATUS PRINTOUTS
			X					1								HALT ON ERROR
			X						1							HALT PROGRAM
0 1	0 0 P P P P	0	0	0	C	0	0	0	0							RUN ALL NORMAL ROUTINES
		0	0	0	0	D	D	D	D							RUN ROUTINE 'DDDD' (HEX)
		0	0	0	0	1	1	0	1							RUN SEEK TIMING TEST
1 0	0 0 P P P P	0	0	0	0	0	0	0	0							TEST CPU DRIVE
		0	0	0	0	0	0	0	1							TEST DRIVE 1
		0	0	0	0	0	0	1	0							TEST DRIVE 2
		0	0	0	0	0	1	0	0							TEST DRIVE 3
		0	0	0	0	1	0	0	0							TEST DRIVE 4

TABLE 2. DSW BITS

DSW BITS	MEANING
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	
. . . . . X X X X X X X X . .	
. . . . .	.....SECTOR COUNT (TWO BITS)
. . . . .	
. . . . ..CARRIAGE HOME	
. . . .	
. . . ..DISK BUSY (READ/WRITE/CONTROL)	
. . .	
. . ..DISK NOT READY	
. .	
. ..OPERATION COMPLETE (W/INTERRUPT)	
.	
..DATA ERROR	

3.2.3 PATCH OPTIONS

THERE ARE FIVE PATCH OPTIONS AVAILABLE WITH THIS PROGRAM. TO USE ONE OR ALL OF THESE OPTIONS, MAKE UP PATCH CARD(S) AS SHOWN.

```
&XXXX DDDD
..... ....
. ... ...
. .. ..
.  .  ..... DATA TO BE ENTERED IN SPECIFIED CORE LOC'N
.  .
.  ..... 'CORE ADDRESS' TAKEN FROM PROGRAM LISTING
.
.............. 12-PUNCH IN COLUMN ONE (1)
```

NOTE - THESE PATCH OPTIONS MAY BE INSERTED, AFTER PROGRAM LOAD, THROUGH THE CONSOLE SWITCHES BUT GREAT CARE MUST BE TAKEN TO COMPUTE CORRECTED ADDRESSES USING NECESSARY RELOCATION FACTORS.

1. SELECTION OF FIRST RANDOM NUMBER TO BE USED BY THE RANDOM SEEK ROUTINE (3). THIS NUMBER WILL BE USED AS THE FIRST RANDOM NUMBER ON EVERY ROUTINE PASS. TO SELECT THIS OPTION, DETERMINE THE ADDRESS OF THE VARIABLE 'RNDSK' FROM THE PROGRAM LISTING. THIS ADDRESS IS THE 'CORE ADDRESS' TO BE PUNCHED IN THE PATCH CARD. THE RANDOM NUMBER TO BE INSERTED SHOULD BE TAKEN FROM A PREVIOUS SUMMARY PRINTOUT, LINE 5.

2. SELECTION OF FIRST RANDOM NUMBER TO BE USED BY THE RANDOM PATTERN WRITE-READ ROUTINES, 9 AND 10. THIS NUMBER WILL BE USED AS THE FIRST RANDOM NUMBER OF THE FIRST PATTERN GENERATED, ON EVERY ROUTINE PASS. TO SELECT THIS OPTION, DETERMINE THE ADDRESS OF THE VARIABLE 'RNDWR' FROM THE PROGRAM LISTING. THIS ADDRESS IS THE 'CORE ADDRESS' TO BE PUNCHED IN THE PATCH CARD. THE RANDOM NUMBER TO BE INSERTED SHOULD BE TAKEN FROM A PREVIOUS SUMMARY PRINT, EITHER LINE 6 OR LINE 7, DEPENDING UPON THAT WAS FAILING.

OPTIONS 3, 4, AND 5 BELOW ALLOW CONTINUATION OF RANDOM GENERATION FROM A PREVIOUS LOAD OF THE THE PROGRAM. THESE PATCHES ALLOW THE CE TO SPECIFY THE STARTING POINT OF THE RANDOM PATTERNS. VALUES TO BE ENTERED CAN BE FOUND IN THE LAST SUMMARY TABLE PRINTED.

3. SELECTION OF FIRST RANDOM NUMBER OF THE FIRST PROGRAM PASS ONLY, TO BE USED BY THE RANDOM SEEK ROUTINE. THIS OPTION WILL CAUSE THE RANDOM PATTERN GENERATION TO CONTINUE FROM THE LAST NUMBER USED ON PREVIOUS LOADS OF LOADS OF THE PROGRAM. THE ADDRESS OF THE VARIABLE 'PRNSK' IS THE 'CORE ADDRESS' TO BE PUNCHED ON THE PATCH CARD.

4. SELECTION OF FIRST RANDOM NUMBER TO BE USED BY ROUTINE NINE (9). THIS PATCH WILL CAUSE THE RANDOM PATTERN GENERATION TO CONTINUE FROM A PREVIOUS LOAD OF THE PROGRAM. THE ADDRESS OF THE VARIABLE 'LRN1' IS THE 'CORE ADDRESS' TO BE PUNCHED IN THE PATCH CARD.

5. SELECTION OF FIRST RANDOM NUMBER TO BE USED BY THE RANDOM WRITE-READ ROUTINE (10). THIS OPTION WILL CAUSE THE RANDOM PATTERN GENERATION TO CONTINUE FROM A PREVIOUS LOAD OF THE PROGRAM. THE ADDRESS OF THE VARIABLE 'LRN2' IS THE CORE ADDRESS TO BE PUNCHED IN THE PATCH CARD.

3.3 PROGRAM HALTS

THIS PROGRAM HAS ONE ERROR TRAP (70FF), IN THE SEEK TIMING ROUTINE (D). THIS TRAP WILL OCCUR IF THERE IS NO INTERRUPT FROM THE DISK AFTER A SEEK XIO IS EXECUTED. THE FUNCTION TEST WILL HAVE TO BE RESTARTED USING THE SWITCH OPTIONS TO CONTINUE.

NOTE - THE SEEK TIMING TEST IS A SPECIAL ROUTINE AND MUST BE SELECTED IN ORDER TO BE RUN.

3.4 PROGRAM TERMINATION

THE PROGRAM WILL NORMALLY TERMINATE AFTER ONE COMPLETE PASS, UNLESS THE DIAGNOSTIC MONITOR OPTION OF LOOP ALL PROGRAMS IS SELECTED. SEE OM USE PROCEDURE FOR THIS OPTION.

THE PROGRAM CAN BE MANUALLY TERMINATED IN ONE OF TWO WAYS.

1. BY THE MONITOR HALT OPTION (BIT 15 ONLY).
2. BY USE OF THE HALT OPTION (SEE SW OPTIONS).

THIS PROGRAM WILL ALSO BE TERMINATED WHEN CERTAIN ERRORS OCCUR. ALL SUCH TERMINATIONS WILL BE ACCOMPANIED BY AT LEAST TWO PRINTOUTS, ONE STATING THE ERROR, AND THE SECOND STATING THAT THE TEST WAS TERMINATED. THE DFT WILL HAVE TO BE RESTARTED TO CONTINUE.

3.5 PROGRAM RESTART

THE PROGRAM CAN BE RESTARTED FOLLOWING ANY TERMINATION BY SETTING THE BIT SWITCHES TO '0X80', WHERE X IS THE PROGRAM LOAD NUMBER, AND THEN PRESSING CONSOLE INTERRUPT.

4. PRINTOUTS

ALL PRINTOUTS FROM THIS FUNCTION TEST WILL INCLUDE THE LAST DISK DSW THAT WAS SENSED, AND THE NUMBER OF THE FILE BEING TESTED. ALL MESSAGE MODIFIERS MOST EASILY UNDERSTOOD AS DECIMAL NUMBERS, SUCH AS ERROR COUNTS, CYLINDER NUMBERS, AND FILE NUMBER, WILL BE PRINTED AS DECIMAL NUMBERS. ALL NUMBERS WHICH SHOULD BE ANALYZED FOR BITS BEING ON OR OFF, ARE PRINTED IN HEX.

4.1 STATUS MESSAGES

```
A2D00                    FILE  DSW   CPU CYCLE TIME = NN  2310 DFT START
                         000X  XXXX
```

THE PROGRAM DETERMINED THAT THE CPU CYCLE TIME IS NN, WHERE NN IS EITHER '22' OR '36', REPRESENTING 2.2 AND 3.6 USEC MEMORY SPEED. THE DETERMINATION IS MADE BY EXECUTING A 'SHIFT TO RED' IOCC TO THE CONSOLE TYPEWRITER. THIS MESSAGE WILL OCCUR EVERY TIME THE FUNCTION TEST BEGINS A LOOP.

```
A2D01  RTN#   RTN ADRS  FILE  DSW    DSK NOT INIT
                        000X  XXXX
```

THE HEXIDECIMAL WORD 'CEDC' WAS NOT FOUND ON CYLINDER 199, SECTOR 6. THE DISK PROBABLY IS NOT INITIALIZED WITH THE 2315 DIAGNOSTIC DISK INITIALIZER (0308).

```
A2D02  RTN#   RTN ADRS  FILE  DSW    INVLD RTN#
                        000X  XXXX
```

AN INVALID ROUTINE NUMBER WAS SELECTED USING SWITCH FUNCTION ONE. THE DFT MUST BE RESTARTED TO CONTINUE.

```
A2D03  RTN#   RTN ADRS  FILE  DSW    RECOVERED RD ERR
                        000X  XXXX
```

AFTER ONE OR MORE DSW ERRORS ON A READ, A SUCCESSFUL READ WAS EXECUTED WITHOUT DSW ERRORS. THIS PRINTOUT WILL BE PRECEEDE BY ONE OR MORE ERROR MESSAGES.

```
A2D04  RTN#   RTN ADRS  FILE  DSW    HRD CMP ERR
                        000X  XXXX
```

AFTER EIGHT (8) RETRIES, DATA READ FROM THE DISK DID NOT COMPARE WITH THAT EXPECTED. THIS MESSAGE INDICATES THAT THE DATA WAS PROBABLY WRITTEN WRONG BY A WRITE ROUTINE, OR THAT THE DISK IS NOT INITIALIZED. LOOK AT THE ROUTINE NUMBER TO DETERMINE IF IT IS A WRITE ROUTINE.

```
A2D06  RTN#   RTN ADRS  FILE  DSW    RECOVERED SK ERR
                        000X  XXXX
```

AFTER ONE OR MORE SEEK ERRORS, THE DESIRED CYLINDER WAS REACHED. THIS PRINTOUT WILL BE PRECEEDED BY ONE OR MORE SEEK ERROR PRINTOUTS.

```
A2D07  RTN#   RTN ADRS  FILE  DSW    DFT TERMINATED
                        000X  XXXX
```

THE DISK FUNCTION TEST HAS BEEN TERMINATED. THE PREVIOUS PRINTOUTS WILL EXPLAIN THE REASON FOR THE TERMINATION. THE DFT WILL HAVE TO BE RESTARTED TO CONTINUE THE TEST.


```
A2D08  RTN#   RTN ADRS  FILE  DSW  SEEK TIMING IN PROGRESS
                        000X  XXXX

                        FILE  DSW  MAX  MIN  AVG  INCR   SK TIME (MS)
                        000X  XXXX NNNN NNNN NNNN NNNN
```

SEEK TIMING PRINTOUT (ROUTINE D). THIS PRINTOUT OCCURS WHEN THE SEEK TIMING ROUTINE IS EXECUTED. WHEN THE TIMING ROUTINE STARTS, THE CPU IS DEDICATED TO THE DISK AND ALL OTHER TESTS WHICH MAY BE RUNNING IN OVERLAP, ARE SUSPENDED UNTIL THE CONCLUSION OF THIS TEST.

SEEK INCREMENT IS THE NUMBER OF CYLINDERS SEEKED.

```
MAX  = MAXIMUM SEEK TIME OUT OF 20 SEEKS FOR THE GIVEN INCR.
MIN  = MINIMUM SEEK TIME OUT OF 20 SEEKS FOR THE GIVEN INCR.
AVG  = AVERAGE OF THE 20 SEEKS FOR THE GIVEN INCREMENT
INCR = SEEK INCREMENT
```

NOTE - - AVERAGE SEEK TIME = 15MS X (NUMBER OF 20 MIL STEPS + NUMBER OF 10 MIL STEPS)

```
A2D09  RTN#   RTN ADRS  FILE  DSW  PASS SKS  SFT  HRD   7-LINE SMRY
                        000X  XXXX 00NN NNNN NNNN NNNN

                        FILE  DSW  PASS RDS  SFT  HRD
                        000X  XXXX 00NN NNNN NNNN NNNN

                        FILE  DSW  PASS WRTS SFT  HRD
                        000X  XXXX 00NN NNNN NNNN NNNN

                        FILE  DSW  PASS  #WDS IN SECTOR
                        000X  XXXX 00NN NNNN

                        FILE  DSW  PASS   SK-RNDM WDS
                        000X  XXXX 00NN  FRST  LAST

                        FILE  DSW  PASS  WRT-RNDM WDS/RTN9
                        000X  XXXX 00NN  FRST  LAST

                        FILE  DSW  PASS   WRT-RNDM WDS/RTN10
                        000X  XXXX 00NN  FRST  LAST
```

THIS PRINTOUT OCCURS EVERY TIME THE DFT COMPLETES A PASS. IT ALSO OCCURS WHENEVER THE DFT IS TERMINATED WITH AN ERROR.

```
PASS = 00NN   THE TOTAL NUMBER OF COMPLETE PASSES
SKS  = NNNN   THE TOTAL NUMBER OF SEEKS EXECUTED
 SFT = NNNN   THE NUMBER OF SOFT SEEK ERRORS
 HRD = NNNN   THE NUMBER OF HARD SEEK ERRORS
RDS  = NNNN   THE TOTAL NUMBER OF READS EXECUTED
 SFT = NNNN   THE NUMBER OF SOFT READ ERRORS
 HRD = NNNN   THE NUMBER OF HARD READ ERRORS
WRTS = NNNN   THE TOTAL NUMBER OF WRITES EXECUTED
 SFT = NNNN   THE NUMBER OF SOFT WRITE ERRORS
 HRD = NNNN   THE NUMBER OF HARD WRITE ERRORS
#WDS IN SECTOR = AVG # WORDS WRITTEN WITH WRITE 400
SK RNDM WDS   WORDS USED TO GENERATE RANDOM SEEKS.
              HIGH ORDER EIGHT BITS ONLY ARE USED

WRT RNDM WDS RTN9   WORDS USED TO GENERATE RANDOM
                    PATTERNS FOR RTN 9

WRT RNDM WDS RTN10  WORDS USED TO GENERATE RANDOM
                    PATTERNS FOR RTN 10
 FRST = FIRST RANDOM NUMBER USED ON THIS PASS
 LAST = LAST RANDOM NUMBER USED ON THIS PASS - ALSO
        IS THE FIRST NUMBER USED ON THE NEXT PASS
```

4.2 ERROR MESSAGES

E2D01 RTN# RTN ADRS FILE DSW LAST IOCC LOST INT
000X XXXX XXXX XXXX

AFTER THE EXECUTION OF AN I/O INSTRUCTION, THE DFT LOOPS THROUGH THE MONITOR WAITING FOR THE EXPECTED INTERRUPT. IF A TIMEOUT OCCURS, THIS MESSAGE IS PRINTED AND THE DFT IS TERMINATED.

E2D02 RTN# RTN ADRS FILE DSW LAST IOCC EXTRA INT
000X XXXX XXXX XXXX

AN UNEXPECTED INTERRUPT OCCURRED. IF THIS PRINTOUT IS PRECEEDED BY THE 'LOST INTERRUPT' MESSAGE, THE INTERRUPT OCCURRED BUT WAS LATE.

E2D03 RTN# RTN ADRS FILE DSW DSK NOT RDY
000X XXXX

THE DISK DRIVE 'FILE#' IS NOT READY AND/OR BUSY WHEN IT SHOULD BE BOTH READY AND NOT BUSY. THIS CHECK IS MADE PRIOR TO THE EXECUTION OF ANY SEEK, READ, OR WRITE. THE FUNCTION TEST WILL LOOP WAITING UNTIL THE DISK COMES READY, PRINTING THIS MESSAGE APPROXIMATELY EVERY TWELVE SECONDS.

E2D04 RTN# RTN ADRS FILE DSW LAST IOCC DSW WRONG
000X XXXX XXXX XXXX

THE DISK IS CHECKED THAT IT GOES BUSY AND NOT READY IMMEDIATELY AFTER AN XIO FOR A READ, SEEK, OR WRITE. THIS MESSAGE IS PRINTED IF THE DISK DID NOT GO BUSY AND/OR NOT READY AFTER SUCH AN XIO. THE PROGRAM THEN ENTERS A LOOP THROUGH THE MONITOR CHECKING FOR A LOST INTERRUPT.

E2D05 RTN# RTN ADRS FILE DSW LAST IOCC DSW SK ERR
000X XXXX XXXX XXXX

A DSW ERROR WAS INDICATED AFTER THE OP COMPLETE INTERRUPT OCCURRED FOR THE SEEK IOCC SPECIFIED. THE SEEK WILL THEN BE VERIFIED BY READING SECTOR IDS BEFORE RE-SEEKING.

E2D06 RTN# RTN ADRS FILE DSW LAST IOCC DSW RD ERR
000X XXXX XXXX XXXX

THE DSW INDICATED AN ERROR OCCURRED WHILE READING. THE DATA WILL BE COMPARED WITH THAT EXPECTED BEFORE ANY RETRIES ARE MADE.

E2D07 RTN# RTN ADRS FILE DSW LAST IOCC HRD DSW RD ERR
000X XXXX XXXX XXXX

AFTER EIGHT (8) RETRIES, A SUCCESSFUL READ USING THE GIVEN IOCC COULD NOT BE EXECUTED. THIS PRINTOUT WILL BE PRECEEDED BY EIGHT 'E2D06' MESSAGES.

E2D08 RTN# RTN ADRS FILE DSW LAST IOCC DSW WRT ERR
000X XXXX XXXX XXXX

THE DSW INDICATED AN ERROR OCCURRED AFTER THE EXECUTION OF A WRITE IOCC. THE DATA WRITTEN WILL BE CHECKED FOR VALIDITY AND RE-WRITTEN IF ANY COMPARE ERRORS OCCUR.

E2D09 RTN# RTN ADRS FILE DSW FROM S/B WAS SEEK ERR
000X XXXX 00CC 00CC 0CCC

WHEN A SEEK WAS ATTEMPTED AND VERIFIED, IT WAS FOUND THAT THE WRONG CYLINDER WAS OBTAINED. SEEKS ARE ALL VERIFIED BY READING ALL EIGHT SECTOR ID'S. THE CYLINDER NUMBER OF ALL ID'S MUST BE THE SAME, AND THE EIGHT SECTOR COUNTS (BITS 13-15) MUST BE SEQUENTIAL (0-7) BEFORE THE SEEK IS ACCEPTED AS VERIFIED.

E2D10 RTN# RTN ADRS FILE DSW CYL# 00HS #WDS CMP ERR
000X XXXX 0CCC 00HS NNNN

FILE DSW WD# S/B WAS
000X XXXX NNNN DDDD DDDD

FILE DSW WD# S/B WAS
000X XXXX NNNN DDDD DDDD

FILE DSW WD# S/B WAS
000X XXXX NNNN DDDD DDDD

FILE DSW #ERS
000X XXXX NNNN

COMPARE ERROR. THIS PRINTOUT WILL OCCUR IF THE DATA READ FROM THE DISK DOES NOT COMPARE WITH THE DATA THAT WAS EXPECTED FROM THE DISK. THERE ARE THREE THINGS THAT THIS PRINTOUT CAN MEAN.

1. DATA WAS MISREAD FROM THE DISK
2. DATA WAS WRITTEN INCORRECTLY ON A PRECEDING WRITE
3. THE DISK IS NOT INITIALIZED

IN ORDER TO DETERMINE WHICH WAS THE CAUSE OF THIS MESSAGE, FIRST LOOK FOR A PREVIOUS PRINTOUT STATING THAT A WRITE ERROR OCCURRED. IF THERE IS NOT SUCH A PRINTOUT, THEN THIS PRINTOUT WAS NOT CAUSED BY FAULTY WRITE CIRCUITRY.

IF THIS PRINTOUT OCCURS REPEATEDLY FOR THE SAME CYL. AND SECTOR AND NO WRITE ERROR PRINTOUT HAS OCCURRED, THEN THE DISK IS PROBABLY NOT INITIALIZED.

IF THIS PRINTOUT OCCURS INTERMITTENTLY, THEN THE ERRORS ARE PROBABLY DUE TO FAULTY READ CIRCUITRY.

USE CAREFUL JUDGMENT IN DETERMINING WHICH CONDITION EXISTS BEFORE LOOKING FOR ANY HARDWARE FAULTS.

CYL# = CYLINDER WHICH WAS READ (DECIMAL)
00HS = TRACK ON THAT CYLINDER
H - HEAD USED (0 OR 1)
S - SECTOR READ (0, 1, 2, OR 3)
#WDS = READ WORD COUNT USED IN THE READ XIO
WD# = POSITION IN THE I/O TABLE OF THE WORD
S/B = DATA EXPECTED
WAS = DATA FOUND
#ERS = NUMBER OF BAD DATA WORDS FOUND

NOTE - FOR EVERY BAD WORD THAT IS FOUND, THE WORD PRECEEDING IT, AND THE WORD FOLLOWING IT, AS WELL AS THE BAD WORD, ARE PRINTED TO GIVE AN OVERALL PICTURE OF THE I/O AREA.

E2D11 RTN# RTN ADRS FILE DSW CYL# OOHS #WDS OVERREAD
000X XXXX OCCC OOHS NNNN

OVERREAD. BEFORE ANY READS ARE EXECUTED, THE I/O AREA IS SET TO HEXADECIMAL 'FFFF'. THE TWO WORDS FOLLOWING THE EXPECTED READ AREA ARE ALSO SET TO 'FFFF'. WHEN DATA IS READ AND COMPARED, THESE TWO WORDS ARE CHECKED TO SEE THAT THEY ARE STILL SET TO 'FFFF'. IF NOT, THEN THIS MESSAGE IS PRINTED.

CYL# = CYLINDER NUMBER ON WHICH THE ERROR OCCURRED (DECIMAL)
OOHS = TRACK ON WHICH ERROR OCCURRED
H - HEAD USED TO READ
S - SECTOR READ
#WDS = WORD COUNT USED IN READ IOCC

E2D12 RTN# RTN ADRS FILE DSW WRITE ERROR
000X XXXX

THE DATA JUST WRITTEN HAS BEEN READ AND COMPARED WITH THE DATA EXPECTED, SUPPRESSING ALL PRINTOUTS WHICH MIGHT HAVE OCCURRED. A HARD COMPARE ERROR WAS INDICATED (EIGHT RETRIES). AFTER THIS MESSAGE IS PRINTED, THE DATA WILL BE COMPARED AGAIN, THIS TIME NOT SUPPRESSING PRINTOUTS. ALL COMPARE ERRORS MAY THEN BE INTERPRETED AS WRITE ERRORS.

E2D13 RTN# RTN ADRS FILE DSW CYL# HOME BIT WRONG
000X XXXX OCCC

HOME BIT IN DSW (BIT 4) IS WRONG. IF THE CYLINDER NUMBER GIVEN IS ZERO, THEN THE HOME BIT WAS FOUND OFF WHEN THE ARM WAS AT HOME. IF NON-ZERO, THEN THE HOME BIT WAS ON WHEN THE ARM WAS AT THE GIVEN POSITION (DECIMAL).

THE HOME BIT IS CHECKED AFTER EVERY SEEK TO SEE THAT IT IS CORRECT.

E2D14 RTN# RTN ADRS FILE DSW LAST IOCC NO DSW ERR/WRT 400
000X XXXX XXXX XXXX

A WRITE WITH A WORD COUNT OF 400 WAS EXECUTED. THIS WRITE OPERATION SHOULD HAVE BEEN TERMINATED BY THE NEXT SECTOR GAP AND AN ERROR INDICATED IN THE DSW. NO SUCH ERROR WAS INDICATED.

E2D15 RTN# RTN ADRS FILE DSW LAST IOCC NO DSW ERR/RD 370
000X XXXX XXXX XXXX

A READ WITH A WORD COUNT OF 370 WAS EXECUTED. THIS READ OPERATION SHOULD HAVE BEEN TERMINATED BY THE NEXT SECTOR GAP AND AN ERROR INDICATED IN THE DSW. NO SUCH INDICATION WAS GIVEN.

E2D16 RTN# RTN ADRS FILE DSW WDCNT SECT WD CNT WRONG
000X XXXX NNNN

A READ WITH A WORD COUNT OF 370 WAS EXECUTED. THE I/O AREA WAS PRESET TO HEXADECIMAL 'FFFF' SO THAT THE NUMBER OF WORDS TRANSFERRED COULD BE DETERMINED. IF THE NUMBER OF WORDS TRANSFERRED IS LESS THAN 331 OR GREATER THAN 358, THIS ERROR MESSAGE WILL BE PRINTED.

E2D17 RTN# RTN ADRS FILE DSW WRT 400 WROTE NEXT SECT
000X XXXX

A WRITE WITH A WORD COUNT OF 400 WAS EXECUTED. THE NEXT SECTOR WAS THEN READ TO DETERMINE IF THE WRITE OPERATION TERMINATED WHEN THE SECTOR GAP CAME UP. IF NOT, THIS ERROR MESSAGE IS PRINTED.

E2D18 RTN# RTN ADRS FILE DSW LAST IOCC #TMS RDCK XFRD DATA
000X XXXX XXXX XXXX NNNN

A READ USING THE READ-CHECK MODIFIER BIT WAS EXECUTED. THE I/O AREA WAS PRESET TO HEX 'FFFF' BEFORE THE RD CK. AFTERWARDS, THE I/O WAS NOT 'FFFF', INDICATING DATA WAS TRANSFERRED.

#TMS = NUMBER OF READ-CHECK XIO'S WHICH XFRD DATA

E2D19 FILE DSW SECT CNTR BAD
000X XXXX ABCD

THE SECTOR COUNTS IN BITS 14-15 OF THE DSW INDICATE THE NEXT THEY CHANGE FROM 0-1-2-3 AS THE DISK ROTATES. IF NOT, THIS MESSAGE IS PRINTED AND THE DSW IS TERMINATED, SINCE ALL READ AND WRITE OPERATIONS HINGE ON GOOD SECTOR COUNT.

ABCD = SECTOR COUNTS (S/B = 0123)

E2D20 RTN# RTN ADRS FILE DSW 8 CYLINDER IDS
000X XXXX AAAA BBBB CCCC DDDD

FILE DSW
000X XXXX EEEE FFFF GGGG HHHH

IMMEDIATELY AFTER A SEEK INTERRUPT OCCURS, THE NEXT AVAILABLE SECTOR ON THE DISK IS READ TO GET THE SECTOR ID (WORD 1). THE OTHER SEVEN (7) SECTOR IDS ARE THEN READ IN SEQUENCE.

THESE SECTOR IDS ARE THEN CHECKED FOR INDICATING THE SAME CYLINDER, AND FOR HAVING SEQUENTIAL SECTOR COUNTS. IF NOT, THIS MESSAGE IS PRINTED. UP TO SEVEN RETRIES ARE MADE TO MEET THE ABOVE CONDITIONS.

IF THIS MESSAGE IS PRINTED EIGHT TIMES FOR THE SAME CYLINDER, THEN THE DISK IS PROBABLY NOT INITIALIZED.

IF IT OCCURS INTERMITTENTLY, WITH THE FIRST SECTOR ID ALWAYS IN ERROR, THEN HEAD SETTLING TIME SHOULD BE EXAMINED.

OTHERWISE, A READ ERROR IS PROBABLY INDICATED.

NOTE - THE SECTOR IDS WILL NOT NECESSARILY BE IN ORDER LOWEST TO HIGHEST, SINCE THE FIRST AVAILABLE SECTOR WILL NOT ALWAYS BE SECTOR 0. SECTOR IDS IN THE ORDER 5-6-7-0-1-2-3-4, FOR EXAMPLE, WILL NOT BE UNCOMMON.

E2D24 RTN# RTN ADRS FILE DSW SK/HOME BIT ERR
000X XXXX

THE SEEK TIMING ROUTINE SEEKS FORWARD TEN (10) TIMES, THEN BACKWARDS TEN (10) TIMES FOR EVERY SEEK INCREMENT. THE ROUTINE STARTS WITH THE ARM AT HOME AND THE ARM SHOULD BE AT HOME WHEN THE TEST IF FINISHED. THE ONLY CHECK FOR THE ARM BEING AT HOME IS THE HOME BIT (BIT 4) IN THE DSW. IF THIS BIT IS NOT SET, A SEEK ERROR IS PROBABLE INDICATED. THE TIMING TEST RESULTS ARE PROBABLY INVALID.

5. COMMENTS

5.1 TEST ROUTINES

HEXADECIMAL ROUTINE NUMBER	ROUTINE DESCRIPTION
0	---- PRECN ---- THIS ROUTINE MAY NEVER BE EXPLICITLY EXECUTED AS A ROUTINE. IT IS RUN ONCE EACH TIME THE DISK FUNCTION TEST IS LOOPED REGARDLESS OF ANY OPTIONS. THE ROUTINE WILL - A. ISSUE AN XIO SEEK TOWARD HOME OF 203 CYLINDERS TO TEST THE HOME BIT IN THE DSW (BIT 4). B. CHECK THE SECTOR COUNT IN THE DSW FOR PROPER STEPPING - 0123 . IF THE SECTORS COUNTS FOUND ARE NOT SEQUENTIAL THE DFT IS TERMINATED AND MUST BE RESTARTED USING THE SWITCH OPTIONS (SEE PROGRAM TERMINATION ABOVE). C. SEEK CYLINDER 199. READ THE HISTORY TABLE ON SECTOR THREE (3) TO SET UP THE BAD CYLINDER TABLE IN THE PROGRAM. IF THE HEXADECIMAL WORD 'CEDC' IS NOT THE SECOND WORD ON THE SAME TRACK THE DFT IS TERMINATED AND MUST BE RESTARTED USING THE SWITCH OPTIONS (SEE PROGRAM TERMINATION ABOVE).
1	---- RNT1 ---- THIS ROUTINE FIRST SEEKS AND VERIFIES HOME. ALL EIGHT SECTORS ON THE HOME CYLINDER ARE THEN READ, IN ORDER 0 THROUGH 7. THE READ WORD COUNT IS SET TO 1 AT THE START, AND IS DOUBLED EVERY TIME ALL EIGHT SECTORS ARE READ, UNTIL THE READ WORD COUNT REACHES 256. THE READ COUNT IS THEN SET TO 320. THE DATA THAT IS READ IS NOT VERIFIED AS BEING CORRECT UNLESS THE DSW INDICATES AN ERROR OCCURRED, EXCEPT THAT THE DATA IN SECTOR 7 IS ALWAYS VERIFIED THIS ROUTINE IS LOOPED 20 TIMES
2	---- RTN2 ---- INCREMENTAL SEEK ROUTINE. THIS ROUTINE SEEKS 2 CYLINDERS IN AND 1 OUT FROM CYLINDER 0 TO 202. THEN THEN ROUTINE SEEKS 2 OUT AND 1 IN FROM CYLINDER 202 TO 0 (HOME). EACH SEEK IS VERIFIED BY READING ALL EIGHT SECTOR IDS ON EACH CYLINDER. CYLINDERS 90-110 WILL NEVER BE ATTEMPTED.
3	---- RTN3 ---- RANDOM SEEK ROUTINE. THIS ROUTINE WILL EXECUTE 100 RANDOM SEEKS. EACH SEEK IS VERIFIED BY READING ALL EIGHT SECTOR IDS. CYLINDERS 90-110 ARE NEVER ATTEMPTED. - NOTE - THE SAME RANDOM SEEK PATTERN WILL ALWAYS BE EXECUTED IF THE VARIABLE 'RNDSK' IS PATCHED (SEE PATCH OPTIONS).

4	---- RTN4 ---- READ AND VERIFY 320 WORDS OF HEXADECIMAL '1313' FROM CYLINDER 1 SECTOR 0. THIS ROUTINE IS LOOPED 50 TIMES.
5	---- RTN5 ---- READ AND VERIFY 320 WORDS OF HEXADECIMAL 'E5E5' FROM CYLINDER 201 SECTOR 6. THIS ROUTINE IS LOOPED 50 TIMES.
6	---- RTN6 ---- WRITE 320 WORDS OF HEXADECIMAL '1313' ON CYLINDER 2 SECTOR 0. READ BACK THE RECORD AND VERIFY THAT IT WAS WRITTEN CORRECTLY. LOOP THIS ROUTINE 50 TIMES.
7	---- RTN7 ---- WRITE 320 WORDS OF HEXADECIMAL 'E5E5' ON CYLINDER 2 SECTOR 6. READ BACK THE RECORD AND VERIFY THAT IT WAS WRITTEN CORRECTLY. LOOP THIS ROUTINE 50 TIMES.
8	---- RTN8 ---- READ-CHECK CYLINDER 1, SECTOR 0 AND VERIFY THAT NO DATA WAS TRANSFERRED TO CORE. IF DATA IS TRANSFERRED, PRINT AN ERROR MESSAGE IMMEDIATELY INDICAATING THE NUMBER OF TIMES THAT DATA WAS TRANSFERRE TO CORE. LOOP THIS ROUTINE 50 TIMES.
9	---- RTN9 ---- GENERATE 320 WORDS OF RANDOM DATA AND WRITE THESE WORDS ON CYLINDER 2,SECTOR 0. READ AND VERIFY THE DATA WAS WRITTEN CORRECTLY. LOOP THE ROUTINE 50 TIMES WITH DIFFERENT PATTERNS. - NOTE - THE SAME RANDOM PATTERN WILL ALWAYS BE WRITTEN IF THE VARIABLE 'LRN1' IS PATCHED (SEE PATCH OPTIONS).
A	---- RTN10 ---- GENERATE 320 WORDS OF RANDOM DATA AND WRITE THESE WORDS ON CYLINDER 202 SECTOR 6. READ AND VERIFY THAT THE DATA WAS WRITTEN CORRECTLY. LOOP THIS ROUTINE 50 TIMES WITH DIFFERENT PATTERNS. - NOTE - THE SAME RANDOM PATTERN WILL ALWAYS BE WRITTEN IF THE VARIABLE 'LRN2' IS PATCHED (SEE PATCH OPTIONS).
B	---- RTN11 ---- WRITE 320 WORDS OF HEXADECIMAL '1313' ON CYLINDER 2, SECTOR 0. REWRITE THE SAME SECTOR WITH A WORD COUNT OF ONE (1). READ 321 WORDS FROM THE SECTOR AND CHECK THAT ALL 320 WORDS FOLLOWING THE ONE WORD THAT WAS WRITTEN ARE ZERO. RESTORE THE ORIGINAL DATA (HEX '1313') ON SECTOR.

C ---- RTN12 ----

ISSUE A WRITE COMMAND WITH A WORD COUNT OF 400 ON CYLINDER 2, SECTOR 0. THE HARDWARE SHOULD TERMINATE THE WRITE AT NEXT SECTOR GAP. READ THE DATA JUST WRITTEN TO DETERMINE THE NUMBER OF WORDS THAT WERE WRITTEN. CALCULATE THE AVERAGE WORD COUNT FOR FIFTY (50) PASSES AND SAVE FOR SUMMARY TABLE PRINTOUT. IF WORD COUNT IS LESS THAN 331 OR GREATER THAN 358, AN ERROR MESSAGE IS PRINTED IMMEDIATELY.

D ---- RTN13 --- ***SPECIAL ROUTINE***

SEEK TIMING ROUTINE

THIS ROUTINE WILL BE RUN ONLY IF IT IS SPECIFICALLY SELECTED. IF WILL TAKE CONTROL OF THE CPU FOR THE DURATION OF THE TIMING TEST. SEEK INCREMENTS OF 1, 2, 4, 8, 16, 32, 64, 128, AND 200 CYLINDERS ARE TIMED. THE MAXIMUM TIME FOUND, THE MINIMUM TIME FOUND AND THE AVERAGE TIME ARE ALL PRINTED AT THE END OF THE ROUTINE FOR EVERY SEEK INCREMENT.

SEEK TIME = 15MS X (NUMBER OF 20 MIL STEPS +
NUMBER OF 10 MIL STEPS)

5.2 DESCRIPTION OF SUB-ROUTINES

INDEX REGISTER 2 IS SET TO THE ADDRESS 'TB' AT THE START OF THE PROGRAM AND EVERY ROUTINE EXPECTS THIS REGISTER TO CONTAIN THAT ADDRESS. 'TB' IS THE POINTER TO A COMMON TABLE OF CONSTANTS AND ROUTINE CALLS. ALL RETURNS FROM CALLS ON THE MONITOR GO THROUGH A ROUTINE WHICH SET UP THIS POINTER ALSO. REGISTER 2 IS NEVER SET TO ANY OTHER VALUE.

ALL THE SUBROUTINES DESCRIBED PROVIDE ANY NECESSARY ERROR AND STATUS PRINTOUTS. (REFERENCE SECTION 4.)

ALL SUBROUTINES WHICH REQUIRE THE OPTION ARE PROVIDED WITH THE 'LOCK ON ERROR' OPTION. THIS OPTION WILL LOOP THE SUBROUTINE IN THE SMALLEST POSSIBLE LOOP WHICH CAUSED THE ORIGINAL ERROR. ONCE AN ERROR OCCURS, AND THE OPTION IS SELECTED, THE ROUTINE WILL REMAIN IN THE LOOP AS LONG AS THE 'LOCK ON ERROR' SWITCH IS ON, WHETHER THE ERROR RECURRS OR NOT. IF NO ERROR OCCURS THEN THE OPTION HAS NO EFFECT.

CALL

```
...BSI  2  STMLS-TB
```

THIS SUBROUTINE IS USED TO SET AN ENTRY IN THE MAIN LINE SEQUENCE CONTROL FIELD (MLSCF) WHEN EXITING TO THE MONITOR. THE ROUTINE SAVES ALL INDEX REGISTERS, SETS A RETURN ADDRESS IN 'MLSCF+1', AND GOES TO MONITOR 'START'. UPON RETURN FROM MONITOR, THE SUBROUTINE RESTORES THE INDEX REGISTERS, AND RETURNS TO THE CALLING ROUTINE.

```
...BSI  2  XEQ-TB
   DC      RETURN1
```

THIS SUBROUTINE BUILDS THE IOCC WITH THE DEVICE AREA CODE, SETS THE INTERRUPT SWITCH NON-ZERO, AND SETS UP A LOOP COUNT TO TEST THE SELECTED DEVICE FOR READY. IF THE DEVICE IS READY, THIS ROUTINE TESTS THE VALUE OF 'COMA'. IF ZERO, EXIT IS TAKEN IMMEDIATELY. IF NON-ZERO, THE XIO SET UP IN LOCATION 'ZXIO' IS EXECUTED. A LOOP IS THEN SET UP THROUGH THE MONITOR WAITING FOR A LOST INTERRUPT. WHEN THE INTERRUPT OCCURS, EXIT IS MADE TO CALL+1.


```
...BSI  2  CKLK-TB
...DC      RETURN1
```

THIS SUBROUTINE IS USED TO CHECK FOR THE LOCK ON ERROR OPTION SELECTED. IF THE SWITCH IS ON THE ROUTINE RETURNS INDIRECTLY VIA THE ADDRESS RETURN1 IN CALL+1. IF THE SWITCH IS OFF THE ROUTINE RETURNS DIRECTLY TO CALL+2.

```
...BSI  2  SETV-TB
```
A-REG CONTAINS DATA TO SET

THIS SUBROUTINE SETS THE I/O AREA TO THE CONTENTS OF THE A REGISTER. THE NUMBER OF WORDS TO BE SET MUST BE STORED IN LOCATION 'COMA' PRIOR TO THE CALL.

```
...BSI  2  RNDOM-TB
```
A-REG CONTAINS LAST RANDOM NUMBER

THIS ROUTINE USES THE NUMBER IN THE A REGISTER TO GENERATE A RANDOM NUMBER, AND RETURNS TO CALL+1 WITH THE NEW NUMBER IN THE A REGISTER. THE NUMBER IN THE A REGISTER AT THE TIME OF THE CALL IS NORMALLY THE LAST RANDOM NUMBER USED.

```
...BSI  2  STMSG-TB
   DC      FMMM
           F  =  FORM NUMBER
           MMM=  MESSAGE ID.

ALTERNATE CALL
...BSI L   STMSG+/8000
   DC      FMMM
           THIS MESSAGE WILL BE PRINTED AS AN ADDITIONAL LINE MESSAGE,
           AND MID-RID-RAC WILL NOT BE PRINTED.
```

THIS ROUTINE WILL SET UP THE MESSAGE SPECIFIED BY THE FORM NUMBER. THE MESSAGE ID IS THEN CHECKED TO SEE IF HEX CHARACTER ONE IS AN E. IF IT IS AN E THE DIAGNOSTIC MONITOR ERROR ROUTINE IS CALLED. OTHERWISE THE LOG ROUTINE IS CALLED, UNLESS THE BYPASS LOG MESSAGES OPTION IS SELECTED. IF THE CALL WAS TO THE ERROR ROUTINE THE DIAGNOSTIC MONITOR OPTION OF LOOP ON ERROR IS CHECKED AND IF SELECTED THE TEST ROUTINE CAUSING THE ERROR WILL BE LOOPED. THIS ROUTINE NORMALLY EXITS TO CALL+2.

```
...BSI   2   VERFY-TB
   DC        CYL. NO. DESIRED
   DC        ERROR ADDRESS RETURN
```

THIS ROUTINE WILL SEEK THE DESIRED THE DESIRED CYLINDER, USING THE CYL-ADDRESS IN 'PCYL#' AS THE PRESENT DISK POSITION. ALL EIGHT SECTOR IDS ARE THEN READ. IF ALL EIGHT SECTOR ADDRESSES INDICATE THE SAME CYLINDER NUMBER, AND ALL EIGHT SECOTR IDS (BITS 13-15) ARE SEQUENTIAL (0-7), THE ROUTINE EXITS TO CALL +3.

IF NOT, AN ERROR MESSAGE IS PRINTED IMMEDIATELY. AN ERROR RETRY PROCEDURE IS THEN INITIATED. ALL EIGHT SECTOR IDS ARE REREAD UP TO SEVEN TIMES AND EVALUATED USING THE ABOVE CRITERION. IF THIS CRITERION IS NOT THEN MET, THE DET IS TERMINATED.

```
...BSI   2  READ-TB
   DC       WORD COUNT
   DC       NUMBER (USED IN CALL TO CMP ROUTINE)
   DC       ERROR RETURN
   (A REG. CONTAINS SECTOR DESIRED.)

THIS ROUTINE WILL BUILD THE READ IOCC, PRESET THE I/O AREA TO HEX 'FFFF',
SET THE READ WORD COUNT IN THE I/O AREA, AND EXECUTE THE READ THROUGH THE
XEQ SUBROUTINE.

UPON RETURN FROM XEQ, THE DSW IS CHECKED TO SEE IF ANY ERROR IS INDICATED.
IF A DSW ERROR IS INDICATED AFTER ANY READ, AN ERROR MESSAGE IS PRINTED.

WITH OR WITHOUT DSW ERRORS, A CALL IS MADE ON THE 'CMP' SUBROUTINE TO CHECK
THE DATA TO SEE THAT IT WAS AS EXPECTED.  IF NOT, UP TO EIGHT RETRIEES ARE
MADE FOR A GOOD READ.  IF ALL RETRIES FAIL, THE ROUTINE EXITS TO THE ERROR
RETURN ADDRESS.

...BSI     CMP
   MDX     ERROR RETURN

THIS ROUTINE WILL MAKE A WORD BY WORD COMPARISON OF THE DATA
READ AGAINST THE DATA EXPECTED.  THE ROUTINE WILL ALSO MAKE A CHECK
OF THE WORD COUNTER BY COMPARING TO SEE IF MORE WORDS WERE TRANS-
FERRED THAN EXPECTED.
IF NO ERRORS ARE FOUND THE ROUTINE EXITS DIRECTLY TO

CALL+2.  OTHERWISE THE EXIT IS TO CALL+1.

...BSI     2  WRITE-TB
   DC       NUMBER OF WORDS (IF BIT 0 = 1, DO NOT PRESET I/O AREA)
   DC       DATA TO BE PRESET IN I/O AREA
   DC       ERROR RETURN
   (A REG. CONTAINS THE SECTOR NUMBER)

THIS ROUTINE WILL PRESET THE I/O AREA 'COMA' WITH THE DATA TO BE WRITTEN.
THE ROUTINE WILL PLACE THE CURRENT VERIFIED SECTOR ID AT THE I/O AREA PLUS
1 AND THE WRITE WORD COUNT AT I/O AREA.  THE ROUTINE WILL BUILD THE WRITE
IOCC, AND ISSUE THE XIO THROUGH THE 'XEQ' ROUTINE.  UPON RETURN FROM 'XEQ'
THE DSW IS CHECKED FOR ERRORS.

IF NO DSW ERROR IS INDICATED, EXIT IS MADE TO CALL+4 WITHOUT ANY CHECKING.

IF A DSW ERROR IS INDICATED, AN ERROR MESSAGE IS PRINTED IMMEDIATELY AND
EXIT IS MADE TO THE ERROR RETURN ADDRESS.  NO RETRIES ARE MADE TO WRITE
A GOOD RECORD WITHIN THIS SUBROUTINE.
```

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

```
*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
*
*                     THIS PROGRAM USES A NEW CODING
*                     CALLED EXTENDED MNEMONIC
*                     CODING.
*
*                     THIS CODING IS SUMMARIZED HERE
*                     FOR CONVENIENCE.
*
*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
*
* EXTENDED            STANDARD            MEANING
* MNEMONIC            MNEMONIC            OF CODE
* CODING              EQUIVALENT
*--------------------+------------------+-----------------
* SKP     &           BSC     &          SKIP IF A IS
*                                        PLUS.
*--------------------+------------------+-----------------
* SKP     &-          BSC     &-         SKIP IS A IS
*                                        PLUS OR MINUS.
*--------------------+------------------+-----------------
* SKP     Z           BSC     Z          SKIP IF A IS
*                                        ZERO.
*--------------------+------------------+-----------------
* SKP     O           BSC     O          SKIP IF OVERFLOW
*                                        IS OFF.
*--------------------+------------------+-----------------
* SKP     C           BSC     C          SKIP IF CARRY IS
*                                        OFF
*--------------------+------------------+-----------------
* SKP     &-C         BSC     &-C        SKIP IF A IS
*                                        PLUS OR MINUS OR
*                                        IF CARRY IS OFF.
*--------------------+------------------+-----------------
* B       EXIT        MDX     EXIT       BRANCH TO EXIT
*                                        WHERE EXIT IS
*                                        WITHIN NORMAL
*                                        DISPLACEMENT.
*--------------------+------------------+-----------------
* B    L  ALPH        BSC L   ALPH       BRANCH TO ALPH.
*--------------------+------------------+-----------------
* BZ      BETA        BSC L   BETA,&-    BRANCH TO BETA
*                                        IF A IS ZERO.
*--------------------+------------------+-----------------
* BNZ     BETA        BSC L   BETA,Z     BRANCH TO BETA
*                                        IF A IS NON-ZERO
*--------------------+------------------+-----------------
* BNZ I   BETA        BSC I   BETA,Z     BRANCH
*                                        INDIRECTLY TO
*                                        BETA IF A IS
*                                        NON-ZERO.
*--------------------+------------------+-----------------
* BN      RTNA        BSC L   RTNA,Z&    BRANCH TO RTNA
*                                        IF A IS MINUS.
*--------------------+------------------+-----------------
* BNN     RTNB        BSC L   RTNB,-     BRANCH TO RTNB
*                                        IF A IS
*                                        NOT MINUS.
*--------------------+------------------+-----------------
* BP      SUBO        BSC L   SUBO,Z-    BRANCH TO SUBO
*                                        IF A IS PLUS.
*--------------------+------------------+-----------------
* BNP     SUB         BSC L   SUB,&      BRANCH TO SUB
*                                        IF A IS NOT
*                                        PLUS.
*--------------------+------------------+-----------------
* BC      ENTR        BSC L   ENTR,C     BRANCH TO ENTR
*                                        IF CARRY IS ON.
```



```
*--------------------+------------------+-----------------
* BO    2 5           BSC L2 5,O         BRANCH TO ADRS.
*                                        SPECIFIED BY
*                                        CONTENTS OF IX.
*                                        2 PLUS 5 IF
*                                        OVERFLOW IS ON.
*--------------------+------------------+-----------------
* BOD     SAFE        BSC L   SAFE,E     BRANCH TO SAFE
*                                        IF A IS ODD.
*--------------------+------------------+-----------------
* MDM     AVA,5       MDX L   AVA,5      INCREMENT ADRS.
*                                        AVA BY 5.
*--------------------+------------------+-----------------
* XCH                 RTE     16         EXCHANGE THE
*                                        CONTENTS OF A
*                                        AND Q.
*--------------------+------------------+-----------------
*--------------------------------------------------------
*--------------------------------------------------------
*
*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
*
*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
*      SUBROUTINE CALLS
*
*  BNDEC
*     A REG.=HEX NUMBER (0-9999 BASE 10)
*     BSI     BNDEC       CONVERT HEX TO DECIMAL
*     A REG.=CONVERTED DEC. NUMBER
*
*  CKLK
*     BSI   2 CKLK-TB     CHECK BIT 12 SWO
*     DC        RETURN ADRS IF BIT 12 SET
*
*  CMP
*     BSI     CMP         COMPARE DATA WITH NUMBER
*     MDX     CMP ERR BRANCH
*
*  COUNT
*     IX3 = SUMMARY TABLE POINTER
*     BSI   2 COUNT-TB    INCR COUNT MODULO 10,000.
*
*  PRSUM
*     BSI   2 PRSUM-TB    PRINT SUMMARY TABLE
*
*  READ
*     A REG.= SECTOR COUNT
*     BSI   2 READ-TB     READ SECTOR AT PRESENT
**                        * CYL. COMPARE DATA IF
**                        * NOCK ZERO.
*     DC        NO.OF WORDS-BIT 0 EQUAL 1 MEANS USE
**                         RANDOM NUMBERS FOR CMP
*     DC        NUMBER      USED IN COMPARE
*     DC        ADRS OF CMP ERROR RETURN
*
****ALTERNATE CALL USED
*     BSI L  READ+/8000
*     DC       NO. OF WORDS
*
*  RNDOM
*     A REG.= NO. USED TO BUILD NEXT RANDOM NO.
*     BSI   2 RNDOM-TB    GENERATE NO.
*     A REG.= NEW RANDOM NO.
*
*  SECT
*     A REG.=SECTOR ID IN HEX
*     BSI      SECT       CONVERT SID FOR PRINT
*     OOCC   ' OOHS       CC=CYL # IN DECIMAL
```

```
**                      H = HEAD (0-1)                          32D01380
**                      S = SECTOR (0-3)                        32D01390
*                                                               32D01400
*  SETV                                                         32D01410
*     A REG.=NO.TO BE SET IN COMA AREA                          32D01420
*     COMA = WORD COUNT                                         32D01430
*     BSI   2 SETV-TB     PRESET COMA+1 TO COMA+N+2             32D01440
**                        TO VALUE IN A REG.                    32D01450
*                                                               32D01460
*  STMLS                                                        32D01470
*     BSI  2  STMLS-TB    SAVE IX 1, IX 2 AND EXIT              32D01480
**                        * MONITOR. RETURN IS TO               32D01490
**                        * CALL+1.                             32D01500
*                                                               32D01510
*  STMSG                                                        32D01520
*     BSI   2 STMSG-TB    PRINT MESSAGE                         32D01530
*     DC      MESSAGE ID                                        32D01540
*                                                               32D01550
****ALTERNATE CALL USED                                         32D01560
*     BSI  L  STMSG+/8000                                       32D01570
*     DC      MESSAGE ID                                        32D01580
*                                                               32D01590
*  VERFY                                                        32D01600
*     BSI   2 VERFY-TB    SEEK A CYLINDER AND VER-              32D01610
**                        * IFY CYL. BY READING AT              32D01620
**                        * LEAST TWO SECTOR ID'S.              32D01630
*     DC      CYL # DESIRED                                     32D01640
*     DC      RETURN ADRS IF CYL # INVALID OR                   32D01650
**            BAD FROM 2315 DISK INITIALIZER.                   32D01660
*                                                               32D01670
*  WRITE                                                        32D01680
*     A REG.=SECTOR COUNT                                       32D01690
*     BSI   2 WRITE-TB    WRITE IN PRESENT CYLINDER             32D01700
*     DC      NO.OF WORDS TO BE WRITTEN                         32D01710
**                        IF BIT 0=1, DONT PRESET               32D01720
**                        THE I/O AREA                          32D01730
*     DC      DATA TO BE WRITTEN                                32D01740
*     DC      ADRS OF DSW ERROR RETURN                          32D01750
*                                                               32D01760
****ALTERNATE CALL USED                                         32D01770
*     BSI  L  WRITE+/8000                                       32D01780
*     DC      NO OF WORDS                                       32D01790
*     DC      DATA TO BE WRITTEN                                32D01800
*                                                               32D01810
*  XEQ                                                          32D01820
*     BSI   2 XEQ-TB      EXECUTE I/O AND WAIT                  32D01830
**                        * FOR INTERRUPT                       32D01840
*                                                               32D01850
*                                                               32D01860
*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D01870
*                                                               32D01880
*          MONITOR INTERFACE                                    32D01890
*                                                               32D01900
*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D01910
*                                                               32D01920
************************************************************** 32D01930
*     EQUATE TABLE                                              32D01940
************************************************************** 32D01950
*    THIS TABLE EQUATES TEST PROGRAM LABLES                     32D01960
*     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR                    32D01970
*     ADDRESSES.                                                32D01980
*                                                               32D01990
*---------------------------------------------------------      32D02000
*     MONITOR ENTRY ADDRESSES                                   32D02010
*---------------------------------------------------------      32D02020
*                                                               32D02030
0160 0  BEGIN EQU     /0160       BEGIN ROUTINE                 32D02040
0161 0  START EQU     BEGIN+1     SUPERVISOR ROUTINE            32D02050
```



```
0162 0  ERROR EQU     START+1     ERROR LOG ROUTINE             32D02060
0163 0  LOG   EQU     ERROR+1     STATUS LOG ROUTINE            32D02070
0164 0  END   EQU     LOG+1       END ROUTINE                   32D02080
*                                                               32D02090
*---------------------------------------------------------      32D02100
*     MONITOR CONTROL WORD ADDRESSES                            32D02110
*---------------------------------------------------------      32D02120
0165 0  RTNSW EQU     END+1       ROUTINE START SWITCH          32D02130
0166 0  ERLCK EQU     END+2       LOCK ON ERROR CONTROL         32D02140
0167 0  LOGBY EQU     END+3       I/O BUSY SWITCH ADDRESS       32D02150
0168 0  ADDRS EQU     END+4       ACTIVE PGRM MLSCF ADRS        32D02160
*                                                               32D02170
*---------------------------------------------------------      32D02180
*     INTERRUPT TRANSFER VECTOR ADDRESSES                       32D02190
*---------------------------------------------------------      32D02200
017A 0  IL0   EQU     /017A       INTERRUPT LEVEL ZERO          32D02210
018A 0  IL1   EQU     IL0+16      INTERRUPT LEVEL ONE           32D02220
019A 0  IL2   EQU     IL1+16      INTERRUPT LEVEL TWO           32D02230
01AA 0  IL3   EQU     IL2+16      INTERRUPT LEVEL THREE         32D02240
01BA 0  IL4   EQU     IL3+16      INTERRUPT LEVEL FOUR          32D02250
01BB 0  RQTY  EQU     IL4+1       CONSOLE PRINTER REQUEST       32D02260
01BC 0  RQKB  EQU     RQTY+1      USE KEYBOARD REQUEST          32D02270
01BD 0  SVKB  EQU     RQKB+1      KB SERVICE REQUEST            32D02280
*                                                               32D02290
************************************************************** 32D02300
05DC            ORG     *+1500                                  32D02310
************************************************************** 32D02320
*              PROGRAM CONTROL TABLE                            32D02330
************************************************************** 32D02340
*                                                               32D02350
*                                                               32D02360
*              MONITOR INTERFACE TABLES                         32D02370
*                                                               32D02380
05DC 0 032D     PID   DC      /032D       PGM ID                32D02390
05DD 0 0000     RID   DC      0           ROUTINE ID            32D02400
05DE 0 0000     RAD   DC      0           ROUTINE ADRS          32D02410
05DF 0 0000     SW0   DC      0           SWITCH FUNCTION 00    32D02420
05E0 0 0000     SW1   DC      0           SWITCH FUNCTION 01    32D02430
05E1 0 0000     SW2   DC      0           SWITCH FUNCTION 10    32D02440
05E2 0 0000     SW3   DC      0           SWITCH FUNCTION 11    32D02450
05E3 1 0828     LPA   DC      ZLPA        LOOP PROGRAM ADDRESS  32D02460
05E4 1 0812     IPA   DC      ZIPA        RESTART ADDRESS       32D02470
*                                                               32D02480
05E5 0 0C00     MLSCF DC      0           MAIN LINE SEQUENCE    32D02490
05E6 0 0000           DC      0           * CONTROL FIELD       32D02500
05E7 0 FFFF     TERM  DC      /FFFF       TERMINATOR            32D02510
05E8 1 0FCB           DC      PEND        LAST PROGRAM ADDRESS  32D02520
*---------------------------------------------------------      32D02530
05E9 0 2000     DVAS  DC      /2000       AREA CODE-CPU DRIVE   32D02540
05EA 0 8800           DC      /8800       AREA CODE-UNIT 1      32D02550
05EB 0 9000           DC      /9000       AREA CODE-UNIT 2      32D02560
05EC 0 9800           DC      /9800       AREA CODE-UNIT 3      32D02570
05ED 0 A000           DC      /A000       AREA CODE-UNIT 4      32D02580
05EE 0 0000     RNDSK DC      0           PATCH OPTION-RANDOM SEEK 32D02590
05EF 0 0000     RNDWR DC      0           PATCH OPTION RANDOM WRT 32D02600
05F0 0 FFFF     BADCY DC      -1                                32D02610
05F1 0 FFFF           DC      -1                                32D02620
05F2 0 FFFF           DC      -1                                32D02630
*                                                               32D02640
*              BEGIN ROUTINE                                    32D02650
*                                                               32D02660
05F3 0 4480 0160 BEG  BSI   I BEGIN       EXIT TO MONITOR       32D02670
05F5 1 05DC           DC      PID         ADRS OF PID           32D02680
*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D02690
*                                                               32D02700
*              INTERRUPT ROUTINE                                32D02710
*                                                               32D02720
*<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D02730
```

```
05F6 0 0000          INTSW DC      0          INTERRUPT SWITCH                32D02740
05F7 0 0000          DVA   DC      0          AREA CODE STORAGE               32D02750
05F8 0 0000          INTR  DC      0          INTRPT ENTRY                    32D02760
05F9 0 C0FC                LD      INTSW      GET INTRPT SWITCH               32D02770
05FA 1 6700 0604           LDX   L3 INTRB     GET RETURN ADDRESS              32D02780
05FC 0 4818                SKP     +-         SKIP IF INT EXPECTED            32D02790
05FD 0 6BE7                STX    3 MLSCF     SET IN TABLE FOR MONITOR        32D02800
05FE 0 1010          INTRC SLA     16         CLEAR INTRPT SW                 32D02810
05FF 0 D0F6                STO     INTSW      *                               32D02820
                     *                                                        32D02830
0600 0 0815                XIO     ZSNS       SENSE DSW                       32D02840
0601 0 D014                STO     ZSNS       STORE DSW IN TEMP LOC'N         32D02850
0602 1 4C80 05F8           BSC   I INTR       EXIT ROUTINE                    32D02860
                     *                                                        32D02870
                     *                PRINT ERROR - MAINLINE                  32D02880
                     *                                                        32D02890
0604 0 C011          INTRB LD      ZSNS       GET INTRPT DSW                  32D02900
0605 0 D021                STO     TBDSW      STORE FOR PRINT                 32D02910
0606 1 6600 065C           LDX   L2 TB        SET UP POINTER                  32D02920
0608 0 4230                BSI    2 STMSG-TB  PRINT EXTRA INT MSG             32D02930
0609 0 5E02                DC      /5E02      MESSAGE ID                      32D02940
060A 0 4480 0161           BSI   I START      EXIT TO MONITOR                 32D02950
                     *--------------------------------------------------      32D02960
                     *--------------------------------------------------      32D02970
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<      32D02980
                     *                                                        32D02990
                     *                TABLE OF COMMON PROGRAM                 32D03000
                     *                CONSTANTS AND EQUATES                   32D03010
                     *                                                        32D03020
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<      32D03030
065C 0               TB    EQU     PID+128    CONSTANT TABLE POINTER          32D03040
0014 0               LP13  EQU     20         NUMBER OF LOOPS RTN 13          32D03050
                     *--------------------------------------------------      32D03060
060C 0 0404          XSKBK DC      /0404      FNC/MOD-SEEK OUT                32D03070
060D 0 3000          H3000 DC      /3000      FORM NUMBER FOR PRSUM           32D03080
060E 0 1313          H1313 DC      /1313      CONSTANT HEX 1313               32D03090
060F 0 0123          MASK  DC      /0123      ORDER OF SECTOR COUNTS          32D03100
0610 0 0500          WRMOD DC      /0500      WRITE FUNCTION                  32D03110
0611 0 0600          DSKMD DC      /0600      READ FNC/MOD                    32D03120
0612 0 0680          RDCHK DC      /0680      READ-CHECK IOCC                 32D03130
0613 0 0700          SNRES DC      /0700      SENSE/RESET CONSTANT            32D03140
0614 0 0900          TYRED DC      /0900                                      32D03150
0615 0 8000          H8000 DC      /8000      CONSTANT HEX 8000               32D03160
0616   0000                BSS   E 0                                          32D03170
0616 0 0000          ZSNS  DC      *-*        USED AS TEMP LOC'N      EVEN    32D03180
0617 0 0000                DC      *-*        SENSE-RESET IOCC        ODD     32D03190
0618 0 0000          ZXIO  DC      *-*        COMMON IOCC STORAGE     EVEN    32D03200
0619 0 0000                DC      *-*        *                       ODD     32D03210
061A 0 0000          SNXIO DC      *-*        IOCC-STORAGE-SENSE      EVEN    32D03220
061B 0 0000                DC      *-*                                ODD     32D03230
061C 1 0614          TYPE  DC      TYRED      SHIFT TO RED IOCC               32D03240
061D 0 0900                DC      /0900                                      32D03250
061E 0 0000          SNSTY DC      *-*        SENSE DSW W/RESET               32D03260
061F 0 0F00                DC      /0F00      SENSE DSW FOR TYPEWRITER        32D03270
0620 0 E5E5          HE5E5 DC      /E5E5      CONSTANT HEX E5E5               32D03280
0621 0 0000          MSGO  DC      *-*        MESSAGE STORAGE         ODD     32D03290
0622 0 0000          HXDC  DC      *-*        HEX/DEC FLAG            EVEN    32D03300
0623 0 0000          MSGID DC      *-*        MESSAGE ID              ODD     32D03310
0624 1 0DF0          ADDR1 DC      ALPHO                                      32D03320
0625 0 0000          ADDR2 DC      0          ALPHA ADDRESS 2                 32D03330
0626 0 0000          FILE# DC      *-*        FILE NUMBER             ODD     32D03340
0627 0 0000          TBDSW DC      *-*        DSW                     EVEN    32D03350
0628 0 0000          MOD3  DC      *-*        MODIFIERS               EVEN    32D03360
0629 0 0000          MOD4  DC      *-*        *                       ODD     32D03370
062A 0 0000          MOD5  DC      *-*        *                       EVEN    32D03380
062B 0 0000          MOD6  DC      *-*        *                       ODD     32D03390
062C 0 0000          MOD7  DC      *-*        *                       EVEN    32D03400
062D 0 0000          BNTMP DC      *-*        TEMP STORAGE            ODD     32D03410
```



```
062E 0 0000          PCYL# DC      *-*        PRESENT CYLINDER        EVEN    32D03420
062F 0 0000          NCYL# DC      *-*        NEXT DESIRED CYLINDER   ODD     32D03430
0630 0 0000          ERSK1 DC      *-*        SEEK RTN ERROR SW       EVEN    32D03440
0631 0 0000          CNTB  DC      *-*        SEEK RTN-RETRY CTR B    ODD     32D03450
0632 0 0000          RTRYA DC      *-*        RETRY CTRS              EVEN    32D03460
0633 0 0000          RTRYB DC      *-*        *                       ODD     32D03470
0634 0 0000          RDDSW DC      *-*        ERROR CTRS              EVEN    32D03480
0635 0 0000          RDCMP DC      *-*        *                       ODD     32D03490
0636 0 0001          K1    DC      1          CONSTANT 1                      32D03500
0637 0 0002          K2    DC      2          CONSTANT 2                      32D03510
0638 0 0003          K3    DC      3          CONSTANT 3                      32D03520
0639 0 0004          K4    DC      4          CONSTANT 4                      32D03530
063A 0 0007          K7    DC      7          CONSTANT 7                      32D03540
063B 0 0008          K8    DC      8          CONSTANT 8              ODD     32D03550
063C 0 000A          TEN   DC      10         TEN                             32D03560
063D 0 FFF2          KM14  DC      -14        USED TO CALCULATE CPU TIME      32D03570
063E 0 0017          K23   DC      23         USED TO CALCULATE CPU TIME      32D03580
063F 0 0024          K36   DC      36         USED TO CALCULATE CPU TIME      32D03590
0640 0 0064          HUNDR DC      100        ONE HUNDRED                     32D03600
0641 0 00CA          K202  DC      202        CONSTANT 202                    32D03610
0642 0 00CB          K203  DC      203        CONSTANT 203                    32D03620
0643 0 00FD          K253  DC      253        DECIMAL CONSTANT                32D03630
0644 0 014B          K331  DC      331        CONSTANT                        32D03640
0645 0 03E8          THOUS DC      1000       ONE THOUSAND                    32D03650
0646 0 2710          K10TH DC      10000      CONSTANT 10000 DEC              32D03660
0647 0               SUMRY EQU     *          SUMMARY TABLE ORIGIN            32D03670
0647 0 0000          PSSCT DC      *-*        PASS COUNT                      32D03680
0648 0 0000          SKCNT DC      *-*        NUMBER OF SEEKS                 32D03690
0649 0 0000          SFTSK DC      *-*        NUMBER SOFT SK ERRORS           32D03700
064A 0 0000          HRDSK DC      *-*        NUMBER HARD SK ERRORS           32D03710
064B 0 0000          RDCNT DC      *-*        NUMBER OF READS                 32D03720
064C 0 0000          SFTRD DC      *-*        NUMBER SOFT RD ERRORS           32D03730
064D 0 0000          HRDRD DC      *-*        NUMBER HARD RD ERRORS           32D03740
064E 0 0000          WRCNT DC      *-*        NUMBER OF WRITES                32D03750
064F 0 0000          SFTWR DC      *-*        NUMBER SOFT WR ERRORS           32D03760
0650 0 0000          HRDWR DC      *-*        NUMBER HARD WR ERRORS           32D03770
0651 0 0000          WRLNG DC      *-*        AVG SECT LNGTH/WRT 400          32D03780
0652 0 0000          PRSW  DC      *-*        IF NON ZERO-BYPASS PRT          32D03790
000C 0               SMLNG EQU     *-SUMRY    LENGTH OF SUMMARY TABLE         32D03800
0653 0 0000          FRNSK DC      *-*        FIRST RANDOM SK ISSUED          32D03810
0654 0 0000          PRNSK DC      *-*        LAST RANDOM SEEK ISSUED         32D03820
0655 0 0000          FRN1  DC      *-*        FIRST RANDOM # RTN 9            32D03830
0656 0 0000          LRN1  DC      *-*        LAST RANDOM #  RTN 9            32D03840
0657 0 0000          FRN2  DC      *-*        FIRST RANDOM # RTN 10           32D03850
0658 0 0000          LRN2  DC      *-*        LAST RANDOM #  RTN 10           32D03860
0659 0 0000          CNTA  DC      *-*        SEEK RTN-RETRY CTR              32D03870
065A 0 0000          RNDCK DC      *-*        TEMP STORAGE                    32D03880
065B 0 0000          NOCK  DC      *-*        BYPASS RD CKS IF NON 0          32D03890
065C 0 0000          LNGTH DC      *-*        RECORD LENGTH STORAGE           32D03900
065D 0 0000          INDEX DC      *-*        INDEX POINTER                   32D03910
065E 0 0000          ERCT  DC      *-*        CMP RTN ERROR CTR               32D03920
065F 0 0000                DC      *-*        TEMP STORAGE CMP RTN    EVEN    32D03930
0660 0 0000          S#B   DC      *-*        *                               32D03940
0661 0 0000                DC      *-*        *                               32D03950
0662 0 0000          IDS#B DC      *-*        PRESENT SECT/CYL ID     ODD     32D03960
0663 0 0000          LPRNT DC      *-*        LAST WORD PRINTED               32D03970
0664 0 0000          RTCNT DC      *-*        RETRY COUNTER                   32D03980
0665 0 0000          WRRTY DC      *-*        RETRY COUNTER                   32D03990
0666 0 0000          ZCNT  DC      *-*        DELAY COUNT                     32D04000
0667 0 0000          RTNER DC      *-*        RTN ERROR COUNTER               32D04010
0668 0 0000          CMPTM DC      *-*        TEMP STORAGE                    32D04020
0669 0 007B          K123  DC      123        DECIMAL CONSTANT                32D04030
066A 0 1510          TLP13 DC      5392       RTN 13 LOOP TIME (NSEC)         32D04040
066B 0 0014          KLP13 DC      LP13       AVERAGING CONSTANT RTN 13       32D04050
066C 0 0000 0001     TIMCN DEC     1          LOOP ADDEND RTN 13      EVEN    32D04060
066E 0 0000          TIMSL DC      *-*        RTN 13 LOOP (NSEC)              32D04070
                     *                                                        32D04080
066F 0 019A          ADIL2 DC      IL2        INTERRUPT ADDRESS               32D04090
```

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0670 1 05F8          ADINT DC      INTR      ADDRESS OF INTERRUPT RTN   32D04100
0671 1 0AB6          ADIN2 DC      INT2      INTRPT ADRS TIME RTN       32D04110
0672 1 069C          ADCMA DC      COMA      ADRS OF COMA               32D04120
0673 1 083C          ADPCN DC      PRECN     ADRS PRE CNTL RTN          32D04130
0674 0 0000          CKLK  DC      *-*       ENTRY TO CK LOCK OPTION    32D04140
0675 1 4C00 0CDD            BSC  L  CKLKE     * RTN                      32D04150
                     *                                                  32D04160
0677 0 0000          CKPRT DC      *-*       CHECK PRINT-ALL-ERRORS OPT 32D04170
0678 1 4C00 0CEB            BSC  L  CKPRE     ENTRY POINT                32D04180
                     *                                                  32D04190
067A 0 0000          CNTLE DC      *-*       BRANCH TO CONTROL          32D04200
067B 1 4C00 088A            BSC  L  CNTL      * ROUTINE                  32D04210
                     *                                                  32D04220
067D 0 0000          COUNT DC      *-*       ENTRY TO INCR SUMMARY      32D04230
067E 1 4C00 0D34            BSC  L  COUNE     * COUNT RTN                32D04240
                     *                                                  32D04250
0680 0 0000          READ  DC      *-*       ENTRY TO DISK READ         32D04260
0681 1 4C00 08C1            BSC  L  RDEN      * RTN                      32D04270
                     *                                                  32D04280
0683 0 0000          RNDOM DC      *-*       ENTRY TO GENERATE          32D04290
0684 1 4C00 0CD7            BSC  L  RNDME     * RANDOM NUMBER RTN        32D04300
                     *                                                  32D04310
0686 0 0000          SETV  DC      *-*       ENTRY TO SET I/O AREA      32D04320
0687 1 4C00 0CF5            BSC  L  SETVE     * RTN                      32D04330
                     *                                                  32D04340
0689 0 0000          STMLS DC      *-*       ENTRY TO SAVE INDEXING     32D04350
068A 1 4C00 0B06            BSC  L  STMLE     * AND EXIT TO MONITOR      32D04360
                     *                                                  32D04370
068C 0 0000          STMSG DC      *-*       ENTRY TO SET UP AND        32D04380
068D 1 4C00 0D3D            BSC  L  STMSE     * PRINT A MESSAGE          32D04390
                     *                                                  32D04400
068F 0 0000          TEXIT DC      *-*       ENTRY OF CALL              32D04410
0690 1 4C00 0CFE            BSC  L  DFTXT     TO TERMINATE DFT           32D04420
                     *                                                  32D04430
0692 0 0000          VERFY DC      *-*       ENTRY TO SEEK A CYL AND    32D04440
0693 1 4C00 0B15            BSC  L  VRFYE     * VERIFY THE SEEK          32D04450
                     *                                                  32D04460
0695 0 0000          WRITE DC      *-*       ENTRY TO WRITE DATA        32D04470
0696 1 4C00 0CAB            BSC  L  WRTEN     * ON THE DISK              32D04480
                     *                                                  32D04490
0698 0 0000          XEQ   DC      *-*       ENTRY TO EXECUTE AN        32D04500
0699 1 4C00 0ACF            BSC  L  XEQE      * XIO INSTRUCTION          32D04510
                     *                                                  32D04520
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D04530
                     *                                                  32D04540
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D04550
                     *-------------------------------------------------- 32D04560
                     *                                                  32D04570
069C   0176          COMA  BSS  E  374       THIS SETS 'BDCYL' EVEN     32D04580
080A 0               BDCYL EQU     COMA+366  USED IN VERFY ONLY         32D04590
                     *                                                  32D04600
                     *-------------------------------------------------- 32D04610
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D04620
                     *                                                  32D04630
                     *              INITIALIZATION ROUTINE              32D04640
                     *                                                  32D04650
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D04660
                     *                                                  32D04670
                     *        CLEAR SUMMARY TABLE                       32D04680
                     *                                                  32D04690
0812 0 630C          ZIPA  LDX    3 SMLNG    LENGTH OF SUMMARY TABLE    32D04700
0813 0 1010                SLA      16       CLEAR A REGISTER           32D04710
0814 1 D700 0646     ZIPL  STO  L3 SUMRY-1   CLEAR SUMMARY TABLE        32D04720
0816 0 73FF                MDX    3 -1       DECR POINTER               32D04730
0817 0 70FC                B        ZIPL     LOOP                       32D04740
                     *                                                  32D04750
0818 1 6600 065C           LDX  L2 TB         SET UP TABLE POINTER       32D04760
081A 0 C285                LD     2 SW2-TB    GET SW FNC TWO             32D04770
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081B 0 100C                SLA      12       CLEAR BITS 0-11            32D04780
081C 0 180C                SRA      12        **                        32D04790
081D 0 6310                LDX    3 16        SET INITIAL COUNT          32D04800
081E 0 1340                SLCA   3 0         CREATE DRIVE NUMBER        32D04810
081F 1 C700 05E9           LD   L3 DVAS       GET CORRECT AREA CODE      32D04820
0821 0 D298                STO    2 DVA-TB    SET IN DEV. AREA CODE      32D04830
0822 1 6F00 0626           STX  L3 FILE#      FOR PRINTOUTS              32D04840
0824 0 C213                LD     2 ADIL2-TB  GET ADDRESS OF IL2         32D04850
0825 0 92CA                S      2 FILE#-TB  CREATE INTERRUPT ENTRY     32D04860
0826 1 D400 0AD1           STO  L XEQA+1      SET FOR XIO RTN            32D04870
                     *                                                  32D04880
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D04890
                     *                                                  32D04900
                     *                LOOP PROGRAM ENTRY                32D04910
                     *                                                  32D04920
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D04930
0828 1 6600 065C     ZLPA  LDX  L2 TB           POINTER TO TABLE           32D04940
082A 0 C283                LD     2 SWO-TB    GET FNC SW 00              32D04950
0828 1 4C04 0839           BOD      ZLPB      BRANCH # BIT 15 SET        32D04960
082D 0 C217                LD     2 ADPCN-TB  GET ADDRESS OF PRE-CONTROL 32D04970
082E 0 D28A                STO    2 MLSCF+1-TB SET IN MLSCF              32D04980
082F 0 D282                STO    2 RAD-TB    SET FOR MESSAGES AND ERROR 32D04990
0830 0 D240                STO    2 COMA-TB   MAKE COMA NON-ZERO FOR XEQ 32D05000
                     *                                                  32D05010
0831 0 1010                SLA      16        CLEAR REGISTER             32D05020
0832 0 D281                STO    2 RID-TB    CLEAR RID                  32D05030
0833 0 D2F6                STO    2 PRSW-TB   CLEAR NO-PRINT SWITCH      32D05040
                     *                                                  32D05050
                     *        CREATE IOCC'S FOR SENSE DEVICE            32D05060
                     *                                                  32D05070
0834 0 C29B                LD     2 DVA-TB    GET AREA CODE OF SEL. DEV. 32D05080
0835 0 EA87                OR     2 SNRES-TB  COBINE WITH SNS IOCC       32D05090
0836 0 D28F                STO    2 SNXIO+1-TB SET FOR SENSING           32D05100
0837 0 EADA                OR     2 K1-TB     SET RESET MODIFIER BIT     32D05110
0838 0 D28B                STO    2 ZSNS+1-TB SET FOR INTRPT SNS         32D05120
0839 0 4480 0161     ZLPB  BSI  I  START       GO TO MONITOR              32D05130
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D05140
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D05150
                     *                                                  32D05160
                     *     PRE-CONTROL ROUTINE                          32D05170
                     *                                                  32D05180
                     *          THIS 'ROUTINE' TESTS FOR SEQUENTIAL     32D05190
                     *          SECTOR COUNTS IN THE DSW,  ISSUES A SEEK 32D05200
                     *          TOWARD HOME OF 202 CYLINDERS TO ASSURE  32D05210
                     *          THAT THE ARM IS HOME AFTER WHICH THE    32D05220
                     *          HOME BIT (BIT 4) IS TESTED FOR ON.      32D05230
                     *                                                  32D05240
                     *          CALLS ON THE 'VERFY' ROUTINE TO MAKE    32D05250
                     *          SURE THE ARM IS AT HOME.                32D05260
                     *                                                  32D05270
                     *          READS THE CE HISTORY TRACK ON CYLINDER  32D05280
                     *          199 SECTOR 6 AND SETS UP THE BAD CYL-   32D05290
                     *          INDER TABLE.                            32D05300
                     *                                                  32D05310
                     *                                                  32D05320
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D05330
                     *                                                  32D05340
083B 0 CEDC          HCEDC DC       /CEDC      CE DISK PACK               32D05350
                     *                                                  32D05360
083C 1 6600 065C     PRECN LDX  L2 TB           IX2 = TABLE POINTER        32D05370
083E 0 4230                BSI    2 STMSG-TB  PRINT '2310 DFT START'     32D05380
083F 0 5A00                DC       /5A00     FORM/MESSAGE ID            32D05390
0840 0 C2B0                LD     2 XSKBK-TB  GET SEEK-TOWARD-HOME IOCC  32D05400
0841 0 1890                SRT      16        PUT IN Q REGISTER          32D05410
0842 0 D2D2                STO    2 PCYL#-TB  SET CYL POINTER            32D05420
0843 0 C2E6                LD     2 K203-TB   SEEK OUT 203 CYLINDERS     32D05430
0844 0 DABC                STD    2 ZXIO-TB   SET FOR XEQ RTN            32D05440
0845 0 423C                BSI    2 XEQ-TB    EXECUTE IOCC IN ZXIO       32D05450
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0846 0 6132            LDX   1 50        LOOP COUNTER                    32D05460
0847 0 1010      PRECA SLA     16        CLEAR A REG.                    32D05470
0848 0 D240            STO   2 COMA-TB   SET FLAG FOR NOT EXECUTE        32D05480
0849 0 423C            BSI   2 XEQ-TB    GO TO CHECK FOR READY           32D05490
084A 0 63FC            LDX   3 -4        SET COUNTER AND SECTORS         32D05500
084B 0 402E      PRECB BSI     PRECJ      GO WAIT FOR SECTOR              32D05510
084C 0 C02C            LD      PRECT     GET SECTOR JUST TESTED          32D05520
084D 0 E2DC            AND   2 K3-TB     *                               32D05530
084E 0 100C            SLA     12        SAVE HEX DIGIT IN Q REG.        32D05540
084F 0 18DC            RTE     28        *                               32D05550
0850 0 7301            MDX   3 1         COUNT NUMBER SECTORS            32D05560
0851 0 70F9            B       PRECB     LOOP                            32D05570
                       *                                                 32D05580
0852 0 1090            SLT     16        GET FOUR SECTORS                32D05590
0853 0 D2CC            STO   2 MOD3-TB   SAVE IN CASE PRINT             32D05600
0854 0 F283            EOR   2 MASK-TB   TEST FOR /0123                  32D05610
0855 1 4C18 085A       BZ      PRECD                                     32D05620
0857 0 4230            BSI   2 STMSG-TB  ELSE PRINT ERROR MESSAGE        32D05630
0858 0 9E13            DC      /9E13     SECTOR COUNTER BAD              32D05640
0859 0 4233            BSI   2 TEXIT-TB  TERMINATE DFT                   32D05650
085A 0 71FF      PRECD MDX     1 -1      LOOP COUNT DECREMENTED          32D05660
085B 0 70EB            B       PRECA     LOOP                            32D05670
                       *                                                 32D05680
                       *     LOOP IS FINISHED                            32D05690
                       *                                                 32D05700
085C 0 4236      PRECE BSI   2 VERFY-TB  GO VERIFY ARM AT HOME            32D05710
085D 0 0000            DC      0         CYLINDER ZERO                   32D05720
085E 1 0CFE            DC      DFTXT     ERROR RETURN ADDRESS            32D05730
085F 0 4236            BSI   2 VERFY-TB  GO TO CYLINDER 199              32D05740
0860 0 00C7            DC      199       * CE HISTORY TRACK              32D05750
0861 1 0CFE            DC      DFTXT     ERROR RETURN ADDRESS            32D05760
                       *                                                 32D05770
0862 0 C2DC            LD    2 K3-TB     GET 3                           32D05780
0863 1 4400 8680       BSI   L READ+/8000 READ SECTOR 3                  32D05790
0865 0 001B            DC      27        READ 27 WORDS                   32D05800
                       *                                                 32D05810
0866 0 C242            LD    2 COMA+2-TB GET WORD 2                      32D05820
0867 0 F0D3            EOR     HCEDC     CMP WITH S/B                    32D05830
0868 1 4C18 086D       BZ      PRECG     BRANCH IF OK                    32D05840
086A 0 4230            BSI   2 STMSG-TB  ELSE PRINT MESSAGE              32D05850
086B 0 5A01            DC      /5A01     NOT INITIALIZED DISK            32D05860
086C 0 4233            BSI   2 TEXIT-TB  TERMINATE DFT                   32D05870
086D 1 6780 069F PRECG LDX   I3 COMA&3   NO BAD SECTORS-NOT CYLS         32D05880
086F 1 6500 05F0       LDX   L1 BADCY    ADRS OF BAD CYL TABLE           32D05890
                       *                                                 32D05900
0871 1 C700 069E PRECF LD    L3 COMA&2   GET BAD SECTOR NO.              32D05910
0873 0 1883            SRT     3         RIGHT JUSTIFY                   32D05920
0874 0 D100            STO   1 0         STORE IN BAD CYL TABLE          32D05930
0875 0 7101            MDX   1 1         INCR POINTER                    32D05940
0876 0 73F8            MDX   3 -8        DECR SECTOR COUNTER             32D05950
0877 0 70F9            B       PRECF     LOOP                            32D05960
0878 0 7011            MDX     CNTL      GO TO CONTROL ROUTINE           32D05970
                       *                                                 32D05980
                       *                                                 32D05990
                       *                                                 32D06000
                       *     WAITS FOR SECTOR COUNT IN DSW               32D06010
                       *     SECTOR COUNT IS LOW ORDER TWO BITS OF       32D06020
                       *       INDEX REGISTER THREE                      32D06030
                       *                                                 32D06040
0879 0 0000      PRECT DC        0       TEMPORARY STORAGE               32D06050
                       *                                                 32D06060
087A 0 0000      PRECJ DC        *-*     SUBROUTINE ENTRY POINT          32D06070
087B 0 6BFD            STX   3 PRECT     SAVE SECTOR COUNT WORD          32D06080
087C 0 C2EA            LD    2 K10TH-TB  SET TIMEOUT COUNTER             32D06090
087D 0 D20A            STO   2 ZCNT-TB   SAVE TIMEOUT COUNT              32D06100
087E 0 0ABE      PRECL XIO     2 SNXIO-TB  SENSE DSW                     32D06110
087F 0 D2CB            STO   2 TBDSW-TB  SET IN CASE PRINT               32D06120
0880 0 F0F8            ECR     PRECT     LOOK FOR SAME SECTOR            32D06130
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0881 0 E2DC            AND   2 K3-TB     * COUNTS AS IN IX3              32D06140
0882 1 4C98 087A PRECM BZ    I PRECJ                                     32D06150
0884 1 74FF 0666       MDX   L ZCNT,-1   ELSE COUNT TIME                32D06160
0886 0 70F7            MDX     PRECL     LOOP IF NOT TIMEOUT             32D06170
0887 0 1010            SLA     16        CLEAR A REGISTER                32D06180
0888 0 D0F0            STO     PRECT     SET SECTOR TO ZERO              32D06190
0889 0 70F8            B       PRECM     RETURN                          32D06200
                       *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D06210
                       *                                                 32D06220
                       *                CONTROL ROUTINE                  32D06230
                       *                                                 32D06240
                       *     THIS ROUTINE SELECTS A TEST ROUTINE AND     32D06250
                       *     BRANCHES CONTROL TO IT.                     32D06260
                       *                                                 32D06270
                       *     WHEN ALL ROUTINES ARE COMPLETE THIS ROUTINE 32D06280
                       *     BRANCHES TO MONITOR END ROUTINE.            32D06290
                       *                                                 32D06300
                       *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D06310
0032 0           LPCNT EQU     50        ROUTINE LOOP COUNT              32D06320
088A 1 6600 065C CNTL  LDX   L2 TB        IX2 = TABLE ADDRESS             32D06330
088C 0 C283            LD    2 SW0-TB    GET SW FNC 0                    32D06340
088D 1 4C04 0CFE       BOD     DFTXT     BRANCH # TERM OFT SW ON         32D06350
088F 0 C284            LD    2 SW1-TB    GET SW FNC 1                    32D06360
0890 1 4C20 08A7       BNZ     CNTLD     BRANCH IF NO RTN SELECTED       32D06370
                       *                                                 32D06380
0892 0 C281            LD    2 RID-TB    GET RTN ID                      32D06390
0893 0 82DA            A     2 K1-TB     ADD 1                           32D06400
0894 0 D281            STO   2 RID-TB    SAVE                            32D06410
0895 0 9018            S       RTTBL     CK FOR VALID                    32D06420
0896 1 4C10 0D03       BNN     PRSUM     BRANCH IF COMPLETE              32D06430
                       *                                                 32D06440
0898 1 6580 05DD CNTLB LDX   I1 RID       IX EQUAL RTN ID                 32D06450
089A 1 C500 08AE       LD    L1 RTTBL    GET RTN ADRS                    32D06460
                       *                                                 32D06470
089C 0 D282            STO   2 RAD-TB    SAVE RTN ADRS                   32D06480
089D 0 6132            LDX   1 LPCNT     SET LOOP COUNT                  32D06490
089E 0 1010            SLA     16        CLEAR ROUTINE ERROR SW          32D06500
089F 0 D20B            STO   2 RTNER-TB  *                               32D06510
08A0 1 4C80 05DE       B     I RAD       BRANCH TO TEST RTN              32D06520
                       *                                                 32D06530
                       *     LOOP ON ERROR RETURN                        32D06540
                       *                                                 32D06550
08A2 1 6600 065C PRLP  LDX   L2 TB        LOAD XR 2 WITH TABLE ADRS       32D06560
08A4 0 C281            LD    2 RID-TB    GET PRESENT RTN NUMBER          32D06570
08A5 1 4C18 083C       BZ      PRECN     IF ZERO, GO TO PRE-CONTROL      32D06580
08A7 0 D281      CNTLD STO   2 RID-TB    SET IN RTN ID                   32D06590
08A8 0 9013            S       SPRTN                                     32D06600
08A9 1 4C28 0898       BN      CNTLB     BRANCH IF SPECIAL RTN           32D06610
08AB 0 4230            BSI   2 STMSG-TB  ELSE PRINT MESSAGE              32D06620
08AC 0 5A02            DC      /5A02     INVALID RTN SELECTED            32D06630
08AD 0 4233            BSI   2 TEXIT-TB  TERMINATE DFT                   32D06640
                       *                                                 32D06650
                       *              ROUTINE ADDRESS TABLE              32D06660
                       *                                                 32D06670
08AE 0 000D      RTTBL DC        LRTN-RTTBL  LENGTH OF RTN ADRS TABLE    32D06680
08AF 1 08BD            DC      RTN1      ADDRESS OF TEST ROUTINE 1       32D06690
08B0 1 08F1            DC      RTN2                              2       32D06700
08B1 1 0914            DC      RTN3                              3       32D06710
08B2 1 0925            DC      RTN4                              4       32D06720
08B3 1 092C            DC      RTN5                              5       32D06730
08B4 1 0932            DC      RTN6                              6       32D06740
08B5 1 0934            DC      RTN7                              7       32D06750
08B6 1 0963            DC      RTN8                              8       32D06760
08B7 1 098B            DC      RTN9                              9       32D06770
08B8 1 0991            DC      RTN10                             10      32D06780
08B9 1 09D4            DC      RTN11                             11      32D06790
08BA 1 09EA            DC      RTN12                             12      32D06800
08BB 0           LRTN  EQU     *         END OF RTN TABLE                32D06810
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                        *     SPECIAL RTN TABLE                                  32D06820
08BB 1 0A44                   DC    RTN13                                 13     32D06830
08BC 0 000E             SPRTN DC    SPRTN-RTTBL                                  32D06840
                        *-------------------------------------------------------- 32D06850
                        *-------------------------------------------------------- 32D06860
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D06870
                        *                                                        32D06880
                        *                  TEST ROUTINE ONE                      32D06890
                        *                                                        32D06900
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D06910
                        *                                                        32D06920
08BD 0 6114             RTN1  LDX   1 20          LOOP COUNTER                   32D06930
08BE 0 4236                   BSI   2 VERFY-TB    SEEK CYLINDER ZERO             32D06940
08BF 0 0000                   DC    0             CYLINDER NUMBER                32D06950
08C0 1 08C1                   DC    RTN1A         ERROR RETURN ADDRESS           32D06960
                        *                                                        32D06970
08C1 0 6922             RTN1A STX   1 RTN1E+1     SAVE ROUTINE LOOP COUNTER      32D06980
08C2 0 C2DA                   LD    2 K1-TB       INITIAL WORD COUNT             32D06990
08C3 0 D006                   STO     WDCNT       SET FOR CALL ON READ RTN       32D07000
                        *                                                        32D07010
08C4 0 61F8             RTN1B LDX   1 -8          READ EIGHT SECTORS             32D07020
                        *                                                        32D07030
08C5 0 6922             RTN1C STX   1 SCTOR       SET FOR MASK                   32D07040
08C6 0 C021                   LD      SCTOR       GET PRESENT SECTOR             32D07050
08C7 0 E2DE                   AND   2 K7-TB       SAVE BITS 13-15                32D07060
08C8 1 4400 8680              BSI L   READ+/8000  READ WITHOUT CHECKING DATA     32D07070
08CA 0 0001             WDCNT DC      1           WORD COUNT                     32D07080
08CB 0 C28A                   LD    2 ZSNS-TB     GET INTERRUPT DSW              32D07090
08CC 1 4C28 08D0              BN      RTN1D       BRANCH IF ERROR INDICATED      32D07100
08CE 0 7101                   MDX   1 1          ELSE READ NEXT SECTOR          32D07110
08CF 0 70F5                   B       RTN1C       LOOP                           32D07120
                        *                                                        32D07130
08D0 1 C500 08F0        RTN1D LD    L1 STORG+7    GET DATA LAST READ             32D07140
08D2 0 D20C                   STO   2 CMPTM-TB    SET FOR COMPARE                32D07150
08D3 1 4400 0C21              BSI L   CMP         GO COMPARE                     32D07160
08D5 0 1000                   NOP     0           ERROR RETURN                   32D07170
08D6 0 C0F3                   LD      WDCNT       GET LAST WORD COUNT            32D07180
08D7 0 1001                   SLA     1           DOUBLE WORD COUNT              32D07190
08D8 0 D0F1                   STO     WDCNT       SET FOR NEXT READ              32D07200
08D9 0 1006                   SLA     6           TEST FOR GREATER THAN 256      32D07210
08DA 1 4C30 08C4              BP      RTN1B       BRANCH IF NOT                  32D07220
08DC 0 1001                   SLA     1           SHIFT LEFT                     32D07230
08DD 1 4C30 08E3              BP      RTN1E       BRANCH IF WORD CNT = 321       32D07240
08DF 0 6700 0141              LDX   L3 321        ELSE SET MAX WORD COUNT        32D07250
08E1 0 68E8                   STX   3 WDCNT       SET FOR CALL                   32D07260
08E2 0 70E1                   B       RTN1B       GO DO IT                       32D07270
                        *                                                        32D07280
08E3 0 6500 0000        RTN1E LDX   L1 *-*        GET RTN LOOP COUNTER           32D07290
08E5 0 71FF                   MDX     1 -1        DECREMENT COUNT                32D07300
08E6 0 70DA                   B       RTN1A       LOOP                           32D07310
08E7 0 421E                   BSI   2 CNTLE-TB    TERMINATE RTN                  32D07320
                        *                                                        32D07330
08E8 0 FFF8             SCTOR DC      -8          SECTOR POINTER                 32D07340
                        *                                                        32D07350
08E9 0 1313             STORG DC      /1313       SEQUENTIAL SECTOR DATA         32D07360
08EA 0 E5E5                   DC      /E5E5       *                              32D07370
08EB 0 1313                   DC      /1313       *                              32D07380
08EC 0 E5E5                   DC      /E5E5       *                              32D07390
08ED 0 E5E5                   DC      /E5E5       *                              32D07400
08EE 0 1313                   DC      /1313       *                              32D07410
08EF 0 E5E5                   DC      /E5E5       *                              32D07420
08F0 0 1313                   DC      /1313       *                              32D07430
                        *                                                        32D07440
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D07450
                        *                                                        32D07460
                        *                  TEST ROUTINE TWO                      32D07470
                        *                                                        32D07480
                        *     THIS ROUTINE WILL SEEK 2 IN AND 1 OUT FROM         32D07490
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                        *     CYLINDER ZERO TO CYLINDER 202 EXCEPT               32D07500
                        *     CYLINDERS 90-110.  THE ROUTINE WILL THEN           32D07510
                        *     SEEK 2 OUT AND 1 IN FROM CYLINDER 202 TO           32D07520
                        *     CYLINDER ZERO.  EACH SEEK IS VERFIED FOR           32D07530
                        *     PROPER CYLINDER REACHED.                           32D07540
                        *                                                        32D07550
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D07560
08F1 0 63FF             RTN2  LDX   3 -1          DECR SEEKS BY ONE              32D07570
08F2 0 6B1F                   STX   3 INCR1       *                              32D07580
08F3 0 6302                   LDX   3 2           INCR SEEKS BY TWO              32D07590
08F4 0 6B1E                   STX   3 INCR2       *                              32D07600
08F5 0 C2DA                   LD    2 K1-TB       FIRST CYL. WILL BE HOME        32D07610
08F6 0 4007                   BSI     RTN2P       EXECUTE SUCCESSIVE SEEKS       32D07620
                        *                                                        32D07630
08F7 0 63FE                   LDX   3 -2          DECR SEEKS BY TWO              32D07640
08F8 0 6B19                   STX   3 INCR1       *                              32D07650
08F9 0 6301                   LDX   3 1           INCR SEEKS BY ONE              32D07660
08FA 0 6B18                   STX   3 INCR2       *                              32D07670
08FB 0 C2E6                   LD    2 K203-TB     INI. CYL. + 1                  32D07680
08FC 0 4001                   BSI     RTN2P       EXECUTE SUCCESSIVE SEEKS       32D07690
08FD 0 421E                   BSI   2 CNTLE-TB    EXIT ROUTINE                   32D07700
                        *                                                        32D07710
08FE 0 0000             RTN2P DC      *-*         ENTRY POINT                    32D07720
08FF 0 D00C                   STO     RTN2T       STOR FOR CALL                  32D07730
0900 0 6500 00CA              LDX   L1 202        NO. IF SEEKS                   32D07740
                        *                                                        32D07750
0902 0 C009             RTN2Q LD      RTN2T       GET CYL. NO.                   32D07760
0903 0 800E                   A       INCR1       INCR OR DECR                   32D07770
0904 0 D001                   STO     RTN2R       STORE FOR SEEK                 32D07780
0905 0 4236                   BSI   2 VERFY-TB    SEEK CYL. AND VERIFY           32D07790
0906 0 0000             RTN2R DC      *-*         CYLINDER NO.                   32D07800
0907 1 0908                   DC      RTN2S       ADRS ERROR RETURN              32D07810
0908 0 C0FD             RTN2S LD      RTN2R       GET LAST CYL. NO.              32D07820
0909 0 8009                   A       INCR2       INCR OR DECR                   32D07830
090A 0 D001                   STO     RTN2T       STORE FOR SEEK                 32D07840
090B 0 4236                   BSI   2 VERFY-TB    CALL VERFY ROUTINE             32D07850
090C 0 0000             RTN2T DC      *-*         CYLINDER DESIRED               32D07860
090D 1 090E                   DC      RTN2U       INVALID ADRS RETURN            32D07870
090E 0 71FF             RTN2U MDX     1 -1        DECR COUNTER                   32D07880
090F 0 70F2                   B       RTN2Q       NOT FINISHED                   32D07890
0910 1 4C80 08FE              B     I RTN2P       RETURN                         32D07900
                        *                                                        32D07910
0912 0 0000             INCR1 DC      0                                          32D07920
0913 0 0000             INCR2 DC      0                                          32D07930
                        *-------------------------------------------------------- 32D07940
                        *-------------------------------------------------------- 32D07950
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D07960
                        *                                                        32D07970
                        *                  TEST ROUTINE THREE                    32D07980
                        *                                                        32D07990
                        *     THIS ROUTINE WILL ISSUE AND VERFY 100 RANDOM       32D08000
                        *     SEEKS.  CYLINDERS 90-110 WILL NEVER BE             32D08010
                        *     ATTEMPTED.                                         32D08020
                        *                                                        32D08030
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D08040
0914 0 7132             RTN3  MDX     1 100-LPCNT 100 LOOPS                    32D08050
0915 0 C292                   LD    2 RNDSK-TB    GET RNDM SEEK SWITCH           32D08060
0916 0 4818                   SKP     +-          USE AS FIRST IF NOT ZERO       32D08070
0917 0 C2F8                   LD    2 PRNSK-TB    ELSE USE LAST GENERATED        32D08080
0918 0 D2F7                   STO   2 FRNSK-TB    FIRST RANDOM NUMBER            32D08090
0919 0 7002                   B       RTN3B       *                              32D08100
                        *                                                        32D08110
091A 0 C2F8             RTN3A LD      2 PRNSK-TB    GET LAST RNDM NUMBER           32D08120
091B 0 4227                   BSI   2 RNDOM-TB    GENERATE NEXT                  32D08130
                        *                                                        32D08140
091C 0 D2F8             RTN3B STO     2 PRNSK-TB    SAVE                           32D08150
091D 0 1808                   SRA     8           *  FROM 0-202                  32D08160
091E 0 D001                   STO     RTN3C       STORE FOR SEEK                 32D08170
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091F 0 4236                *
0920 0 0000                      BSI   2 VERFY-TB   SEEK AND VERIFY CYL.          32D08180
0921 1 091A                RTN3C DC      *-*        CYL. DESIRED                  32D08190
0922 0 71FF                      DC      RTN3A      IF INVALID, DON'T COUNT       32D08200
0923 0 70F6                      MDX   1 -1         ELSE COUNT                    32D08210
0924 0 421E                      B       RTN3A      LOOP                          32D08220
                                 BSI   2 CNTLE-TB   END OF RTN                    32D08230
                           *                                                      32D08240
                           *-------------------------------------------------     32D08250
                           *-------------------------------------------------     32D08260
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08270
                           *                                                      32D08280
                           *                                                      32D08290
                           *                TEST ROUTINE FOUR                     32D08300
                           *             READ AND CHECK 320 WORDS OF              32D08310
                           *             HEX 1313 FROM CYL 1-SECTOR 0             32D08320
                           *                                                      32D08330
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08340
0925 0 6301                RTN4  LDX   3 1            IX EQUAL CYL                32D08350
0926 0 6100                      LDX   1 0            IX EQUAL WRITE SW           32D08360
0927 0 C2B2                CMN2  LD    2 H1313-TB     GET DATA EXPECTED           32D08370
0928 0 6200                      LDX   2 0            IX EQUAL SECTOR             32D08380
0929 0 69F6                CMN1  STX   1 RTN3C        SET RTN VALUES              32D08390
092A 0 6132                      LDX   1 LPCNT        IX EQUAL LOOP CTR           32D08400
092B 0 700B                      B       CMRT2        BRANCH TO COMMON RTN        32D08410
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08420
                           *                                                      32D08430
                           *                TEST ROUTINE FIVE                     32D08440
                           *             READ AND CHECK 320 WORDS OF              32D08450
                           *             HEX E5E5 FROM CYL 201-SECTOR 6           32D08460
                           *                                                      32D08470
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08480
092C 0 6700 00C9           RTN5  LDX   L3 201          IX EQUAL CYL               32D08490
092E 0 6100                      LDX   1 0            IX EQUAL WRT SW             32D08500
092F 0 C2C4                CMN3  LD    2 HE5E5-TB     GET DATA EXPECTED           32D08510
0930 0 6206                      LDX   2 6            IX EQUAL SECTOR             32D08520
0931 0 70F7                      MDX     CMN1         BRANCH TO COMPLETE SETUP    32D08530
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08540
                           *                                                      32D08550
                           *                TEST ROUTINE SIX                      32D08560
                           *                WRITE AND READ 320 WORDS              32D08570
                           *                OF HEX 1313 ON CYL 2-SECT             32D08580
                           *                0-CHECK DATA READ                     32D08590
                           *                                                      32D08600
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08610
0932 0 6302                RTN6  LDX   3 2            IX EQUAL CYL               32D08620
0933 0 70F3                      B       CMN2         BRANCH TO COMPLETE SETUP    32D08630
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08640
                           *                                                      32D08650
                           *                TEST ROUTINE SEVEN                    32D08660
                           *                WRITE AND READ 320 WORDS              32D08670
                           *                OF HEX E5E5 ON CYL 202-               32D08680
                           *                SECTOR 6-CHECK DATA READ              32D08690
                           *                                                      32D08700
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08710
0934 0 6700 00CA           RTN7  LDX   L3 202          IX EQUAL CYL               32D08720
0936 0 70F8                      B       CMN3         BRANCH TO COMPLETE SETUP    32D08730
                           *-------------------------------------------------     32D08740
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08750
                           *                                                      32D08760
                           *                THIS ROUTINE IS COMMON TO             32D08770
                           *                TEST ROUTINES 3,4,5,6,AND 7           32D08780
                           *                                                      32D08790
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D08800
                           *                                                      32D08810
0937 0 6807                CMRT2 STX   3 CYL          SET CYLINDER TO USE         32D08820
0938 0 6A75                      STX   2 SECTD        *                           32D08830
0939 0 D00F                      STO     DATA1        SET DATA EXPECTED           32D08840
093A 0 D015                      STO     DATA2        SET DATA EXPECTED           32D08850
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093B 0 D01B                      STO     DATA3        SET DATA EXPECTED           32D08860
093C 1 6600 065C                 LDX   L2 TB          INDEX EQUAL TBL ADRS        32D08870
093E 0 4236                      BSI   2 VERFY-TB     SEEK DESIRED CYL AND        32D08880
093F 0 0000                CYL   DC      *-*          * VERIFY THE SEEK           32D08890
0940 1 088A                      DC      CNTL         EXIT ON ERROR               32D08900
0941 0 C288                CMRTL LD    2 TERM-TB      SET DATA EXPECTED           32D08910
0942 0 D241                      STO   2 COMA+1-TB    SET FOR COMPARE RTN         32D08920
0943 0 C0DC                      LD      RTN3C        IS ROUTINE TO WRITE         32D08930
0944 1 4C18 0952                 BZ      CMRTB        BRANCH TO READ ONLY         32D08940
0946 0 C067                      LD      SECTD        GET SECTOR DESIRED          32D08950
0947 0 4239                      BSI   2 WRITE-TB     GO WRITE DATA               32D08960
0948 0 0141                      DC      321          WORD COUNT                  32D08970
0949 0 0000                DATA1 DC      *-*          DATA EXPECTED               32D08980
094A 1 094B                      DC      CMRTA        ERROR EXIT ADDRESS          32D08990
094B 0 C2DA                CMRTA LD    2 K1-TB        SET SW FOR NO PRINT         32D09000
094C 0 D2F6                      STO   2 PRSW-TB      *                           32D09010
094D 0 C060                      LD      SECTD        GET DESIRED SECTOR          32D09020
094E 0 4224                      BSI   2 READ-TB      GO READ WITHOUT ERR PRINTS  32D09030
094F 0 0141                      DC      321          WORD COUNT                  32D09040
0950 0 0000                DATA2 DC      *-*          EXPECTED DATA               32D09050
0951 1 095C                      DC      CMRTG        ERROR ADDRESS               32D09060
                           *                                                      32D09070
0952 0 1010                CMRTB SLA     16           CLEAR NO-PRINT SWITCH       32D09080
0953 0 D2F6                      STO   2 PRSW-TB      *                           32D09090
0954 0 C059                      LD      SECTD        GET DESIRED SECTOR          32D09100
0955 0 4224                      BSI   2 READ-TB      GO READ DATA                32D09110
0956 0 0141                      DC      321          WORD COUNT                  32D09120
0957 0 0000                DATA3 DC      *-*          EXPECTED DATA               32D09130
0958 1 0959                      DC      CMRTD        CMP ERROR ADDRESS           32D09140
                           *                                                      32D09150
0959 0 71FF                CMRTD MDX   1 -1           DECREMENT LOOP COUNT        32D09160
095A 0 70E6                      MDX     CMRTL        LOOP ROUTINE                32D09170
095B 0 421E                      BSI   2 CNTLE-TB     EXIT ROUTINE                32D09180
                           *                                                      32D09190
095C 0 1010                CMRTG SLA     16           CLEAR NO-PRINT SWITCH       32D09200
095D 0 D2F6                      STO   2 PRSW-TB      *                           32D09210
095E 0 6309                      LDX   3 HRDWR-SUMRY  COUNT WRITE ERROR           32D09220
095F 0 4221                      BSI   2 COUNT-TB     COUNT ERROR                 32D09230
0960 0 4230                      BSI   2 STMSG-TB     PRINT PROBABLE WRITE ERROR  32D09240
0961 0 5E0C                      DC      /5E0C        PROBABLE WRITE ERRRO        32D09250
0962 0 70EF                      MDX     CMRTB        GIVE PRINTOUTS OF ERRORS    32D09260
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D09270
                           *                                                      32D09280
                           *                TEST ROUTINE EIGHT-                   32D09290
                           *                READ CYL 1-SECT 0 USING               32D09300
                           *                READ CK-CK FOR ANY DSW                32D09310
                           *                ERRORS AND CK THAT NO                 32D09320
                           *                DATA IS TRANSFERRED TO                32D09330
                           *                MEMORY.                               32D09340
                           *                                                      32D09350
                           *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<     32D09360
0963 0 4236                RTN8  BSI   2 VERFY-TB     SEEK CYL 1 - VERIFY         32D09370
0964 C 0001                      DC      1            * THE SEEK                  32D09380
0965 1 088A                      DC      CNTL         EXIT IF ERROR               32D09390
0966 0 10A0                      SLT     32           CLEAR AQ                    32D09400
0967 0 DAD4                      STD   2 ERSK1-TB     CLEAR ERROR COUNTERS        32D09410
                           *                *  ERSK1 & CNTB                       32D09420
                           *                                                      32D09430
0968 0 C2D3                RTN8L LD    2 NCYL#-TB     GET CYL. SOUGHT             32D09440
0969 0 1003                      SLA     3            CREATE PROPER SECTOR ID     32D09450
096A 0 D241                      STO   2 COMA+1-TB    SET IN I/O AREA             32D09460
096B 0 C2B6                      LD    2 RDCHK-TB     SET READ CK MODIFIER        32D09470
096C 0 4224                      BSI   2 READ-TB      READ ROUTINE                32D09480
096D 0 0141                      DC      321          321 WORDS                   32D09490
096E 0 FFFF                      DC      /FFFF        DATA EXPECTED               32D09500
096F 1 0988                      DC      RTN8J        CMP ERROR RETURN            32D09510
0970 0 C28A                      LD    2 ZSNS-TB      GET INTRPT DSW              32D09520
0971 1 4C10 097A                 BNN     RTN8A        BRANCH ON ERROR             32D09530
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0973 1 7401 0630          MDX  L  ERSK1,1     INCR ERROR CNT                32D09540
0975 0 421B         RTN8M BSI   2 CKPRT-TB    CK PRINT-ALL OPTION           32D09550
0976 0 7001               B       RTN8N       OPTION NOT SET                32D09560
0977 0 7002               B       RTN8A       OPTION SET                    32D09570
0978 0 C2DA         RTN8N LD    2 K1-TB       SET PRINT SW NON-ZERO         32D09580
0979 0 D2F6               STO   2 PRSW-TB                                   32D09590
                          *                                                 32D09600
097A 0 71FF         RTN8A MDX   1 -1          DECR RTN LOOP COUNT           32D09610
097B 0 70EC               MDX     RTN8L       LOOP                          32D09620
097C 0 1010               SLA     16          CLEAR A REG.                  32D09630
097D 0 D2F6               STO   2 PRSW-TB     CLEAR PRINT SWITCH            32D09640
097E 0 CABC               LDD   2 ZXIO-TB     GET IOCC LAST ISSUED          32D09650
097F 0 DACC               STD   2 MOD3-TB     STORE IN CASE PRINT           32D09660
0980 0 C2D5               LD    2 CNTB-TB     GET ERROR COUNT               32D09670
0981 0 D2CE               STO   2 MOD5-TB     SET FOR PRINT                 32D09680
0982 0 82D4               A     2 ERSK1-TB    ADD OTHER ERROR COUNT         32D09690
0983 1 4C18 088A          BZ      CNTL        EXIT ROUTINE IF ZERO          32D09700
0985 0 4230               BSI   2 STMSG-TB    PRINT MESSAGE                 32D09710
0986 0 6E12               DC      /6E12       DATA XFERD IN READ CHECK      32D09720
0987 0 421E               BSI   2 CNTLE-TB    EXIT ROUTINE                  32D09730
                          *                                                 32D09740
                          *                                                 32D09750
0988 1 7401 0631    RTN8J MDX  L  CNTB,1      INCR ERROR COUNT              32D09760
098A 0 70EA               MDX     RTN8M       LOOP                          32D09770
                          *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D09780
                          *                                                 32D09790
                          *                ROUTINE NINE-WRITE 320           32D09800
                          *                RANDOM WORDS-READ AND CK-        32D09810
                          *                ON CYL 2-SECT 0.                 32D09820
                          *                                                 32D09830
                          *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D09840
098B 0 4236         RTN9  BSI   2 VERFY-TB    SEEK CYL 2-VERIFY             32D09850
098C 0 0002               DC      2           * THE SEEK                    32D09860
098D 1 088A               DC      CNTL        TERMINATE ON ERROR            32D09870
098E 0 6300               LDX   3 0           IX EQUAL SECTOR 0             32D09880
098F 0 C2FA               LD    2 LRN1-TB     GET BEGIN PATCH OPTION        32D09890
0990 0 7005               MDX     RT910       BRANCH TO COMMON              32D09900
                          *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D09910
                          *                                                 32D09920
                          *                ROUTINE TEN-WRITE 320            32D09930
                          *                RANDOM WORDS-READ AND CK-        32D09940
                          *                CYL 202-SECT 6.                  32D09950
                          *                                                 32D09960
                          *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D09970
0991 0 4236         RTN10 BSI   2 VERFY-TB    SEEK CYL 202-VERIFY           32D09980
0992 0 00CA               DC      202         * THE SEEK                    32D09990
0993 1 088A               DC      CNTL        TERMINATE ON ERROR            32D10000
0994 0 C2FC               LD    2 LRN2-TB     GET BEGIN PATCH OPTION        32D10010
0995 0 6306               LDX   3 6           IX EQUAL SECTOR 6             32D10020
                          *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D10030
                          *                                                 32D10040
                          *                THIS PORTION COMMON TO           32D10050
                          *                ROUTINES NINE AND TEN.           32D10060
                          *                                                 32D10070
                          *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D10080
0996 0 6817         RT910 STX   3 SECTD       SAVE SECTOR NUMBER            32D10090
0997 0 4820               SKP     Z           SKIP IF ZERO                  32D10100
0998 0 D039               STO     LSTNO       SAVE BEGIN PATCH OPTION       32D10110
0999 0 C293               LD    2 RNDWR-TB    GET START OPTION              32D10120
099A 0 4818               SKP     &-          SKIP IF NON ZERO              32D10130
099B 0 C036               LD      LSTNO       CONTINUE PATTERN              32D10140
099C 0 D036               STO     FSTNO       SET RTN FIRST NUMBER          32D10150
099D 0 C293         RTN9L LD    2 RNDWR-TB    GET START OPTION              32D10160
099E 0 4820               SKP     Z           SKIP IF ZERO                  32D10170
099F 0 D032               STO     LSTNO       SET AS LAST NUMBER            32D10180
                          *                                                 32D10190
09A0 0 6700 FEC0          LDX  L3 -320        NUMBER OF WORDS               32D10200
09A2 0 C02F               LD      LSTNO       GET LAST NUMBER               32D10210
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09A3 0 D011               STO     RTN9C       SET IN READ CALL              32D10220
09A4 0 D017               STO     RTN9E       SET IN READ CALL              32D10230
                          *                                                 32D10240
09A5 1 D700 07DE    RTN9A STO   L3 COMA&322    SET PATTERN                   32D10250
09A7 0 4227               BSI   2 RNDOM-TB    GENERATE NEW NUMBER           32D10260
09A8 0 7301               MDX   3 1           DECR WORD COUNT               32D10270
09A9 0 70FB               MDX     RTN9A       LOOP                          32D10280
09AA 0 D027               STO     LSTNO       SET NEW LAST NUMBER           32D10290
                          *                                                 32D10300
09AB 0 C002               LD      SECTD       GET SECTOR NUMBER             32D10310
09AC 0 4239               BSI   2 WRITE-TB    WRITE DATA                    32D10320
09AD 0 8141               DC      321+/8000   NO. OF WORDS/DON'T PRESET     32D10330
                          *                     * THE I/O AREA              32D10340
09AE 0 0000         SECTD DC      *-*         SECTOR TO USE-0 OR 6          32D10350
09AF 1 09B0               DC      RTN9B       ERROR RETURN                  32D10360
                          *                                                 32D10370
09B0 0 C2DA         RTN9B LD    2 K1-TB       SET NO-PRINT SWITCH           32D10380
09B1 0 D2F6               STO   2 PRSW-TB     *                             32D10390
09B2 0 C0FB               LD      SECTD       GET DESIRED SECTOR            32D10400
09B3 0 4224               BSI   2 READ-TB     READ W/O ERROR PRINTOUTS      32D10410
09B4 0 8141               DC      321+/8000   RANDOM DATA                   32D10420
09B5 0 0000         RTN9C DC      *-*         FIRST DATA WORD EXPECTED      32D10430
09B6 1 09C8               DC      RTN9G       ERROR ADDRESS RETURN          32D10440
                          *                                                 32D10450
09B7 0 1010         RTN9D SLA     16          CLEAR NOPRINT SWITCH          32D10460
09B8 0 D2F6               STO   2 PRSW-TB     *                             32D10470
09B9 0 C0F4               LD      SECTD       GET DESIRED SECTOR            32D10480
09BA 0 4224               BSI   2 READ-TB     READ DATA-COMPARE             32D10490
09BB 0 8141               DC      321+/8000   WORD COUNT/RANDOM NUMBERS     32D10500
09BC 0 0000         RTN9E DC      *-*         FIRST DATA WORD EXPECTED      32D10510
09BD 1 09BE               DC      RTN9F       ERROR RETURN ADDRESS          32D10520
                          *                                                 32D10530
09BE 0 71FF         RTN9F MDX     1 -1        DECREMENT LOOP COUNT          32D10540
09BF 0 70DD               MDX     RTN9L       LOOP-NEW PATTERN              32D10550
09C0 0 C012               LD      FSTNO       SET SUMMARY TABLE             32D10560
09C1 1 6780 05DD          LDX   I3 RID         IX EQUAL RTN NUMBER           32D10570
09C3 0 73F7               MDX   3 -9          SKP IF RTN 9                  32D10580
09C4 0 7301               MDX   3 1           INDEX = 2                     32D10590
09C5 1 D700 0655          STO   L3 FRN1       SAVE FIRST NUMBER USED        32D10600
09C7 0 C00A               LD      LSTNO       GET LAST NUMBER USED          32D10610
09C8 1 D700 0656          STO   L3 LRN1       SAVE                          32D10620
09CA 0 421E               BSI   2 CNTLE-TB    EXIT ROUTINE                  32D10630
                          *                                                 32D10640
                          *              READ OR COMPARE ERROR              32D10650
                          *                                                 32D10660
09CB 0 1010         RTN9G SLA     16          CLEAR NO-PRINT SWITCH         32D10670
09CC 0 D2F6               STO   2 PRSW-TB     *                             32D10680
09CD 0 6309               LDX   3 HRDWR-SUMRY  COUNT WRITE ERROR            32D10690
09CE 0 4221               BSI   2 COUNT-TB    COUNT ERROR                   32D10700
09CF 0 4230               BSI   2 STMSG-TB    PRINT ERROR MSG               32D10710
09D0 0 5E0C               DC      /5E0C       MESSAGE ID                    32D10720
09D1 0 70E5               MDX     RTN9D       GO PRINT ERRORS               32D10730
09D2 0 007B         LSTNO DC      123         LAST RANDOM NUMBER            32D10740
09D3 0 0000         FSTNO DC      *-*         FIRST NUMBER USED             32D10750
                          *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D10760
                          *                                                 32D10770
                          *              TEST ROUTINE ELEVEN-               32D10780
                          *               1. WRITE SECTOR ID PLUS           32D10790
                          *                  320 WORDS OF /1313 ON          32D10800
                          *                  CYL 2-SECT 0.                  32D10810
                          *               2. REWRITE CYL 2-SECT 0           32D10820
                          *                  WITH 1 WORD OF SECTOR          32D10830
                          *                  ID ONLY.                       32D10840
                          *               3. READ 321 WORDS FROM            32D10850
                          *                  CYL 2-SECT 0.                  32D10860
                          *               4. CK DATA READ FOR               32D10870
                          *                  CORRECT SECT ID AND            32D10880
                          *                  DATA OF ALL ZEROS.             32D10890
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                        *                    5. RESTORE ORIGINAL DATA          32D10900
                        *                       ON CYL 2-SECT 0.               32D10910
                        *                                                      32D10920
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D10930
09D4 0 4236             RTN11 BSI    2 VERFY-TB    SEEK CYL 2-VERIFY          32D10940
09D5 0 0002                   DC     2             * THE SEEK                 32D10950
09D6 1 088A                   DC     CNTL          EXIT ON ERROR              32D10960
09D7 0 700A                   B      RT11B         WRITE 321 WORDS FIRST      32D10970
                        *                                                      32D10980
09D8 0 1010             RT11L SLA    16            WRITE CYL 2-SECT 0         32D10990
09D9 0 4239                   BSI    2 WRITE-TB    * WITH SECTOR ID           32D11000
09DA 0 8001                   DC     1+/8000       *  ONLY                    32D11010
09DB 0 0000             AVG   DC     0             AVERAGE OF 50 PASSES       32D11020
09DC 1 09DD                   DC     RT11A         EXIT IF ERROR              32D11030
                        *                                                      32D11040
09DD 0 1010             RT11A SLA    16            READ CYL 2-SECT 0          32D11050
09DE 0 4224                   BSI    2 READ-TB     *                          32D11060
09DF 0 0141                   DC     321           *                          32D11070
09E0 0 0000                   DC     0             DATA EXPECTED              32D11080
09E1 1 09E2                   DC     RT11B         EXIT IF ERROR              32D11090
                        *                                                      32D11100
09E2 0 1010             RT11B SLA    16            WRITE CYL 2-SECT 0         32D11110
09E3 0 4239                   BSI    2 WRITE-TB    * WITH /1313               32D11120
09E4 0 0141                   DC     321           321 WORDS                  32D11130
09E5 0 1313                   DC     /1313         DATA                       32D11140
09E6 1 09E7                   DC     RT11C         EXIT IF ERROR              32D11150
                        *                                                      32D11160
09E7 0 71FF             RT11C MDX    1 -1          DECREMENT LOOP COUNT       32D11170
09E8 0 70EF                   MDX    RT11L         LOOP ROUTINE               32D11180
09E9 0 421E                   BSI    2 CNTLE-TB    EXIT ROUTINE               32D11190
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D11200
                        *                                                      32D11210
                        *                    TEST ROUTINE 12-WRITE 400         32D11220
                        *                    WORDS ON CYL 2-SECT 0.            32D11230
                        *                    READ AND CK NUMBER OF             32D11240
                        *                    WORDS WRITTEN-SAVE IN             32D11250
                        *                    SUMMARY.                          32D11260
                        *                    RESTORE SECTOR 1 IF               32D11270
                        *                    DESTROYED.                        32D11280
                        *                    NOTE-SUMMARY VALUE IS THE         32D11290
                        *                    AVERAGE OF 50 PASSES.             32D11300
                        *                                                      32D11310
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D11320
09EA 0 4236             RTN12 BSI    2 VERFY-TB    SEEK CYL 2 AND VERIFY      32D11330
09EB 0 0002                   DC     2             * THE SEEK                 32D11340
09EC 1 088A                   DC     CNTL          EXIT IF ERROR              32D11350
09ED 0 1010             RT12Z SLA    16            CLEAR AVERAGE              32D11360
09EE 0 D0EC                   STO    AVG           *                          32D11370
                        *                                                      32D11380
09EF 0 C00E             RT12L LD     K370          SET WORD COUNT             32D11390
09F0 0 D240                   STO    2 COMA-TB     IN I/O AREA                32D11400
09F1 0 C2B2                   LD     2 H1313-TB    GET DATA                   32D11410
09F2 0 422A                   BSI    2 SETV-TB     PRESET I/O AREA            32D11420
                        *                                                      32D11430
09F3 0 1010                   SLA    16            WRITE CYL 2-SECT 0         32D11440
09F4 1 4400 8695              BSI  L WRITE&/8000 * WITH NO DSW CK              32D11450
09F6 0 8190                   DC     400&/8000     NO PRESET OF I/O AREA      32D11460
09F7 0 001B             K27   DC     27            CONSTANT 27                32D11470
09F8 0 403C                   BSI    R12CK         CK DSW                     32D11480
                        *                                                      32D11490
09F9 0 4230                   BSI    2 STMSG-TB    PRINT IF ERROR             32D11500
09FA 0 0E0E                   DC     /0E0E         DSW ERROR BIT NOT SET      32D11510
                        *                                                      32D11520
09FB 0 1010                   SLA    16            READ SECTOR 0              32D11530
09FC 1 4400 8680              BSI  L READ&/8000 WITH NO CKING                  32D11540
09FE 0 0172             K370  DC     370           WORD COUNT                 32D11550
09FF 0 4035                   BSI    R12CK         CHECK DSW                  32D11560
0A00 0 4230                   BSI    2 STMSG-TB    PRINT IF ERROR             32D11570
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0A01 0 0E0F                   DC     /0E0F         DSW ERROR BIT NOT SET      32D11580
                        *                                                      32D11590
0A02 0 6700 0172              LDX  L3 370           CK NUMBER OF WORDS         32D11600
0A04 1 C700 069C        RT12A LD   L3 COMA          *                          32D11610
0A06 0 F2B2                   EOR    2 H1313-TB    *                          32D11620
0A07 1 4C18 0A0B              BZ     RT12B         BRANCH IF FOUND            32D11630
0A09 0 73FF                   MDX    3 -1          DECR WD COUNT              32D11640
0A0A 0 70F9                   MDX    RT12A         LOOP                       32D11650
                        *                                                      32D11660
0A0B 0 6BC7             RT12B STX    3 FSTNO       SAVE NUMBER OF WORDS       32D11670
0A0C 1 7780 09DB              MDX  I3 AVG           ADD TO TOTAL               32D11680
0A0E 0 6BCC                   STX    3 AVG         SAVE TOTAL                 32D11690
                        *                                                      32D11700
0A0F 0 C2DA                   LD     2 K1-TB       READ SECTOR 1              32D11710
0A10 1 4400 8680              BSI  L READ&/8000 WITH NO CKING                  32D11720
0A12 0 0001                   DC     1             WORD COUNT                 32D11730
0A13 0 C241                   LD     2 COMA&1-TB   GET ID READ                32D11740
0A14 0 F206                   EOR    2 IDS#B-TB    CHECK FOR CORRECT ID       32D11750
0A15 1 4C18 0A21              BZ     RT12D         BRANCH IF CORRECT          32D11760
0A17 0 C20B                   LD     2 RTNER-TB    GET ERROR SW               32D11770
0A18 0 D2BA                   STO    2 ZSNS-TB     DUMMY ENTRY                32D11780
0A19 0 4018                   BSI    R12CK         CK PRINT SW ONLY           32D11790
                        *                                                      32D11800
0A1A 0 4230                   BSI    2 STMSG-TB    PRINT ERROR                32D11810
0A1B 0 5E11                   DC     /5E11         WRITE 400 DESTROYED NXT SC 32D11820
0A1C 0 C2DA                   LD     2 K1-TB       RESTORE SECTOR 1           32D11830
0A1D 0 4239                   BSI    2 WRITE-TB    *                          32D11840
0A1E 0 0141                   DC     321           *                          32D11850
0A1F 0 E5E5                   DC     /E5E5         *                          32D11860
0A20 1 0A21                   DC     RT12D         ERROR RETURN               32D11870
0A21 0 C0B1             RT12D LD     FSTNO         GET CURRENT WD CT          32D11880
0A22 0 D2CC                   STO    2 MOD3-TB     SET IN CASE PRINT          32D11890
0A23 0 92E8                   S      2 K331-TB     SUB 331                    32D11900
0A24 1 4C28 0A29              BN     RT12G         BRANCH IF LESS             32D11910
0A26 0 90D0                   S      K27           SUB 27                     32D11920
0A27 1 4C08 0A2D              BNP    RT12F         BRANCH IF LESS THAN 358    32D11930
0A29 0 C20B             RT12G LD     2 RTNER-TB    GET ERROR SW               32D11940
0A2A 0 400A                   BSI    R12CK         CHECK PRT SW ONLY          32D11950
0A2B 0 4230                   BSI    2 STMSG-TB    PRINT ERROR                32D11960
0A2C 0 4E10                   DC     /4E10         SECTOR WORD COUNT NOT WITH 32D11970
                        *                          *  IN LIMITS 331-358       32D11980
0A2D 0 71FF             RT12F MDX    1 -1          DECREMENT LOOP COUNT       32D11990
0A2E 0 70C0                   MDX    RT12L         LOOP                       32D12000
0A2F 0 C0AB                   LD     AVG           GET TOTAL WORDS            32D12010
0A30 0 18D0                   RTE    16            EXCHANGE REGISTERS         32D12020
0A31 0 1010                   SLA    16            CLEAR A REGISTER           32D12030
0A32 0 A810                   D      NLOOP         DIVIDE BY 50               32D12040
0A33 0 D2F5                   STO    2 WRLNG-TB    SET IN SUMMARY             32D12050
0A34 0 421E                   BSI    2 CNTLE-TB    EXIT ROUTINE               32D12060
                        *                                                      32D12070
0A35 0 0000             R12CK DC     *-*           ENTRY                      32D12080
0A36 0 C2BA                   LD     2 ZSNS-TB     GET INTERRUPT DSW          32D12090
0A37 1 4C28 0A40              BN     RCKX          BRANCH IF ON               32D12100
0A39 0 C20B                   LD     2 RTNER-TB    GET ERROR SW               32D12110
0A3A 0 421B                   BSI    2 CKPRT-TB    CHECK PRINT ALL SW         32D12120
0A3B 0 7004                   MDX    RCKX          RETURN IF OFF              32D12130
0A3C 0 C0BA                   LD     K27           SET ERROR SW               32D12140
0A3D 0 D20B                   STO    2 RTNER-TB    *                          32D12150
0A3E 1 4C80 0A35        RCKX1 BSC  I R12CK         EXIT ROUTINE               32D12160
0A40 1 7402 0A35        RCKX  MDX  L R12CK,2       INCR RETURN TO NO PRINT    32D12170
0A42 0 70FB                   MDX    RCKX1         GO EXIT                    32D12180
0A43 0 0032             NLOOP DC     LPCNT         LOOP COUNT                 32D12190
                        *                                                      32D12200
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D12210
                        *                                                      32D12220
                        *                  SPECIAL ROUTINE THIRTEEN            32D12230
                        *                                                      32D12240
                        *     SPECIAL ROUTINE -- SEEK TIMING        *          32D12250
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                        *
                        *     TIME SEEKS OF 1,2,4,8,16,32,64,128,200                32D12260
                        *     CALCULATE AVERAGE, MAXIMUM, MINIMUM                   32D12270
                        *                                                           32D12280
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D12290
                        *                                                           32D12300
0A44 0 C2B0             RTN13 LD    2 XSKBK-TB    GET SEEK TOWARD HOME IOCC       32D12310
0A45 0 1890                   SRT     16          PUT IN Q                        32D12320
0A46 0 C2E6                   LD    2 K203-TB     GET SEEK INCREMENT OF 203       32D12330
0A47 0 DABC                   STD   2 ZXIO-TB     SET FOR XEQ ROUTINE             32D12340
0A48 0 423C                   BSI   2 XEQ-TB      EXECUTE SEEK                    32D12350
0A49 0 C2CB                   LD    2 TBDSW-TB    GET INTERRUPT DSW               32D12360
0A4A 0 1004                   SLA     4           TEST HOME BIT IN DSW            32D12370
0A4B 1 4C10 0AA4              BNN     RT13J       BRANCH IF NOT SET               32D12380
0A4D 0 4230                   BSI   2 STMSG-TB     PRINT MESSAGE                   32D12390
0A4E 0 5A08                   DC      /5A08       FORM/MESSAGE ID                 32D12400
0A4F 0 C20E                   LD    2 TLP13-TB    GET LOOP TIME (NSEC)            32D12410
0A50 0 A2C2                   M     2 SNSTY-TB    MULT BY CPU TIME X 10           32D12420
0A51 0 AAE0                   D     2 TEN-TB      NORMALIZE TO NSEC               32D12430
0A52 0 D212                   STO   2 TIMSL-TB    SAVE FOR LATER CALCULATION      32D12440
0A53 0 C2DA                   LD    2 K1-TB       SET FIRST SEEK INCREMENT        32D12450
0A54 0 D2BC                   STO   2 ZXIO-TB     *   TO ONE                      32D12460
0A55 1 6500 069C              LDX   L1 COMA       SET SINK POINTER                32D12470
                                                                                    32D12480
0A57 0 C20F             RT13A LD    2 KLP13-TB    GET RTN13 LP CNT                32D12490
0A58 0 D2D5                   STO   2 CNTB-TB     SET FOR LOOPING CNT             32D12500
                                                                                    32D12510
0A59 0 C2BD             RT13B LD    2 ZXIO+1-TB   GET SEEK IOCC                   32D12520
0A5A 0 F2DD                   EOR   2 K4-TB       CHANGE DIRECTION MODIFIER       32D12530
0A5B 0 D2BD                   STO   2 ZXIO+1-TB   PUT IT BACK FOR SEEKING         32D12540
0A5C 0 404C                   BSI     TIMIT       GO ISSUE SEEK AND TIME IT       32D12550
0A5D 0 7101                   MDX     1 1         INCREMENT STORE POINTER         32D12560
0A5E 1 74FF 0631              MDX   L CNTB,-1     DECREMENT LOOP COUNT            32D12570
0A60 0 70F8                   MDX     RT13B       LOOP IF NOT THROUGH             32D12580
                                                                                    32D12590
0A61 0 C2BC                   LD    2 ZXIO-TB     GET SEEK INCREMENT              32D12600
0A62 0 D100                   STO   X1 0          SAVE FOR LATER USE              32D12610
0A63 0 7101                   MDX     1 1         BUMP SAVE POINTER               32D12620
0A64 0 1001                   SLA     1           DOUBLE SEEK INCREMENT           32D12630
0A65 0 D2BC                   STO   2 ZXIO-TB     SET IN IOCC                     32D12640
0A66 0 1007                   SLA     7           TEST FOR 128                    32D12650
0A67 1 4C10 0A57              BNN     RT13A       BRANCH IF LESS THAN 128         32D12660
0A69 0 F2B9                   EOR   2 H8000-TB    ELSE CLEAR BIT 0                32D12670
0A6A 1 4C30 0A70              BP      RT13K       BRANCH IF INCR 200              32D12680
0A6C 0 C2E5                   LD    2 K202-TB     SET SEEK INCREMENT              32D12690
0A6D 0 92D8                   S     2 K2-TB       **   TO 200                     32D12700
0A6E 0 D2BC                   STO   2 ZXIO-TB     SET FOR EXECUTION               32D12710
0A6F 0 70E7                   MDX     RT13A       GO SEEK                         32D12720
                                                                                    32D12730
0A70 0 C2CB             RT13K LD    2 TBDSW-TB    GET INTERRUPT DSW               32D12740
0A71 0 1004                   SLA     4           CHECK HOME BIT                  32D12750
0A72 1 4C28 0A76              BN      RT13C       BRANCH IF OK                    32D12760
0A74 0 4230                   BSI   2 STMSG-TB     ELSE PRINT ERROR MESSAGE        32D12770
0A75 0 5E18                   DC      /5E18       FORM/MESSAGE ID                 32D12780
                                                                                    32D12790
0A76 1 6500 069C        RT13C LDX   L1 COMA       SET FROM POINTER                32D12800
0A78 0 6309                   LDX     3 9         SET LOOP COUNTER                32D12810
                                                                                    32D12820
0A79 0 C20F             RT13D LD    2 KLP13-TB    GET LOOP COUNT                  32D12830
0A7A 0 D2D5                   STO   2 CNTB-TB     SET FOR LOOPING                 32D12840
0A7B 0 C28B                   LD    2 TERM-TB     SET A-REG TO GREATEST           32D12850
0A7C 0 1801                   SRA     1           *  POSITIVE NUMBER              32D12860
0A7D 0 1890                   SRT     16          MOVE TO Q/ZERO A-REG            32D12870
0A7E 0 DACC                   STD   2 MOD3-TB     SET INITIAL COUNTS              32D12880
0A7F 0 1890                   SRT     16          CLEAR Q-REG NOW                 32D12890
0A80 0 DACE                   STD   2 MOD5-TB     SET INITIAL TOTAL               32D12900
                                                                                    32D12910
0A81 0 1090             RT13E SLT     16          CLEAR Q-REG                     32D12920
0A82 0 C100                   LD    X1 0          GET TIME COUNT                  32D12930
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0A83 0 18D0                   RTE     16          PUT IN POSITION TO ADD          32D12940
0A84 0 8ACE                   AD    2 MOD5-TB     ADD IN EXISTING TOTAL           32D12950
0A85 0 DACE                   STD   2 MOD5-TB     SAVE IN MOD5                    32D12960
0A86 0 C2CC                   LD    2 MOD3-TB     GET MAXIMUM COUNT SINK          32D12970
0A87 0 9100                   S     X1 0          TEST FOR GREATER                32D12980
0A88 1 4C30 0A8C              BP      RT13F       BRANCH IF NOT                   32D12990
0A8A 0 C100                   LD    X1 0          ELSE SET IN NEW MAXIMUM         32D13000
0A8B 0 D2CC                   STO   2 MOD3-TB     **                              32D13010
                                                                                    32D13020
0A8C 0 C2CD             RT13F LD    2 MOD4-TB     GET MINIMUM TIME SINK           32D13030
0A8D 0 9100                   S     X1 0          TEST FOR LESS THAN MINIMUM      32D13040
0A8E 1 4C28 0A92              BN      RT13G       BRANCH IF GREATER               32D13050
0A90 0 C100                   LD    X1 0          ELSE SET IN NEW MINIMUM         32D13060
0A91 0 D2CD                   STO   2 MOD4-TB     **                              32D13070
                                                                                    32D13080
0A92 0 7101             RT13G MDX     1 1         INCREMENT SOURCE POINTER        32D13090
0A93 1 74FF 0631              MDX   L CNTB,-1     DECREMENT LOOP COUNTER          32D13100
0A95 0 70EB                   MDX     RT13E       LOOP IF NOT THROUGH             32D13110
                                                                                    32D13120
0A96 0 CACE                   LDD   2 MOD5-TB     GET TOTAL COUNT                 32D13130
0A97 0 AA0F                   D     2 KLP13-TB    CALCULATE AVERAGE SEEK TIM      32D13140
0A98 0 D2CE                   STO   2 MOD5-TB     SET FOR PRINT                   32D13150
0A99 0 C100                   LD    X1 0          GET SEEK INCREMENT              32D13160
0A9A 0 7101                   MDX     1 1         INCREMENT POINTER               32D13170
0A9B 0 D2CF                   STO   2 MOD6-TB     SET FR PRINT                    32D13180
0A9C 1 4400 868C              BSI   L STMSG+/8000   PRINT W/O PID-MID..           32D13190
0A9E 0 1E19                   DC      /1E19       FORM/MSG ID                     32D13200
0A9F 0 73FF                   MDX     3 -1        DECREMENT LOOP COUNT            32D13210
0AA0 0 70D8                   MDX     RT13D       LOOP IF NOT THROUGH             32D13220
                                                                                    32D13230
0AA1 0 4480 0164        RT13H BSI   I   END       GO TO MONITOR END               32D13240
0AA3 1 05DC                   DC        PID       ADDRESS OF PRG ID               32D13250
                                                                                    32D13260
0AA4 0 1010             RT13J SLA       16        SET CYL ZERO IN MSG WORD        32D13270
0AA5 0 D2CC                   STO   2 MOD3-TB     **                              32D13280
0AA6 0 4230                   BSI   2 STMSG-TB    CALL MSG ROUTINE                32D13290
0AA7 0 4E17                   DC      /4E17       FORM/MSG ID                     32D13300
0AA8 0 70F8                   MDX     RT13H       CONTINUE PROCESSING ANYWAY      32D13310
                        *                                                           32D13320
                        *     TIMING ROUTINE                                        32D13330
                        *                                                           32D13340
0AA9 0 0000             TIMIT DC        *-*       ENTRY POINT                     32D13350
0AAA 0 C215                   LD    2 ADIN2-TB    SET INT ADRS IN MONITOR         32D13360
0AAB 1 D480 0AD1              STO   I XEQA+1      *                               32D13370
0AAD 0 0ABC                   XIO   2 ZXIO-TB     EXECUTE SEEK                    32D13380
0AAE 0 10A0                   SLT     32          CLEAR AQ                        32D13390
                                                                                    32D13400
0AAF 0 82DA             TIM2  A     2 K1-TB       BUMP TIMER                      32D13410
0AB0 1 4C20 0AAF              BNZ     TIM2        BRANCH IF NOT OV AND CARRY      32D13420
0AB2 0 8A10                   AD    2 TIMCN-TB    ADD DOUBLE WORD COUINT          32D13430
0AB3 1 4C18 0AAF              BZ      TIM2        IF Q OVERFLOWS/A NONZERO        32D13440
                        *                                                           32D13450
                        *     10 MINUTE TIMEOUT                                     32D13460
                        *                                                           32D13470
0AB5 0 70FF             TIMOT MDX       TIMOT     TRAP STOP/NO INTRPT             32D13480
                        *                                                           32D13490
                        *     INTERRUPT ROUTINE FOR TIMER                           32D13500
                        *                                                           32D13510
0AB6 0 0000             INT2  DC        *-*       ENTRY POINT                     32D13520
0AB7 0 0ABA                   XIO   2 ZSNS-TB     SENSE WITH RESET                32D13530
0AB8 1 C480 0AB6              LD    I INT2        GET INSTRUCTION AT CALL+1       32D13540
0ABA 0 1008                   SLA     8           GET DISPLACEMENT                32D13550
0ABB 0 1808                   SRA     8           *                               32D13560
0ABC 0 82DA                   A     2 K1-TB       IX2 NOT DISTURBED               32D13570
0ABD 0 80F8                   A       INT2        ADD CALL ADDRESS                32D13580
0ABE 0 D001                   STO     INT2A+1     SET ABS ADDRESS                 32D13590
0ABF 0 CC00 0000        INT2A LDD   L *-*         GET SAVED AQ REGISTERS          32D13600
0AC1 0 18D0                   RTE     16          A TO Q/Q TO A                   32D13610
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0AC2 0 AAE9              D     2 THOUS-TB    DIVIDE BY 1000                  32D13620
0AC3 0 DACC              STD   2 MOD3-TB     SAVE AQ                         32D13630
0AC4 0 A212              M     2 TIMSL-TB    MULT BY LOOP TIME               32D13640
0AC5 0 DACE              STD   2 MOD5-TB     SAVE AQ                         32D13650
0AC6 0 C2CD              LD    2 MOD4-TB     GET PREVIOUS REMAINDER          32D13660
0AC7 0 A212              M     2 TIMSL-TB MULT BY SINGLE LP TIME             32D13670
0AC8 0 AAE9              D     2 THOUS-TB    DIVIDE BY 1000                  32D13680
0AC9 0 1890              SRT     16          A TO Q                          32D13690
0ACA 0 8ACE              AD    2 MOD5-TB     ADD DOUBLE SAVED AQ             32D13700
0ACB 0 AAE9              D     2 THOUS-TB    DIVIDE BY 1000                  32D13710
0ACC 0 D100              STO  X1 0           SAVE FOR LATER                  32D13720
0ACD 1 4CC0 0AA9         BOSC I  TIMIT       EXIT TO MY RTN                  32D13730
                    *-------------------------------------------------      32D13740
                    *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D13750
                    *                                                       32D13760
                    *            SUB-ROUTINE XEQ                            32D13770
                    *                                                       32D13780
                    *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D13790
                    *                                                       32D13800
                    *                                                       32D13810
                    *          THIS ROUTINE WILL BUILD AND ISSUE            32D13820
                    *          AN XIO INSTRUCTION.                          32D13830
                    *                                                       32D13840
                    *          IT WILL THEN WAIT FOR AN INTERRUPT,          32D13850
                    *          LOOPING THROUGH THE MONITOR.  THE            32D13860
                    *          LOCATION (XCNT) WILL KEEP                    32D13870
                    *          THE CURRENT DELAY COUNT FOR A LOST           32D13880
                    *          INTERRUPT.                                   32D13890
                    *                                                       32D13900
                    *          IF AN INTERRUPT IS LOST AN ERROR             32D13910
                    *          MESSAGE IS PRINTED AND THE ROUTINE           32D13920
                    *             TERMINATES THE DFT                        32D13930
                    *                                                       32D13940
                    **** ROUTINE CALL                                       32D13950
                    *     BSI   2 XEQ-TB                                    32D13960
                    *     IOCC MUST BE PRESET AT LOCATION (ZXIO).           32D13970
                    *                                                       32D13980
                    *-------------------------------------------------      32D13990
0ACF 0 C214         XEQE  LD    2 ADINT-TB    GET INTRPT RTN ADDRESS          32D14000
0AD0 0 D400 0000    XEQA  STO  L  *-*         DEVICE REQUEST ADDRESS          32D14010
0AD2 0 C2BD               LD    2 ZXIO+1-TB   GET IOCC                        32D14020
0AD3 0 EA9B               OR    2 DVA-TB      COMBINE WITH AREA CODE          32D14030
0AD4 0 D2BD               STO   2 ZXIO&1-TB   SAVE                            32D14040
0AD5 0 D29A               STO   2 INTSW-TB    SET INTRPT SWITCH               32D14050
0AD6 0 E2B5               AND   2 DSKMD-TB    TEST FOR READ IOCC              32D14060
0AD7 0 F2B5               EOR   2 DSKMD-TB    **                              32D14070
0AD8 1 4C18 0AE8          BZ      XEQB        NO RDY CK IF READ OPERATIO      32D14080
                    *                                                       32D14090
0ADA 0 0ABE         CKRD1 XIO   2 SNXIO-TB    SENSE DSW                       32D14100
0ADB 0 D2CB               STO   2 TBDSW-TB    SAVE                            32D14110
0ADC 0 E2B1               AND   2 H3000-TB    TEST FOR BITS 2-3=00            32D14120
0ADD 1 4C18 0AE8          BZ      XEQB        BRANCH IF OK                    32D14130
                    *                                                       32D14140
                    *     DISK IS BUSY AND/OR NOT READY                     32D14150
                    *                                                       32D14160
0ADF 0 4230               BSI   2 STMSG-TB    CALL MSG SETUP RTN              32D14170
0AE0 0 5E03               DC      /5E03       MESSAGE ID                      32D14180
                    *                                                       32D14190
                    *     LOOP THRU MONITOR                                 32D14200
                    *                                                       32D14210
0AE1 0 C2EA               LD    2 K10TH-TB    SET LOOP COUNT TO 10,000        32D14220
0AE2 0 D20A               STO   2 ZCNT-TB     *                               32D14230
0AE3 0 422D         CKRD3 BSI   2 STMLS-TB    SET RETURN AND EXIT             32D14240
                    *                                                       32D14250
                    *     MONITOR RETURNS HERE                              32D14260
                    *                                                       32D14270
0AE4 1 74FF 0666          MDX  L  ZCNT,-1     DECR COUNT                      32D14280
0AE6 0 70FC               MDX     CKRD3       LOOP                            32D14290
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0AE7 0 70F2               MDX     CKRD1       TEST AGAIN                      32D14300
                    *                                                       32D14310
                    *                                                       32D14320
                    *                                                       32D14330
0AE8 0 C240         XEQB  LD    2 COMA-TB     GET CK-ONLY-RDY SWITCH          32D14340
0AE9 1 4C98 0698          BZ   I  XEQ         EXIT IF ZERO                    32D14350
                    *     EXECUTE I/O COMMAND                               32D14360
0AEB 0 0ABC               XIO   2 ZXIO-TB     ISSUE COMMAND                   32D14370
                    *                                                       32D14380
0AEC 0 0ABE               XIO   2 SNXIO-TB    SENSE DSW                       32D14390
0AED 0 D2CB               STO   2 TBDSW-TB    SAVE                            32D14400
0AEE 0 E2B1               AND   2 H3000-TB    TEST FOR BITS 2-3=11            32D14410
0AEF 0 F2B1               EOR   2 H3000-TB    ***                             32D14420
0AF0 1 4C18 0AF4          BZ      XEQC        BRANCH IF OK                    32D14430
                    *                                                       32D14440
0AF2 0 4230               BSI   2 STMSG-TB    NOT READY ERROR MSG             32D14450
0AF3 0 0E04               DC      /0E04       MESSAGE ID                      32D14460
0AF4 0 C2EA         XEQC  LD    2 K10TH-TB    SET TIMEOUT COUNT               32D14470
0AF5 0 D20A               STO   2 ZCNT-TB     *  TO 10,000                    32D14480
                    *                                                       32D14490
                    *                  EXIT TO MONITOR                      32D14500
                    *                                                       32D14510
0AF6 0 422D         XEQLP BSI   2 STMLS-TB    SET MLSCF ENTRY AND EXIT        32D14520
                    *                                                       32D14530
                    *                  MONITOR RETURNS HERE                 32D14540
                    *                                                       32D14550
0AF7 0 C29A               LD    2 INTSW-TB    GET INTRPT SWITCH               32D14560
0AF8 1 4C18 0B00          BZ      XEQX        BRANCH IF OFF                   32D14570
0AFA 1 74FF 0666          MDX  L  ZCNT,-1     DECR LOOP COUNT                 32D14580
0AFC 0 70F9               B       XEQLP       BRANCH IF NOT ZERO              32D14590
                    *                                                       32D14600
0AFD 0 4230               BSI   2 STMSG-TB    PRINT LOST INTRPT               32D14610
0AFE 0 0E01               DC      /0E01       MESSAGE ID                      32D14620
0AFF 0 4233               BSI   2 TEXIT-TB    TERMINATE DFT                   32D14630
                    *                                                       32D14640
0B00 0 C28A         XEQX  LD    2 ZSNS-TB     GET INTERRUPT DSW               32D14650
0B01 0 D2CB               STO   2 TBDSW-TB    STORE FOR PRINT                 32D14660
0B02 0 CABC               LDD   2 ZXIO-TB     SET LAST IOCC IN MSG            32D14670
0B03 0 DACC               STD   2 MOD3-TB     *                               32D14680
0B04 1 4C80 0698          B    I  XEQ         EXIT                            32D14690
                    *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D14700
                    *                                                       32D14710
                    *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  32D14720
                    *                                                       32D14730
                    *                ROUTINE TO SAVE INDEX REGS             32D14740
                    *                AND EXIT TO MONITOR                    32D14750
                    *                                                       32D14760
                    **** ROUTINE CALL                                       32D14770
                    *     BSI   2 STMLS-TB                                  32D14780
                    *                                                       32D14790
                    *-------------------------------------------------      32D14800
                    *                                                       32D14810
0B06 0 6908         STMLE STX   1 STMLR+3     SAVE IX 1                       32D14820
0B07 0 6B09               STX   3 STMLR+5     SAVE IX 3                       32D14830
0B08 0 C00B               LD      STML        GET RETURN ADRS                 32D14840
0B09 0 D28A               STO   2 MLSCF+1-TB  SET IN MLSCF TABLE              32D14850
0B0A 0 4480 0161          BSI  I  START       EXIT TO MONITOR                 32D14860
                    *                                                       32D14870
                    *                  MONITOR RETURNS HERE                 32D14880
                    *                                                       32D14890
0B0C 1 6600 065C    STMLR LDX  L2 TB          RESTORE INDEX REGS              32D14900
0B0E 0 6500 0000          LDX  L1 *-*         *                               32D14910
0B10 0 6700 0000          LDX  L3 *-*         *                               32D14920
0B12 1 4C80 0689          B    I  STMLS       EXIT VIA ENTRANCE               32D14930
0B14 1 0B0C         STML  DC      STMLR       ADRS OF RETURN                  32D14940
                    *                                                       32D14950
                    *-------------------------------------------------      32D14960
                    *-------------------------------------------------      32D14970
```

```
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D14980
                        *                                                       32D14990
                        *              SUB-ROUTINE VERFY                        32D15000
                        *                                                       32D15010
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D15020
                        *     THIS ROUTINE CALLS THE SEEK SUB-ROUTINE           32D15030
                        *     TO LOCATE DESIRED CYLINDER. THE CORRECT           32D15040
                        *     CYLINDER IS VERIFIED BY READING ALL EIGHT         32D15050
                        *     SECTOR ID'S.                                      32D15060
                        *                                                       32D15070
                        *                                                       32D15080
                        **** ROUTINE CALL                                       32D15090
                        *                                                       32D15100
                        *     BSI    2 VERFY-TB                                 32D15110
                        *     DC       CYL # DESIRED                            32D15120
                        *     DC       ADDRS OF ADDRESS ERROR RETURN            32D15130
                        *-------------------------------------------------------32D15140
                        *                                                       32D15150
0B15 0 CADF             VRFYE LDD    2 K8-TB      SET BOTH COUNTERS TO EIGHT    32D15160
0B16 0 DA08                   STD    2 RTCNT-TB   *                             32D15170
0B17 1 6D00 0BB4              STX  L1 VERFX&1      SAVE INDEX 1                32D15180
0B19 1 6780 0692              LDX  I3 VERFY        GET CALLING ADRS+1          32D15190
0B1B 0 C301                   LD     3 1           GET CONTENTS OF CALL+2      32D15200
0B1C 0 D014                   STO      TSTCF+1     SET FOR EXIT                32D15210
0B1D 1 7402 0692              MDX  L   VERFY,2     SET FOR NORMAL RETURN       32D15220
0B1F 0 C300                   LD     3 0           GET CYL. DESIRED            32D15230
0B20 0 D2D3                   STO    2 NCYL#-TB    SAVE                        32D15240
0B21 0 6303                   LDX    3 3           COUNTER                     32D15250
                              *                                                32D15260
0B22 0 C2D3             VERFA LD     2 NCYL#-TB    GET DESIRED CYL.            32D15270
0B23 1 F700 05EF              EOR  L3 BADCY-1      CMP WITH BAD CYLS           32D15280
0B25 1 4C18 0B30              BZ       TSTCF       BRANCH IF CMP               32D15290
0B27 0 73FF                   MDX    3 -1          DECR COUNT                  32D15300
0B28 0 70F9                   B        VERFA       LOOP                        32D15310
                              *                                                32D15320
0B29 1 6780 062F              LDX  I3 NCYL#        CYL DESIRED TO IX1          32D15330
0B2B 0 73A7                   MDX    3 -89         TEST FOR CYLINDERS 0-89     32D15340
0B2C 0 7001                   B        TSTCC       90-...                      32D15350
0B2D 0 7006                   B        SEEK        0-89                        32D15360
                              *                                                32D15370
0B2E 0 73EB             TSTCC MDX    3 -21         TEST FOR 90-110             32D15380
0B2F 0 7002                   B        TSTCD       111-...                     32D15390
0B30 0 4C00 0000        TSTCF B    L  *-*         90-110 TAKE ADRS ERR EXIT   32D15400
                              *                                                32D15410
0B32 0 73A4             TSTCD MDX    3 -92         TEST FOR CYLS 111-202       32D15420
0B33 0 70FC                   B        TSTCF       GREATER THAN 202            32D15430
                              *     FALL THRU TO SEEK DESIRED CYLINDER         32D15440
                              *                                                32D15450
                              *-------------------------------------------------32D15460
                              *                                                32D15470
                              *-------------------------------------------------32D15480
                              *                                                32D15490
0B34 0 C2B0             SEEK  LD     2 XSKBK-TB    GET SEEK TOWARD HOME IOCC   32D15500
0B35 0 1890                   SRT      16          PUT IN Q REGISTER           32D15510
0B36 0 D240                   STO    2 COMA-TB     CLEAR COMA..DON'T XEQ IO    32D15520
0B37 0 C2D3                   LD     2 NCYL#-TB    GET DESIRED CYLINDER        32D15530
0B38 0 92D2                   S      2 PCYL#-TB    CREATE DISPLACEMENT         32D15540
0B39 1 4C18 0B5C              BZ       VERFB       DON'T SEEK IF ZERO          32D15550
0B3B 1 4C28 0B40              BN       SEEKB       IF NEGATIVE-BRANCH          32D15560
0B3D 0 1883                   SRT      3           ELSE CLEAR SEEK OUT BIT     32D15570
0B3E 0 1083                   SLT      3           *  IN IOCC                  32D15580
0B3F 0 7002                   B        SEEKD       GO EXECUTE SEEK             32D15590
                              *                                                32D15600
0B40 0 F28B             SEEKB EOR    2 TERM-TB     FORM TWO'S COMPLEMENT OF    32D15610
0B41 0 82DA                   A      2 K1-TB       * SEEK DISPLACEMENT         32D15620
                              *                                                32D15630
0B42 0 DABC             SEEKD STD    2 ZXIO-TB     STORE FOR XEQ ROUTINE       32D15640
0B43 0 423C                   BSI    2 XEQ-TB      GO TO TEST FOR READY ONLY   32D15650
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0B44 0                  SEEKE EQU    *            RETURN FROM XEQ             32D15660
0B44 0 C2DF                   LD     2 K8-TB      SET READ RETRY COUNTER      32D15670
0B45 0 D208                   STO    2 RTCNT-TB   * FOR SEEK VERIFIES         32D15680
0B46 0 6301                   LDX    3 SKCNT-SUMRY  COUNT SEEK                32D15690
0B47 0 4221                   BSI    2 COUNT-TB   COUNT                       32D15700
0B48 0 0ABC                   XIO    2 ZXIO-TB    EXECUTE SEEK IOCC           32D15710
0B49 0 C2EA                   LD     2 K10TH-TB   SET COUNT IN ACC            32D15720
0B4A 0 D20A                   STO    2 ZCNT-TB    SET PRIMARY COUNTER         32D15730
0B4B 0 422D             SEEKF BSI    2 STMLS-TB   GO TO MONITOR               32D15740
0B4C 0 0ABE                   XIO    2 SNXIO-TB   SENSE DSW                   32D15750
0B4D 0 1003                   SLA      3          SHIFT.DISK BUSY BIT         32D15760
0B4E 1 4C10 0B56              BNN      SEEKG      BRANCH IF NOT BUSY          32D15770
0B50 1 74FF 0666              MDX  L   ZCNT,-1     DECREMENT COUNT           32D15780
0B52 0 70F8                   MDX      SEEKF      LOOP                        32D15790
0B53 1 7412 0698              MDX  L   XEQ,SEEKG-SEEKE  SET RETURN TO SEEKG   32D15800
0B55 0 709E                   MDX      XEQC       GO WAIT FOR INTERRUPT       32D15810
                              *                                                32D15820
0B56 0 0ABE             SEEKG XIO    2 SNXIO-TB   SENSE DISK DSW              32D15830
0B57 0 D2CB                   STO    2 TBDSW-TB   SET IN CASE PRINT           32D15840
0B58 1 4C10 0B5C              BNN      VERFB      BRANCH IF NO ERROR          32D15850
0B5A 0 4230                   BSI    2 STMSG-TB   ELSE PRINT E035 MESSAGE     32D15860
0B5B 0 0E05                   DC       /0E05                                   32D15870
                              *                                                32D15880
0B5C 0 0ABE             VERFB XIO    2 SNXIO-TB   SENSE DISK DSW              32D15890
0B5D 0 61F8                   LDX    1 -8         SET LOOP COUNTER            32D15900
                              *                                                32D15910
0B5E 0 E2DE             VERFC AND    2 K7-TB      SAVE BITS 13-15 FOR SECTOR  32D15920
0B5F 0 D0D1                   STO      TSTCF+1    * WANTED                    32D15930
0B60 1 4400 8680              BSI  L   READ+/8000 READ DESIRED SECTOR         32D15940
0B62 0 0001                   DC       1          ONE WORD                    32D15950
0B63 0 C241                   LD     2 COMA+1-TB  GET SECTOR ID READ          32D15960
0B64 1 D500 0812              STO  L1  BDCYL+8    SAVE IN TABLE               32D15970
0B66 0 C0CA                   LD       TSTCF+1    GET SECTOR POINTER          32D15980
0B67 0 82DA                   A      2 K1-TB      INCREMENT BY ONE            32D15990
0B68 0 7101                   MDX    1 1          BUMP LOOP COUNTER           32D16000
0B69 0 70F4                   MDX      VERFC      LOOP IF NOT THROUGH         32D16010
0B6A 0 D0C6                   STO      TSTCF+1    ELSE SAVE FIRST SECTOR      32D16020
0B6B 0 61F8                   LDX    1 -8         SET LOOP COUNTER            32D16030
                              *                                                32D16040
0B6C 0 C0C4             VERFD LD       TSTCF+1    GET SECTOR POINTER          32D16050
0B6D 1 F500 0812              EOR  L1  BDCYL+8    TEST CORRECT SECTOR         32D16060
0B6F 0 E2DE                   AND    2 K7-TB      SAVE BITS 13-15             32D16070
0B70 1 4C20 0B93              BNZ      VERFF      ERROR MESSAGE IF ERROR      32D16080
0B72 1 7401 0B31              MDX  L   TSTCF+1,1    BUMP SECTOR POINTER       32D16090
0B74 0 7101                   MDX    1 1          BUMP LOOP COUNTER           32D16100
0B75 0 70F6                   MDX      VERFD      LOOP IF NOT THRU            32D16110
                              *                                                32D16120
0B76 0 61F9                   LDX    1 -7         SET LOOP COUNTER            32D16130
0B77 1 C400 080A        VERFE LD     L  BDCYL     GET FIRST SECTOR ID READ    32D16140
0B79 1 F500 0812              EOR  L1  BDCYL+8    COMPARE WITH NEXT ONE       32D16150
0B7B 0 1803                   SRA      3          * FOR SAME CYLINDER NUM.    32D16160
0B7C 1 4C20 0B93              BNZ      VERFF      BRANCH IF NOT SAME          32D16170
0B7E 0 7101                   MDX    1 1          ELSE BUMP LOOP COUNTER      32D16180
0B7F 0 70F7                   MDX      VERFE      LOOP IF NOT THROUGH         32D16190
                              *                                                32D16200
                              *              CHECK FOR EXPECTED CYLINDER       32D16210
                              *                                                32D16220
0B80 0 CAD2                   LDD    2 PCYL#-TB   SET PRINT MESSAGE           32D16230
0B81 0 DACC                   STD    2 MOD3-TB    *                           32D16240
0B82 0 C241                   LD     2 COMA&1-TB  CK FOR EXPECTED CYLINDER    32D16250
0B83 0 1883                   SRT      3          *                           32D16260
0B84 0 D2CE                   STO    2 MOD5-TB    SAVE FOR PRINT              32D16270
0B85 0 D2D2                   STO    2 PCYL#-TB   SET AS PRESENT CYLINDER     32D16280
0B86 0 F2D3                   EOR    2 NCYL#-TB   IS IT EXPECTED              32D16290
0B87 1 4C18 0BA8              BZ       VERFI      BRANCH IF YES               32D16300
                              *                                                32D16310
                              *              CYLINDER ID NOT AS EXPECTED       32D16320
                              *                                                32D16330
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0B89 0 4230            BSI   2 STMSG-TB   PRINT MESSAGE                32D16340
0B8A 0 2E09            DC     /2E09       SEEK ERROR                   32D16350
0B8B 0 6302            LDX   3 SFTSK-SUMRY    COUNT SOFT SEEK ERROR    32D16360
0B8C 0 4221            BSI   2 COUNT-TB   *                            32D16370
0B8D 1 74FF 0665       MDX L  WRRTY,-1     DECR RETRY COUNTER           32D16380
0B8F 0 70A4            B      SEEK         RETRY THE SEEK               32D16390
0B90 0 6303            LDX   3 HRDSK-SUMRY    COUNT HARD SEEK ERROR    32D16400
0B91 0 4221            BSI   2 COUNT-TB   *                            32D16410
0B92 0 4233            BSI   2 TEXIT-TB   TERMINATE DFT                32D16420
                  *                                                    32D16430
0B93 0 61F8       VERFF LDX   1 -5         SET LOOP COUNTER             32D16440
0B94 1 CD00 080F  VERFG LDD  L1 BDCYL&5     SET HARD ERROR MSG           32D16450
0B96 0 DACC            STD   2 MOD3-TB    *                            32D16460
0B97 1 CD00 0811       LDD  L1 BDCYL&7     *                            32D16470
0B99 0 DACE            STD   2 MOD5-TB    *                            32D16480
0B9A 0 7104            MDX   1 4           DECR CTR                     32D16490
0B9B 0 7009            MDX     VERFH       BRANCH                       32D16500
0B9C 1 4400 868C       BSI  L  STMSG&/8000 PRINT SECOND LINE            32D16510
0B9E 0 8E00            DC      /8E00       MSG ID NOT PRINTED           32D16520
0B9F 1 74FF 0664       MDX  L  RTCNT,-1    BUMP ERROR RETRY COUNTER     32D16530
0BA1 0 708A            MDX     VERFB       LOOP IF NOT MAXIMUM          32D16540
0BA2 0 4230            BSI   2 STMSG-TB   PRINT MESSAGE                32D16550
0BA3 0 5A01            DC     /5A01       DSK NOT INIT                 32D16560
0BA4 0 4233            BSI   2 TEXIT-TB   TERMINATE DFT                32D16570
0BA5 0 4230       VERFH BSI   2 STMSG-TB   PRINT LINE 1                 32D16580
0BA6 0 8E14            DC     /8E14       HARD READ ERROR              32D16590
0BA7 0 70EC            B      VERFG       BRANCH                       32D16600
                  *                                                    32D16610
                  *                REACHED PROPER CYLINDER-CHECK       32D16620
                  *                FOR PREVIOUS ERRORS                 32D16630
                  *                                                    32D16640
0BA8 0 CA08       VERFI LDD   2 RTCNT-TB   CK PREVIOUS ERRORS           32D16650
0BA9 0 9ADF            SD    2 K8-TB      *                            32D16660
0BAA 1 4C20 0BAF       BNZ     VERFJ      BRANCH IF ERROR OCCURRED     32D16670
0BAC 0 1090            SLT     16         GET Q REG                    32D16680
0BAD 1 4C18 0BB3       BZ      VERFX      GO EXIT RTN                  32D16690
0BAF 0 4218       VERFJ BSI   2 CKLK-TB   CHECK LOCK ON ERROR          32D16700
0BB0 1 0B34            DC      SEEK       RETURN IF ON                 32D16710
0BB1 0 4230            BSI   2 STMSG-TB   PRINT RECOVERED ERROR        32D16720
0BB2 0 5A06            DC     /5A06       MESSAGE ID                   32D16730
0BB3 0 6500 0000  VERFX LDX  L1 *-*        RESTORE INDEX 1              32D16740
                  *                                                    32D16750
                  *                CHECK HOME BIT FOR EXPECTED         32D16760
                  *                                                    32D16770
0BB5 0 C2D2            LD    2 PCYL#-TB   GET PRESENT CYLINDER         32D16780
0BB6 0 D2CC            STO   2 MOD3-TB    *                            32D16790
0BB7 0 4820            SKP     Z          SKIP IF CYL ZERO             32D16800
0BB8 0 C28B            LD    2 TERM-TB    MAKE HOME BIT ZERO           32D16810
0BB9 0 F28A            EOR   2 ZSNS-TB    *                            32D16820
0BBA 0 1004            SLA     4          CHECK HOME BIT               32D16830
0BBB 1 4CA8 0692       BN    I VERFY      EXIT ROUTINE                 32D16840
0BBD 0 4230            BSI   2 STMSG-TB   PRINT HOME BIT INCORRECT      32D16850
0BBE 0 4E0D            DC     /4E0D       FORM/MESSAGE ID              32D16860
0BBF 1 4C80 0692       B     I VERFY      EXIT ROUTINE                 32D16870
                  *-------------------------------------------------   32D16880
                  *-------------------------------------------------   32D16890
                  *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   32D16900
                  *                                                    32D16910
                  *                READ SUB-ROUTINE                    32D16920
                  *                                                    32D16930
                  *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<   32D16940
                  *                                                    32D16950
                  *          THIS ROUTINE WILL ISSUE THE               32D16960
                  *          READ OPERATION, CHECK THE DSW             32D16970
                  *          FOR ERRORS AND CALL THE                   32D16980
                  *          COMPARE SUB-ROUTINE TO CHECK              32D16990
                  *          FOR ANY ERRORS.                           32D17000
                  *                                                    32D17010
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                  *          A MAXIMUM OF EIGHT RETRYS WILL            32D17020
                  *          BE MADE ON BOTH A DSW OR A                32D17030
                  *          COMPARE ERROR.                            32D17040
                  *                                                    32D17050
                  *          THE LOCK ON ERROR OPTION WILL             32D17060
                  *          LOCK THE ROUTINE IN THE READ              32D17070
                  *          OPTION AS LONG AS THE SWITCH              32D17080
                  *          IS ON EVEN IF THE ERROR IS                32D17090
                  *          INTERMITTENT.                             32D17100
                  *                                                    32D17110
                  **** ROUTINE CALL                                    32D17120
                  *                                                    32D17130
                  *     (A)=SECTOR COUNT                               32D17140
                  *     BSI   2 READ-TB                                32D17150
                  *     DC      WDCNT      NO. OF WORDS TO BE READ     32D17160
                  *                        * BIT 0 EQUAL 1 MEANS USE   32D17170
                  *                        * RANDOM DATA FOR COMPARE   32D17180
                  *     DC      NUMBER     USED IN COMPARE             32D17190
                  *     DC      CMPERR     ADRS OF CMP ERROR RETURN    32D17200
                  *                                                    32D17210
                  ****ALTERNATE CALL USED                              32D17220
                  *     (A) = SECTOR COUNT                             32D17230
                  *     BSI  L  READ+/8000                             32D17240
                  *     DC      WD CNT                                 32D17250
                  *                                                    32D17260
                  *     THE ALTERNATE CALL WILL CAUSE THE ROUTINE      32D17270
                  *     TO READ AND RETURN WITHOUT CHECKING EITHER     32D17280
                  *     THE DSW OR THE DATA READ.                      32D17290
                  *                                                    32D17300
                  *-------------------------------------------------   32D17310
0BC1 0 EAB5       RDEN  OR    2 DSKMD-TB   COMBINE WITH READ           32D17320
0BC2 0 1890             SRT     16         A TO Q                      32D17330
0BC3 0 D2D8             STO   2 RDDSW-TB   CLEAR DSW ERROR COUNTER     32D17340
0BC4 0 D2D9             STO   2 RDCMP-TB   CLEAR CMP ERROR COUNTER     32D17350
0BC5 0 C216             LD    2 ADCMA-TB                               32D17360
0BC6 0 DABC             STD   2 ZXIO-TB    SET FOR XEQ CALL            32D17370
0BC7 0 108D             SLT     13         SECTOR TO 0-2 Q REG.        32D17380
0BC8 0 C2D3             LD    2 NCYL#-TB   GET CYL. # WHERE DISK S/B    32D17390
                  *                        *   AFTER LAST SEEK         32D17400
0BC9 0 1083             SLT     3          COMBINE FOR COMPARE         32D17410
0BCA 0 D206             STO   2 IDS#B-TB   PRESENT SECTOR ID           32D17420
                  *                                                    32D17430
                  *                                                    32D17440
0BCB 1 6780 0680        LDX  I3 READ       GET CALLING ADRS+1          32D17450
0BCD 0 C3FF             LD    3 -1         SET NOCK SW                 32D17460
0BCE 0 D2FF             STO   2 NOCK-TB    *                           32D17470
0BCF 0 C300             LD    3 0          GET WORD COUNT              32D17480
0BD0 0 D2FE             STO   2 RNDCK-TB   IF NEG. USE RANDOM NUMBERS  32D17490
0BD1 0 1001             SLA     1          CLEAR BIT 0                 32D17500
0BD2 0 1801             SRA     1          *                           32D17510
0BD3 0 D240             STO   2 COMA-TB    WORD COUNT                  32D17520
0BD4 0 D200             STO   2 LNGTH-TB   *  FOR COMPARE RTN          32D17530
0BD5 0 C301             LD    3 1          GET NUMBER                  32D17540
0BD6 0 D20C             STO   2 CMPTM-TB   *  FOR COMPARE RTN          32D17550
0BD7 0 C302             LD    3 2          GET CMP ERROR ADRS          32D17560
0BD8 0 D029             STO     RDCPX+1    SET FOR CMP ERROR EXIT      32D17570
0BD9 1 7401 0680        MDX  L  READ,1     INCR FOR NO-CHECK RETURN    32D17580
0BDB 0 6304             LDX   3 RDCNT-SUMRY POINTER FOR SUMMARY        32D17590
0BDC 0 4221             BSI   2 COUNT-TB   INCR READ COUNT              32D17600
                  *                                                    32D17610
0BDD 0 CADF       READA LDD   2 K8-TB      SET RETRY COUNTER           32D17620
0BDE 0 DAD6             STD   2 RTRYA-TB   * TO 8                      32D17630
                  *                                                    32D17640
                  *                PRESET I/O AREA TO /FFFF            32D17650
                  *                                                    32D17660
0BDF 0 C28B       READB LD    2 TERM-TB    /FFFF                       32D17670
0BE0 0 422A             BSI   2 SETV-TB    CALL PRESET ROUTINE         32D17680
                  *                                                    32D17690
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                        *                   ISSUE A READ OPERATION                  32D17700
                        *                   THRU THE XEQ SUB-ROUTINE                32D17710
                        *                                                           32D17720
0BE1 0 423C                   BSI   2 XEQ-TB      ISSUE READ COMMAND                32D17730
                        *                                                           32D17740
                        *     IF NOCK NEG DONT CHECK FOR                            32D17750
                        *     DSW ERRORS, BUT EXIT AS IF NORMAL READ.               32D17760
                        *                                                           32D17770
0BE2 0 C2FF                   LD    2 NOCK-TB     GET NO CHECK SWITCH               32D17780
0BE3 1 4C28 0BF6              BN      RDNCK       EXIT IF NEGATIVE                  32D17790
                        *                                                           32D17800
                        *                   CHECK DSW FOR ERRORS                    32D17810
                        *                                                           32D17820
0BE5 0 C28A                   LD    2 ZSNS-TB     INTRPT DSW                        32D17830
0BE6 1 4C28 0C03              BN      RDER2       BRANCH ON ERROR                   32D17840
0BE8 0 4038                   BSI     CMP         CALL COMPARE RTN                  32D17850
0BE9 0 700E                   B       RDER1       COMPARE ERROR RETURN              32D17860
0BEA 0 C2D8                   LD    2 RDDSW-TB    GET ERROR CONT                    32D17870
0BEB 0 82D9                   A     2 RDCMP-TB    ADD COMPARE ERRORS                32D17880
0BEC 1 4C18 0BF4              BZ      READX       BRANCH IF NO ERRORS               32D17890
0BEE 0 4218                   BSI   2 CKLK-TB     CHECK LOCK ON ERROR SW            32D17900
0BEF 1 0BDD                   DC      READA       IF SET                            32D17910
0BF0 0 6305                   LDX   3 SFTRD-SUMRY     POINTER                     32D17920
0BF1 0 4221                   BSI   2 COUNT-TB    SOFT READ ERROR                   32D17930
0BF2 0 4230                   BSI   2 STMSG-TB    PRINT MESSAGE                     32D17940
0BF3 0 5A03                   DC      /5A03       SOFT READ ERROR                   32D17950
                        *                                                           32D17960
0BF4 1 7402 0680    READX MDX   L   READ,2      INCR FOR NORMAL RETURN            32D17970
                        *                                                           32D17980
0BF6 1 4C80 0680    RDNCK B     I   READ        RETURN                            32D17990
                        *                                                           32D18000
0BF8 1 7401 0635    RDER1 MDX   L   RDCMP,1     COUNT COMPARE ERROR               32D18010
0BFA 1 74FF 0632          MDX   L   RTRYA,-1    DECR RETRY COUNTER                32D18020
0BFC 0 70E2               B         READB       LOOP                              32D18030
0BFD 0 4230               BSI   2 STMSG-TB      PRINT MESSAGE                     32D18040
0BFE 0 5A04               DC      /5A04         HARD CMP ERROR                    32D18050
0BFF 0 6306               LDX   3 HRDRD-SUMRY POINTER TO HRD RD ERR CNT           32D18060
0C00 0 4221               BSI   2 COUNT-TB      COUNT ERROR                       32D18070
0C01 0 4C00 0000    RDCPX B     L   *-*         COMPARE ERROR EXIT                32D18080
                        *                                                           32D18090
0C03 0 C2D8         RDER2 LD    2 RDDSW-TB      GET DSW ERROR COUNT               32D18100
0C04 1 7401 0634          MDX   L   RDDSW,1      BUMP COUNT                        32D18110
0C06 0 421B               BSI   2 CKPRT-TB      CK PRINT-ALL-ERRORS OPTION        32D18120
0C07 0 7002               B       RDR2B         BR AROUND PRINT                   32D18130
0C08 0 4230         RDR2A BSI   2 STMSG-TB      PRINT MESSAGE                     32D18140
0C09 0 0E06               DC      /0E06         HARD DSW ERROR                    32D18150
0C0A 0 4016         RDR2B BSI     CMP           CALL COMPARE RTN                  32D18160
0C0B 0 700F               B       RDER4         COMPARE ERROR RETURN              32D18170
0C0C 1 74FF 0632          MDX   L   RTRYA,-1     DECR RETRY COUNTER                32D18180
0C0E 0 70D0               B         READB       LOOP                              32D18190
                        *                                                           32D18200
0C0F 0 CABC         RDER3 LDD   2 ZXIO-TB       GET LAST IOCC ISSUED              32D18210
0C10 0 DACC               STD   2 MOD3-TB       STORE IN CASE PRINT               32D18220
0C11 0 4218               BSI   2 CKLK-TB       CHECK LOCK-ON-ERROR               32D18230
0C12 1 0BDD               DC      READA         IF SET                            32D18240
0C13 0 4230               BSI   2 STMSG-TB      PRINT MESSAGE                     32D18250
0C14 0 0E07               DC      /0E07         DSW ERROR                         32D18260
0C15 0 6306               LDX   3 HRDRD-SUMRY     POINTER                       32D18270
0C16 0 4221               BSI   2 COUNT-TB      HARD READ ERROR                   32D18280
0C17 0 C2D6               LD    2 RTRYA-TB      GET DSW RETRY COUNTER             32D18290
0C18 1 4C18 0BF4          BZ      READX         NORMAL EXIT/NO CMP ERRORS         32D18300
                        *                       *  ON LAST READ                   32D18310
0C1A 0 70E6               B       RDCPX         TAKE CMP ERROR EXIT               32D18320
                        *                                                           32D18330
0C1B 1 7401 0635    RDER4 MDX   L   RDCMP,1     INCR CMP ERROR COUNT              32D18340
0C1D 1 74FF 0633          MDX   L   RTRYB,-1     DECR CMP ERROR COUNT              32D18350
0C1F 0 70BF               B         READB       LOOP                              32D18360
0C20 0 70EE               B         RDER3       GO EXIT                           32D18370
```



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                        *-------------------------------------------------------- 32D18380
                        *-------------------------------------------------------- 32D18390
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D18400
                        *                                                         32D18410
                        *                   COMPARE SUB-ROUTINE                   32D18420
                        *                                                         32D18430
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D18440
                        *             THIS ROUTINE WILL CHECK ADRS                32D18450
                        *             READ AGAINST ADRS EXPECTED AND              32D18460
                        *             COMPARE DATA EXPECTED AGAINST               32D18470
                        *             DATA READ.                                  32D18480
                        *                                                         32D18490
                        *             ERROR PRINTOUTS WILL INCLUDE                32D18500
                        *             ADRS, WORD NUMBER, EXPECTED,                32D18510
                        *             RECEIVED AND TOTAL NUMBER OF                32D18520
                        *             ERRORS.                                     32D18530
                        *                                                         32D18540
                        *             AN OPTION OF PRINT ONLY FIRST               32D18550
                        *             ERROR OR PRINT ALL ERRORS IS                32D18560
                        *             PROVIDED                                    32D18570
                        *                                                         32D18580
                        **** ROUTINE CALL                                         32D18590
                        *                                                         32D18600
                        *     BSI     CMP                                         32D18610
                        *     MDX     CMPERR      ERROR RETURN                    32D18620
                        *-----------------------------------------                32D18630
                        *                                                         32D18640
0C21 0 0000         CMP   DC      *-*           ROUTINE ENTRANCE                  32D18650
0C22 0 1010               SLA     16            ZERO A                            32D18660
0C23 0 D202               STO   2 ERCT-TB       CLEAR ERROR COUNT                 32D18670
0C24 0 D207               STO   2 LPRNT-TB      CLEAR LAST-WORD-PRINTED           32D18680
0C25 0 C2DA               LD    2 K1-TB         SET INDEX TO ONE                  32D18690
0C26 0 D201               STO   2 INDEX-TB      *                                 32D18700
                        *                                                         32D18710
0C27 0 C20C               LD    2 CMPTM-TB      GET NUMBER TO COMPARE WITH        32D18720
0C28 0 D205               STO   2 S#B&1-TB      SET                               32D18730
0C29 0 CA06               LDD   2 IDS#B-TB      GET ID EXPECTED                   32D18740
0C2A 0 DA03               STD   2 S#B-1-TB      SET                               32D18750
0C2B 0 402D               BSI     CMPB          GO MAKE COMPARISION               32D18760
0C2C 0 C20C               LD    2 CMPTM-TB      SET NUMBER                        32D18770
0C2D 0 D204               STO   2 S#B-TB        SET                               32D18780
0C2E 0 7004               B       CMP2          CHECK FOR FINISHED                32D18790
0C2F 0 C2FE         CMP1  LD    2 RNDCK-TB      GET RANDOM INDICATOR              32D18800
0C30 1 4C28 0C8B          BN      CMRND         BRANCH IF ON                      32D18810
0C32 0 705B               B       CMRN1         GO TEST FOR BAD DATA              32D18820
0C33 1 7401 065D    CMP2  MDX   L   INDEX,1      INCR INDEX                        32D18830
0C35 0 C201               LD    2 INDEX-TB      GET CONTENTS INDEX                32D18840
0C36 0 9200               S     2 LNGTH-TB      CK FOR COMPLETE                   32D18850
0C37 1 4C08 0C2F          BNP     CMP1          BRANCH IF NOT FINISHED            32D18860
0C39 0 C202               LD    2 ERCT-TB       GET ERROR CNT                     32D18870
0C3A 0 D2CC               STO   2 MOD3-TB       STORE FOR PRINT                   32D18880
0C3B 1 4C18 0C43          BZ      CMP3          BRANCH IF ZERO                    32D18890
0C3D 0 C2D9               LD    2 RDCMP-TB      GET CMP ERROR COUNT               32D18900
0C3E 0 421B               BSI   2 CKPRT-TB      CK PRINT-ALL-ERRORS               32D18910
0C3F 0 7003               B       CMP3          BRANCH IF NOT SET                 32D18920
0C40 1 4400 868C          BSI   L STMSG&/8000 PRINT NO. ERRORS                    32D18930
0C42 0 4E15               DC      /4E15         # OF COMPARE ERRORS                32D18940
                        *                                                         32D18950
0C43 1 6780 065D    CMP3  LDX   I3 INDEX        IX EQUAL WD CT                    32D18960
0C45 1 C700 069C          LD    L3 COMA         GET REC LNGTH &1                  32D18970
0C47 1 8700 069D          A     L3 COMA&1       ADD REC LNGTH &2                  32D18980
0C49 0 82D8               A     2 K2-TB         ADD 2                             32D18990
0C4A 1 4C18 0C52          BZ      CMPX          BRANCH IF AS EXPECTED             32D19000
0C4C 0 C2D9               LD    2 RDCMP-TB      GET CMP ERROR COUNT               32D19010
0C4D 0 421B               BSI   2 CKPRT-TB      CK PRINT-ALL-ERRORS OPTION        32D19020
0C4E 0 7002               B       CMP4          BRANCH IF NOT SET                 32D19030
0C4F 0 4230               BSI   2 STMSG-TB      PRINT OVERREAD                    32D19040
0C50 0 7E08               DC      /7E08                                           32D19050
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0C51 0 C2DA          CMP4  LD    2 K1-TB      MAKE SURE A REG. NON-ZERO  32D19060
0C52 0 8202          CMPX  A     2 ERCT-TB    CK IF ANY ERRORS           32D19070
0C53 1 4C20 0C57           BNZ     CMPEX      BRANCH IF YES              32D19080
0C55 1 7401 0C21           MDX   L CMP,1      INCR RETURN                32D19090
0C57 1 4C80 0C21     CMPEX BSC   I CMP        EXIT ROUTINE               32D19100
                     *                                                   32D19110
0C59 0 0000          CMPB  DC      *-*        ENTRY                      32D19120
0C5A 1 6780 065D           LDX   I3 INDEX     GET INDEX                  32D19130
0C5C 1 F700 069C           EOR   L3 COMA      COMPARE WITH S/B           32D19140
0C5E 1 4C98 0C59           BZ    I  CMPB      EXIT IF EQUAL              32D19150
0C60 1 7700 069C           MDX   L3 COMA      INCR IX BY ADRS OF COMA    32D19160
0C62 0 6B37                STX     3 PNTC+1   SET FOR POINTER            32D19170
0C63 0 C202                LD      2 ERCT-TB  GET ERROR CNT MINUS 1      32D19180
0C64 1 7401 065E           MDX   L ERCT,1     INCREMENT ERROR COUNT      32D19190
0C66 1 4C18 0C75           BZ      CMPB2      BRANCH IF FIRST CMP ERROR  32D19200
                     *                                                   32D19210
                     *     CHECK PRINT ALL ERRORS OPTION                 32D19220
                     *                                                   32D19230
0C68 0 421B                BSI     2 CKPRT-TB CK PRINT-ALL-ERRORS OPTION 32D19240
0C69 0 701F                B       CMPB6      BRANCH IF NOT SET          32D19250
                     *                                                   32D19260
                     *     PRINT ADDITIONAL ERRORS                       32D19270
                     *                                                   32D19280
0C6A 0 C207          CMPB1 LD      2 LPRNT-TB TEST TO SEE IF BAD WORDS   32D19290
0C6B 0 82DA                A       2 K1-TB    * AND PREVIOUS WORD HAVE   32D19300
0C6C 0 9201                S       2 INDEX-TB * BEEN PRINTED YET         32D19310
0C6D 1 4C18 0C81           BZ      CMPB4      BRANCH TO PRINT BAD WORD   32D19320
0C6F 1 4C28 0C7F           BN      CMPB3      BRANCH/PRINT PREVIOUS WORD 32D19330
0C71 0 92DA                S     2 K1-TB      TEST FOR NEXT WORD PRINTED 32D19340
0C72 1 4CA0 0C59           BNZ   I CMPB       EXIT IF LAST WORD          32D19350
0C74 0 700E                B       CMPB5      BAD WORD+1 NOT PRINTED YET 32D19360
                     *                                                   32D19370
0C75 0 C2D9          CMPB2 LD      2 RDCMP-TB GET CMP ERROR COUNT        32D19380
0C76 0 421B                BSI     2 CKPRT-TB CK PRINT-ALL-ERRORS OPTION 32D19390
0C77 0 7002                B       CMP2A      BRANCH IF NOT SET          32D19400
0C78 0 4230                BSI     2 STMSG-TB PRINT MESSAGE              32D19410
0C79 0 7E0A                DC      /7E0A      MESSAGE ID                 32D19420
0C7A 0 C201          CMP2A LD      2 INDEX-TB GET POINTER                32D19430
0C7B 0 92DA                S       2 K1-TB        * TO ONE (1)          32D19440
0C7C 1 4C20 0C6A           BNZ     CMPB1          BRANCH IF NOT EQUAL   32D19450
0C7E 0 7002                B       CMPB4          PRINT BAD WORD        32D19460
                     *                                                   32D19470
                     *     PRINT WORD PREVIOUS TO BAD WORD               32D19480
                     *                                                   32D19490
0C7F 0 63FF          CMPB3 LDX     3 -1           INDEX-1               32D19500
0C80 0 4014                BSI     PNTB           PRINT                 32D19510
                     *                                                   32D19520
                     *     PRINT BAD WORD                                32D19530
                     *                                                   32D19540
0C81 0 6300          CMPB4 LDX     3 0            SET POINTER           32D19550
0C82 0 4012                BSI     PNTB           PRINT                 32D19560
                     *                                                   32D19570
                     *     TEST IF LAST WORD                             32D19580
                     *                                                   32D19590
0C83 0 C200          CMPB5 LD      2 LNGTH-TB     GET RECORD LNGTH      32D19600
0C84 0 9201                S       2 INDEX-TB     TEST FOR END          32D19610
0C85 1 4C98 0C59           BZ    I CMPB           EXIT IF LAST WORD WAS JUST 32D19620
                     *                            * PRINTED             32D19630
                     *                                                  32D19640
                     *     PRINT WORD FOLLOWING BAD WORD                 32D19650
                     *                                                   32D19660
0C87 0 6301                LDX     3 1            SET POINTER           32D19670
0C88 0 400C                BSI     PNTB           PRINT FORM 2          32D19680
0C89 1 4C80 0C59     CMPB6 B     I CMPB           RETURN                32D19690
                     *                                                   32D19700
0C8B 0 C204          CMRND LD      2 S#B-TB       GET CURRENT NUMBER    32D19710
0C8C 0 4227                BSI     2 RNDOM-TB     GET NEXT NUMBER       32D19720
0C8D 0 D205                STO     2 S#B&1-TB     SET                   32D19730
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0C8E 0 C204          CMRN1 LD      2 S#B-TB       CK CURRENT NUMBER     32D19740
0C8F 0 40C9                BSI     CMPB           *                     32D19750
0C90 0 C204                LD      2 S#B-TB       SET PREVIOUS NUMBER   32D19760
0C91 0 D203                STO     2 S#B-1-TB     *                     32D19770
0C92 0 C205                LD      2 S#B&1-TB     SET CURRENT NUMBER    32D19780
0C93 0 D204                STO     2 S#B-TB       *                     32D19790
0C94 0 709E                B       CMP2           CK FOR COMPLETE       32D19800
                     *                                                   32D19810
0C95 0 0000          PNTB  DC      *-*            ENTRY                 32D19820
0C96 0 C2D9                LD      2 RDCMP-TB     GET CMP ERROR COUNT   32D19830
0C97 0 421B                BSI     2 CKPRT-TB     CK PRINT-ALL-ERRORS OPTION 32D19840
0C98 0 7010                B       PNTBX          DON'T PRINT IF NOT SET 32D19850
0C99 0 C700 0000     PNTC  LD    L3 *-*           GET WORD READ         32D19860
0C9B 0 D2CE                STO     2 MOD5-TB      SET FOR PRINT         32D19870
0C9C 1 C700 0660           LD    L3 S#B           GET WORD EXPECTED     32D19880
0C9E 0 D2CD                STO     2 MOD4-TB      SET FOR PRINT         32D19890
0C9F 1 7780 065D           MDX   I3 INDEX         ADJUST INDEX          32D19900
0CA1 0 1000                NOP                    IN CASE SKIP OCCURS   32D19910
0CA2 1 6F00 0628           STX   L3 MOD3          SET FOR PRINT         32D19920
0CA4 1 6F00 0663           STX   L3 LPRNT         SET AS LAST WORD PRINTED 32D19930
0CA6 1 4400 868C           BSI   L  STMSG+/8000   PRINT W/O MID-PID---  32D19940
0CA8 0 6E16                DC       /6E16         S/B WAS               32D19950
0CA9 1 4C80 0C95     PNTBX B     I  PNTB          EXIT                  32D19960
                     *-------------------------------------------------- 32D19970
                     *-------------------------------------------------- 32D19980
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D19990
                     *                                                   32D20000
                     *                  WRITE ROUTINE                    32D20010
                     *                                                   32D20020
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D20030
                     *                                                   32D20040
                     *                                                   32D20050
                     *             THE ROUTINE WILL INSERT               32D20060
                     *             THE WORD COUNT AND THE DISK ADRS      32D20070
                     *             AS THE FIRST TWO WORDS OF THE         32D20080
                     *             I/O AREA AND ISSUE THE WRITE          32D20090
                     *             THRU THE XEQ ROUTINE.                 32D20100
                     *                                                   32D20110
                     *             AFTER INTRPT THE DSW IS CHECKED       32D20120
                     *             FOR ANY ERRORS.                       32D20130
                     *                                                   32D20140
                     *             IF ERRORS ARE FOUND THE ROUTINE       32D20150
                     *             WILL RETRY UP TO EIGHT TIMES.         32D20160
                     *                                                   32D20170
                     *             LOCK ON ERROR OPTION IS               32D20180
                     *             PROVIDED AND WILL LOCK THE            32D20190
                     *             ROUTINE IN WRITE ON EITHER AN         32D20200
                     *             INTERMITTENT OR SOLID ERROR.          32D20210
                     *                                                   32D20220
                     *             THE LOCK WILL REMAIN IN EFFECT        32D20230
                     *             UNTIL THE SWITCH IS CLEARED.          32D20240
                     *                                                   32D20250
                     **** ROUTINE CALL                                   32D20260
                     *                                                   32D20270
                     *     A REG. = SECTOR COUNT                         32D20280
                     *     BSI    2 WRITE-TB                             32D20290
                     *     DC       WORD COUNT                           32D20300
                     *              BIT 0 EQUAL 1 MEANS                  32D20310
                     *              DON'T PRESET I/O AREA.               32D20320
                     *     DC       NUMBER USED AS PRESET                32D20330
                     *     DC       ADRS TO RETURN TO                    32D20340
                     *              IF 8 RETRYS FAIL                     32D20350
                     *                                                   32D20360
                     ****ALTERNATE CALL USED                             32D20370
                     *                                                   32D20380
                     *     A REG = SECTOR COUNT                          32D20390
                     *     BSI  L  WRITE+/8000                           32D20400
                     *     DC      WORD COUNT                            32D20410
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                        *     DC      NUMBER USED AS PRESET                       32D20420
                        *                                                         32D20430
                        *     THE ALTERNATE CALL WILL CAUSE THE ROUTINE TO        32D20440
                        *     PRESET THE I/O AREA, WRITE AND RETURN WITH-         32D20450
                        *     OUT CHECKING THE DSW.                               32D20460
                        *                                                         32D20470
                        *---------------------------------------                  32D20480
0CAB 0 EAB4             WRTEN OR    2 WRMOD-TB   COMBINE WITH WRT FNC           32D20490
0CAC 0 1890                   SRT     16         A TO Q                          32D20500
0CAD 0 C216                   LD    2 ADCMA-TB   ADRS OF COMA                   32D20510
0CAE 0 DABC                   STD   2 ZXIO-TB    SET FOR XEQ                   32D20520
0CAF 0 108D                   SLT     13         POSITION SECTOR COUNT         32D20530
0CB0 0 C2D2                   LD    2 PCYL#-TB   GET PRESENT CYLINDER          32D20540
0CB1 0 1083                   SLT     3          CREATE SECTOR ID              32D20550
0CB2 0 D206                   STO   2 IDS#B-TB   UPDATE SECTOR ID             32D20560
0CB3 0 D241                   STO   2 COMA+1-TB  SET FOR WRITE OP             32D20570
0CB4 0 6307                   LDX   3 WRCNT-SUMRY   POINTER                   32D20580
0CB5 0 4221                   BSI   2 COUNT-TB   INCR WRITE COUNT            32D20590
0CB6 1 6780 0695              LDX  I3 WRITE      GET ADRS OF CALL+1           32D20600
0CB8 1 7402 0695              MDX  L  WRITE,2    CREATE NORMAL RETURN ADRS    32D20610
0CBA 0 C3FF                   LD    3 -1                                      32D20620
0CBB 0 D2FF                   STO   2 NOCK-TB    SET FOR NO CHECK IF NEG.     32D20630
0CBC 0 C302                   LD    3 2          DSW ERR ADRS                 32D20640
0CBD 0 D018                   STO     WRTE+1     SET FOR ERROR RETURN         32D20650
0CBE 0 C300                   LD    3 0          GET WORD COUNT               32D20660
0CBF 0 D240                   STO   2 COMA-TB    SET FOR XIO                  32D20670
0CC0 1 4C28 0CC4              BN      WRTA       BIT 0 SET MEANS DON'T        32D20680
                        *                        *  PRESET THE I/O AREA       32D20690
0CC2 0 C301                   LD    3 1          NUMBER                       32D20700
0CC3 0 422A                   BSI   2 SETV-TB    PRESET I/O AREA              32D20710
                        *                                                     32D20720
                        *                                                     32D20730
                        *                ISSUE WRITE THRU XEQ RTN             32D20740
                        *                                                     32D20750
0CC4 0 423C             WRTA  BSI   2 XEQ-TB     ISSUE WRITE COMMAND          32D20760
0CC5 0 C28B                   LD    2 TERM-TB    GET ALL F'S                  32D20770
0CC6 0 D241                   STO   2 COMA+1-TB  PRESETS IO AREA              32D20780
                        *                                                     32D20790
                        *     IF NOCK NEGATIVE, DON'T CHECK FOR               32D20800
                        *     DSW ERRORS BUT EXIT AS IF NORMAL WRITE.         32D20810
                        *                                                     32D20820
0CC7 0 C2FF                   LD    2 NOCK-TB    GET NO CHECK SWITCH          32D20830
0CC8 1 4CA8 0695              BN   I  WRITE      IF NEGATIVE, EXIT            32D20840
0CCA 1 7401 0695              MDX  L  WRITE,1    INCR RETURN                  32D20850
                        *                                                     32D20860
                        *                CHECK FOR DSW ERRORS                 32D20870
                        *                                                     32D20880
0CCC 0 C2BA                   LD    2 ZSNS-TB    INTRPT DSW                   32D20890
0CCD 1 4C90 0695              BNN  I  WRITE      EXIT IF NO ERRORS            32D20900
                        *                                                     32D20910
                        *                PRINT UNRECOVERABLE WRT              32D20920
                        *                                                     32D20930
0CCF 0 CA8C                   LDD   2 ZXIO-TB    GET LAST IOCC ISSUED         32D20940
0CD0 0 DACC                   STD   2 MOD3-TB    SET FOR PRINTING             32D20950
0CD1 0 4230                   BSI   2 STMSG-TB   DSW WRITE ERROR              32D20960
0CD2 0 0E08                   DC      /0E08                                     32D20970
                        *                                                     32D20980
0CD3 0 6308                   LDX   3 SFTWR-SUMRY   POINTER                   32D20990
0CD4 0 4221                   BSI   2 COUNT-TB   INCR HARD WRITE ERROR        32D21000
0CD5 0 4C00 0000        WRTE  B     L  *-*         DSW ERROR EXIT             32D21010
                        *---------------------------------------------------- 32D21020
                        *---------------------------------------------------- 32D21030
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D21040
                        *                                                     32D21050
                        *              SUB-ROUTINE RNDOM                      32D21060
                        *                                                     32D21070
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D21080
                        *     RANDOM NUMBER GENERATOR                         32D21090
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                        *                                                     32D21100
                        *          ROUTINE IS ENTERED WITH PREVIOUS NUMBER    32D21110
                        *          THAT WAS GENERATED, IN THE A REG.          32D21120
                        *                                                     32D21130
                        *          ROUTINE EXITS WITH A NEW 16-BIT            32D21140
                        *          NUMBER IN THE A REGISTER.                  32D21150
                        *                                                     32D21160
                        *                                                     32D21170
                        **** ROUTINE CALL                                     32D21180
                        *     A REG = NUMBER                                  32D21190
                        *     BSI   2 RNDOM-TB                                32D21200
                        *                                                     32D21210
                        *---------------------------------------------------- 32D21220
                        *                                                     32D21230
0CD7 0 A2E7             RNDME M     2 K253-TB    GENERATE RANDOM NUMBER       32D21240
0CD8 0 1090                   SLT     16         Q TO A                       32D21250
0CD9 0 4818                   SKP     +-         SKIP IF NON-ZERO             32D21260
0CDA 0 820D                   A     2 K123-TB    ELSE ADD 123 BASE 10         32D21270
0CDB 1 4C80 0683              B     I RNDOM      EXIT ROUTINE                 32D21280
                        *                                                     32D21290
                        *---------------------------------------------------- 32D21300
                        *---------------------------------------------------- 32D21310
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D21320
                        *              ROUTINE TO CHECK FOR LOCK              32D21330
                        *              ON ERROR OPTION                        32D21340
                        *                                                     32D21350
                        **** ROUTINE CALL                                     32D21360
                        *                                                     32D21370
                        *     BSI   2 CKLK-TB                                 32D21380
                        *     DC      ADRS TO RETURN TO IF SW IS SET.         32D21390
                        *                                                     32D21400
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D21410
0CDD 1 4C18 0CE7        CKLKE BZ      CKLK2        DON'T CK IF A REG. ZERO    32D21420
0CDF 1 C480 0674              LD   I  CKLK         GET LOCK ADRS              32D21430
0CE1 0 D004                   STO     CKLK1+1      SET AS RETURN              32D21440
0CE2 0 18D0                   RTE     16           SET IN Q                   32D21450
0CE3 0 C283                   LD    2 SW0-TB       GET SW FNC 0               32D21460
0CE4 0 108C                   SLT     12           CK FOR LOCK ON ERROR       32D21470
0CE5 0 4C28 0000        CKLK1 BN    L *-*          BRANCH IF ON               32D21480
0CE7 1 7401 0674        CKLK2 MDX   L CKLK,1       INCR RETURN                32D21490
0CE9 1 4C80 0674              BSC   I CKLK         EXIT SUB-ROUTINE           32D21500
                        *---------------------------------------------------- 32D21510
                        *---------------------------------------------------- 32D21520
0CEB 1 4C18 0CF1        CKPRE BZ      CKPRA        DON'T TEST IF ZERO         32D21530
0CED 0 C283                   LD    2 SW0-TB       GET FNC SW 00              32D21540
0CEE 0 100A                   SLA     10           BIT 10                     32D21550
0CEF 1 4C90 0677              BNN   I CKPRT        EXIT IF NOT SET            32D21560
0CF1 1 7401 0677        CKPRA MDX   L CKPRT,1      BUMP RETURN                32D21570
0CF3 1 4C80 0677              B     I CKPRT        EXIT                       32D21580
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D21590
                        *                                                     32D21600
                        *              SUB-ROUTINE SETV                       32D21610
                        *                                                     32D21620
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D21630
                        *                                                     32D21640
                        **** ROUTINE CALL                                     32D21650
                        *                                                     32D21660
                        *     (A)=WORD TO BE PRESET IN I/O AREA               32D21670
                        *     BSI   2 SETV-TB                                 32D21680
                        *---------------------------------------------------- 32D21690
                        *                                                     32D21700
0CF5 1 6780 069C        SETVE LDX   I3 COMA        GET NO. OF WORDS TO BE SET 32D21710
0CF7 0 7301                   MDX     3 1          INCR BY ONE                32D21720
0CF8 1 D700 069D        SETVA STO   L3 COMA&1      STORE WORD IN I/O AREA     32D21730
0CFA 0 73FF                   MDX     3 -1         DECR COUNT                 32D21740
0CFB 0 70FC                   B       SETVA        LOOP                       32D21750
0CFC 1 4C80 0686              B     I SETV         EXIT                       32D21760
                        *---------------------------------------------------- 32D21770
```

```
                        *-------------------------------------------------- 32D21780
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D21790
                        *                                                  32D21800
                        *     PRINT SUMMARY TABLE                          32D21810
                        *                                                  32D21820
                        **** ROUTINE CALL                                  32D21830
                        *     BSI   2 TEXIT-TB                             32D21840
                        *                                                  32D21850
                        ****ALTERNATE CALL                                 32D21860
                        *     BSC  L  DFTXT                                32D21870
                        *                                                  32D21880
                        *     THIS ROUTINE WILL PRINT THE SUMMARY TABLE    32D21890
                        *     AND SET SW 15 IN FUNCTION ZERO.              32D21900
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D21910
                        *                                                  32D21920
                        *                                                  32D21930
                        *     TERMINATE DFT                                32D21940
                        *                                                  32D21950
0CFE 0 C283             DFTXT LD    2 SWO-TB     FUNCTION 00               32D21960
0CFF 0 EADA                   OR    2 K1-TB      SET BIT 15 TO TERMINATE   32D21970
0D00 0 D283                   STO   2 SWO-TB     *  DFT PROGRAM            32D21980
0D01 0 4230                   BSI   2 STMSG-TB   TERMINATE DFT             32D21990
0D02 0 5A07                   DC      /5A07      TERMINATE DFT             32D22000
0D03 1 7401 0647        PRSUM MDX   L  PSSCT,1   INCR PASS COUNT           32D22010
                              *                                            32D22020
0D05 1 6700 0648              LDX   L3 SUMRY+1   SET POINTER               32D22030
0D07 0 6500 1A09              LDX   L1 /1A09     FORM/MESSAGE ID           32D22040
0D09 0 6922                   STX    1 ID        SET FOR STMSG CALL        32D22050
0D0A 0 C035                   LD       STMAD+1   GET ADDRESS OF STMSG RTN   32D22060
0D0B 0 D01F                   STO      FRM+1     SET FOR CALL              32D22070
0D0C 0 6103                   LDX    1 3         SET LOOP COUNT            32D22080
0D0D 0 4013             PRLN1 BSI      PRSML     GO PRINT A LINE           32D22090
0D0E 0 7303                   MDX    3 3         INCREMENT POINTER         32D22100
0D0F 0 71FF                   MDX    1 -1        DECREMENT LOOP COUNT      32D22110
0D10 0 70FC                   MDX      PRLN1     LOOP IF NOT THROUGH       32D22120
0D11 0 6500 3A05              LDX   L1 /3A05     MESSAGE ID                32D22130
0D13 0 6918                   STX    1 ID        SET FOR CALL              32D22140
0D14 0 400C                   BSI      PRSML     PRINT A LINE              32D22150
0D15 0 7302                   MDX    3 2         BUMP POINTER              32D22160
0D16 0 6500 6A0C              LDX   L1 /6A0C     MESSAGE ID                32D22170
0D18 0 6913                   STX    1 ID        SET FOR CALL              32D22180
0D19 0 6103                   LDX    1 3         SET LOOP COUNTER          32D22190
0D1A 0 4006             PRLN2 BSI      PRSML     PRINT A LINE              32D22200
0D1B 0 7302                   MDX    3 2         INCREMENT POINTER         32D22210
0D1C 0 71FF                   MDX    1 -1        DECREMENT LOOP COUNTER    32D22220
0D1D 0 70FC                   MDX      PRLN2     LOOP IF NOT THROUGH       32D22230
0D1E 0 4480 0164              BSI   I  END       ELSE GO TO MONITOR END RTN 32D22240
0D20 1 05DC                   DC       PID       ADDRESS OF PROGRAM ID     32D22250
                              *                                            32D22260
0D21 0 0000             PRSML DC       *-*       ENTRY                     32D22270
0D22 0 C2EB                   LD     2 PSSCT-TB  GET PASS COUNT            32D22280
0D23 0 D2CC                   STO    2 MOD3-TB   SET IN MSG                32D22290
0D24 0 C300                   LD     3 0         GET MODIFIER WORD         32D22300
0D25 0 D2CD                   STO    2 MOD4-TB   SET IN MSG                32D22310
0D26 0 C301                   LD     3 1         GET MODIFIER              32D22320
0D27 0 D2CE                   STO    2 MOD5-TB   SET IN MSG                32D22330
0D28 0 C302                   LD     3 2         GET MODIFIER              32D22340
0D29 0 D2CF                   STO    2 MOD6-TB   SET IN MSG                32D22350
0D2A 1 4400 068C        FRM   BSI   L  STMSG     GO PRINT LINE             32D22360
0D2C 0 0000             ID    DC       *-*       FORM/MSG ID               32D22370
0D2D 0 C0FD                   LD       FRM&1     SET NO PID-MID----PRINT   32D22380
0D2E 0 EAB9                   OR     2 H8000-TB                           32D22390
0D2F 0 D0FB                   STO      FRM&1                              32D22400
0D30 1 7401 0D2C              MDX   L  ID,1       INCREMENT MSG ID          32D22410
0D32 1 4C80 0D21              BSC   I  PRSML      EXIT                      32D22420
                              *                                            32D22430
                              *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D22440
                              *                                            32D22450
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                        *          INCREMENT AN ENTRY IN THE SUMMARY.      32D22460
                        *                                                  32D22470
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D22480
                        *          IX 1 IS THE POSITION IN THE SUMMARY     32D22490
                        *          TABLE TO BE INCREMENTED.  IF THE        32D22500
                        *          COUNT EXCEEDS 9999, THE COUNTER IS      32D22510
                        *          RESET TO ZERO SO THAT A MODULO 10,000   32D22520
                        *          IS SIMULATED.  THIS IS TO RELIEVE       32D22530
                        *          PRINTOUT PROBLEMS.                      32D22540
                        *                                                  32D22550
0D34 1 C700 0647        COUNE LD    L3 SUMRY     GET PROPER COUNTER        32D22560
0D36 0 82DA                   A      2 K1-TB     ADD ONE                   32D22570
                        *                                                  32D22580
0D37 1 D700 0647        COUNA STO   L3 SUMRY     STORE                     32D22590
0D39 0 92EA                   S      2 K10TH-TB  SUBTRACT 10,000.  THIS WIL 32D22600
                        *                        *  BE MEANINGLESS ON LOOP. 32D22610
0D3A 1 4CA0 067D              BNZ   I  COUNT      EXIT IF NOT 10,000        32D22620
0D3C 0 70FA                   B        COUNA      ELSE LOOP                 32D22630
                        *                                                  32D22640
                        *-------------------------------------------------- 32D22650
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D22660
                        *                                                  32D22670
                        *              SUB-ROUTINE STMSG                   32D22680
                        *                                                  32D22690
                        *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D22700
                        *                                                  32D22710
                        *                   COMMON MESSAGE SETUP RTN       32D22720
                        *                                                  32D22730
                        *              THIS ROUTINE WILL BUILD THE         32D22740
                        *              MESSAGE DESIRED AND CALL RTN        32D22750
                        *              PRINT TO PRINT THE MESSAGE.         32D22760
                        *                                                  32D22770
                        **** ROUTINE CALL                                  32D22780
                        *                                                  32D22790
                        *      BSI    2 STMSG-TB                           32D22800
                        *      DC       MSG ID                             32D22810
                        *      MSG ID = FMMM (WHERE)                       32D22820
                        *                F = FORM NUMBER                   32D22830
                        *                MMM = MESSAGE ID                  32D22840
                        *                                                  32D22850
                        ****ALTERNATE CALL USED                            32D22860
                        *      BSI  L  STMSG+/8000                         32D22870
                        *      DC       MSG ID                             32D22880
                        *                                                  32D22890
                        *      THE ALTERNATE CALL WILL PRINT THE MESSAGE   32D22900
                        *      AS AN ADDITIONAL LINE WHERE PID-MID-RID-RAD 32D22910
                        *      ARE NOT PRINTED.                            32D22920
                        *                                                  32D22930
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D22940
                        * FORM   MOD   MOD   MOD   MOD   MOD   MOD   MOD  * 32D22950
                        *  NO.    1     2     3     4     5     6     7   * 32D22960
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D22970
                        *  0    FILE#  DSW   HEX   HEX                     * 32D22980
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D22990
                        *  1    FILE#  DSW   DEC   DEC   DEC   DEC       * 32D23000
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D23010
                        *  2    FILE#  DSW   DEC   DEC   DEC             * 32D23020
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D23030
                        *  3    FILE#  DSW   DEC   DEC                   * 32D23040
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D23050
                        *  4    FILE#  DSW   DEC                         * 32D23060
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D23070
                        *  5    FILE#  DSW                               * 32D23080
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D23090
                        *  6    FILE#  DSW   DEC   HEX   HEX             * 32D23100
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D23110
                        *  7    FILE#  DSW   CYL   OOHS  #WDS            * 32D23120
                        *------+-----+-----+-----+-----+-----+-----+-----* 32D23130
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                        *  8    FILE#  DSW   HEX   HEX   HEX   HEX      *  32D23140
                        *------+------+-----+-----+-----+-----+-----*  32D23150
                        *  9    FILE#  DSW   HEX                        *  32D23160
                        *-------------------------------------------------  32D23170
                        *                                                  32D23180
0D3D 0 691C             STMSE STX    1 STMSX+1     SAVE IX 1               32D23190
0D3E 0 681F                   STX    3 STMSX+5     SAVE IX3                32D23200
0D3F 1 6580 068C        STMAD LDX    I1 STMSG      GET CALL ADRS           32D23210
0D41 0 C1FF                   LD     1 -1          *                       32D23220
0D42 0 E2B9                   AND    2 H8000-TB    SAVE BIT 0              32D23230
0D43 0 D2C7                   STO    2 MSGID-TB    STORE FOR LOG CALL      32D23240
0D44 0 10A0                   SLT      32          CLEAR AQ                32D23250
0D45 0 C100                   LD     1 0           GET FORM NUMBER         32D23260
0D46 0 18D8                   RTE      24          *                       32D23270
0D47 0 1808                   SRA      8           GET MSG ID              32D23280
0D48 0 D2C5                   STO    2 MSGO-TB     SAVE FOR LATER          32D23290
0D49 0 1010                   SLA      16          CLEAR A-REG             32D23300
0D4A 0 108C                   SLT      12          GET FORM NUMBER TO A-REG 32D23310
0D4B 0 D00A                   STO      STMSA+1     SAVE FOR INDEXING       32D23320
0D4C 0 1083                   SLT      3           GET TYPE MSG INDICATOR  32D23330
0D4D 0 D2C9                   STO    2 ADDR2-TB    SAVE FOR LATER TEST     32D23340
0D4E 1 7401 068C              MDX  L   STMSG,1      INCR RETURN             32D23350
                        *                                                  32D23360
0D50 0 C2F6                   LD     2 PRSW-TB     GET PRINTER SWITCH      32D23370
0D51 1 4C20 0D59              BNZ      STMSX       EXIT IF SW IS NON-ZERO  32D23380
                        *                                                  32D23390
0D53 0 6301                   LDX    3 1           SET CONV CTR            32D23400
0D54 0 C2D8                   LD     2 K2-TB       GET MOD WD CT           32D23410
0D55 0 6500 0000        STMSA LDX    L1 *-*                                32D23420
0D57 1 4D80 0D61              B      I1 FRMTB                              32D23430
                        *                                                  32D23440
                        *                                                  32D23450
0D59 0 6500 0000        STMSX LDX    L1 *-*        RESTORE                 32D23460
0D5B 1 6600 065C              LDX    L2 TB         SET UP TABLE POINTER    32D23470
0D5D 0 6700 0000              LDX    L3 *-*        RESTORE IX              32D23480
0D5F 1 4C80 068C              B      I  STMSG      EXIT                    32D23490
                        *                                                  32D23500
                        *-------------------------------------------------  32D23510
                        *                                                  32D23520
                        *      FORM TABLE                                  32D23530
                        *                                                  32D23540
0D61 1 0D6B             FRMTB DC       FORM0       ADRS OF RTN FORM 0      32D23550
0D62 1 0D6D                   DC       FORM1                         1       32D23560
0D63 1 0D6E                   DC       FORM2                         2       32D23570
0D64 1 0D6F                   DC       FORM3                         3       32D23580
0D65 1 0D70                   DC       FORM4                         4       32D23590
0D66 1 0D72                   DC       FORM5                         5       32D23600
0D67 1 0D7B                   DC       FORM6                         6       32D23610
0D68 1 0D7E                   DC       FORM7                         7       32D23620
0D69 1 0D8C                   DC       FORM8                         8       32D23630
0D6A 1 0D8D                   DC       FORM9                         9       32D23640
                        *                                                  32D23650
                        *                  FORM IS 0                       32D23660
                        *                                                  32D23670
0D6B 0 82DB             FORM0 A      2 K2-TB       INCR MOD CNT            32D23680
0D6C 0 7005                   B        FORM5       COMMON ROUTINE          32D23690
                        *                                                  32D23700
                        *                  FORM IS 1                       32D23710
                        *                                                  32D23720
0D6D 0 82DA             FORM1 A      2 K1-TB       INCR MOD CNT            32D23730
                        *                                                  32D23740
                        *                  FORM IS 2                       32D23750
                        *                                                  32D23760
0D6E 0 82DA             FORM2 A      2 K1-TB       INCR MOD CNT            32D23770
                        *                                                  32D23780
                        *                  FORM IS 3                       32D23790
                        *                                                  32D23800
0D6F 0 82DA             FORM3 A      2 K1-TB       INCR MOD CNT            32D23810
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                        *                                                  32D23820
                        *                  FORM IS 4                       32D23830
                        *                                                  32D23840
0D70 0 82DA             FORM4 A      2 K1-TB       INCR MOD CNT            32D23850
0D71 0 6306                   LDX    3 6           SET CONVERSION CTR      32D23860
                        *                                                  32D23870
                        *                  FORM IS 5                       32D23880
                        *          COMMON ROUTINE                          32D23890
                        *                                                  32D23900
0D72 0 D2D1             FORM5 STO    2 BNTMP-TB    SAVE IN TEMP STORAGE    32D23910
0D73 1 6580 062D              LDX    I1 BNTMP      SET COUNT IN IX1        32D23920
0D75 0 CA8B                   LDD    2 TERM-TB     SET AQ TO FOXES         32D23930
0D76 0 1010                   SLA      16          CLEAR A REGISTER        32D23940
0D77 0 11C0                   SLC    1 0           SET BITS FOR MODIFIERS  32D23950
0D78 0 EAC7                   OR     2 MSGID-TB    GET BIT 0               32D23960
0D79 0 D2C7                   STO    2 MSGID-TB    SET IN TABLE            32D23970
0D7A 0 7019                   B        PRINT       PRINT                   32D23980
                        *                                                  32D23990
                        *                  FORM IS 6                       32D24000
                        *                                                  32D24010
0D7B 0 82DC             FORM6 A      2 K3-TB       INCR MOD CNTR           32D24020
0D7C 0 6302                   LDX    3 2           SET CONVERSION CNTR     32D24030
0D7D 0 70F4                   B        FORM5                               32D24040
                        *                                                  32D24050
                        *                  FORM IS 7                       32D24060
                        *                                                  32D24070
0D7E 0 C206             FORM7 LD     2 IDS#B-TB    GET PRESENT SECTOR      32D24080
0D7F 0 1803                   SRA      3           SAVE CYLINDER NUMBER ONLY 32D24090
0D80 0 4032                   BSI      BNDEC       CONVERT TO DECIMAL      32D24100
0D81 0 D2CC                   STO    2 MOD3-TB     SET FOR PRINTTING       32D24110
0D82 0 C206                   LD     2 IDS#B-TB    GET PRESENT SECTOR ID   32D24120
0D83 0 E2DE                   AND    2 K7-TB       SAVE SECTOR ONLY        32D24130
0D84 0 1882                   SRT      2           SET SECTOR COUNT IN Q   32D24140
0D85 0 1002                   SLA      2           CLEAR TWO BITS          32D24150
0D86 0 1082                   SLT      2           MOVE BACK SECTOR CNT    32D24160
0D87 0 D2CD                   STO    2 MOD4-TB     SET FOR PRINTING        32D24170
0D88 0 C200                   LD     2 LNGTH-TB    GET READ LENGTH         32D24180
0D89 0 4029                   BSI      BNDEC       CONVERT TO DECIMAL      32D24190
0D8A 0 D2CE                   STO    2 MOD5-TB     SET IN PRINT MOD        32D24200
0D8B 0 C2DA                   LD     2 K1-TB       SET WORD CNT            32D24210
                        *     FALL THRU TO GET WRD CNT=5                   32D24220
                        *                                                  32D24230
                        *                  FORM IS 8                       32D24240
                        *                                                  32D24250
0D8C 0 82DC             FORM8 A      2 K3-TB       BUMP MSG WD COUNT       32D24260
                        *                                                  32D24270
                        *                  FORM IS 9                       32D24280
                        *                                                  32D24290
0D8D 0 82DA             FORM9 A      2 K1-TB       INCR MOD CNT            32D24300
0D8E 0 70E3                   B        FORM5       COMMON ROUTINE          32D24310
                        *-------------------------------------------------  32D24320
                        *-------------------------------------------------  32D24330
0D8F 1 C700 0627        MSGC1 LD     L3 MOD3-1     GET MODIFIER            32D24340
0D91 0 4021                   BSI      BNDEC       CONVERT TO DECIMAL      32D24350
0D92 1 D700 0627              STO    L3 MOD3-1     SET IN MODIFIER         32D24360
0D94 0 73FF             PRINT MDX    3 -1          DECR CONVERSION CTR     32D24370
0D95 0 70F9                   MDX      MSGC1       LOOP                    32D24380
0D96 1 6780 0621        PRINB LDX    I3 MSGO       GET MSG ID NUMBER       32D24390
0D98 0 C2C5                   LD     2 MSGO-TB     GET SAME TO A-REG       32D24400
0D99 0 4019                   BSI      BNDEC       CONVERT TO DECIMAL      32D24410
0D9A 0 D2C5                   STO    2 MSGO-TB     SET FOR MSG ID          32D24420
0D9B 0 C2C9                   LD     2 ADDR2-TB    GET MSG TYPE INDICATOR  32D24430
0D9C 0 E2DE                   AND    2 K7-TB       SAVE BITS 13-15         32D24440
0D9D 0 F2DE                   EOR    2 K7-TB       (NO MESSAGES WITH F)    32D24450
0D9E 1 4C18 0DAB              BZ       PRINA       BRANCH FOR ERROR MESSAGE 32D24460
0DA0 1 C700 0DC7              LD     L3 AALPH      GET ALPHA ADDRESS       32D24470
0DA2 0 D2C9                   STO    2 ADDR2-TB    SET ALPHA ADDRS FOR LOG 32D24480
0DA3 0 C283                   LD     2 SW0-TB      GET SW FNC 0            32D24490
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0DA4 0 100D              SLA     13          BIT 13-BYPASS ALL LOGS      32D24500
0DA5 1 4C28 0D59         BN      STMSX       EXIT IF SET                 32D24510
                     *                                                   32D24520
0DA7 0 4480 0163         BSI  I  LOG         MONITOR LOG CALL            32D24530
0DA9 1 0621              DC      MSGO        ADRS MSG                    32D24540
0DAA 0 70AE              B       STMSX       EXIT PRINT ROUTINE          32D24550
                     *                                                   32D24560
0DAB 1 C700 0DD6 PRINA LD    L3 EALPH       GET ALPHA ADDRESS           32D24570
0DAD 0 D2C9              STO    2 ADDR2-TB   SET ALPHA ADDRS FOR ERROR   32D24580
0DAE 0 4480 0162         BSI  I  ERROR       MONITOR ERROR CALL          32D24590
0DB0 1 0621              DC      MSGO        ADRS MSG                    32D24600
0DB1 1 08A2              DC      PRLP        LOOP RETURN                 32D24610
0DB2 0 70A6              B       STMSX       BCH TO EXIT                 32D24620
                     *-------------------------------------------------- 32D24630
                     *                                                   32D24640
                     *          CONVERT A POSITIVE NUMBER IN THE         32D24650
                     *          RANGE FROM 0-9999 TO IT'S DECI-          32D24660
                     *          MAL EQUIVALENT.                          32D24670
                     *                                                   32D24680
                     *          ENTER ROUTINE WITH THE NUMBER            32D24690
                     *          IN THE A REGISTER.  EXIT WITH            32D24700
                     *          THE CONVERTED NUMBER IN THE A REG.       32D24710
                     *                                                   32D24720
0DB3 0 0000 BNDEC    DC         *-*      ENTRY POINT                     32D24730
0DB4 1 4CA8 0DB3         BN   I  BNDEC       EXIT IF NEGATIVE            32D24740
0DB6 0 1890              SRT     16          A TO Q                      32D24750
0DB7 0 AAE9              D       2 THOUS-TB  MOST SIGNIF. DIGIT          32D24760
0DB8 0 100C              SLA     12          POSITION DIGIT              32D24770
0DB9 0 D2BE              STO     2 SNXIO-TB  SAVE                        32D24780
0DBA 0 1004              SLA     4           CLEAR A REG                 32D24790
0DBB 0 AAE4              D       2 HUNDR-TB  NEXT SIGNIF. DIGIT          32D24800
0DBC 0 1008              SLA     8           POSITION                    32D24810
0DBD 0 EABE              OR      2 SNXIO-TB  COMBINE IN HEX WORD         32D24820
0DBE 0 D2BE              STO     2 SNXIO-TB  SAVE                        32D24830
0DBF 0 1008              SLA     8           CLEAR A                     32D24840
0DC0 0 AAE0              D       2 TEN-TB    NEXT SIGNIF. DIGIT          32D24850
0DC1 0 108C              SLT     12          COMBINE LAST TWO DIGITS     32D24860
0DC2 0 180C              SRA     12          *                           32D24870
0DC3 0 1084              SLT     4           *                           32D24880
0DC4 0 EABE              OR      2 SNXIO-TB  COMBINE IN HEX WORD         32D24890
0DC5 1 4C80 0DB3         BSC  I  BNDEC       EXIT WITH WORD IN A REG.    32D24900
                     *                                                   32D24910
                     *-------------------------------------------------- 32D24920
0DC7 1 0DF5 AALPH    DC      ALPA0                                       32D24930
0DC8 1 0E09              DC      ALPA1                                   32D24940
0DC9 1 0E12              DC      ALPA2                                   32D24950
0DCA 1 0E1A              DC      ALPA3                                   32D24960
0DCB 1 0E25              DC      ALPA4                                   32D24970
0DCC 1 0E2D              DC      ALPA5                                   32D24980
0DCD 1 0E3A              DC      ALPA6                                   32D24990
0DCE 1 0E45              DC      ALPA7                                   32D25000
0DCF 1 0E4F              DC      ALPA8                                   32D25010
0DD0 1 0E5C              DC      ALPA9                                   32D25020
0DD1 1 0E6D              DC      ALPAA                                   32D25030
0DD2 1 0E78              DC      ALPAB                                   32D25040
0DD3 1 0E83              DC      ALPAC                                   32D25050
0DD4 1 0E8D              DC      ALPAD                                   32D25060
0DD5 1 0E9A              DC      ALPAE                                   32D25070
0DD6 0 0000 EALPH    DC      0                                           32D25080
0DD7 1 0EA8              DC      ALPE1                                   32D25090
0DD8 1 0EB4              DC      ALPE2                                   32D25100
0DD9 1 0EBB              DC      ALPE3                                   32D25110
0DDA 1 0EC3              DC      ALPE4                                   32D25120
0DDB 1 0ECF              DC      ALPE5                                   32D25130
0DDC 1 0EDC              DC      ALPE6                                   32D25140
0DDD 1 0EE9              DC      ALPE7                                   32D25150
0DDE 1 0EF8              DC      ALPE8                                   32D25160
0DDF 1 0F05              DC      ALPE9                                   32D25170
```



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0DE0 1 0F13              DC      ALPEA                                   32D25180
0DE1 1 0F21              DC      ALPEB                                   32D25190
0DE2 1 0F2F              DC      ALPEC                                   32D25200
0DE3 1 0F37              DC      ALPED                                   32D25210
0DE4 1 0F44              DC      ALPEE                                   32D25220
0DE5 1 0F55              DC      ALPEF                                   32D25230
0DE6 1 0F65              DC      ALPF0                                   32D25240
0DE7 1 0F73              DC      ALPF1                                   32D25250
0DE8 1 0F80              DC      ALPF2                                   32D25260
0DE9 1 0F91              DC      ALPF3                                   32D25270
0DEA 1 0F9A              DC      ALPF4                                   32D25280
0DEB 1 0FA3              DC      ALPF5                                   32D25290
0DEC 1 0FA7              DC      ALPF6                                   32D25300
0DED 1 0F37              DC      ALPF7                                   32D25310
0DEE 1 0FAF              DC      ALPF8                                   32D25320
0DEF 1 0FB8              DC      ALPF9                                   32D25330
                     *                                                   32D25340
ALPHO EQU    *                                                           32D25350
0DF0 0                   TYPE    .FILE DSW.                              32D25360
0DF4 0 FFFF              DC      /FFFF                                   32D25370
ALPAO EQU    *                                                           32D25380
0DF5   0010              TYPE    . CPU CYCLE TIME = 58.                  32D25390
0DFF   0009              TYPE    .   2310 DFT START.                     32D25400
0E08 0 FFFF              DC      /FFFF                                   32D25410
ALPA1 EQU    *                                                           32D25420
0E09   0008              TYPE    .   DSK NOT INIT.                       32D25430
0E11 0 FFFF              DC      /FFFF                                   32D25440
ALPA2 EQU    *                                                           32D25450
0E12   0007              TYPE    .   INVLD RTN#.                         32D25460
0E19 0 FFFF              DC      /FFFF                                   32D25470
ALPA3 EQU    *                                                           32D25480
0E1A   0010              TYPE    .   RECOVERED RD ERR.                   32D25490
0E25 0 FFFF              DC      /FFFF                                   32D25500
ALPA4 EQU    *                                                           32D25510
0E25   0007              TYPE    .   HRD CMP ERR.                        32D25520
0E2C 0 FFFF              DC      /FFFF                                   32D25530
ALPA5 EQU    *                                                           32D25540
0E2D   0012              TYPE    . PASS #WDS WRTN IN SECT.               32D25550
0E39 0 FFFF              DC      /FFFF                                   32D25560
ALPA6 EQU    *                                                           32D25570
0E3A   0010              TYPE    .   RECOVERED SK ERR.                   32D25580
0E44 0 FFFF              DC      /FFFF                                   32D25590
ALPA7 EQU    *                                                           32D25600
0E45   0009              TYPE    .   DFT TERMINATED.                     32D25610
0E4E 0 FFFF              DC      /FFFF                                   32D25620
ALPA8 EQU    *                                                           32D25630
0E4F   0012              TYPE    .SEEK TIMING IN PROGRESS.               32D25640
0E5B 0 FFFF              DC      /FFFF                                   32D25650
ALPA9 EQU    *                                                           32D25660
0E5C   0016              TYPE    . PASS SKS  SFT  HRD  7-LINE SMRY.      32D25670
0E6C 0 FFFF              DC      /FFFF                                   32D25680
ALPAA EQU    *                                                           32D25690
0E6D   0010              TYPE    . PASS RDS  SFT  HRD.                   32D25700
0E77 0 FFFF              DC      /FFFF                                   32D25710
ALPAB EQU    *                                                           32D25720
0E78   0010              TYPE    . PASS WRTS SFT  HRD.                   32D25730
0E82 0 FFFF              DC      /FFFF                                   32D25740
ALPAC EQU    *                                                           32D25750
0E83   0009              TYPE    . PASS  SK-RNDM WDS.                    32D25760
0E8C 0 FFFF              DC      /FFFF                                   32D25770
ALPAD EQU    *                                                           32D25780
0E8D   0012              TYPE    . PASS  WRT-RNDM WDS/RTN9.              32D25790
0E99 0 FFFF              DC      /FFFF                                   32D25800
ALPAE EQU    *                                                           32D25810
0E9A   0013              TYPE    . PASS  WRT-RNDM WDS/RTN10.             32D25820
0EA7 0 FFFF              DC      /FFFF                                   32D25830
ALPE1 EQU    *                                                           32D25840
0EA8   0011              TYPE    . LAST IOCC   LOST INT.                 32D25850
```

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0EB3 0 FFFF          DC      /FFFF                                    32D25860
0EB4 0               ALPE2   EQU     *                                32D25870
0EB4   0006          TYPE    .   EXTRA INT.                           32D25880
0EBA 0 FFFF          DC      /FFFF                                    32D25890
0EBB 0               ALPE3   EQU     *                                32D25900
0EBB   0007          TYPE    .   DSK NOT RDY.                         32D25910
0EC2 0 FFFF          DC      /FFFF                                    32D25920
0EC3 0               ALPE4   EQU     *                                32D25930
0EC3   0011          TYPE    . LAST IOCC   DSW WRONG.                 32D25940
0ECE 0 FFFF          DC      /FFFF                                    32D25950
0ECF 0               ALPE5   EQU     *                                32D25960
0ECF   0012          TYPE    . LAST IOCC   DSW SK ERR.                32D25970
0EDB 0 FFFF          DC      /FFFF                                    32D25980
0EDC 0               ALPE6   EQU     *                                32D25990
0EDC   0012          TYPE    . LAST IOCC   DSW RD ERR.                32D26000
0EE8 0 FFFF          DC      /FFFF                                    32D26010
0EE9 0               ALPE7   EQU     *                                32D26020
0EE9   0014          TYPE    . LAST IOCC   HRD DSW RD ERR.            32D26030
0EF7 0 FFFF          DC      /FFFF                                    32D26040
0EF8 0               ALPE8   EQU     *                                32D26050
0EF8   0012          TYPE    . LAST IOCC   DSW WRT ERR.               32D26060
0F04 0 FFFF          DC      /FFFF                                    32D26070
0F05 0               ALPE9   EQU     *                                32D26080
0F05   0013          TYPE    . FROM S/B  WAS   SEEK ERR.              32D26090
0F12 0 FFFF          DC      /FFFF                                    32D26100
0F13 0               ALPEA   EQU     *                                32D26110
0F13   0013          TYPE    . CYL# 00HS #WDS   CMP ERR.              32D26120
0F20 0 FFFF          DC      /FFFF                                    32D26130
0F21 0               ALPEB   EQU     *                                32D26140
0F21   0013          TYPE    . CYL# 00HS #WDS   OVERREAD.             32D26150
0F2E 0 FFFF          DC      /FFFF                                    32D26160
0F2F 0               ALPEC   EQU     *                                32D26170
0F2F   0007          TYPE    .   WRITE ERROR.                         32D26180
0F36 0 FFFF          DC      /FFFF                                    32D26190
0F37 0               ALPED   EQU     *                                32D26200
0F37   0012          TYPE    . CYL#    HOME BIT WRONG.                32D26210
0F43 0 FFFF          DC      /FFFF                                    32D26220
0F44 0               ALPEE   EQU     *                                32D26230
0F44   0016          TYPE    . LAST IOCC   NO DSW ERR/WRT 400.        32D26240
0F54 0 FFFF          DC      /FFFF                                    32D26250
0F55 0               ALPEF   EQU     *                                32D26260
0F55   0015          TYPE    . LAST IOCC   NO DSW ERR/RD 370.         32D26270
0F64 0 FFFF          DC      /FFFF                                    32D26280
0F65 0               ALPF0   EQU     *                                32D26290
0F65   0013          TYPE    . WDCNT  SECT WD CNT WRONG.              32D26300
0F72 0 FFFF          DC      /FFFF                                    32D26310
0F73 0               ALPF1   EQU     *                                32D26320
0F73   0012          TYPE    . WRT 400 WROTE NEXT SECT.               32D26330
0F7F 0 FFFF          DC      /FFFF                                    32D26340
0F80 0               ALPF2   EQU     *                                32D26350
0F80   0016          TYPE    . LAST IOCC #TMS   RDCK XFRD DATA.       32D26360
0F90 0 FFFF          DC      /FFFF                                    32D26370
0F91 0               ALPF3   EQU     *                                32D26380
0F91   0008          TYPE    .   SECT CNTR BAD.                       32D26390
0F99 0 FFFF          DC      /FFFF                                    32D26400
0F9A 0               ALPF4   EQU     *                                32D26410
0F9A   0008          TYPE    . 8 CYLINDER IDS.                        32D26420
0FA2 0 FFFF          DC      /FFFF                                    32D26430
0FA3 0               ALPF5   EQU     *                                32D26440
0FA3   0003          TYPE    . #ERS.                                  32D26450
0FA6 0 FFFF          DC      /FFFF                                    32D26460
0FA7 0               ALPF6   EQU     *                                32D26470
0FA7   0007          TYPE    . WD#  S/B  WAS.                         32D26480
0FAE 0 FFFF          DC      /FFFF                                    32D26490
0FAF 0               ALPF7   EQU     ALPED                            32D26500
0FAF   0008          ALPF8   EQU     *                                32D26510
0FB7 0 FFFF          TYPE    . SK/HOME BIT ERR.                       32D26520
                     DC      /FFFF                                    32D26530
```



```
0FB8 0               ALPF9   EQU     *                                32D26540
0FB8   0018          TYPE    . MAX  MIN  AVG  INCR   SK TIME (MS).    32D26550
0FCA 0 FFFF          DC      /FFFF                                    32D26560
                     *                                                32D26570
                     *------------------------------------------------ 32D26580
0FCB 0               PEND    EQU     *          LAST PROGRAM ADRS     32D26590
                     *<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<< 32D26600
0FCC   05F3          END     BEG        INITIAL XFER ADDRESS          32D26610
  NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```

```
AALPH   0DC7  0DA0
ADCMA   0672  0BC5 0CAD
ADDRS   0168
ADDR1   0624
ADDR2   0625  0D4D 0D9B 0DA2 0DAD
ADIL2   066F  0824
ADINT   0670  0ACF
ADIN2   0671  0AAA
ADPCN   0673  082D
ALPAA   0E6D  0DD1
ALPAB   0E78  0DD2
ALPAC   0E83  0DD3
ALPAD   0E8D  0DD4
ALPAE   0E9A  0DD5
ALPA0   0DF5  0DC7
ALPA1   0E09  0DC8
ALPA2   0E12  0DC9
ALPA3   0E1A  0DCA
ALPA4   0E25  0DCB
ALPA5   0E2D  0DCC
ALPA6   0E3A  0DCD
ALPA7   0E45  0DCE
ALPA8   0E4F  0DCF
ALPA9   0E5C  0DD0
ALPEA   0F13  0DE0
ALPEB   0F21  0DE1
ALPEC   0F2F  0DE2
ALPED   0F37  0DE3
ALPEE   0F44  0DE4
ALPEF   0F55  0DE5
ALPE1   0EA8  0DD7
ALPE2   0EB4  0DD8
ALPE3   0EBB  0DD9
ALPE4   0EC3  0DDA
ALPE5   0ECF  0DDB
ALPE6   0EDC  0DDC
ALPE7   0EE9  0DDD
ALPE8   0EF8  0DDE
ALPE9   0F05  0DDF
ALPF0   0F65  0DE6
ALPF1   0F73  0DE7
ALPF2   0F80  0DE8
ALPF3   0F91  0DE9
ALPF4   0F9A  0DEA
ALPF5   0FA3  0DEB
ALPF6   0FA7  0DEC
ALPF7   0F37  0DED
ALPF8   0FAF  0DEE
ALPF9   0FB8  0DEF
ALPH0   0DF0  0624
AVG     09DB  09EE 0A0C 0A0E 0A2F
BADCY   05F0  086F 0823
BDCYL   080A  0864 0B6D 0B77 0B79 0B94 0B97
BEG     05F3  0FCC
BEGIN   0160  05F3
BNDEC   0DB3  0D80 0D89 0D91 0D99 0DB4 0DC5
BNTMP   062D  0D72 0D73
CKLK    0674  0BAF 0BEE 0C11 0CDF 0CE7 0CE9
CKLKE   0CDD  0675
CKLK1   0CE5  0CE1
CKLK2   0CE7  0CDD
CKPRA   0CF1  0CEB
CKPRE   0CEB  0678
CKPRT   0677  0975 0A3A 0C06 0C3E 0C4D 0C68 0C76 0C97 0CEF 0CF1 0CF3
CKRD1   0ADA  0AE7
CKRD3   0AE3  0AE6
CMN1    0929  0931
CMN2    0927  0933
```



```
CMN3    092F  0936
CMP     0C21  08D3 0BE8 0C0A 0C55 0C57
CMPB    0C59  0C2B 0C5E 0C72 0C85 0C89 0C8F
CMPB1   0C6A  0C7C
CMPB2   0C75  0C66
CMPB3   0C7F  0C6F
CMPB4   0C81  0C6D 0C7E
CMPB5   0C83  0C74
CMPB6   0C89  0C69
CMPEX   0C57  0C53
CMPTM   0668  08D2 0BD6 0C27 0C2C
CMPX    0C52  0C4A
CMP1    0C2F  0C37
CMP2    0C33  0C2E 0C94
CMP2A   0C7A  0C77
CMP3    0C43  0C3B 0C3F
CMP4    0C51  0C4E
CMRND   0C8B  0C30
CMRN1   0C8E  0C32
CMRTA   094B  094A
CMRTB   0952  0944 0962
CMRTD   0959  0958
CMRTG   095C  0951
CMRTL   0941  095A
CMRT2   0937  092B
CNTA    0659
CNTB    0631  0980 0988 0A58 0A5E 0A7A 0A93
CNTL    088A  067B 0878 0940 0965 0983 098D 0993 09D6 09EC
CNTLB   0898  08A9
CNTLD   08A7  0890
CNTLE   067A  08E7 08FD 0924 095B 0987 09CA 09E9 0A34
COMA    069C  0672 0830 0848 0866 086D 0871 0942 096A 09A5 09F0 0A04 0A13 0A55
              0A76 0AE8 0B36 0B63 0B82 0BD3 0C45 0C47 0C5C 0C60 0CB3 0CBF 0CC6
              0CF5 0CF8
COUNA   0D37  0D3C
COUNE   0D34  067E
COUNT   067D  095F 09CE 0B47 0B8C 0B91 0BDC 0BF1 0C00 0C16 0C85 0CD4 0D3A
CYL     093F  0937
DATA1   0949  0939
DATA2   0950  093A
DATA3   0957  093B
DFTXT   0CFE  0690 085E 0861 088D
DSKMD   0611  0AD6 0AD7 0BC1
DVA     05F7  0821 0834 0AD3
DVAS    05E9  081F
EALPH   0DD6  0DAB
END     0164  0AA1 0D1E
ERCT    065E  0C23 0C39 0C52 0C63 0C64
ERLCK   0166
ERROR   0162  0DAE
ERSK1   0630  0967 0973 0982
FILE#   0626  0822 0825
FORM0   0D6B  0D61
FORM1   0D6D  0D62
FORM2   0D6E  0D63
FORM3   0D6F  0D64
FORM4   0D70  0D65
FORM5   0D72  0D66 0D6C 0D7D 0D8E
FORM6   0D7B  0D67
FORM7   0D7E  0D68
FORM8   0D8C  0D69
FORM9   0D8D  0D6A
FRM     0D2A  0D0B 0D2D 0D2F
FRMTB   0D61  0D57
FRNSK   0653  0918
FRN1    0655  09C5
FRN2    0657
FSTNO   09D3  099C 09C0 0A0B 0A21
```

```
HCEDC   083B  0867
HE5E5   0620  092F
HRDRD   064D  0BFF 0C15
HRDSK   064A  0B90
HRDWR   0650  095E 09CD
HUNDR   0640  0DBB
HXDC    0622
H1313   060E  0927 09F1 0A06
H3000   060D  0ADC 0AEE 0AEF
H8000   0615  0A69 0D2E 0D42
ID      0D2C  0D09 0D13 0D18 0D30
IDS#B   0662  0A14 0BCA 0C29 0CB2 0D7E 0D82
IL0     017A
IL1     018A
IL2     019A  066F
IL3     01AA
IL4     01BA
INCR1   0912  08F2 08F8 0903
INCR2   0913  08F4 08FA 0909
INDEX   065D  0C26 0C33 0C35 0C43 0C5A 0C6C 0C7A 0C84 0C9F
INTR    05F8  0602 0670
INTRB   0604  05FA
INTRC   05FE
INTSW   05F6  05F9 05FF 0AD5 0AF7
INT2    0AB6  0671 0AB8 0ABD
INT2A   0ABF  0ABE
IPA     05E4
KLP13   066B  0A57 0A79 0A97
KM14    063D
K1      0636  0837 0893 08C2 08F5 094B 0978 09B0 0A0F 0A1C 0A53 0AAF 0ABC 0B41
              0867 0C25 0C51 0C6B 0C71 0C7B 0CFF 0D36 0D6D 0D6E 0D6F 0D70 0D8B
              0D8D
K10TH   0646  087C 0AE1 0AF4 0B49 0D39
K123    0669  0CDA
K2      0637  0A6D 0C49 0D54 0D6B
K202    0641  0A6C
K203    0642  0843 08FB 0A46
K23     063E
K253    0643  0CD7
K27     09F7  0A26 0A3C
K3      0638  084D 0862 0881 0D7B 0D8C
K331    0644  0A23
K36     063F
K370    09FE  09EF
K4      0639  0A5A
K7      063A  08C7 0B5E 0B6F 0D83 0D9C 0D9D
K8      063B  0B15 0B44 0BA9 0BDD
LNGTH   065C  0BD4 0C36 0C83 0D88
LOG     0163  0DA7
LOGBY   0167
LPA     05E3
LPCNT   0032  089D 0914 092A 0A43
LPRNT   0663  0C24 0C6A 0CA4
LP13    0014  066B
LRN1    0656  098F 09C8
LRN2    0658  0994
LRTN    08BB  08AE
LSTNO   09D2  0998 099B 099F 09A2 09AA 09C7
MASK    060F  0854
MLSCF   05E5  05FD 082E 0B09
MOD3    0628  0853 097F 0A22 0A7E 0A86 0A88 0AA5 0AC3 0B03 0B31 0B96 0BB6 0C10
              0C3A 0CA2 0CD0 0D23 0D81 0D8F 0D92
MOD4    0629  0A8C 0A91 0AC6 0C9E 0D25 0D87
MOD5    062A  0981 0A80 0A84 0A85 0A96 0A98 0AC5 0ACA 0B84 0B99 0C9B 0D27 0D8A
MOD6    062B  0A9B 0D29
MOD7    062C
MSGC1   0D8F  0D95
MSGID   0623  0D43 0D78 0D79
```



```
MSGO    0621  0D48 0D96 0D98 0D9A 0DA9 0DB0
NCYL#   062F  0968 0B20 0B22 0B29 0B37 0B86 0BC8
NLOOP   0A43  0A32
NOCK    065B  0BCE 0BE2 0CBB 0CC7
PCYL#   062E  0842 0B38 0B80 0B85 0B85 0CB0
PEND    0FCB  05E8
PID     05DC  05F5 0AA3 0D20
PNTB    0C95  0C80 0C82 0C88 0CA9
PNTBX   0CA9  0C98
PNTC    0C99  0C62
PRECA   0847  085B
PRECB   084B  0851
PRECD   085A  0855
PRECE   085C
PRECF   0871  0877
PRECG   086D  0868
PRECJ   087A  084B 0682
PRECL   087E  0886
PRECM   0882  0889
PRECN   083C  0673 08A5
PRECT   0879  084C 087B 0880 0888
PRINA   0DAB  0D9E
PRINB   0D96
PRINT   0D94  0D7A
PRLN1   0D0D  0D10
PRLN2   0D1A  0D1D
PRLP    08A2  0DB1
PRNSK   0654  0917 091A 091C
PRSML   0D21  0D0D 0D14 0D1A 0D32
PRSUM   0D03  0896
PRSW    0652  0833 094C 0953 095D 0979 097D 09B1 09B8 09CC 0D50
PSSCT   0647  0D03 0D22
RAD     05DE  082F 089C 08A0
RCKX    0A40  0A37 0A3B
RCKX1   0A3E  0A42
RDCHK   0612  096B
RDCMP   0635  0BC4 0BEB 0BF8 0C1B 0C3D 0C4C 0C75 0C96
RDCNT   064B  0BDB
RDCPX   0C01  0BD8 0C1A
RDDSW   0634  0BC3 0BEA 0C03 0C04
RDEN    0BC1  0681
RDER1   0BF8  0BE9
RDER2   0C03  0BE6
RDER3   0C0F  0C20
RDER4   0C1B  0C0B
RDNCK   0BF6  0BE3
RDR2A   0C08
RDR2B   0C0A  0C07
READ    0680  0863 08C8 094E 0955 096C 09B3 09BA 09DE 09FC 0A10 0B60 0BCB 0BD9
              0BF4 0BF6
READA   0BDD  0BEF 0C12
READB   0BDF  0BFC 0C0E 0C1F
READX   0BF4  0BEC 0C18
RID     05DD  0832 0892 0894 0898 08A4 08A7 09C1
RNDCK   065A  0BD0 0C2F
RNDME   0CD7  0684
RNDOM   0683  091B 09A7 0C8C 0CDB
RNDSK   05EE  0915
RNDWR   05EF  0999 099D
RQKB    01BC
RQTY    01BB
RTCNT   0664  0B16 0B45 0B9F 0BA8
RTNER   0667  089F 0A17 0A29 0A39 0A3D
RTNSW   0165
RTN1    08BD  08AF
RTN1A   08C1  08C0 08E6
RTN1B   08C4  08DA 08E2
RTN1C   08C5  08CF
```

```
RTN1D   08D0   08CC
RTN1E   08E3   08C1 08DD
RTN10   0991   08B8
RTN11   09D4   08B9
RTN12   09EA   08BA
RTN13   0A44   08BB
RTN2    08F1   08B0
RTN2P   08FE   08F6 08FC 0910
RTN2Q   0902   090F
RTN2R   0906   0904 0908
RTN2S   0908   0907
RTN2T   090C   08FF 0902 090A
RTN2U   090E   090D
RTN3    0914   08B1
RTN3A   091A   0921 0923
RTN3B   091C   0919
RTN3C   0920   091E 0929 0943
RTN4    0925   08B2
RTN5    092C   08B3
RTN6    0932   08B4
RTN7    0934   08B5
RTN8    0963   08B6
RTN8A   097A   0971 0977
RTN8J   0988   096F
RTN8L   0968   097B
RTN8M   0975   098A
RTN8N   0978   0976
RTN9    098B   08B7
RTN9A   09A5   09A9
RTN9B   09B0   09AF
RTN9C   09B5   09A3
RTN9D   09B7   09D1
RTN9E   09BC   09A4
RTN9F   09BE   09BD
RTN9G   09CB   09B6
RTN9L   099D   09BF
RTRYA   0632   0BDE 0BFA 0C0C 0C17
RTRYB   0633   0C1D
RTTBL   08AE   0895 089A 08AE 08BC
RT11A   09DD   09DC
RT11B   09E2   09D7 09E1
RT11C   09E7   09E6
RT11L   09D8   09E8
RT12A   0A04   0A0A
RT12B   0A0B   0A07
RT12D   0A21   0A15 0A20
RT12F   0A2D   0A27
RT12G   0A29   0A24
RT12L   09EF   0A2E
RT12Z   09ED
RT13A   0A57   0A67 0A6F
RT13B   0A59   0A60
RT13C   0A76   0A72
RT13D   0A79   0AA0
RT13E   0A81   0A95
RT13F   0A8C   0A88
RT13G   0A92   0A8E
RT13H   0AA1   0AA8
RT13J   0AA4   0A4B
RT13K   0A70   0A6A
RT910   0996   0990
R12CK   0A35   09F8 09FF 0A19 0A2A 0A3E 0A40
S#B     0660   0C28 0C2A 0C2D 0C8B 0C8D 0C8E 0C90 0C91 0C92 0C93 0C9C
SCTOR   08E8   08C5 08C6
SECTD   09AE   0938 0946 094D 0954 0996 09AB 09B2 09B9
SEEK    0B34   0B2D 0B8F 0BB0
SEEKB   0B40   0B3B
SEEKD   0B42   0B3F
```



```
SEEKE   0B44   0B53
SEEKF   0B4B   0B52
SEEKG   0B56   0B4E 0B53
SETV    0686   09F2 0BE0 0CC3 0CFC
SETVA   0CF8   0CFB
SETVE   0CF5   0687
SFTRD   064C   0BF0
SFTSK   0649   0B8B
SFTWR   064F   0CD3
SKCNT   0648   0B46
SMLNG   000C   0812
SNRES   0613   0835
SNSTY   061E   0A50
SNXIO   061A   0836 087E 0ADA 0AEC 0B4C 0B56 0B5C 0DB9 0DBD 0DBE 0DC4
SPRTN   08BC   08A8 08BC
START   0161   060A 0839 0B0A
STMAD   0D3F   0D0A
STML    0B14   0B08
STMLE   0B06   068A
STMLR   0B0C   0B06 0B07 0B14
STMLS   0689   0AE3 0AF6 0B12 0B4B
STMSA   0D55   0D4B
STMSE   0D3D   068D
STMSG   068C   0608 083E 0857 086A 08AB 0960 0985 09CF 09F9 0AC0 0A1A 0A2B 0A4D
               0A74 0A9C 0AA6 0ADF 0AF2 0AFD 0B5A 0B89 0B9C 0BA2 0BA5 0BB1 0BBD
               0BF2 0BFD 0C08 0C13 0C40 0C4F 0C78 0CA6 0CD1 0D01 0D2A 0D3F 0D4E
               0D5F
STMSX   0D59   0D3D 0D3E 0D51 0DA5 0DAA 0DB2
STORG   08E9   08D0
SUMRY   0647   0814 095E 09C0 0B46 0B8B 0B90 0BDB 0BF0 0BFF 0C15 0CB4 0CD3 0D05
               0D34 0D37
SVKB    01BD
SW0     05DF   082A 088C 0CE3 0CED 0CFE 0D00 0DA3
SW1     05E0   088F
SW2     05E1   081A
SW3     05E2
TB      065C   0606 0608 0818 081A 0821 0824 0825 0828 082A 082D 082E 082F 0830
               0832 0833 0834 0835 0836 0837 0838 083C 083E 0840 0842 0843 0844
               0845 0848 0849 084D 0853 0854 0857 0859 085C 085F 0862 0866 086A
               086C 087C 087D 087E 087F 0881 088A 088C 088F 0892 0893 0894 089C
               089F 08A2 08A4 08A7 08AB 08AD 08BE 08C2 08C7 08CB 08D2 08E7 08F5
               08FB 08FD 0905 090B 0915 0917 0918 091A 091B 091C 091F 0924 0927
               092F 093C 093E 0941 0942 0947 094B 094C 094E 0953 0955 095B 095D
               095F 0960 0963 0967 0968 096A 096B 096C 0970 0975 0978 0979 097D
               097E 097F 0980 0981 0982 0985 0987 098B 098F 0991 0994 0999 099D
               09A7 09AC 09B0 09B1 09B3 09B8 09BA 09CA 09CC 09CE 09CF 09D4 09D9
               09DE 09E3 09E9 09EA 09F0 09F1 09F2 09F9 0A00 0A06 0A0F 0A13 0A14
               0A17 0A18 0A1A 0A1C 0A1D 0A22 0A23 0A29 0A2B 0A33 0A34 0A36 0A39
               0A3A 0A3D 0A44 0A46 0A47 0A48 0A49 0A4D 0A4F 0A50 0A51 0A52 0A53
               0A54 0A57 0A58 0A59 0A5A 0A5B 0A61 0A65 0A69 0A6C 0A6D 0A6E 0A70
               0A74 0A79 0A7A 0A7B 0A7E 0A80 0A84 0A85 0A86 0A8B 0A8C 0A91 0A96
               0A97 0A98 0A9B 0AA5 0AA6 0AAA 0AAD 0AAF 0AB2 0AB7 0ABC 0AC2 0AC3
               0AC4 0AC5 0AC6 0AC7 0AC8 0ACA 0ACB 0ACF 0AD2 0AD3 0AD4 0AD5 0AD6
               0AD7 0ADA 0ADB 0ADC 0ADF 0AE1 0AE2 0AE3 0AE8 0AEB 0AEC 0AED 0AEE
               0AEF 0AF2 0AF4 0AF5 0AF6 0AF7 0AFD 0AFF 0B00 0B01 0B02 0B03 0B09
               0B0C 0B15 0B16 0B20 0B22 0B34 0B36 0B37 0B38 0B40 0B41 0B42 0B43
               0B44 0B45 0B47 0B48 0B49 0B4A 0B4B 0B4C 0B56 0B57 0B5A 0B5C 0B5E
               0B63 0B67 0B6F 0B80 0B81 0B82 0B84 0B85 0B86 0B89 0B8C 0B91 0B92
               0B96 0B99 0BA2 0BA4 0BA5 0BA8 0BA9 0BAF 0BB1 0BB5 0BB6 0BB8 0BB9
               0BBD 0BC1 0BC3 0BC4 0BC5 0BC6 0BC8 0BCA 0BCE 0BD0 0BD3 0BD4 0BD6
               0BDC 0BDD 0BDE 0BDF 0BE0 0BE1 0BE2 0BE5 0BEA 0BE8 0BEE 0BF1 0BF2
               0BFD 0C00 0C03 0C06 0C08 0C0F 0C10 0C11 0C13 0C16 0C17 0C23 0C24
               0C25 0C26 0C27 0C28 0C29 0C2A 0C2C 0C2D 0C2F 0C35 0C36 0C39 0C3A
               0C3D 0C3E 0C49 0C4C 0C4D 0C4F 0C51 0C52 0C63 0C68 0C6A 0C6B 0C6C
               0C71 0C75 0C76 0C78 0C7A 0C7B 0C83 0C84 0C8B 0C8C 0C8D 0C8E 0C90
               0C91 0C92 0C93 0C96 0C97 0C9B 0C9E 0CAB 0CAD 0CAE 0CB0 0CB2 0CB3
               0CB5 0CBB 0CBF 0CC3 0CC4 0CC5 0CC6 0CC7 0CCC 0CCF 0CD0 0CD1 0CD4
               0CD7 0CDA 0CE3 0CED 0CFE 0CFF 0D00 0D01 0D22 0D23 0D25 0D27 0D29
```

```
                 0D2E 0D36 0D39 0D42 0D43 0D48 0D4D 0D50 0D54 0D5B 0D6B 0D6D 0D6E
                 0D6F 0D70 0D72 0D75 0D78 0D79 0D7B 0D7E 0D81 0D82 0D83 0D87 0D88
                 0D8A 0D8B 0D8C 0D8D 0D98 0D9A 0D9B 0D9C 0D9D 0DA2 0DA3 0DAD 0DB7
                 0DB9 0DBB 0DBD 0DBE 0DC0 0DC4
TBDSW    0627    0605 087F 0A49 0A70 0ADB 0AED 0B01 0B57
TEN      063C    0A51 0DC0
TERM     05E7    0941 0A7B 0B40 0B88 0BDF 0CC5 0D75
TEXIT    068F    0859 086C 08AD 0AFF 0B92 0BA4
THOUS    0645    0AC2 0AC8 0ACB 0DB7
TIMCN    066C    0A32
TIMIT    0AA9    0A5C 0ACD
TIMOT    0AB5    0AB5
TIMSL    066E    0A52 0AC4 0AC7
TIM2     0AAF    0AB0 0AB3
TLP13    066A    0A4F
TSTCC    0B2E    0B2C
TSTCD    0B32    0B2F
TSTCF    0B30    0B1C 0B25 0B33 0B5F 0B66 0B6A 0B6C 0B72
TYPE     061C
TYRED    0614    061C
VERFA    0B22    0B28
VERFB    0B5C    0B39 0B58 0BA1
VERFC    0B5E    0B69
VERFD    0B6C    0B75
VERFE    0B77    0B7F
VERFF    0B93    0B70 0B7C
VERFG    0B94    0BA7
VERFH    0BA5    0B9B
VERFI    0BA8    0B87
VERFJ    0BAF    0BAA
VERFX    0BB3    0B17 0BAD
VERFY    0692    085C 085F 08BE 0905 090B 091F 093E 0963 098B 0991 09D4 09EA 0B19
                 0B1D 0BBB 0BBF
VRFYE    0B15    0693
WDCNT    08CA    08C3 08D6 08D8 08E1
WRCNT    064E    0CB4
WRITE    0695    0947 09AC 09D9 09E3 09F4 0A1D 0CB6 0CB8 0CC8 0CCA 0CCD
WRLNG    0651    0A33
WRMOD    0610    0CAB
WRRTY    0665    0B8D
WRTA     0CC4    0CC0
WRTE     0CD5    0CBD
WRTEN    0CAB    0696
XEQ      0698    0845 0849 0A48 0AE9 0B04 0B43 0B53 0BE1 0CC4
XEQA     0AD0    0826 0AAB
XEQB     0AE8    0AD8 0ADD
XEQC     0AF4    0AF0 0B55
XEQE     0ACF    0699
XEQLP    0AF6    0AFC
XEQX     0B00    0AF8
XSKBK    060C    0840 0A44 0B34
ZCNT     0666    087D 0884 0AE2 0AE4 0AF5 0AFA 0B4A 0B50
ZIPA     0812    05E4
ZIPL     0814    0817
ZLPA     0828    05E3
ZLPB     0839    082B
ZSNS     0616    0600 0601 0604 0838 08CB 0970 0A18 0A36 0AB7 0B00 0BB9 0BE5 0CCC
ZXIO     0618    0844 097E 0A47 0A54 0A59 0A5B 0A61 0A65 0A6E 0AAD 0AD2 0AD4 0AEB
                 0B02 0B42 0B48 0BC6 0C0F 0CAE 0CCF
END OF ASSEMBLY
```

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NOTE

WHEN RUN IN OVERLAP, THE 1132 PRINT BUFFER MAY NOT BE SET UP WITHIN THE PRESCRIBED 11 MS AFTER AN EMITTER INTERRUPT. THIS MAY CAUSE ROUTINE 5 TO DROP THE FIRST CHARACTER OF THE LINE AND ROUTINE 6 AND 7 TO DROP THE ENTIRE LINE.

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 MOD 4 CPU
2. 1132 MOD 2 PRINTER WITH EC 138400
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 OM 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 ERROR 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 - FUNCTION 2 AND 3

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 81XX WHERE XX EQUALS THE DSW BIT CODE FOR THE DESIRED CHANNEL.

CHARACTER	EMIT CODE	CHARACTER	EMIT CODE
CHARACTER EMITTER 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 - 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

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 2C 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.

```
A2C00 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.

```
A2C01 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 BOSC. NO ATTEMPT IS MADE BY THE ERROR ROUTINE TO RESET THE REQUEST BIT.

E2C01 OOOR 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.

LAST OP - CCCC
E2C02 OOOR AAAA 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.

LAST OP - CCCC
E2C03 OOOR AAAA 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 (E2C02) WILL ALSO BE PRINTED.

LAST OP - CCCC
E2C04 OOOR AAAA 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.

LAST OP - CCCC
E2C05 OOOR AAAA 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.

E2C06 OOOR AAAA EMIT BIT FAILURE
XXOO YYOO

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 OO... ANY SHORTED BIT WILL BE IDENTIFIED BY A 1 IN THAT BIT POSITION.

E2C07 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.

E2C08 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.

E2C09 000R AAAA PRINTER DID NOT TURN OFF

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

E2C10 000R AAAA MULT SPACE INTERRUPTS

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

E2C11 000R AAAA MULT SKIP INTERRUPTS

AN UNEXPECTED SKIP INTERRUPT OCCURRED.

E2C12 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.

E2C13 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.

E2C14 000R AAAA MULT CHANNEL BITS
XXXX

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

E2C15 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.

DURING HEAVY CYCLE STEALING OR INTERRUPTING, THIS MESSAGE IS INVALID.

E2C16 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.

E2C17 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 (A2C01) WILL BE PRINTED EACH 10 SECONDS. IF THE LAST COMMAND WAS SKIP, THE CARRIAGE DID NOT STOP ON A STOP CARRIAGE COMMAND.

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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 (E2C01). IF NOT READY, THE NRDY MESSAGE (A2C01) 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 (E2C02) 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 (E2C05) IDENTIFYING ANY ERROR IS PRINTED IN MAIN-LINE. 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 (E2C17) IS PRINTED AND THE PROGRAM WILL WAIT IN A LOOP, PRINTING THE NRDY MESSAGE (A2C01) 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 (E2C15 OR E2C16).

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 ROUTINES
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 E2C05 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.
   SEE NOTE ON PAGE 1 .

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.
   FAILURES SHOWN BY THIS TEST ARE USUALLY THE RESULT OF LOADING OF THE POWER SUPPLY.
   SEE NOTE ON PAGE 1 .

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.
   SEE NOTE ON PAGE 1 .

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 ERROR MESSAGES ARE PRINTED.

A. E2C02 IF BUSY DSW ERROR

B. E2C03 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. E2C02 IF BUSY DSW ERROR

B. E2C05 IF INTERRUPT DSW ERROR

C. E2C06, E2C07 OR E2C08 IF EMIT ERROR

D. E2C15, 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.

6. APPENDIX

RT1 EMIT TEST

RT2 SCAN CHECK TEST

RT3 SPACE TEST -PRINTER OFF

```
SPACE 1
SPACE 1
SPACE 1
SPACE 1
SPACE 1

SPACE 2

SPACE 2

SPACE 2

SPACE 2

SPACE 2
```



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SPACE 3

SPACE 3

SPACE 3

SPACE 4                                  (IRREGULAR SPACING BETWEEN LINES)

SPACE 4                                  (IRREGULAR SPACING BETWEEN LINES)

SPACE 4                                  (IRREGULAR SPACING BETWEEN LINES)

SPACE 9                                  (IRREGULAR SPACING BETWEEN LINES)

SPACE 39                                 (IRREGULAR SPACING BETWEEN LINES)
                                         ( 39 SPACES EQUALS 1 REVOLUTION
                                         OF THE PLATEN AT 6 LINES/INCH)
RT4 SPACE TEST -PRINTER ON

                                         (PRINTOUT IS THE SAME AS
                                         RT3 SPACE TEST -PRINTER OFF)

RT5 RIPPLE PATTERN TEST
                                         (THIS IS ONLY THE 1ST 80 CHARACTERS

XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFIT
ZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV
BDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2
DHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV24
HSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV246
SU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469
U135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=
135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.
35780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,
5780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-
780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+
80$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++
0$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++J
 ')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JL
')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLN
)(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNP
(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPR
/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG
&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG
KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG X
MOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZ
OQEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZB
QEWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBD
EWYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDH
WYACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHS
YACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU
ACFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU1
CFITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU13
FITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU135
ITV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU1357
TV2469=.,-++JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-++JLNPRG XZBDHSU13578
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V2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780
2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$
469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$'
69=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')
9=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(
=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/
.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&
,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&K
-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KM
+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMO
*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQ
JLNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQE
LNPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEW
NPRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWY
PRG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYA
RG XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYAC
G XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACF
 XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFI
XZBDHSU135780$')(/&KMOQEWYACFITV2469=.,-+*JLNPRG XZBDHSU135780$')(/&KMOQEWYACFIT
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RT6 ALL CHARACTERS TEST

(THIS IS ONLY THE 1ST 80 CHARACTERS

```
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
ZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
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DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
11111111111111111111111111111111111111111111111111111111111111111111111111111111
33333333333333333333333333333333333333333333333333333333333333333333333333333333
55555555555555555555555555555555555555555555555555555555555555555555555555555555
77777777777777777777777777777777777777777777777777777777777777777777777777777777
88888888888888888888888888888888888888888888888888888888888888888888888888888888
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MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
QQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQQ
EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWW
YYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
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FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
TTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTTT
VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV
22222222222222222222222222222222222222222222222222222222222222222222222222222222
44444444444444444444444444444444444444444444444444444444444444444444444444444444
66666666666666666666666666666666666666666666666666666666666666666666666666666666
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********************************************************************************
JJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJJ
LLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL
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NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN
PPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPPP
RRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRRR
GGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGGG
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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RT7 STRESS TEST

(THIS ROUTINE PRINTS THE FIRST
CHARACTER FOUND IN ALL POSITIONS.)

RT8 SKIP CHANNEL TEST

INITIALIZE RT8 RT9 RTA

SPACE TO CHANNEL

(THESE PRINTOUTS WILL VARY WITH THE
CARRIAGE TAPE THAT IS ON THE 1132.
ANY CHANNELS THAT ARE MISSING WILL
CAUSE A MESSAGE TO BE TYPED. THIS
EXAMPLE HAS ONLY 1, 9 & 12 PUNCHES)

CHANNEL 1

(IRREGULAR SPACING BETWEEN LINES)

CHANNEL 9

(IRREGULAR SPACING BETWEEN LINES)

CHANNEL 12

(THE ABOVE PRINTOUT IS REPEATED)

SKIP TO CHANNEL

(PRINTOUT IS THE SAME AS
SPACE TO CHANNEL TEST)

RT9 SKIP TEST -PRINTER OFF

SKIP TO CHANNEL 1

(IRREGULAR SPACING BETWEEN LINES)

CHAMMEL 1

(IRREGULAR SPACING BETWEEN LINES)

SKIP TO CHANNEL 9

(IRREGULAR SPACING BETWEEN LINES)

CHANNEL 9
SKIP TO CHANNEL 12

(IRREGULAR SPACING BETWEEN LINES)

CHANNEL 12

RTA SKIP TEST -PRINTER ON

(PRINTOUT IS THE SAME AS
RT9 SKIP TEST -PRINTER OFF)

-- LAST PAGE --

```
                                                                      32C00020
                *                                                     32C00030
                *  THIS ENGINEERING CHANGE REFLECTS MAJOR             32C00040
                *  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS       32C00050
                *  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.     32C00060
                *                                                     32C00070
                *  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.     32C00080
                *                                                     32C00090
                *  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966        32C00100
                *  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC          32C00110
                *  MONITOR II.                                        32C00120
                *                                                     32C00130
                                                                      32C00140
                *******************************************         32C00150
                *-----------------------------------------          32C00160
                *     1130 - 1132 PRINTER FUNCTION TEST               32C00170
                *-----------------------------------------          32C00180
                *******************************************         32C00190
                *                                                     32C00200
                *                                                     32C00210
                *                                                     32C00220
                *******************************************         32C00230
                *            EQUATE TABLE                             32C00240
                *******************************************         32C00250
                *     THIS TABLE EQUATES TEST PROGRAM LABLES          32C00260
                *     TO THEIR EQUIVALENT DIAGNOSTIC MONITOR          32C00270
                *     ADDRESSES.                                      32C00280
                *                                                     32C00290
                *-----------------------------------------          32C00300
                *     MONITOR ENTRY ADDRESSES                         32C00310
                *-----------------------------------------          32C00320
0160 0          BEGIN EQU     /160      BEGIN ROUTINE               32C00330
0161 0          START EQU     BEGIN&1   SUPERVISOR ROUTINE          32C00340
0162 0          ERROR EQU     START&1   ERROR LOG ROUTINE           32C00350
0163 0          LOG   EQU     ERROR&1   STATUS LOG ROUTINE          32C00360
0164 0          END   EQU     LOG&1     END ROUTINE                 32C00370
                *                                                     32C00380
                *-----------------------------------------          32C00390
                *     MONITOR CONTROL WORD ADDRESSES                  32C00400
                *-----------------------------------------          32C00410
0165 0          RTNSW EQU     END&1     ROUTINE START SW            32C00420
0166 0          ERLCK EQU     END&2     LOCK ON ERROR CONTROL       32C00430
0167 0          LOGBY EQU     END&3     I/O BUSY SW ADDRS           32C00440
                *                                                     32C00450
                *-----------------------------------------          32C00460
                *     INTERRUPT TRANSFER VECTOR ADDRESSES             32C00470
                *-----------------------------------------          32C00480
017A 0          IL0   EQU     /17A      INTERRUPT LEVEL ZERO        32C00490
018A 0          IL1   EQU     IL0&16    INTERRUPT LEVEL ONE         32C00500
019A 0          IL2   EQU     IL1&16    INTERRUPT LEVEL TWO         32C00510
01AA 0          IL3   EQU     IL2&16    INTERRUPT LEVEL THREE       32C00520
01BA 0          IL4   EQU     IL3&16    INTERRUPT LEVEL FOUR        32C00530
01BB 0          RQTY  EQU     IL4&1     CONSOLE PRINTER REQUEST     32C00540
01BC 0          RQKB  EQU     RQTY&1    USE KEYBOARD REQUEST        32C00550
01BD 0          SVKB  EQU     RQKB&1    KB SERVICE REQUEST          32C00560
                *                                                     32C00570
                *******************************************         32C00580
05DC                  ORG     *&/05DC                               32C00590
                *                                                     32C00600
                *-----------------------------------------          32C00610
                *     THE MONITOR USES CORE LOCATIONS 0-05DC.         32C00620
                *     FOR CONTENTS OF THESE ADDRESSES REFER           32C00630
                *     TO THE DIAGNOSTIC MONITOR LISTING.              32C00640
                *-----------------------------------------          32C00650
                *                                                     32C00660
                *                                                     32C00670
                *                                                     32C00680
                *                                                     32C00690
```



```
                *******************************************         32C00700
                *            PROGRAM CONTROL TABLE                    32C00710
                *******************************************         32C00720
                *                                                     32C00730
05DC 0 032C     PID   DC      /032C     PROGRAM ID                  32C00740
05DD 0 0000     RID   DC      *-*       ROUTINE ID                  32C00750
05DE 0 0000     RAD   DC      *-*       ROUTINE ADDRS               32C00760
05DF 0 0000     SW0   DC      *-*       PROGRAM CONTROL             32C00770
05E0 0 0000     SW1   DC      *-*       ROUTINE SELECTION           32C00780
05E1 0 0000     SW2   DC      *-*       SCAN START CHARACTER        32C00790
05E2 0 0012     SW3   DC      18        SPACE AFTER PRINT DLY       32C00800
05E3 1 05F4           DC      STRT                                  32C00810
05E4 1 05F4           DC      STRT      RESTART ADDRESS             32C00820
                *                                                     32C00830
05E5 0 0000     MLSCF DC      *-*       SET BY WAIT RTN AND MON     32C00840
05E6 0 0000           DC      *-*       SET BY CNTRL AND INRTPT     32C00850
05E7 0 FFFF           DC      /FFFF     TERMINATOR                  32C00860
                *                                                     32C00870
                *******************************************         32C00880
                *            TEST INITIALIZATION                      32C00890
                *******************************************         32C00900
                *                                                     32C00910
                *                                                     32C00920
                *            REMOVE BITS 8-15 OF EMITTER WORD         32C00930
                *                                                     32C00940
05E8 0 6131     BGIN  LDX     1 CHARF-CHAR NUMBER OF POSITIONS        32C00950
05E9 1 C500 0CBF      LD    L1 CHAR-1     GET CHAR                  32C00960
05EB 0 1808           SRA     8           * SHIFT OFF BITS          32C00970
05EC 0 1008           SLA     8           * RESTORE                 32C00980
05ED 1 D500 0CBF      STO   L1 CHAR-1     * AND PLACE BACK          32C00990
05EF 0 71FF           MDX     1 -1                                  32C01000
05F0 0 70F8           MDX     BGIN&1                                32C01010
                *                                                     32C01020
05F1 0 4480 0160      BSI   I BEGIN       SIGNAL MONITOR            32C01030
05F3 1 05DC           DC      PID         PCT ADDRESS               32C01040
                *                                                     32C01050
                *-----------------------------------------          32C01060
                *  START OF TEST AND SINGLE PASS INITIALIZATION       32C01070
                *-----------------------------------------          32C01080
                *                                                     32C01090
05F4 0 6100     STRT  LDX     1 0         SET TO START WITH           32C01100
05F5 0 69E7           STX     1 RID       FIRST ROUTINE               32C01110
05F6 0 69EA           STX     1 SW2       RESET CHAR SELECT           32C01120
05F7 1 6D00 0AE0      STX   L1 WAIT                                   32C01130
05F9 1 6D00 078F      STX   L1 SW89A                                  32C01140
05FB 0 6164           LDX     1 100                                 32C01150
05FC 1 6D00 0C0E      STX   L1 EMTCT      SET EMIT CHECK CNT          32C01160
05FE 1 CC00 0BFE      LDD   L ANDOR                                   32C01170
0600 1 DC00 0BFC      STD   L ANDEM       SET EMIT CK CONSTANT        32C01180
0602 0 6112           LDX     1 18                                  32C01190
0603 0 69DE           STX     1 SW3       RESET SPACE DELAY           32C01200
0604 1 6500 0B6A      LDX   L1 PIRT                                   32C01210
0606 0 6D00 018A      STX   L1 IL1        SET INTERRUPT ADRS          32C01220
0608 0 4000           BSI     CNTRL       GO TO CONTROL RTN           32C01230
                *                                                     32C01240
                *******************************************         32C01250
                *            SEQUENCE CONTROL ROUTINE                 32C01260
                *******************************************         32C01270
                * THIS ROUTINE CHECKS SWITCHES AND CONTROLS           32C01280
                * SEQUENCE IN WHICH TEST ROUTINES ARE RUN.            32C01290
                *-----------------------------------------          32C01300
                *                                                     32C01310
0609 0 0000     CNTRL DC      *-*                                   32C01320
060A 0 C0D5           LD      SW1                                   32C01330
060B 1 4C08 0614      BSC   L CN20,&      BR IF NO RTN SELECTD      32C01340
                *                                                     32C01350
060D 0 D0CF     CN10  STO     RID         SAVE NEW RTN NUMBER       32C01360
060E 0 9015           S       RIDCK                                 32C01370
```

```
060F 1 4C08 061A        BSC  L  CN30,&     BR IF VALID RTN                32C01380
0611 0 1810              SRA     16                                        32C01390
0612 0 D0CD              STO     SW1        IF INVALID RTN GO              32C01400
0613 0 D0C9              STO     RID         TO RTN ONE                    32C01410
                         *                                                 32C01420
0614 1 7401 05DD CN20    MDX  L  RID,1      ADV TO NEXT RTN                32C01430
0616 0 C0C6              LD      RID        CHECK FOR END OF               32C01440
0617 0 900D              S       RTNOM       NORMAL SEQUENCE               32C01450
0618 0 4480 0164         BSI  I  END,-Z     END OF PROGRAM                 32C01460
                         *                                                 32C01470
061A 1 6580 05DD CN30    LDX  I1 RID                                       32C01480
061C 1 C500 0625         LD   L1 RTTBL-1    FETCH RETURN ADRS              32C01490
061E 0 D0BF              STO     RAD                                       32C01500
061F 0 D400 0165         STO  L  RTNSW      SET RTN START SW               32C01510
0621 0 D0C4              STO     MLSCF&1    SET MLSCF FOR RETURN           32C01520
0622 0 4480 0161         BSI  I  START      GO TO MONITOR                  32C01530
                         *                                                 32C01540
0624 0 000B              RIDCK DC    LRTN-RTTBL&1                          32C01550
0625 0 000A              RTNOM DC    NRTN-RTTBL&1                          32C01560
                         *                                                 32C01570
                         *-----------------------------------------       32C01580
                         * ROUTINE ADDRESS TABLE                           32C01590
                         *-----------------------------------------       32C01600
0626 1 0631              RTTBL DC    TST1       EMIT SEQUENCE TEST         32C01610
0627 1 0645                    DC    TST2       SCAN CHECK TEST            32C01620
0628 1 0667                    DC    TST3       SPACE TEST                 32C01630
0629 1 069E                    DC    TST4       SKIP TEST                  32C01640
062A 1 06C6                    DC    TST5       ROTATING PAT TEST          32C01650
062B 1 06E0                    DC    TST6       ALL CHARACTERS TEST        32C01660
062C 1 0709                    DC    TST7       FAST PRINT TEST            32C01670
062D 1 0790                    DC    TST8       CHANNEL SEQUENCE TEST      32C01680
062E 1 0807                    DC    TST9       SKIP- PRINTER OFF          32C01690
062F 1 0835              NRTN  DC    TSTA       SKIP- PRINTER ON           32C01700
0630 1 086D              LRTN  DC    TSTB       MANUAL CONTROL             32C01710
                         *                                                 32C01720
                         ******************************************      32C01730
                         *          TEST ROUTINE 1                 *      32C01740
                         ******************************************      32C01750
                         * CHECK EMIT SEQUENCE AND NORMAL PRINT DSW        32C01760
                         *-----------------------------------------       32C01770
                         *                                                 32C01780
0631 1 4400 08BD         TST1  BSI  L  INTLZ      GO INITIALIZE ROUTINE    32C01790
0633 0 0048                    DC      /0048      EMIT TEST                32C01800
0634 0 6164                    LDX   1 100                                 32C01810
0635 1 6D00 06DE               STX  L1 LPCNT      SET LOOP COUNT           32C01820
                         *                                                 32C01830
0637 1 6C00 0AC5               STX  L  LOOP       SET LOOP ADDRS           32C01840
0639 0 6600 8200         T01A  LDX  L2 /8200                               32C01850
                               LDX   1 1          SET IDLE CNT             32C01860
063C 1 4400 08E1               BSI  L  IDLE                                32C01870
063E 1 4400 09E9               BSI  L  LOCK       CK FOR LOCK ON FUNCTION  32C01880
0640 1 74FF 06DE               MDX  L  LPCNT,-1   ADV LOOP CNT             32C01890
0642 0 70F6                    MDX     T01A                                32C01900
0643 1 4400 0609               BSI  L  CNTRL      GO TO CONTROL RTN        32C01910
                         *                                                 32C01920
                         ******************************************      32C01930
                         *          TEST ROUTINE 2                 *      32C01940
                         ******************************************      32C01950
                         * CHECK PRINT SCAN CHECK INDICATOR                32C01960
                         *-----------------------------------------       32C01970
                         *                                                 32C01980
0645 1 4400 08BD         TST2  BSI  L  INTLZ      GO INITIALIZE ROUTINE    32C01990
0647 0 0088                    DC      /0088      SCAN CHECK TEST          32C02000
0648 0 6164                    LDX   1 100                                 32C02010
0649 1 6D00 06DE               STX  L1 LPCNT      SET LOOP COUNT           32C02020
064B 1 4400 09CC               BSI  L  CLEAR      CLEAR PRINT BUFFER       32C02030
                         *                                                 32C02040
064D 1 6C00 0AC5               STX  L  LOOP       SET LOOP ADDRS           32C02050
```



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064F 1 6C00 0B74         T02A  STX  L  RT2SW      SET RTN SW                32C02060
0651 0 1010                    SLA     16         CLEAR ACC AND             32C02070
0652 1 D400 0956               STO  L  RT2EX      * EXECUTE SWITCH          32C02080
0654 0 D400 0027               STO  L  39        CLEAR BIT 15 LOC 39        32C02090
0656 0 6600 8A00               LDX  L2 /8A00      SET TO CK FOR SCAN CK     32C02100
0658 0 6101                    LDX   1 1          SET IDLE CNT              32C02110
0659 1 4400 08E1               BSI  L  IDLE                                 32C02120
065B 1 6C00 0956               STX  L  RT2EX      SET EXEC SWITCH           32C02130
065D 1 4400 09E9               BSI  L  LOCK       CK FOR LOCK ON FUNCTION   32C02140
065F 0 7401 0027               MDX  L  39,1       SET SCAN BIT              32C02150
0661 1 74FF 06DE               MDX  L  LPCNT,-1   ADV LOOP CNT              32C02160
0663 0 70EB                    MDX     T02A                                 32C02170
0664 1 0C00 08F5               XIO  L  SRSET      RESET DSW                 32C02180
0666 0 40A2                    BSI     CNTRL      GO TO CONTROL RTN         32C02190
                         *                                                 32C02200
                         *                                                 32C02210
                         ******************************************      32C02220
                         *          TEST ROUTINE 3                 *      32C02230
                         ******************************************      32C02240
                         * THIS ROUTINE CHECKS FOR SPACE RESPONSES         32C02250
                         * AND CHECKS THE DSW                              32C02260
                         *-----------------------------------------       32C02270
                         *                                                 32C02280
0667 1 4400 08BD         TST3  BSI  L  INTLZ      GO INITIALIZE ROUTINE     32C02290
0669 0 011D                    DC      /011D      SPACE TEST -PRINTER OFF   32C02300
066A 0 63F4                    LDX   3 -12                                  32C02310
066B 0 6B23                    STX   3 T3CTL      SET TEST CONTROL          32C02320
                         *                                                 32C02330
066C 1 6C00 0AC5               STX  L  LOOP       SET LOOP ADDRS            32C02340
066E 1 6780 068F         T03A  LDX  I3 T3CTL      LD CONTROL                32C02350
0670 1 C700 069C               LD   L3 T3CTL&13   LD MSG CONTROL            32C02360
0672 0 D011                    STO     T03B                                 32C02370
0673 1 C700 069D               LD   L3 T3CTL&14   LD NO. OF LOOPS & SPACES  32C02380
0675 0 1888                    SRT     8                                    32C02390
0676 1 D400 06DE               STO  L  LPCNT                                32C02400
0678 0 1090                    SLT     16                                   32C02410
0679 0 1808                    SRA     8                                    32C02420
067A 0 D022                    STO     SAVE3      SAVE NUMBER OF SPACES     32C02430
                         *                                                 32C02440
067B 0 C021              T03A1 LD      SAVE3      LD NUMBER OF SPACES       32C02450
067C 0 D01F                    STO     SCNT                                 32C02460
                         *                                                 32C02470
                         *                                                 32C02480
067D 1 4400 0907         T03C  BSI  L  SPACE                                32C02490
                         *                                                 32C02500
067F 1 74FF 069C               MDX  L  SCNT,-1    CNT SPACES                32C02510
0681 0 70FB                    MDX     T03C                                 32C02520
0682 1 4400 0957               BSI  L  PMSG       PRINT 1132 MSG            32C02530
0684 0 0000              T03B  DC      *-*                                  32C02540
0685 1 4400 09E9               BSI  L  LOCK       CK FOR LOCK ON FUNCTION   32C02550
                         *                                                 32C02560
0687 1 74FF 06DE               MDX  L  LPCNT,-1                             32C02570
0689 0 70F1                    MDX     T03A1                                32C02580
                         *                                                 32C02590
068A 1 7402 068F               MDX  L  T3CTL,2    ADV CONTROL               32C02600
068C 0 70E1                    MDX     T03A                                 32C02610
068D 1 4400 0609               BSI  L  CNTRL      GO TO CONTROL RTN         32C02620
                         *                                                 32C02630
068F 0 0000              T3CTL DC      *-*        TEST 3 AND 4 CONTROL      32C02640
0690 0 9002                    DC      /9002      SPACE 1                   32C02650
0691 0 0501                    DC      /0501                                32C02660
0692 0 9004                    DC      /9004      SPACE 2                   32C02670
0693 0 0502                    DC      /0502                                32C02680
0694 0 9008                    DC      /9008      SPACE 3                   32C02690
0695 0 0303                    DC      /0303                                32C02700
0696 0 9010                    DC      /9010      SPACE 4                   32C02710
0697 0 0304                    DC      /0304                                32C02720
0698 0 9080                    DC      /9080      SPACE 9                   32C02730
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0699 0 0109              DC      /0109                                  32C02740
069A 0 9200              DC      /9200       SPACE 39                   32C02750
069B 0 0127              DC      /0127                                  32C02760
069C 0 0000        SCNT  DC      *-*                                    32C02770
069D 0 0000        SAVE3 DC      *-*                                    32C02780
                   *                                                    32C02790
                   ********************************************         32C02800
                   *            TEST ROUTINE 4                *         32C02810
                   ********************************************         32C02820
                   *  THIS ROUTINE EXECUTES SPACE COMMANDS IN           32C02830
                   *  INTERRUPT WITH THE PRINTER ON. CHECK IS MADE      32C02840
                   *  FOR SPACE RESPONSE AND FOR PROPER DSW             32C02850
                   ********************************************         32C02860
                   *                                                    32C02870
069E 1 4400 088D   TST4  BSI  L  INTLZ     GO INITIALIZE ROUTINE      32C02880
06A0 0 021E              DC      /021E      SPACE TEST -PRINTER ON     32C02890
                   *                                                    32C02900
06A1 0 63F4              LDX     3 -12                                  32C02910
06A2 0 6BEC              STX     3 T3CTL    SET TEST CONTROL           32C02920
                   *                                                    32C02930
06A3 1 6C00 0AC5         STX  L  LOOP       SET LOOP ADDRS             32C02940
06A5 1 6780 068F   T04A  LDX  I3 T3CTL      LD CONTROL                 32C02950
06A7 1 C700 069C         LD   L3 T3CTL&13   LD MSG. CONTROL            32C02960
06A9 0 D011              STO     T04B                                   32C02970
06AA 1 C700 069D         LD   L3 T3CTL&14   LD NO. OF LOOPS & SPACES   32C02980
06AC 0 1888              SRT     8                                      32C02990
06AD 0 D030              STO     LPCNT                                  32C03000
06AE 0 1090              SLT     16                                     32C03010
06AF 0 1808              SRA     8                                      32C03020
06B0 0 D0EC              STO     SAVE3      SAVE NUMBER OF SPACES       32C03030
                   *                                                    32C03040
06B1 0 C0EB        T04A1 LD      SAVE3      LD NUMBER OF SPACES         32C03050
06B2 1 D400 0C09         STO  L  SPCSW      SET TO SPACE IN INTRPT      32C03060
06B4 0 6101              LDX     1 1                                    32C03070
06B5 0 6600 8200         LDX  L2 /8200                                  32C03080
06B7 1 4400 08E1         BSI  L  IDLE                                   32C03090
                   *                                                    32C03100
06B9 1 4400 0957         BSI  L  PMSG       PRINT 1132 MSG              32C03110
06BB 0 0000        T04B  DC      *-*                                    32C03120
                   *                                                    32C03130
06BC 1 4400 09E9         BSI  L  LOCK       CK FOR LOCK ON FUNCTION     32C03140
                   *                                                    32C03150
06BE 1 74FF 06DE         MDX  L  LPCNT,-1                               32C03160
06C0 0 70F0              MDX     T04A1                                  32C03170
                   *                                                    32C03180
06C1 1 7402 068F         MDX  L  T3CTL,2    ADV CONTROL                 32C03190
06C3 0 70E1              MDX     T04A                                   32C03200
06C4 1 4400 0609         BSI  L  CNTRL      GO TO CONTROL RTN           32C03210
                   *                                                    32C03220
                   ********************************************         32C03230
                   *            TEST ROUTINE 5                *         32C03240
                   ********************************************         32C03250
                   *  THIS ROUTINE PRINTS A ROTATING PATTERN. THE       32C03260
                   *  PATTERN IS GENERATED BY FLOATING A BIT ACROSS     32C03270
                   *  THE PRINT BUFFER.                                 32C03280
                   *------------------------------------------        32C03290
                   *                                                    32C03300
06C6 1 4400 08BD   TST5  BSI  L  INTLZ     GO INITIALIZE ROUTINE      32C03310
06C8 0 0408              DC      /0408      RIPPLE PATTERN TEST        32C03320
                   *                                                    32C03330
06C9 0 61CF              LDX     1 -49                                  32C03340
06CA 1 6D00 099D         STX  L1 RIPL3&1    SET EMIT CHAR CNT          32C03350
                   *                                                    32C03360
06CC 0 6132        T05A  LDX     1 50       SET LINE COUNT             32C03370
06CD 0 690E              STX     1 LINES                                32C03380
                   *                                                    32C03390
06CE 1 6C00 0AC5         STX  L  LOOP       SET LOOP ADDRS             32C03400
                   *                                                    32C03410
```



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                   *                                                    32C03420
06D0 1 4400 0993   T05C  BSI  L  RIPL         GO PRINT ONE RIPPLE LINE 32C03430
06D2 1 4400 09E9         BSI  L  LOCK         CK FOR LOCK ON FUNCTION  32C03440
                   *                                                    32C03450
06D4 1 7401 099D   T05D  MDX  L  RIPL3&1,1    ADV CHAR FOR NXT SCAN    32C03460
06D6 0 1000              NOP                  SAFETY NOP               32C03470
06D7 1 74FF 06DC         MDX  L  LINES,-1     ADV LINE CNT             32C03480
06D9 0 70F6              MDX     T05C                                  32C03490
                   *                                                    32C03500
06DA 1 4400 0609         BSI  L  CNTRL        GO TO CONTROL RTN        32C03510
                   *                                                    32C03520
06DC 0 0000        LINES DC      0            LINE COUNT               32C03530
06DD 0 0031        NO49  DC      49                                    32C03540
06DE 0 0000        LPCNT DC      0            LOOP COUNT               32C03550
06DF 0 0032        NO50  DC      50                                    32C03560
                   *                                                    32C03570
                   *                                                    32C03580
                   *            TEST ROUTINE 6                *         32C03590
                   *                                                    32C03600
                   * THIS ROUTINE PRINTS LINES OF ONE CHAR              32C03610
                   * UNTIL ALL 48 CHARACTERS HAVE BEEN PRINTED          32C03620
                   *                                                    32C03630
06E0 1 4400 08BD   TST6  BSI  L  INTLZ        GO INITIALIZE ROUTINE    32C03640
06E2 0 0808              DC      /0808        ALL CHARACTERS           32C03650
                   *                                                    32C03660
06E3 0 61D0        T06A  LDX     1 -48                                 32C03670
06E4 0 690A              STX     1 T06D&1     SET CHAR CNT             32C03680
06E5 1 6C00 0AC5         STX  L  LOOP         SET LOOP ADDRS           32C03690
                   *                                                    32C03700
06E7 0 6132        T06B  LDX     1 50         SET EMIT LOOP CNT        32C03710
06E8 0 69F5              STX     1 LPCNT                               32C03720
                   *                                                    32C03730
06E9 0 6600 8200   T06C  LDX  L2 /8200        SET DSW S/B              32C03740
06EB 0 6101              LDX     1 1          SET IDLE CNT             32C03750
06EC 1 4400 08E1         BSI  L  IDLE                                  32C03760
                   *                                                    32C03770
06EE 0 6500 0000   T06D  LDX  L1 *-*          XR1#EMIT TABLE POSITION  32C03780
06F0 1 C400 0C10         LD   L  EMIT         CHECK IF CHARACTER IS    32C03790
06F2 1 9500 0CF0         S    L1 CHAR&48      TO BE PRINTED            32C03800
06F4 1 4C18 06FD         BSC  L  T06E,&-      YES IF BRANCH            32C03810
                   *                                                    32C03820
06F6 1 74FF 0B14         MDX  L  ICNT,-1      SKIP IF INTRPT CNT#1     32C03830
06F8 0 70EE              MDX     T06B                                  32C03840
06F9 1 74FF 06DE         MDX  L  LPCNT,-1     AFTER 50 CONSECUTIVE     32C03850
06FB 0 70ED              MDX     T06C           EMITS - SPACE          32C03860
06FC 0 7002              MDX     T06E&2         THEN CONTINUE          32C03870
                   *                                                    32C03880
06FD 1 4400 09DF   T06E  BSI  L  A1           SET PRINT BUFR TO ONES   32C03890
06FF 0 6101              LDX     1 1          SET SCAN CNT             32C03900
0700 1 4400 08D6         BSI  L  PRINT                                 32C03910
0702 1 4400 09E9         BSI  L  LOCK         CK FOR LOCK ON FUNCTION  32C03920
                   *                                                    32C03930
0704 1 7401 06EF         MDX  L  T06D&1,1     ADV TO NXT CHAR          32C03940
0706 0 70E0              MDX     T06B                                  32C03950
0707 1 4400 0609         BSI  L  CNTRL        GO TO CONTROL RTN        32C03960
                   *                                                    32C03970
                   *                                                    32C03980
                   ********************************************         32C03990
                   *            TEST ROUTINE 7                *         32C04000
                   ********************************************         32C04010
                   * THIS ROUTINE PRINTS LINES OF ALL ONE CHARACTER     32C04020
                   *----------------------------------------          32C04030
                   *                                                    32C04040
0709 1 4400 08BD   TST7  BSI  L  INTLZ        GO INITIALIZE ROUTINE    32C04050
070B 0 8021              DC      /8021        STRESS TEST              32C04060
                   *                                                    32C04070
070C 0 6164              LDX     1 100        SET LINE COUNT           32C04080
070D 0 69CE              STX     1 LINES                               32C04090
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                        *
070E 1 6C00 0AC5        STX  L  LOOP        SET LOOP ADDRS                32C04100
0710 1 4400 09DF  T07A  BSI  L  A1          SET PRINT AREA TO ONES        32C04110
0712 0 6101             LDX  1  1           SET SCAN CNT                  32C04120
0713 1 4400 08D6        BSI  L  PRINT       GO PRINT                      32C04130
0715 0 6110             LDX  1  16          SET FOR 16 IDLES              32C04140
0716 0 6600 8200        LDX  L2 /8200       SET DSW S/B                   32C04150
0718 1 4400 08E1        BSI  L  IDLE                                      32C04160
                        *                                                 32C04170
                                                                          32C04180
071A 1 4400 09E9        BSI  L  LOCK        CK FOR LOCK ON FUNCTION       32C04190
                        *                                                 32C04200
071C 1 74FF 06DC        MDX  L  LINES,-1    UPDATE LINE COUNT             32C04210
071E 0 70F1             MDX     T07A                                      32C04220
071F 1 4400 0609        BSI  L  CNTRL       GO TO CONTROL RTN             32C04230
                        *                                                 32C04240
                        ******************************************        32C04250
                        * INITIALIZATION FOR ROUTINES 8,9, AND A          32C04260
                        ******************************************        32C04270
                        * THIS ROUTINE IDENTIFIES THE SEQUENCE OF PUNCHES 32C04280
                        * IN THE CHANNEL CONTROL TAPE.                    32C04290
                        *----------------------------------------        32C04300
                        *                                                 32C04310
0721 0 0000             IN89A DC      *-*                                 32C04320
0722 0 C06C                   LD      SW89A                               32C04330
0723 1 4C20 0785              BSC  L  I89AX,Z     BR IF INITIALIZED       32C04340
0725 0 6869                   STX     SW89A                               32C04350
0726 1 4400 08BD              BSI  L  INTLZ       GO INITIALIZE ROUTINE   32C04360
0728 0 7000                   DC      /7000                               32C04370
                        *                                                 32C04380
0729 0 6500 00B0              LDX  L1 176         SET FOR 176 SPACES      32C04390
072B 0 6982                   STX  1  LPCNT                               32C04400
072C 0 1810                   SRA     16                                  32C04410
072D 0 610F                   LDX  1  15                                  32C04420
072E 1 D500 07CE              STO  L1 CH12S-1                             32C04430
0730 0 71FF                   MDX  1  -1                                  32C04440
0731 0 70FC                   MDX     *-4                                 32C04450
0732 0 6101                   LDX  1  1                                   32C04460
0733 0 6945                   STX  1  T08D&1                              32C04470
0734 1 6D00 07DA              STX  L1 SHIFT                               32C04480
0736 1 6D00 07DB              STX  L1 SHFT2                               32C04490
0738 1 C400 09C6              LD   L  K8000                               32C04500
073A 1 D400 07D7              STO  L  SEQSW       SET SEQ SW              32C04510
                        *                                                 32C04520
                        *----------------------------------------        32C04530
                        *  SPACE TO CHANNELS                              32C04540
                        *----------------------------------------        32C04550
                        *                                                 32C04560
073C 1 4400 0957              BSI  L  PMSG        MSG- SPACE TO CHANNEL   32C04570
073E 0 9C00                   DC      /9C00       MSG CONTROL             32C04580
                        *                                                 32C04590
073F 1 6C00 0AC5  T08A  STX  L  LOOP        SET LOOP ADDRS                32C04600
0741 1 4400 094A        BSI  L  STOP        STOP THE PRINTER              32C04610
0743 1 4400 0907        BSI  L  SPACE                                     32C04620
0745 1 0C00 0B14        XIO  L  SENSE-1     RECORD CHANL PUNCH IF         32C04630
0747 1 EC00 08F4        OR   L  WAS          DETEC IN INTRPT              32C04640
                        *                    OR MAINLINE                  32C04650
0749 0 1008             SLA     8                                         32C04660
074A 1 4C18 076C        BSC  L  T08B,&-     BR IF CHANL BIT OFF           32C04670
                        *                                                 32C04680
074C 1 4400 07DE        BSI  L  CHMSG       PRINT CHANL ID MSG            32C04690
074E 0 8500             DC      /8500                                     32C04700
                        *                                                 32C04710
074F 1 EC00 07DD        OR   L  VCHNL       RECORD EACH CHANNEL           32C04720
0751 1 D400 07DD        STO  L  VCHNL        DETECTED                     32C04730
0753 1 C400 07D7        LD   L  SEQSW                                     32C04740
0755 0 1001             SLA     1                                         32C04750
0756 1 4C08 076C        BSC  L  T08B,&                                    32C04760
                        *                                                 32C04770
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                        *  AFTER SECOND CHANNEL, CHECK FIRST 16 CHANNELS  32C04780
                        *  FOR REPEAT OF CHANNEL SEQUENCE.                32C04790
                        *                                                 32C04800
0758 1 6680 07DA  T08A1 LDX  I2 SHIFT       XR 2#CHAN BEFORE REPEAT       32C04810
075A 1 C400 07DC        LD   L  LTSEQ       LOAD LAST SEQUENCE            32C04820
075C 0 1200             SLA  2  0            CHECK FOR REPEAT             32C04830
075D 1 E400 07DC        AND  L  LTSEQ       ZERO IF NOT REPEAT            32C04840
075F 1 4C20 076A        BSC  L  T08A2,Z     BR IF REPEAT                  32C04850
0761 1 6680 07DB        LDX  I2 SHFT2                                     32C04860
0763 0 C077             LD      SHFT2                                     32C04870
0764 0 F075             EOR     SHIFT                                     32C04880
0765 0 6A74             STX  2  SHIFT                                     32C04890
0766 1 4C20 0758        BSC  L  T08A1,Z     BR FOR 2ND CHECK              32C04900
0768 1 7401 07DA        MDX  L  SHIFT,1                                   32C04910
076A 1 7401 07DB  T08A2 MDX  L  SHFT2,1                                   32C04920
                        *                                                 32C04930
076C 1 4400 09E9  T08B  BSI  L  LOCK        CK LOCK SW                    32C04940
076E 0 C068             LD      SEQSW                                     32C04950
076F 1 4C18 0774        BSC  L  T08C,&-                                   32C04960
0771 1 74FF 06DE        MDX  L  LPCNT,-1    DEC LOOP CNT                  32C04970
0773 0 70CB             MDX     T08A                                      32C04980
                        *                                                 32C04990
0774 0 C068       T08C  LD      VCHNL                                     32C05000
0775 1 F400 0C05        EOR  L  KFF00                                     32C05010
0777 0 D060             STO     TEMP8                                     32C05020
                        *                                                 32C05030
0778 0 6500 0000  T08D  LDX  L1 *-*         XR1#CHANNEL NUMBER            32C05040
077A 1 4428 0A55        BSI  L  ERR12,&Z    PRINT MISSING CHAN MSG        32C05050
077C 1 7401 0779        MDX  L  T08D&1,1    ADV TO CK NEXT CHAN           32C05060
077E 0 C059             LD      TEMP8                                     32C05070
077F 0 1001             SLA     1           SHIFT TO NEXT CHAN            32C05080
0780 0 D057             STO     TEMP8                                     32C05090
0781 1 4C20 0778        BSC  L  T08D,Z      BR IF MORE ERRORS             32C05100
                        *                                                 32C05110
                        *                                                 32C05120
0783 0 1810             SRA     16                                        32C05130
0784 0 D052             STO     SEQSW                                     32C05140
                        *                                                 32C05150
0785 1 4400 0907  I89AX BSI  L  SPACE       ADVANCE TO THE NEXT           32C05160
0787 1 0C00 0B14        XIO  L  SENSE-1      CHANNEL PUNCH BEFORE         32C05170
0789 1 EC00 08F4        OR   L  WAS          STARTING TEST ROUTINE        32C05180
078B 0 1008             SLA     8                                         32C05190
078C 1 4CA0 0721        BSC  I  IN89A,Z                                   32C05200
078E 0 70F6             MDX     I89AX                                     32C05210
                        *                                                 32C05220
078F 0 0000       SW89A DC      *-*                                       32C05230
                        *                                                 32C05240
                        ******************************************        32C05250
                        *              TEST ROUTINE 8                     32C05260
                        ******************************************        32C05270
                        * THIS TEST CHECKS THAT EACH CHANNEL              32C05280
                        * PUNCH WILL GENERATE A SKIP INTERRUPT.           32C05290
                        *----------------------------------------        32C05300
                        *                                                 32C05310
0790 1 4400 08BD  TST8  BSI  L  INTLZ                                     32C05320
0792 0 E401             DC      /E401                                     32C05330
0793 0 408D             BSI     IN89A       INITIALIZE                    32C05340
0794 0 6202             LDX  2  2                                         32C05350
0795 1 6E00 06DE        STX  L2 LPCNT                                     32C05360
0797 1 4400 0907        BSI  L  SPACE                                     32C05370
0799 1 4400 0957        BSI  L  PMSG                                      32C05380
079B 0 AC00             DC      /AC00                                     32C05390
079C 0 62FF             LDX  2  -1                                        32C05400
079D 0 6A3A             STX  2  TEMP8       SET TEMP8 TO ALL BITS         32C05410
                        *                                                 32C05420
079E 1 6C00 0AC5        STX  L  LOOP        SET LOOP ADDRS                32C05430
07A0 1 6580 07DA  T08E  LDX  I1 SHIFT       LD SHIFT FACTOR               32C05440
                        *                                                 32C05450
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07A2 0 6908          T08F  STX   1 T08X1&1    STO XR1                    32C05460
                     *                                                    32C05470
07A3 1 4400 094A           BSI  L  STOP        STOP THE PRINTER           32C05480
07A5 0 1810                SRA     16          SET SKIP TO SW             32C05490
07A6 0 6600 5000           LDX  L2 /5000       SET BUSY DSW S/B           32C05500
07A8 1 4400 0929           BSI  L  SKIP                                   32C05510
                     *                                                    32C05520
07AA 0 6500 0000     T08X1 LDX  L1 *-*         RESTORE XR1                32C05530
07AC 1 6680 07DA           LDX  I2 SHIFT                                  32C05540
07AE 1 C400 0BF4           LD   L  WAS         LD DSW                     32C05550
07B0 0 1008                SLA     8                                      32C05560
07B1 0 6308                LDX   3 8                                      32C05570
07B2 0 1340                SLCA  3 0           IDENTIFY CODE              32C05580
07B3 0 10A0                SLT     32                                     32C05590
07B4 1 C700 07CE           LD   L3 CH12S-1     LD SEQUENCE FOR THIS CHAN  32C05600
07B6 0 1AC0                RTE   2 0                                      32C05610
07B7 1 EF00 07CE           OR   L3 CH12S-1                                32C05620
07B9 0 19C0                RTE   1 0           RTE BY SHIFT FACTOR        32C05630
07BA 0 1280                SLT   2 0                                      32C05640
07BB 0 E01C                AND     TEMP8       CK FOR PROPER SEQ          32C05650
07BC 1 4418 0A67           BSI  L  ERR13,&-    BR IF SEQ ERR              32C05660
07BE 0 D019                STO     TEMP8                                  32C05670
                     *                                                    32C05680
07BF 1 C400 0BF4           LD   L  WAS         LD DSW                     32C05690
07C1 0 1008                SLA     8                                      32C05700
07C2 0 401B                BSI     CHMSG       MSG- CHANNEL X             32C05710
07C3 0 8500                DC      /8500                                  32C05720
07C4 1 6580 07AB           LDX   I1 T08X1&1                               32C05730
                     *                                                    32C05740
07C6 0 71FF                MDX   1 -1                                     32C05750
07C7 0 70DA                MDX     T08F                                   32C05760
                     *                                                    32C05770
07C8 1 4400 09E9           BSI  L  LOCK        CK FOR LOCK ON FUNCTION    32C05780
07CA 1 74FF 06DE           MDX  L  LPCNT,-1    DEC LOOP COUNT             32C05790
07CC 0 70D3                MDX     T08E        BR IF NOT FINISHED         32C05800
                     *                                                    32C05810
07CD 1 4400 0609           BSI  L  CNTRL                                  32C05820
                     *                                                    32C05830
                     *-------------------------------------------         32C05840
                     *          CHANNEL SEQUENCE TABLE                    32C05850
                     *-------------------------------------------         32C05860
                     *                                                    32C05870
07CF 0 0000          CH12S DC       *-*                                   32C05880
07D0 0 0000          CH9SQ DC       *-*                                   32C05890
07D1 0 0000          CH6SQ DC       *-*                                   32C05900
07D2 0 0000          CH5SQ DC       *-*                                   32C05910
07D3 0 0000          CH4SQ DC       *-*                                   32C05920
07D4 0 0000          CH3SQ DC       *-*                                   32C05930
07D5 0 0000          CH2SQ DC       *-*                                   32C05940
07D6 0 0000          CH1SQ DC       *-*                                   32C05950
07D7 0 0000          SEQSW DC       *-*         SEQ SW                    32C05960
07D8 0 0000          TEMP8 DC       *-*                                   32C05970
07D9 0 0000                DC       *-*                                   32C05980
07DA 0 0000          SHIFT DC       *-*                                   32C05990
07DB 0 0000          SHFT2 DC       *-*                                   32C06000
07DC 0 0000          LTSEQ DC       *-*                                   32C06010
07DD 0 0000          VCHNL DC       *-*         BIT SET FOR EACH CHAN DET 32C06020
                     *                                                    32C06030
                     *-------------------------------------------         32C06040
                     *          PRINT CHANNEL MESSAGE                     32C06050
                     *-------------------------------------------         32C06060
                     *                                                    32C06070
07DE 0 0000          CHMSG DC       *-*                                   32C06080
07DF 1 4C18 07FB           BSC  L  CHM2,&-                                32C06090
07E1 0 D0F7                STO     TEMP8&1     SAVE CHANNEL CODE          32C06100
07E2 0 6107                LDX   1 7                                      32C06110
07E3 0 1140                SLCA  1 0           IDENTIFY BIT               32C06120
07E4 0 1001                SLA     1                                      32C06130
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07E5 1 4C20 0A70           BSC  L  ERR14,Z     ERR IF MORE THAN 1 BIT     32C06140
                     *                                                    32C06150
07E7 0 C0EF                LD      SEQSW       LD SEQ SW                  32C06160
07E8 1 ED00 07CF           OR   L1 CH12S                                  32C06170
07EA 1 D500 07CF           STO  L1 CH12S                                  32C06180
07EC 0 D0EF                STO     LTSEQ                                  32C06190
07ED 0 C0E9                LD      SEQSW       LD SEQ SW                  32C06200
07EE 0 1801                SRA     1           ADV SEQ                    32C06210
07EF 0 D0E7                STO     SEQSW                                  32C06220
                     *                                                    32C06230
07F0 1 C500 07FF           LD   L1 CHTBL       LD MSG                     32C06240
07F2 1 D400 0E8E           STO  L  PMG26                                  32C06250
07F4 1 C480 07DE           LD   I  CHMSG                                  32C06260
07F6 0 D002                STO     CHM1                                   32C06270
07F7 1 4400 0957           BSI  L  PMSG        PRINT 1132 MSG             32C06280
07F9 0 0000          CHM1  DC       *-*         MSG CONTROL                32C06290
                     *                                                    32C06300
07FA 0 C0DE                LD      TEMP8&1                                32C06310
07FB 1 7401 07DE     CHM2  MDX  L  CHMSG,1                                32C06320
07FD 1 4C80 07DE           BSC  I  CHMSG                                  32C06330
                     *                                                    32C06340
07FF 0 F1F2          CHTBL DC       /F1F2       12                         32C06350
0800 0 F900                DC       /F900       9                          32C06360
0801 0 F600                DC       /F600       6                          32C06370
0802 0 F500                DC       /F500       5                          32C06380
0803 0 F400                DC       /F400       4                          32C06390
0804 0 F300                DC       /F300       3                          32C06400
0805 0 F200                DC       /F200       2                          32C06410
0806 0 F100                DC       /F100       1                          32C06420
                     *                                                    32C06430
                     ********************************************         32C06440
                     *          TEST ROUTINE 9                            32C06450
                     ********************************************         32C06460
                     *  THIS ROUTINE WILL SKIP TO EACH CHANNEL IN         32C06470
                     *  ORDER, STARTING WITH CHANNEL ONE. PRINTER IS      32C06480
                     *  OFF DURING THE SKIP OPERATION.                    32C06490
                     *-------------------------------------------         32C06500
                     *                                                    32C06510
0807 1 4400 088D     TST9  BSI  L  INTLZ       GO INITIALIZE ROUTINE      32C06520
0809 0 202D                DC       /202D       MSG CONTROL                32C06530
080A 0 202D                DC       /202D       MSG CONTROL                32C06540
080B 1 4400 0721           BSI  L  IN89A                                  32C06550
                     *                                                    32C06560
080D 1 C400 09C6           LD   L  K8000                                  32C06570
080F 0 D0C8                STO     TEMP8                                  32C06580
                     *                                                    32C06590
0810 1 6C00 0AC5           STX  L  LOOP        SET LOOP ADDRS             32C06600
0812 1 4400 0907     T09A  BSI  L  SPACE                                  32C06610
0814 1 C400 05E1           LD   L  SW2         LD SELECT CHANNEL SWS      32C06620
0816 0 1008                SLA     8                                      32C06630
0817 1 4C20 081D           BSC  L  T09B,Z      BR IF SW ENTRY             32C06640
                     *                                                    32C06650
0819 0 C0BE                LD      TEMP8       LD SKIP SEQ SW             32C06660
081A 0 E0C2                AND     VCHNL       CHECK FOR VALID CHNL       32C06670
081B 1 4C18 082D           BSC  L  T09C,&-                                32C06680
                     *                                                    32C06690
081D 0 40C0          T09B  BSI      CHMSG       MSG- SKIP TO X             32C06700
081E 0 AD00                DC       /AD00       MSG CONTROL                32C06710
081F 1 4400 094A           BSI  L  STOP        STOP THE PRINTER           32C06720
                     *                                                    32C06730
0821 0 C0B7                LD      TEMP8&1     LD SKIP SEQ SW             32C06740
0822 0 6600 5000           LDX  L2 /5000       SET BUSY DSW S/B           32C06750
0824 1 4400 0929           BSI  L  SKIP                                   32C06760
                     *                                                    32C06770
                     *                                                    32C06780
0826 1 C400 0BF4           LD   L  WAS         LD DSW                     32C06790
0828 0 1008                SLA     8           LOOK AT CHANNEL BITS       32C06800
0829 0 40B4                BSI     CHMSG       MSG- CHANNEL X             32C06810
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082A 0 8500              DC     /8500      MSG CONTROL                    32C06820
082B 1 4400 09E9         BSI  L LOCK       CK FOR LOCK ON FUNCTION        32C06830
                         *                                                 32C06840
082D 0 C0AA              T09C   LD         TEMP8      LD SKIP SEQ SW      32C06850
082E 0 1801                     SRA        1          SHIFT FOR NEXT CHANNEL 32C06860
082F 0 D0A8                     STO        TEMP8                          32C06870
0830 0 1808                     SRA        8                              32C06880
0831 1 4C20 0812                BSC  L     T09A,Z     LOOP IF NOT ZERO    32C06890
0833 1 4400 0609                BSI  L     CNTRL                          32C06900
                         *                                                 32C06910
                         ********************************************      32C06920
                         *            TEST ROUTINE A                *      32C06930
                         ********************************************      32C06940
                         *  THIS ROUTINE WILL SKIP TO EACH CHANNEL IN *    32C06950
                         *  ORDER, STARTING WITH CHANNEL ONE. PRINTER IS *  32C06960
                         *  ON DURING THE SKIP OPERATION.             *    32C06970
                         *--------------------------------------------*    32C06980
                         *                                                 32C06990
0835 1 4400 08BD         TSTA   BSI  L  INTLZ      GO INITIALIZE ROUTINE  32C07000
0837 0 102E                     DC     /102E      MSG CONTROL            32C07010
0838 1 4400 0721                BSI  L IN89A                             32C07020
                         *                                                 32C07030
083A 1 C400 09C6                LD   L K8000                             32C07040
083C 0 D09B                     STO    TEMP8                             32C07050
                         *                                                 32C07060
083D 1 6C00 0AC5                STX  L LOOP       SET LOOP ADDRS         32C07070
083F 1 4400 0907         TOAA   BSI  L SPACE                             32C07080
0841 1 C400 05E1                LD   L SW2        LD SELECT CHANNEL SWS  32C07090
0843 0 1008                     SLA    8                                 32C07100
0844 1 4C20 084A                BSC  L TOAB,Z     BR IF SW ENTRY         32C07110
                         *                                                 32C07120
0846 0 C091                     LD     TEMP8      LD SKIP SEQ SW         32C07130
0847 0 E095                     AND    VCHNL      CHECK FOR VALID CHNL   32C07140
0848 1 4C18 0863                BSC  L TOAC,&-                           32C07150
                         *                                                 32C07160
084A 0 4093              TOAB   BSI    CHMSG      MSG- SKIP TO X         32C07170
084B 0 AD00                     DC     /AD00      MSG CONTROL            32C07180
                         *                                                 32C07190
084C 0 6101                     LDX    1 1                               32C07200
084D 0 6600 8200                LDX  L2 /8200                            32C07210
084F 1 4400 08E1                BSI  L IDLE       GO START THE PRINTER   32C07220
                         *                                                 32C07230
0851 0 6500 03E8                LDX  L1 1000      SET IDLCT TO KEEP      32C07240
0853 1 6D00 0C03                STX  L1 IDLCT      PRINTER GOING         32C07250
                         *                                                 32C07260
0855 1 C400 07D9                LD   L TEMP8&1    LD SKIP SEQ SW         32C07270
0857 0 6600 5200                LDX  L2 /5200     SET BUSY DSW S/B       32C07280
0859 1 4400 0929                BSI  L SKIP                              32C07290
                         *                                                 32C07300
085B 1 C400 0BF4                LD   L WAS        LD DSW                 32C07310
085D 0 1008                     SLA    8          LOOK AT CHANNEL BITS   32C07320
085E 1 4400 07DE                BSI  L CHMSG      MSG- CHANNEL X         32C07330
0860 0 8500                     DC     /8500      MSG CONTROL            32C07340
0861 1 4400 09E9                BSI  L LOCK       CK FOR LOCK ON FUNCTION 32C07350
                         *                                                 32C07360
0863 1 C400 07D8         TOAC   LD   L  TEMP8      LD SKIP SEQ SW         32C07370
0865 0 1801                     SRA    1          SHIFT FOR NEXT CHANNEL 32C07380
0866 1 D400 07D8                STO  L TEMP8                             32C07390
0868 0 1808                     SRA    8                                 32C07400
0869 1 4C20 083F                BSC  L TOAA,Z     LOOP IF NOT ZERO       32C07410
086B 1 4400 0609                BSI  L CNTRL                             32C07420
                         *                                                 32C07430
                         ********************************************      32C07440
                         *            TEST ROUTINE B                *      32C07450
                         ********************************************      32C07460
                         *  THIS ROUTINE ENABLES BIT SWITCH CONTROL OF THE 32C07470
                         *  CHARACTER AND THE COLUMN TO BE PRINTED. ONLY  32C07480
                         *  ONE CHARACTER WILL BE PRINTED ON EACH LINE.   32C07490
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                         *  THE COLUMN NUMBER MUST BE ENTERED IN SWITCHES 32C07500
                         *  1-7, AND THE CHARACTER ID IN SWITCHES 8-15.   32C07510
                         *  PRINTING WILL START WHEN SWITCH 0 IS TURNED ON. 32C07520
                         *--------------------------------------------*    32C07530
                         *                                                 32C07540
086D 1 4400 08BD         TSTB   BSI  L  INTLZ      GO INITIALIZE ROUTINE  32C07550
086F 0 0000                     DC     /0000                             32C07560
                         *                                                 32C07570
0870 0 4480 0163                BSI  I LOG        PRINT SET UP MSG       32C07580
0872 1 08B8                     DC     SETUP                             32C07590
                         *                                                 32C07600
0873 0 083C              TOBA   XIO    RBSWS      READ THE BIT SWS       32C07610
0874 0 C03F                     LD     BSWS                              32C07620
0875 1 4C28 087D                BSC  L TOBB,&Z    USE SWS IF SW ZERO ON  32C07630
                         *                                                 32C07640
0877 1 6700 0873                LDX  L3 TOBA      LOOP UNTIL SW ZERO ON  32C07650
0879 1 6F00 05E6                STX  L3 MLSCF&1                          32C07660
087B 1 4C00 0B09                BSC  L WAIT4                             32C07670
                         *                                                 32C07680
087D 0 1001              TOBB   SLA    1          REMOVE SW ZERO         32C07690
087E 0 1801                     SRA    1                                 32C07700
087F 0 1888                     SRT    8          PUT 8-15 IN EXT        32C07710
0880 0 D034                     STO    PCOLM      STO COLUMN NO. SWS 1-7 32C07720
0881 0 1888                     SRT    8                                 32C07730
0882 0 1098                     SLT    24                                32C07740
0883 0 D035                     STO    CHID       STO CHAR ID            32C07750
0884 1 4C18 08AA                BSC  L TOBF,&-    BYPASS PRINT UNLESS A  32C07760
                         *                          VALID CHARACTER ID   32C07770
                         *                                               32C07780
0886 1 6C00 0AC5                STX  L LOOP       SET LOOP ADDRS         32C07790
0888 0 6132                     LDX    1 50       SET EMIT LOOP CNT      32C07800
0889 1 6D00 06DE                STX  L1 LPCNT                            32C07810
                         *                                                 32C07820
088B 0 6600 8200         TOBC   LDX  L2 /8200     SET DSW S/B            32C07830
088D 0 6101                     LDX    1 1        SET IDLE CNT           32C07840
088E 1 4400 08E1                BSI  L IDLE                              32C07850
                         *                                                 32C07860
0890 1 C400 0C10         TOBD   LD   L  EMIT       CHECK IF CHARACTER IS  32C07870
0892 0 9026                     S      CHID        TO BE PRINTED         32C07880
0893 1 4C18 089C                BSC  L TOBE,&-    YES IF BRANCH          32C07890
                         *                                                 32C07900
0895 1 74FF 0B14                MDX  L ICNT,-1    SKIP IF INTRPT CNT#1   32C07910
0897 0 70DB                     MDX    TOBA       BR IF MISSED AN EMIT   32C07920
0898 1 74FF 06DE                MDX  L LPCNT,-1   LOOP FOR 50 SEQUENTIAL 32C07930
089A 0 70F0                     MDX    TOBC        EMITS                 32C07940
089B 0 700E                     MDX    TOBF       SPACE IF NO MATCH      32C07950
                         *                                                 32C07960
089C 0 C018              TOBE   LD     PCOLM      LD COL NO.             32C07970
089D 0 1890                     SRT    16                                32C07980
089E 0 A817                     D      X16                               32C07990
089F 1 DC00 08B2                STD  L TEMPB                             32C08000
08A1 1 6580 08B3                LDX  I1 TEMPB&1   XR1#BUF WORD BIT POSITION 32C08010
08A3 1 6680 08B2                LDX  I2 TEMPB     XR2#BUF WORD NUMBER    32C08020
                         *                                                 32C08030
08A5 1 C400 09C6                LD   L K8000                             32C08040
08A7 0 1900                     SRA    1 0                               32C08050
08A8 0 EA20                     OR     2 32                              32C08060
08A9 0 D220                     STO    2 32       SET BIT IN BUFFER      32C08070
                         *                                                 32C08080
08AA 0 6101              TOBF   LDX    1 1        SET SCAN CNT           32C08090
08AB 1 4400 08D6                BSI  L PRINT                             32C08100
08AD 1 4400 09E9                BSI  L LOCK       CK FOR LOCK ON FUNCTION 32C08110
                         *                                                 32C08120
08AF 0 70C3                     MDX    TOBA                              32C08130
                         *                                                 32C08140
08B0   0000                     BSS  E 0                                 32C08150
08B0 1 08B4              RBSWS  DC     BSWS                              32C08160
08B1 0 3A00                     DC     /3A00      IOCC TO READ BIT SWS   32C08170
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08B2 0 0000          TEMPB DC      *-*                                  32C08180
08B3 0 0000                DC      *-*                                  32C08190
08B4 0 0000          BSWS  DC      *-*                                  32C08200
08B5 0 0000          PCOLM DC      *-*        PRINT COL STORED HERE     32C08210
08B6 0 0010          X16   DC      16                                   32C08220
08B7 0 0030          K0030 DC      /0030                                32C08230
08B8 0 0002          SETUP DC      2                                    32C08240
08B9 0 0000          CHID  DC      *-*                                  32C08250
08BA 0 0000                DC      0                                    32C08260
08BB 1 0DBF                DC      ABSW                                 32C08270
08BC 0 0000                DC      0                                    32C08280
                     *                                                  32C08290
                     ********************************************       32C08300
                     *             INITIALIZE SUBROUTINE            *   32C08310
                     ********************************************       32C08320
                     *                                                  32C08330
08BD 0 0000          INTLZ DC      *-*                                  32C08340
08BE 1 4400 094A           BSI  L  STOP       STOP THE PRINTER          32C08350
                     *                                                  32C08360
08C0 1 4400 09CC           BSI  L  CLEAR      SET PRINT BUF TO ZERO     32C08370
08C2 1 D400 0AC5           STO  L  LOOP       RESET LOOP ADDRS          32C08380
                     *                                                  32C08390
08C4 1 4400 0B33           BSI  L  READY      CK FOR READY              32C08400
                     *                                                  32C08410
08C6 0 4040                BSI     SPACE                                32C08420
08C7 0 403F                BSI     SPACE                                32C08430
                     *                                                  32C08440
08C8 1 C480 08BD           LD   I  INTLZ      LD MSG CONTROL            32C08450
08CA 1 4C18 08D2           BSC  L  INT2,&-    BR IF MSG CONTROL#ZERO    32C08460
                     *                                                  32C08470
08CC 0 D002                STO     INT1       SET CONTROL               32C08480
08CD 1 4400 0957           BSI  L  PMSG       PRINT 1132 MSG            32C08490
08CF 0 0000          INT1  DC      *-*        MSG CONTROL               32C08500
                     *                                                  32C08510
08D0 0 4036                BSI     SPACE                                32C08520
08D1 0 4035                BSI     SPACE                                32C08530
                     *                                                  32C08540
08D2 1 7401 08BD     INT2  MDX  L  INTLZ,1                              32C08550
08D4 1 4C80 08BD           BSC  I  INTLZ      RETURN                    32C08560
                     *                                                  32C08570
                     ********************************************       32C08580
                     *             PRINT SUBROUTINE                 *   32C08590
                     ********************************************       32C08600
                     *                                                  32C08610
08D6 0 0000          PRINT DC      *-*                                  32C08620
08D7 1 C400 05E2           LD   L  SW3                                  32C08630
08D9 1 D400 0C03           STO  L  IDLCT      SET FOR PRINT             32C08640
08DB 0 6600 8200           LDX  L2 /8200      SET FOR PRINT DSW         32C08650
08DD 0 400A                BSI     PRCOM                                32C08660
08DE 0 4028                BSI     SPACE                                32C08670
08DF 1 4C80 08D6           BSC  I  PRINT                                32C08680
                     *                                                  32C08690
                     ********************************************       32C08700
                     *             IDLE SUBROUTINE                  *   32C08710
                     ********************************************       32C08720
                     *                                                  32C08730
08E1 0 0000          IDLE  DC      *-*                                  32C08740
08E2 1 6D00 0C03           STX  L1 IDLCT      SET IDLE CNT              32C08750
08E4 0 6100                LDX   1 0                                    32C08760
08E5 0 4002                BSI     PRCOM                                32C08770
08E6 1 4C80 08E1           BSC  I  IDLE                                 32C08780
                     *                                                  32C08790
                     *------------------------------------------        32C08800
                     *             PRINT COMMON                     *   32C08810
                     *------------------------------------------        32C08820
                     *                                                  32C08830
08E8 0 0000          PRCOM DC      *-*                                  32C08840
08E9 1 6D00 0BF6           STX  L1 SCNCT      SET SCNCT FOR IDLE        32C08850
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08EB 1 6E00 0C00           STX  L2 EXPCT                                32C08860
                     *                                                  32C08870
08ED 1 0C00 0B14     PRC1  XIO  L  SENSE-1    SENSE DSW                 32C08880
08EF 1 D400 0AD7           STO  L  DSWW       STO IN MSG                32C08890
08F1 0 1003                SLA     3                                    32C08900
08F2 1 4C10 08F7           BSC  L  PRC2,-     BR IF CARG NOT BUSY       32C08910
08F4 1 4400 0A8C           BSI  L  ERR17      PRINT ERR MSG             32C08920
08F6 0 70F6                MDX     PRC1                                 32C08930
                     *                                                  32C08940
08F7 1 4400 0B4D     PRC2  BSI  L  FORMS                                32C08950
08F9 1 6600 0D95           LDX  L2 APRT                                 32C08960
08FB 1 6E00 0ACA           STX  L2 OPSW       SET LAST OP SW            32C08970
08FD 0 6700 0200           LDX  L3 /0200      BUSY DSW S/B              32C08980
08FF 1 6F00 0B16           STX  L3 TBDSW      SAVE BUSY DSW S/B         32C08990
0901 1 0C00 09C4           XIO  L  STPRT-1    START THE PRINTER         32C09000
0903 1 4400 0AE0           BSI  L  WAIT       WAIT FOR INTERRUPT        32C09010
0905 1 4C80 08E8           BSC  I  PRCOM                                32C09020
                     *                                                  32C09030
                     ********************************************       32C09040
                     *             SPACE SUBROUTINE                 *   32C09050
                     ********************************************       32C09060
                     *                                                  32C09070
0907 0 0000          SPACE DC      *-*                                  32C09080
0908 0 4041                BSI     STOP       STOP THE PRINTER          32C09090
0909 1 C400 0AE0           LD   L  WAIT                                 32C09100
090B 1 4C18 0919           BSC  L  SPC1,&-    BR ON FIRST SPACE         32C09110
090D 0 6116                LDX   1 /16        ERROR NUMBER              32C09120
090E 1 0C00 0B14           XIO  L  SENSE-1    SENSE DSW                 32C09130
0910 1 D400 0ADE           STO  L  CHWAS&1                              32C09140
0912 1 F400 0ADD           EOR  L  CHWAS      CHECK FOR CHANGE          32C09150
0914 0 1008                SLA     8           IN CHANNEL BITS          32C09160
0915 1 4420 0A85           BSI  L  ERR16,Z    ERROR IF CHANGE           32C09170
0917 1 4400 0B4D           BSI  L  FORMS                                32C09180
                     *                                                  32C09190
0919 0 6600 2000     SPC1  LDX  L2 /2000                                32C09200
091B 1 6E00 0C01           STX  L2 EXPCT&1    SET EXPCT FOR SPACE       32C09210
091D 1 6600 0D8B           LDX  L2 ASPC                                 32C09220
091F 1 6E00 0ACA           STX  L2 OPSW       SET LAST OP SW            32C09230
0921 1 0C00 0BFA           XIO  L  STSPA-1    START SPACE               32C09240
0923 1 C400 09CB           LD   L  K1000      LD CARRIAGE BUSY BIT      32C09250
0925 1 4400 0AE0           BSI  L  WAIT       WAIT FOR INTERRUPT        32C09260
                     *                                                  32C09270
0927 1 4C80 0907           BSC  I  SPACE      RETURN                    32C09280
                     *                                                  32C09290
                     ********************************************       32C09300
                     *             SKIP                             *   32C09310
                     ********************************************       32C09320
                     *                                                  32C09330
0929 0 0000          SKIP  DC      *-*                                  32C09340
092A 0 D01D                STO     SKPTO      SET CHANNEL CODE IN SKPTO 32C09350
092B 1 6E00 0C01           STX  L2 EXPCT&1    SET FOR SKIP INTRPT       32C09360
092D 1 4400 0B4D           BSI  L  FORMS                                32C09370
092F 0 6210                LDX   2 16                                   32C09380
0930 0 6A18                STX   2 SKCNT      SET FOR MAX OF 16 SKIPS   32C09390
0931 1 C400 09CB           LD   L  K1000                                32C09400
0933 1 EC00 0C00           OR   L  EXPCT      SET FOR SKIP WITH         32C09410
0935 1 D400 0C00           STO  L  EXPCT       PRINTER ON               32C09420
0937 1 6600 0D92           LDX  L2 ASKP       SET LAST OP SW            32C09430
0939 1 6E00 0ACA           STX  L2 OPSW        FOR SKIP                 32C09440
093B 1 0C00 09C6           XIO  L  STCAR-1    START SKIP                32C09450
093D 1 C400 09CB           LD   L  K1000      LD CARRIAGE BUSY BIT      32C09460
093F 1 4400 0AE0           BSI  L  WAIT                                 32C09470
                     *                                                  32C09480
0941 0 4008                BSI     STOP                                 32C09490
0942 1 0C00 0B14     SKP1  XIO  L  SENSE-1    SENSE DSW                 32C09500
0944 0 1003                SLA     3          LOOP HERE UNTIL           32C09510
0945 1 4C90 0929           BSC  I  SKIP,-      CARRIAGE BUSY GOES OFF   32C09520
0947 0 70FA                MDX     SKP1                                 32C09530
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                        *                                                       32C09540
0948 0 0000             SKPTO DC      *-*       SKIP TO CONTROL               32C09550
0949 0 0000             SKCNT DC      *-*       SKIP COUNT                    32C09560
                        *                                                     32C09570
                        ***************************************               32C09580
                        *          STOP THE PRINTER                           32C09590
                        ***************************************               32C09600
                        *                                                     32C09610
094A 0 0000             STOP  DC      *-*                                     32C09620
094B 1 0C00 0BF2              XIO   L STPPT-1   STOP PRINTER                  32C09630
094D 0 1810                   SRA     16                                      32C09640
094E 1 D400 0BFA              STO   L EMTSW     RESET 1ST EMIT SW             32C09650
0950 1 D400 0C00              STO   L EXPCT                                   32C09660
0952 1 D400 0B16              STO   L TBDSW                                   32C09670
0954 1 4C80 094A              BSC   I STOP      RETURN TO CALLING RTN         32C09680
                        *                                                     32C09690
0956 0 0002             RT2EX DC      /0002     NON-ZERO CONSTANT             32C09700
                        *                                                     32C09710
                        ***************************************               32C09720
                        *          PRINT 1132 MESSAGE SUBROUTINE              32C09730
                        ***************************************               32C09740
                        *                                                     32C09750
0957 0 0000             PMSG  DC      *-*                                     32C09760
0958 1 C400 05DF              LD    L SW0       DO NOT PRINT IF               32C09770
095A 0 100D                   SLA     13          BYPASS MESSAGE SWITCH       32C09780
095B 1 4C28 0985              BSC   L PMS4,&Z     IS ON                       32C09790
                        *                                                     32C09800
095D 0 40EC                   BSI     STOP                                    32C09810
                        *                                                     32C09820
095E 0 10A0                   SLT     32                                      32C09830
095F 1 C480 0957              LD    I PMSG      LD MESSAGE CONTROL            32C09840
0961 0 610E                   LDX     1 14                                    32C09850
0962 0 4828                   BSC       &Z        CK FOR EXTENDED TABLE         32C09860
0963 0 710F                   MDX     1 15                                    32C09870
0964 0 1001                   SLA       1                                     32C09880
0965 0 D05E                   STO       SAVE                                  32C09890
0966 1 6700 0DE5              LDX   L3 BUF        XR3#BUFFER ADDRS              32C09900
0968 0 7001                   MDX       PMS1&1                                32C09910
                        *                                                     32C09920
0969 0 7301             PMS1  MDX     3 1         PUT SPACE IN MSG              32C09930
096A 0 C059                   LD        SAVE      LD MESSAGE CONTROL            32C09940
096B 0 1140                   SLCA    1 0         SCAN CONTROL                  32C09950
096C 1 4C18 0985              BSC   L PMS4,&-     BR IF CONTROL ZERO            32C09960
096E 0 F057                   EOR       K8000                                 32C09970
096F 0 D054                   STO       SAVE      SAVE CONTROL FOR NXT SCAN     32C09980
0970 1 C500 0E05              LD    L1 PMTAB      LD MSG ADDRS                  32C09990
0972 0 D001                   STO       *&1                                   32C10000
                        *                                                     32C10010
0973 0 C400 0000        PMS2  LD    L *-*         LD MSG CHAR                   32C10020
0975 0 F053                   EOR       TERM      CK FOR TERMINATOR             32C10030
0976 1 4C18 0969              BSC   L PMS1,&-     BR IF TERM                    32C10040
                        *                                                     32C10050
0978 0 F050                   EOR       TERM      RESTORE CHAR                  32C10060
0979 0 18C8                   RTE       8         SHIFT OUT 2ND CHAR            32C10070
097A 0 1008                   SLA       8                                     32C10080
097B 0 D300                   STO     3 0         STO CHAR IN BUF               32C10090
                        *                                                     32C10100
097C 0 1090                   SLT       16        BRING IN 2ND CHAR             32C10110
097D 1 4C18 0981              BSC   L PMS3,&-     BR IF ZERO                    32C10120
097F 0 7301                   MDX     3 1         ADV BUF ADDRS                 32C10130
0980 0 D300                   STO     3 0         STO CHAR IN BUF               32C10140
                        *                                                     32C10150
0981 0 7301             PMS3  MDX     3 1                                     32C10160
0982 1 7401 0974              MDX   L PMS2&1,1    ADV MSG ADDRS                 32C10170
0984 0 70EE                   MDX       PMS2                                  32C10180
                        *                                                     32C10190
0985 0 6131             PMS4  LDX     1 49        LD SCAN CNT                   32C10200
0986 0 6600 8200              LDX   L2 /8200      LD EXPECTED INTRPT DSW        32C10210
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0988 0 6310                   LDX     3 16        SET FOR 16 IDLES              32C10220
0989 1 6F00 0C03              STX   L3 IDLCT       BEFORE SPACE                 32C10230
098B 1 6C00 09CA              STX   L   MSGSW     SET MSG SW                    32C10240
098D 1 4400 08E8              BSI   L   PRCOM     GO PRINT MSG                  32C10250
                        *                                                     32C10260
098F 1 7401 0957        PMS5  MDX   L   PMSG,1                                32C10270
0991 1 4C80 0957              BSC   I   PMSG      RETURN                        32C10280
                        *                                                     32C10290
                        ***************************************               32C10300
                        *          RIPPLE PATTERN SUBROUTINE                  32C10310
                        ***************************************               32C10320
                        *                                                     32C10330
0993 0 0000             RIPL  DC      *-*                                     32C10340
0994 0 6132             RIPL1 LDX     1 50        SET EMIT LOOP CNT             32C10350
0995 1 6D00 06DE              STX   L1 LPCNT                                  32C10360
                        *                                                     32C10370
0997 0 6600 8200        RIPL2 LDX   L2 /8200      SET DSW S/B                   32C10380
0999 0 6101                   LDX     1 1         SET IDLE CNT                  32C10390
099A 1 4400 08E1              BSI   L   IDLE                                  32C10400
                        *                                                     32C10410
099C 0 6700 0000        RIPL3 LDX   L3 *-*        COMPARE START SCAN            32C10420
099E 1 C700 0CF1              LD    L3 CHAR&49      CHAR WITH LAST              32C10430
09A0 1 9400 0C10              S     L   EMIT        EMIT CHAR                   32C10440
09A2 1 4C18 09AC              BSC   L   RIPL4,&-    LOOP IF NOT EQUAL           32C10450
09A4 1 74FF 0B14              MDX   L   ICNT,-1     SKIP IF INTRPT CNT#1        32C10460
09A6 0 70ED                   MDX       RIPL1                                 32C10470
                        *                                                     32C10480
09A7 1 74FF 06DE              MDX   L   LPCNT,-1    IF AFTER 50 CONSECUTIVE     32C10490
09A9 0 70ED                   MDX       RIPL2         EMITS A MATCH IS NOT      32C10500
09AA 0 1810                   SRA       16            FOUND, LEAVE SPACE        32C10510
09AB 0 7001                   MDX       RIPL4&1       THEN CONTINUE             32C10520
                        *                                                     32C10530
09AC 0 C019             RIPL4 LD        K8000     SET BUFFER WITH FIRST BIT     32C10540
09AD 0 61F0                   LDX     1 -16       SET SHIFT REGISTER            32C10550
09AE 0 62F8                   LDX     2 -8        SET STORAGE REGISTER          32C10560
09AF 0 7301                   MDX     3 1                                       32C10570
09B0 0 7005                   MDX       RIPL5                                 32C10580
09B1 0 63CE                   LDX     3 -50                                     32C10590
09B2 0 6BEA                   STX     3 RIPL3&1   RESET EMIT CHAR CNT           32C10600
09B3 0 1801                   SRA       1         SHIFT LAST LINE               32C10610
09B4 0 7101                   MDX     1 1           IN PATTERN                  32C10620
09B5 0 7302                   MDX     3 2                                       32C10630
                        *                                                     32C10640
09B6 1 6F00 0BF2        RIPL5 STX   L3 BLANK      SET FOR PATTERN SPACE         32C10650
09B8 1 6D00 0BD6              STX   L1 PI5&1                                  32C10660
09BA 1 6E00 0BD8              STX   L2 PI6&1                                  32C10670
09BC 0 6176                   LDX     1 118       SET SCAN COUNT                32C10680
09BD 0 D400 0020              STO   L 32          SET 1ST BUFR WORD             32C10690
09BF 1 4400 08D6              BSI   L PRINT       GO PRINT                      32C10700
09C1 1 4C80 0993              BSC   I RIPL                                      32C10710
                        *                                                     32C10720
09C4    0000                  BSS   E 0                                       32C10730
09C4 0 0000             SAVE  DC      *-*                                     32C10740
09C5 0 3480             STPRT DC      /3480       START PRINTER                 32C10750
09C6 0 8000             K8000 DC      /8000                                     32C10760
09C7 0 3404             STCAR DC      /3404       START CARRIAGE                32C10770
09C8 0 FFFF             ONES  DC      /FFFF                                     32C10780
09C9 0 FFFF             TERM  DC      /FFFF                                     32C10790
09CA 0 0000             MSGSW DC      *-*         PRINTER MSG SW                32C10800
09CB 0 1000             K1000 DC      /1000                                     32C10810
                        *                                                     32C10820
                        ***************************************               32C10830
                        *          CLEAR BUFFER SUBROUTINE                    32C10840
                        ***************************************               32C10850
                        *  THIS SUBROUTINE CLEARS 32-39 AND                   32C10860
                        *  SETS BIT 15, LOC 39.                               32C10870
                        *-------------------------------------                32C10880
                        *                                                     32C10890
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09CC 0 0000          CLEAR DC     0                                    32C10900
09CD 0 63F8                LDX    3 -8          PRINT AREA            32C10910
09CE 0 10A0                SLT    32                                  32C10920
09CF 0 DF00 0028     CL10  STD  L3 40                                  32C10930
09D1 0 7302                MDX    3 2                                 32C10940
09D2 0 70FC                MDX    CL10                                32C10950
09D3 0 6301                LDX    3 1           SET SCAN COMP BIT     32C10960
09D4 0 6F00 0027           STX  L3 39                                  32C10970
09D6 1 D400 09CA           STO  L MSGSW         RESET MSG SW          32C10980
09D8 0 63E0                LDX    3 -32                               32C10990
09D9 1 D700 0E05     CL20  STO  L3 BUF&32                              32C11000
09D8 0 7301                MDX    3 1                                 32C11010
09DC 0 70FC                MDX    CL20                                32C11020
09DD 1 4C80 09CC           BSC  I CLEAR                               32C11030
                     *                                                32C11040
                     ********************************************     32C11050
                     *              SET PRINT BUFFER TO ONES        *   32C11060
                     ********************************************     32C11070
                     *                                                32C11080
09DF 0 0000          A1    DC     0                                    32C11090
09E0 0 63F8                LDX    3 -8                                32C11100
09E1 1 CC00 09C8           LDD  L ONES          SET PRINT             32C11110
09E3 0 DF00 0028     A110  STD  L3 40           AREA TO ALL ONES      32C11120
09E5 0 7302                MDX    3 2                                 32C11130
09E6 0 70FC                MDX    A110                                32C11140
09E7 1 4C80 09DF           BSC  I A1            LEAVE                 32C11150
                     *                                                32C11160
                     ********************************************     32C11170
                     *              LOCK ON FUNCTION ROUTINE        *   32C11180
                     ********************************************     32C11190
                     *                                                32C11200
09E9 0 0000          LOCK  DC     *-*                                  32C11210
09EA 1 C400 05DF           LD   L SWO           LD SWO                32C11220
09EC 0 EC80 0166           OR   I ERLCK         COMB WITH MONITOR SWO 32C11230
09EE 0 100A                SLA    10            CK LOCK ON FNC SW     32C11240
09EF 1 4C90 09E9           BSC  I LOCK,-        BR IF NOT LOCK ON FNC 32C11250
09F1 1 4C80 0AC5           BSC  I LOOP          LOOP ON LAST FUNCTION 32C11260
                     *                                                32C11270
                     ********************************************     32C11280
                     *              ERROR MESSAGE SETUP             *   32C11290
                     ********************************************     32C11300
                     *                                                32C11310
09F3 0 0000          ERR1  DC     *-*           STATIC DSW ERR        32C11320
09F4 0 6101                LDX    1 1           SET MSG NO.           32C11330
09F5 0 6260                LDX    2 /0060       SET DATA CONTROL      32C11340
09F6 1 CC00 0A94           LDD  L MSG1          LD ALPHA MSG          32C11350
09F8 1 4400 0AB4           BSI  L ETYPE         GO PRINT MSG          32C11360
09FA 1 4C80 09F3           BSC  I ERR1          RETURN                32C11370
                     *                                                32C11380
09FC 0 0000          ERR2  DC     *-*           BUSY DSW ERR          32C11390
09FD 0 6102                LDX    1 2           SET MSG NO.           32C11400
09FE 0 6600 0180           LDX  L2 /0180        SET DATA CONTROL      32C11410
0A00 1 CC00 0A96           LDD  L MSG2          LD ALPHA MSG          32C11420
0A02 1 4400 0AB4           BSI  L ETYPE         GO PRINT MSG          32C11430
0A04 1 4C80 09FC           BSC  I ERR2          RETURN                32C11440
                     *                                                32C11450
0A06 0 6103          ERR3  LDX    1 3           NO INTRPT             32C11460
0A07 0 6220                LDX    2 /0020       SET DATA CONTROL      32C11470
0A08 1 CC00 0A98           LDD  L MSG3          LD ALPHA MSG          32C11480
                     *                                                32C11490
0A0A 1 7400 0C01           MDX  L EXPCT&1       CK FOR EXPCT SPACE/SKIP 32C11500
0A0C 0 7003                MDX    ERR3X         BR IF SPACE/SKIP      32C11510
0A0D 1 7400 0B14           MDX  L ICNT          CK FOR SOME INTRPTS   32C11520
0A0F 0 7004                MDX    ERR4          BR IF SOME            32C11530
                     *                                                32C11540
0A10 1 4400 0AB4     ERR3X BSI  L ETYPE         GO PRINT MSG          32C11550
0A12 1 4C80 0AE0           BSC  I WAIT          RETURN                32C11560
                     *                                                32C11570
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0A14 0 6104          ERR4  LDX    1 4           PRINTER STOPPED       32C11580
0A15 1 CC00 0A9A           LDD  L MSG4          LD ALPHA MSG          32C11590
0A17 0 70F8                MDX    ERR3X                               32C11600
                     *                                                32C11610
0A18 0 0000          ERR5  DC     *-*           LEVEL 1 DSW ERR       32C11620
0A19 0 6105                LDX    1 5           SET MSG NO.           32C11630
0A1A 0 6600 0600           LDX  L2 /0600        SET DATA CONTROL      32C11640
0A1C 0 C87F                LDD    MSG5          LD ALPHA MSG          32C11650
0A1D 1 4400 0AB4           BSI  L ETYPE         GO PRINT MSG          32C11660
                     *                                                32C11670
0A1F 1 74FF 0B14           MDX  L ICNT,-1       CK FOR MULT INTRPTS   32C11680
0A21 0 7001                MDX    *&1                                 32C11690
0A22 0 700A                MDX    ERR5X                               32C11700
                     *                                                32C11710
0A23 1 C400 0B17           LD   L EBITS         LD DSW ERROR BITS     32C11720
0A25 1 4C28 0A46           BSC  L ERR9,&Z       BR IF PRINT RESPONSE ON 32C11730
0A27 0 1001                SLA    1                                   32C11740
0A28 1 4C28 0A50           BSC  L ERR11,&Z      BR IF SKIP RESPONSE ON 32C11750
0A2A 0 1001                SLA    1                                   32C11760
0A2B 1 4C28 0A4B           BSC  L ERR10,&Z      BR IF SPACE RESPONSE ON 32C11770
                     *                                                32C11780
0A2D 1 4C80 0A18     ERR5X BSC  I ERR5          RETURN                32C11790
                     *                                                32C11800
0A2F 0 0000          ERR6  DC     *-*           EMIT BIT FAILURE      32C11810
0A30 0 6106                LDX    1 6           SET MSG NO.           32C11820
0A31 0 6203                LDX    2 /0003       SET DATA CONTROL      32C11830
0A32 0 C86B                LDD    MSG6          LD ALPHA MSG          32C11840
0A33 1 4400 0AB4           BSI  L ETYPE         GO PRINT MSG          32C11850
0A35 1 4C80 0A2F           BSC  I ERR6          RETURN                32C11860
                     *                                                32C11870
0A37 0 0000          ERR7  DC     *-*           EMIT INVALID          32C11880
0A38 0 6107                LDX    1 7           SET MSG NO.           32C11890
0A39 0 6208                LDX    2 /0008       SET DATA CONTROL      32C11900
0A3A 0 C865                LDD    MSG7          LD ALPHA MSG          32C11910
0A3B 1 4400 0AB4           BSI  L ETYPE         GO PRINT MSG          32C11920
0A3D 1 4C80 0A37           BSC  I ERR7          RETURN                32C11930
                     *                                                32C11940
0A3F 0 0000          ERR8  DC     *-*           EMIT SEQ ERR          32C11950
0A40 0 6108                LDX    1 8           SET MSG NO.           32C11960
0A41 0 6218                LDX    2 /0018       SET DATA CONTROL      32C11970
0A42 0 C85F                LDD    MSG8          LD ALPHA MSG          32C11980
0A43 0 4070                BSI    ETYPE         GO PRINT MSG          32C11990
0A44 1 4C80 0A3F           BSC  I ERR8          RETURN                32C12000
                     *                                                32C12010
0A46 0 6109          ERR9  LDX    1 9           PRINTER DID NOT TURN OFF 32C12020
0A47 0 6200                LDX    2 0           SET FOR NO DATA       32C12030
0A48 0 C858                LDD    MSG9          LD ALPHA MSG          32C12040
0A49 0 406A                BSI    ETYPE         GO PRINT MSG          32C12050
0A4A 0 70E2                MDX    ERR5X                               32C12060
                     *                                                32C12070
0A4B 0 6110          ERR10 LDX    1 /10         MULT SPACE INTRPTS    32C12080
0A4C 0 6200                LDX    2 0           SET FOR NO DATA       32C12090
0A4D 0 C858                LDD    MSG10         LD ALPHA MSG          32C12100
0A4E 0 4065                BSI    ETYPE         GO PRINT MSG          32C12110
0A4F 0 70DD                MDX    ERR5X                               32C12120
                     *                                                32C12130
0A50 0 6111          ERR11 LDX    1 /11         MULT SKIP INTRPTS     32C12140
0A51 0 6200                LDX    2 0           SET FOR NO DATA       32C12150
0A52 0 C855                LDD    MSG11         LD ALPHA MSG          32C12160
0A53 0 4060                BSI    ETYPE         GO PRINT MSG          32C12170
0A54 0 70D8                MDX    ERR5X                               32C12180
                     *                                                32C12190
0A55 0 0000          ERR12 DC     *-*           MISSING CHANNEL       32C12200
0A56 1 C500 0A5E           LD   L1 CHNUM-1      LD CHANNEL NO.        32C12210
0A58 0 D07B                STO    CHANL         SET IN MSG            32C12220
0A59 0 6112                LDX    1 /12         SET MSG NO.           32C12230
0A5A 0 6204                LDX    2 /0004       SET DATA CONTROL      32C12240
0A5B 0 C84E                LDD    MSG12         LD ALPHA MSG          32C12250
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0A5C 0 4057              BSI     ETYPE     GO PRINT MSG                32C12260
0A5D 1 4C80 0A55         BSC  I  ERR12     RETURN                      32C12270
                         *                                             32C12280
0A5F 0 0001      CHNUM   DC      1                                     32C12290
0A60 0 0002              DC      2                                     32C12300
0A61 0 0003              DC      3                                     32C12310
0A62 0 0004              DC      4                                     32C12320
0A63 0 0005              DC      5                                     32C12330
0A64 0 0006              DC      6                                     32C12340
0A65 0 0009              DC      9                                     32C12350
0A66 0 000C              DC      12                                    32C12360
                         *                                             32C12370
0A67 0 0000      ERR13   DC      *-*       CHANNEL SEQ ERR             32C12380
0A68 0 6113              LDX     1 /13     SET MSG NO.                 32C12390
0A69 0 6200              LDX     2 0       SET DATA CONTROL            32C12400
0A6A 0 C841              LDD     MSG13     LD ALPHA MSG                32C12410
0A6B 0 4048              BSI     ETYPE     GO PRINT MSG                32C12420
0A6C 1 C400 09C8         LD   L  ONES                                  32C12430
0A6E 1 4C80 0A67         BSC  I  ERR13     RETURN                      32C12440
                         *                                             32C12450
0A70 0 6114      ERR14   LDX     1 /14     MULT CHANNEL BITS           32C12460
0A71 0 6220              LDX     2 /0020                               32C12470
0A72 1 C400 07D9         LD   L  TEMP8&1   LD INVALID CHANNEL CODE      32C12480
0A74 0 1808              SRA     8                                     32C12490
0A75 0 D061              STO     DSWW                                  32C12500
0A76 0 C837              LDD     MSG14     LD ALPHA MSG                32C12510
0A77 0 403C              BSI     ETYPE     GO PRINT MSG                32C12520
0A78 1 4C00 07FB         BSC  L  CHM2      RETURN                      32C12530
                         *                                             32C12540
0A7A 0 0000      ERR15   DC      *-*       CHANNEL SENSE ERR           32C12550
0A7B 0 6600 0801         LDX  L2 /0801     SET DATA CONTROL            32C12560
0A7D 1 C400 08F4         LD   L  WAS       LD INTRPT DSW               32C12570
0A7F 0 E05F              AND     KOOFF     MASK ALL BUT CHAN BITS      32C12580
0A80 0 D051              STO     ERM4      STO IN MSG                  32C12590
0A81 0 C82E              LDD     MSG15     LD ALPHA MSG                32C12600
0A82 0 4031              BSI     ETYPE     GO PRINT MSG                32C12610
0A83 1 4C80 0A7A         BSC  I  ERR15     RETURN                      32C12620
0A85 0 0000      ERR16   DC      *-*                                   32C12630
0A86 0 6600 1800         LDX  L2 /1800                                 32C12640
0A88 0 C827              LDD     MSG15                                 32C12650
0A89 0 402A              BSI     ETYPE                                 32C12660
0A8A 1 4C80 0A85         BSC  I  ERR16                                 32C12670
                         *                                             32C12680
0A8C 0 0000      ERR17   DC      *-*                                   32C12690
0A8D 0 6117              LDX     1 /17                                 32C12700
0A8E 0 6220              LDX     2 /0020                               32C12710
0A8F 0 C822              LDD     MSG17                                 32C12720
0A90 0 4023              BSI     ETYPE                                 32C12730
0A91 1 4C80 0A8C         BSC  I  ERR17                                 32C12740
                         *                                             32C12750
0A94    0000             BSS  E  0                                     32C12760
0A94 1 0D22      MSG1    DC      AWAS      WAS S/B                     32C12770
0A95 1 0D28              DC      ASDSW     STATIC DSW                  32C12780
0A96 1 0D22      MSG2    DC      AWAS      WAS S/B                     32C12790
0A97 1 0D31              DC      ABDSW     BUSY DSW ERR                32C12800
0A98 1 0D41      MSG3    DC      ADSW      DSW                         32C12810
0A99 1 0D44              DC      ANINT     NO INTRPT                   32C12820
0A9A 1 0D4B      MSG4    DC      ADPR      DSW PRINTER                 32C12830
0A9B 1 0D52              DC      ASTPD     STOPPED                     32C12840
0A9C 1 0D22      MSG5    DC      AWAS      WAS S/B                     32C12850
0A9D 1 0D39              DC      ADSW1     LEV1 DSW ERR                32C12860
0A9E 1 0D60      MSG6    DC      AEBF      EMIT BIT FAILURE            32C12870
0A9F 0 0000              DC      /0000                                 32C12880
0AA0 1 0D6F      MSG7    DC      AEMT      EMIT INVALD                 32C12890
0AA1 0 0000              DC      /0000                                 32C12900
0AA2 1 0D22      MSG8    DC      AWAS      WAS S/B                     32C12910
0AA3 1 0D76              DC      AESER     EMIT SEQ ERR                32C12920
0AA4 1 0D4E      MSG9    DC      APRTR     PRINTER                     32C12930
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0AA5 1 0D57              DC      ADNTO     DID NOT TURN OFF            32C12940
0AA6 1 0D88      MSG10   DC      AMSP      MULT SPACE                  32C12950
0AA7 1 0D47              DC      AINT      INTRPT                      32C12960
0AA8 1 0D8F      MSG11   DC      AMSK      MULT SKIP                   32C12970
0AA9 1 0D47              DC      AINT      INTRPT                      32C12980
0AAA 1 0D7F      MSG12   DC      AMC       MISSING CHANNEL             32C12990
0AAB 0 0000              DC      /0000                                 32C13000
0AAC 1 0D83      MSG13   DC      ACHAN     CHANNEL                     32C13010
0AAD 1 0D7A              DC      ASER      SEQ ERR                     32C13020
0AAE 1 0DA8      MSG14   DC      AINVC     INVALD CHANNEL CODE         32C13030
0AAF 0 0000              DC      /0000                                 32C13040
0AB0 1 0D83      MSG15   DC      ACHAN     CHANNEL                     32C13050
0AB1 1 0DA2              DC      ASNER     SENSE ERR                   32C13060
0AB2 1 0D41      MSG17   DC      ADSW                                  32C13070
0AB3 1 0DDD              DC      ACBSY                                 32C13080
                         *                                             32C13090
                         ********************************************  32C13100
                         *        PRINT ERROR MESSAGES                 32C13110
                         ********************************************  32C13120
                         *                                             32C13130
0AB4 0 0000      ETYPE   DC      *-*                                   32C13140
0AB5 0 6917              STX     1 TABLE   SET ID IN MESSAGE TABLE     32C13150
0AB6 0 6A18              STX     2 TABLE&2 STO DATA WORD CNTRL         32C13160
0AB7 0 D818              STD     ALPHA                                 32C13170
0AB8 1 4400 094A         BSI  L  STOP      STOP THE PRINTER            32C13180
                         *                                             32C13190
0ABA 1 7400 0AC0         MDX  L  OPMSW                                 32C13200
0ABC 0 7005              MDX     ETYP1                                 32C13210
0ABD 0 4480 0162         BSI  I  ERROR     PRINT LAST OP               32C13220
0ABF 1 0AC6              DC      ETYP2                                 32C13230
0AC0 0 0000      OPMSW   DC      *-*       MUST BE ZERO FOR OP MSG     32C13240
0AC1 0 68FE              STX     OPMSW                                 32C13250
                         *                                             32C13260
0AC2 0 4480 0162 ETYP1   BSI  I  ERROR                                 32C13270
0AC4 1 0ACD              DC      TABLE                                 32C13280
0AC5 0 0000      LOOP    DC      0         LOOP ON ERROR               32C13290
                         *                                             32C13300
0AC6 1 4C80 0AB4 ETYP2   BSC  I  ETYPE     RETURN                      32C13310
0AC8 0 8000              DC      /8000                                 32C13320
0AC9 1 0DB6              DC      ALOP                                  32C13330
0ACA 0 0000      OPSW    DC      *-*                                   32C13340
                         *                                             32C13350
                         *-------------------------------------------  32C13360
                         *  ERROR MESSAGE TABLE                        32C13370
                         *-------------------------------------------  32C13380
                         *                                             32C13390
0ACC    0001             BSS  E  1                                     32C13400
0ACD 0 0000      TABLE   DC      *-*       MESSAGE NUMBER              32C13410
0ACE 0 0004              DC      /0004     HEX/DECIMAL SW              32C13420
0ACF 0 0000              DC      *-*       DATA WORD ID                32C13430
0AD0 0 0000      ALPHA   DC      *-*       1ST ALPHA MESSAGE ADDRESS   32C13440
0AD1 0 0000      ERM3    DC      *-*       2ND ALPHA MESSAGE ADDRESS   32C13450
                         *                                             32C13460
0AD2 0 0000      ERM4    DC      *-*       MODIFIERS                   32C13470
0AD3 0 0000              DC      *-*                                   32C13480
0AD4 0 0000      CHANL   DC      *-*       STORE ERR CHANNEL           32C13490
0AD5 0 0000      EMTWS   DC      *-*       STORE EMIT WAS              32C13500
0AD6 0 0000      EMTSB   DC      *-*       STORE EMIT S/B              32C13510
0AD7 0 0000      DSWW    DC      *-*       STORE DSW WAS               32C13520
0AD8 0 0000      DSWSB   DC      /0000     STORE DSW S/B               32C13530
0AD9 0 0000      BDSW    DC      *-*       BUSY DSW WAS                32C13540
0ADA 0 0000              DC      *-*       BUSY DSW S/B                32C13550
0ADB 0 0000      IDSW    DC      *-*       INTRPT DSW WAS              32C13560
0ADC 0 0000              DC      *-*       INTRPT DSW S/B              32C13570
0ADD 0 0000      CHWAS   DC      *-*       CHANNEL DSW WAS             32C13580
0ADE 0 0000              DC      *-*                                   32C13590
0ADF 0 00FF      KOOFF   DC      /00FF                                 32C13600
                         *                                             32C13610
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                        ******************************************          32C13620
                        *            INTERRUPT WAIT ROUTINE      *          32C13630
                        ******************************************          32C13640
                        *                                                  32C13650
0AE0 0 0000             WAIT  DC      *-*                                  32C13660
0AE1 0 E834                   OR      TBDSW           BUILD BUSY DSW S/B   32C13670
0AE2 0 D0F7                   STO     BDSW&1          SET IN S/B           32C13680
0AE3 0 0830                   XIO     SENSE-1         SENSE BUSY DSW       32C13690
0AE4 1 7400 0956              MDX   L RT2EX,0         CHECK FOR RTN 2      32C13700
0AE6 0 7002                   MDX     *+2             SKIP IF NOT RTN 2    32C13710
0AE7 1 E400 0C07              AND   L K7700           MASK BITS 0 AND 4    32C13720
0AE9 1 E400 0C06              AND   L K7F00           MASK BIT 0           32C13730
0AEB 0 D0ED                   STO     BDSW            SAVE BUSY DSW        32C13740
                        *                                                 32C13750
0AEC 0 1010                   SLA     16                                   32C13760
0AED 0 D0D2                   STO     OPMSW                                32C13770
0AEE 0 D025                   STO     ICNT            RESET ICNT           32C13780
0AEF 0 D027                   STO     EBITS           RESET EBITS          32C13790
0AF0 1 D400 0C0D              STO   L CKESW           RESET CKESW          32C13800
                        *                                                 32C13810
0AF2 0 6500 1000              LDX   L1 /1000          SET INTERRUPT        32C13820
0AF4 0 6923                   STX     1 WCNT          WAIT CNT             32C13830
                        *                                                 32C13840
0AF5 1 6500 0AFE      WAIT1   LDX   L1 WAIT3                               32C13850
0AF7 1 7400 05E6              MDX   L MLSCF&1         CK FOR INTERRUPT     32C13860
0AF9 0 700F                   MDX     WAIT4           BR IF INTERRUPT OCCURED 32C13870
                        *                                                 32C13880
0AFA 1 6D00 05E5      WAIT2   STX   L1 MLSCF          SET RETURN ADDRESS   32C13890
0AFC 0 4480 0161              BSI   I START           GO TO MONITOR        32C13900
                        *                                                 32C13910
0AFE 1 74FF 0B18      WAIT3   MDX   L WCNT,-1         DECREMENT WAIT CNT   32C13920
0B00 0 70F4                   MDX     WAIT1                                32C13930
                        *                                                 32C13940
0B01 0 0812                   XIO     SENSE-1         SENSE NO INTRPT DSW  32C13950
0B02 0 D0D4                   STO     DSWW            SET IN MSG           32C13960
0B03 0 C0D6                   LD      BDSW&1          LD BUSY DSW S/B      32C13970
0B04 0 F0D4                   EOR     BDSW            COMPARE WITH BUSY DSW 32C13980
0B05 1 4420 09FC              BSI   L ERR2,Z          BR IF BUSY DSW ERR   32C13990
                        *                                                 32C14000
0B07 1 4C00 0A06              BSC   L ERR3            GO PRINT NO INTRPT MSG 32C14010
                        *                                                 32C14020
0B09 1 C400 05E0      WAIT4   LD    L SW1                                  32C14030
0B0B 0 4488 0161              BSI   I START,&         CK FOR RTN SELECT    32C14040
0B0D 1 9400 05DD              S     L RID             CK FOR NEW ROUTINE   32C14050
0B0F 0 4498 0161              BSI   I START,&-        BR IF NOT NEW RTN    32C14060
0B11 1 4400 0609              BSI   L CNTRL                                32C14070
                        *                                                 32C14080
0B14   0000                   BSS   E 0                                    32C14090
0B14 0 0000           ICNT    DC      *-*                                  32C14100
0B15 0 3700           SENSE   DC      /3700           SENSE WITHOUT RESET  32C14110
0B16 0 0000           TBDSW   DC      *-*                                  32C14120
0B17 0 0000           EBITS   DC      *-*             INT DSW ER BITS      32C14130
0B18 0 0000           WCNT    DC      *-*                                  32C14140
                        *                                                 32C14150
                        *-----------------------------------------        32C14160
                        *  ENTER HERE AFTER INTERRUPT                     32C14170
                        *-----------------------------------------        32C14180
                        *                                                 32C14190
0B19 0 C0C0           RTRN    LD      BDSW&1          LD BUSY DSW S/B      32C14200
0B1A 0 F0BE                   EOR     BDSW            COMPARE WITH BUSY DSW 32C14210
0B1B 1 4420 09FC              BSI   L ERR2,Z          BR IF BUSY DSW ERR   32C14220
                        *                                                 32C14230
0B1D 0 C0F9                   LD      EBITS           CK FOR INTRPT DSW ER 32C14240
0B1E 1 4420 0A18              BSI   L ERR5,Z                               32C14250
                        *                                                 32C14260
0B20 1 C400 0C0D              LD    L CKESW                                32C14270
0B22 0 D001                   STO     *&1                                  32C14280
0B23 0 4420 0000              BSI   L *-*,Z           BR IF EMIT ERR       32C14290
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                        *                                                 32C14300
0B25 0 08EE                   XIO     SENSE-1                              32C14310
0B26 0 E0B8                   AND     KOOFF           MASK ALL BUT CHAN BITS 32C14320
0B27 0 D0B5                   STO     CHWAS           STO IN ERR MSG       32C14330
0B28 1 F400 0BF4              EOR   L WAS             COMPARE WITH INTRPT DSW 32C14340
0B2A 0 1002                   SLA     2                                    32C14350
0B2B 1 4C10 0B31              BSC   L RTRN1,-         BR UNLESS AFTER SPACE 32C14360
                        *                                                 32C14370
0B2D 0 1006                   SLA     6               LOOK AT CHANNEL BITS 32C14380
0B2E 0 6115                   LDX     1 /15           LD MSG NUMBER        32C14390
0B2F 1 4420 0A7A              BSI   L ERR15,Z         BR IF NOT EQUAL      32C14400
                        *                                                 32C14410
0B31 1 4C80 0AE0      RTRN1   BSC   I WAIT                                 32C14420
                        *                                                 32C14430
                        ******************************************        32C14440
                        *            CHECK READY                 *        32C14450
                        ******************************************        32C14460
                        * THIS SUBROUTINE CHECKS THE DSW FOR              32C14470
                        * READY CONDITIONS                                32C14480
                        *-----------------------------------------        32C14490
                        *                                                 32C14500
0B33 0 0000           READY   DC      *-*                                  32C14510
0B34 0 61FD                   LDX     1 -3                                 32C14520
0B35 0 692D                   STX     1 DLYCT                              32C14530
0B36 0 08DD           RDY1    XIO     SENSE-1         SENSE DSW            32C14540
0B37 1 E400 0C05              AND   L KFF00           CK BITS 0-7          32C14550
0B39 0 D09D                   STO     DSWW            STORE DSW IN MSG TABLE 32C14560
0B3A 1 4C98 0B33              BSC   I READY,&-        READY IF BRANCH      32C14570
0B3C 0 E025                   AND     RDYMK           MSK NRDY BIT         32C14580
0B3D 1 7403 0B63              MDX   L DLYCT,3                               32C14590
0B3F 0 7007                   MDX     RDY2                                 32C14600
                        *                                                 32C14610
0B40 1 4420 09F3              BSI   L ERR1,Z          TYPE ERROR MESSAGE   32C14620
                        *                                                 32C14630
0B42 0 4480 0163              BSI   I LOG             TYPE                 32C14640
0B44 1 0B64                   DC      STM             MESSAGE              32C14650
                        *                                                 32C14660
0B45 0 1810                   SRA     16              SET TO DELAY FOR     32C14670
0B46 0 D01C                   STO     DLYCT           TEN SECONDS          32C14680
0B47 1 6500 0B36      RDY2    LDX   L1 RDY1                                32C14690
0B49 1 6D00 05E6              STX   L1 MLSCF&1                            32C14700
0B4B 1 4C00 0B09              BSC   L WAIT4           CK ROUTINE SELECT SWS 32C14710
                        *                                                 32C14720
                        ******************************************        32C14730
                        *            FORM CHECK                  *        32C14740
                        ******************************************        32C14750
                        *     THIS  SUBROUTINE CHECKS FOR A FORM CHECK    32C14760
                        *     AFTER A SPACE OR SKIP COMMAND               32C14770
                        *-----------------------------------------        32C14780
                        *                                                 32C14790
0B4D 0 0000           FORMS   DC      *-*                                  32C14800
0B4E 0 61FD                   LDX     1 -3                                 32C14810
0B4F 0 6913                   STX     1 DLYCT                              32C14820
0B50 0 08C3           FORM1   XIO     SENSE-1                              32C14830
0B51 0 1005                   SLA     5                                    32C14840
0B52 1 4C90 0B4D              BSC   I FORMS,-         BR IF NO FORMS CK    32C14850
                        *                                                 32C14860
0B54 1 7403 0B63              MDX   L DLYCT,3                               32C14870
0B56 0 7005                   MDX     FORM2                                32C14880
0B57 0 4480 0163              BSI   I LOG             TYPE                 32C14890
0B59 1 0B64                   DC      STM             MESSAGE              32C14900
                        *                                                 32C14910
0B5A 0 1810                   SRA     16              SET TO DELAY FOR     32C14920
0B5B 0 D007                   STO     DLYCT           TEN SECONDS          32C14930
                        *                                                 32C14940
                        *                                                 32C14950
0B5C 1 6500 0B50      FORM2   LDX   L1 FORM1                               32C14960
0B5E 1 6D00 05E6              STX   L1 MLSCF&1                            32C14970
```

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0B60 1 4C00 0B09          BSC  L  WAIT4      CK ROUTINE SELECT SWS      32C14980
                        *                                               32C14990
0B62 0 FB00             RDYMK DC     /FB00                              32C15000
0B63 0 0000             DLYCT DC     0         DELAY COUNTER            32C15010
                        *                                               32C15020
0B64 0 0001             STM   DC     1         MESSAGE NUMBER           32C15030
0B65 0 0000                   DC     /0000     HEX/DECIMAL SW           32C15040
0B66 0 0001                   DC     /0001     DATA WORD ID             32C15050
0B67 1 0DBC                   DC     ANRDY                              32C15060
0B68 0 0000                   DC     0                                  32C15070
0B69 0 1132                   DC     /1132     MACHINE TYPE             32C15080
                        *                                               32C15090
                        *                                               32C15100
                        ********************************************   32C15110
                        *          INTERRUPT ROUTINE                  *  32C15120
                        ********************************************   32C15130
                        *                                               32C15140
0B6A 0 0000             PIRT  DC     *-*                                32C15150
0B6B 0 C008                   LD     RT2SW     GET RTN 2 SWITCH         32C15160
0B6C 1 4C08 0B75              BSC  L PIRT1,&   BCH IF SW NOT SET        32C15170
0B6E 1 0C00 0BF4              XIO  L SRSET-1   SENSE AND RESET DSW       32C15180
0B70 0 1010                   SLA    16        CLEAR ACC AND            32C15190
0B71 0 D002                   STO    RT2SW     * RTN 2 SWITCH           32C15200
0B72 1 4C80 0B6A              BSC  I PIRT      RETURN WITHOUT CHECKING   32C15210
                        *                                               32C15220
0B74 0 0000             RT2SW DC     *-*       RTN 2 SWITCH             32C15230
0B75 0                  PIRT1 EQU    *                                  32C15240
0B75 1 6E00 0C43              STX  L2 IOUT2&1   SAVE XR2                 32C15250
0B77 0 1810                   SRA    16                                 32C15260
0B78 1 D400 0C02              STO  L EXPCT&2                            32C15270
0B7A 0 6700 05DC              LDX  L3 1500      RESET INTERRUPT          32C15280
0B7C 0 6B98                   STX    3 WCNT       WAIT COUNTER          32C15290
0B7D 1 7401 0B14              MDX  L ICNT,1     CNT INTERRUPTS           32C15300
                        *                                               32C15310
0B7F 1 0C00 0BF4              XIO  L SRSET-1    SENSE AND RESET DSW      32C15320
0B81 0 D072                   STO    WAS        SAVE DSW                 32C15330
0B82 1 D400 0C0A              STO  L RTRNS                              32C15340
0B84 1 4C10 0C11              BSC  L SKINT,-    BR IF NOT PRINT RESP     32C15350
                        *                                               32C15360
                        *-------------------------------------------    32C15370
                        *          READ EMIT INTERRUPT                  32C15380
                        *-------------------------------------------    32C15390
                        *                                               32C15400
0B86 0 0871             PINT  XIO    RDEMT     READ EMIT                32C15410
0B87 0 C078                   LD     EXPCT                              32C15420
0B88 0 D079                   STO    EXPCT&2   BUILD EXPECTED DSW       32C15430
0B89 1 C400 0956              LD   L RT2EX     CHECK FOR RTN 2          32C15440
0B8B 1 4420 0C53              BSI  L CKEMT,Z   BCH IF NOT RTN 2         32C15450
                        *                                               32C15460
0B8D 0 C068                   LD     SCNCT     CHECK FOR PRINT          32C15470
0B8E 1 4C30 0BC2              BSC  L PI3,Z-     BR IF PRINT              32C15480
                        *                                               32C15490
0B90 0 C072                   LD     IDLCT     CK FOR IDLE              32C15500
0B91 1 4C20 089C              BSC  L PI1,Z      BR IF IDLE               32C15510
                        *                                               32C15520
0B93 1 74FF 0C0B              MDX  L STPCT,-1                           32C15530
0B95 0 707B                   MDX    SKINT                              32C15540
                        *                                               32C15550
                        *-------------------------------------------    32C15560
                        *          STOP PRINTER                         32C15570
                        *-------------------------------------------    32C15580
                        *                                               32C15590
0B96 0 D069                   STO    EXPCT                              32C15600
0B97 1 D400 0B16              STO  L TBDSW                              32C15610
0B99 0 D060                   STO    EMTSW     RESET 1ST EMIT SW        32C15620
0B9A 0 0857                   XIO    STPPT-1   STOP PRINTER             32C15630
0B9B 0 7075                   MDX    SKINT                              32C15640
                        *                                               32C15650
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0B9C 1 74FF 0C03          PI1   MDX  L IDLCT,-1    DEC IDLE CNT          32C15660
0B9E 0 7072                     MDX    SKINT                              32C15670
                        *                                               32C15680
                        *-------------------------------------------    32C15690
                        *          IDLE CNT#0, SET TO RETURN            32C15700
                        *-------------------------------------------    32C15710
                        *                                               32C15720
0B9F 0 1810                     SRA    16                                 32C15730
0BA0 0 6310                     LDX    3 16       SET FOR 16 EMITS        32C15740
0BA1 1 7400 0C09                MDX  L SPCSW,0    CK SPACE-PRINT ON SW    32C15750
0BA3 0 7003                     MDX    PI2                                32C15760
                        *                                               32C15770
0BA4 0 D065                     STO    RTRNS      SET TO RETURN TO MAINLN 32C15780
0BA5 0 6865                     STX    3 STPCT     THEN TURN PRINT OFF    32C15790
0BA6 0 706A                     MDX    SKINT                              32C15800
                        *                                               32C15810
                        *-------------------------------------------    32C15820
                        *          SPACE WITH PRINTER ON                32C15830
                        *-------------------------------------------    32C15840
                        *                                               32C15850
0BA7 1 74FF 0C09          PI2   MDX  L SPCSW,-1    DEC SPACE COUNT       32C15860
0BA9 0 1000                     NOP                                      32C15870
0BAA 0 6860                     STX    3 STPCT                           32C15880
0BAB 0 C063                     LD     K1200                             32C15890
0BAC 1 EC00 0B16                OR   L TBDSW      BIULD BUSY DSW          32C15900
0BAE 1 D400 0ADA                STO  L BDSW&1                             32C15910
0BB0 0 6700 2200                LDX  L3 /2200     SET EXPECTED SPACE      32C15920
0BB2 0 6B4E                     STX    3 EXPCT&1   RESPONSE DSW           32C15930
0BB3 0 6700 9200                LDX  L3 /9200     SET EXPECTED EMIT       32C15940
0BB5 0 6B4A                     STX    3 EXPCT     RESPONSE DSW           32C15950
0BB6 1 6600 0D99                LDX  L2 ASPIN                             32C15960
0BB8 1 6E00 0ACA                STX  L2 OPSW      SET LAST OP SW          32C15970
                        *                                               32C15980
0BBA 0 083F                     XIO    STSPA-1    SPACE                   32C15990
                        *                                               32C16000
0BBB 1 0C00 0B14                XIO  L SENSE-1    SENSE BUSY DSW          32C16010
0BBD 0 E048                     AND    K7F00      MASK EMIT RESPONSE AND  32C16020
                        *                          CHANNEL BITS           32C16030
0BBE 1 D400 0AD9                STO  L BDSW       SAVE BUSY DSW           32C16040
0BC0 1 4C00 0C42                BSC  L IOUT2                              32C16050
                        *                                               32C16060
0BC2 1 74FF 0BF6          PI3   MDX  L SCNCT,-1    DEC SCAN CNT          32C16070
0BC4 0 7006                     MDX    PI4        GO SET UP PRINT BUFFER  32C16080
                        *                                               32C16090
                        *-------------------------------------------    32C16100
                        *          END OF PRINT                         32C16110
                        *-------------------------------------------    32C16120
                        *                                               32C16130
0BC5 1 4400 09CC                BSI  L CLEAR      SET BUFFER TO ZERO      32C16140
0BC7 0 6700 8200                LDX  L3 /8200     SET EXPCT FOR           32C16150
0BC9 0 6B36                     STX    3 EXPCT      NORMAL PRINT DSW      32C16160
0BCA 0 7046                     MDX    SKINT                              32C16170
                        *                                               32C16180
                        *-------------------------------------------    32C16190
                        *          SET UP PRINT BUFFER                  32C16200
                        *-------------------------------------------    32C16210
                        *                                               32C16220
0BCB 0 10A0               PI4   SLT    32                                 32C16230
0BCC 1 C400 09CA                LD   L MSGSW      CK MSG SW               32C16240
0BCE 1 4C20 0CA5                BSC  L MSCAN,Z    IF SW ON- GO SET UP MSG 32C16250
0BD0 1 6780 05E1                LDX  I3 SW2                               32C16260
0BD2 0 1811                     SRA    17                                 32C16270
0BD3 0 73FF                     MDX    3 -1                               32C16280
0BD4 0 70FD                     MDX    *-3                                32C16290
0BD5 0 6700 0000          PI5   LDX  L3 *-*        INITIALIZED TO -16      32C16300
0BD7 0 6600 0000          PI6   LDX  L2 *-*        INITIALIZED TO -8       32C16310
0BD9 0 C228                     LD     2 40       LD WORD TO SHIFT        32C16320
0BDA 0 18C1                     RTE    1          SHIFT BIT               32C16330
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0BDB 0 D228              STO   2 40                                32C16340
0BDC 0 7301              MDX   3 1          DECREMENT WORD CNT      32C16350
0BDD 0 7007              MDX     PI7                               32C16360
0BDE 0 7201              MDX   2 1          ADV TO NEXT WORD        32C16370
0BDF 0 7001              MDX     *&1                               32C16380
0BE0 0 70E4              MDX     PI3&3      FINISHED- STOP PRINT    32C16390
                    *                                              32C16400
0BE1 0 63F0              LDX   3 -16        RESET SHIFT CNT         32C16410
0BE2 0 1090              SLT     16                                 32C16420
0BE3 0 D600 0028         STO   L2 40        SET NEXT WORD           32C16430
                    *                                              32C16440
0BE5 0 C022         PI7  LD      K0001                             32C16450
0BE6 0 EC00 0027         OR    L 39         RESTORE SCAN COMP BIT   32C16460
0BE8 0 D400 0027         STO   L 39                                 32C16470
0BEA 0 6BEB              STX   3 PI5&1      SAVE XR 3               32C16480
0BEB 0 6AEC              STX   2 PI6&1      SAVE XR2                32C16490
0BEC 1 7401 0BF2         MDX   L BLANK,1    WHEN ZERO- PUT BLANK    32C16500
0BEE 0 7022              MDX     SKINT       IN PATTERN             32C16510
                    *                                              32C16520
0BEF 0 63CF              LDX   3 -49        PUT BLANK               32C16530
0BF0 0 6B01              STX   3 BLANK        IN PATTERN            32C16540
0BF1 0 7009              MDX     PI4                                32C16550
                    *                                              32C16560
                    *-------------------------------------         32C16570
                    * CONSTANTS AND STORAGE                        32C16580
                    *-------------------------------------         32C16590
                    *                                              32C16600
0BF2   0000              BSS   E 0                                  32C16610
0BF2 0 0000         BLANK DC      *-*          PATTERN BLANK CNT   32C16620
0BF3 0 3440         STPPT DC      /3440        STOP PRINTER        32C16630
0BF4 0 0000         WAS   DC      *-*          INTERRUPT DSW       32C16640
0BF5 0 3701         SRSET DC      /3701        SENSE AND RESET DSW 32C16650
0BF6 0 0000         SCNCT DC      *-*          SCAN COUNT          32C16660
0BF7 0 3402         STPCA DC      /3402        STOP CARRIAGE       32C16670
0BF8 1 0C10         RDEMT DC      EMIT         READ COUNTER        32C16680
0BF9 0 3200               DC      /3200        SCANNED             32C16690
0BFA 0 0000         EMTSW DC      *-*          FIRST EMIT SW       32C16700
0BFB 0 3401         STSPA DC      /3401        START SPACE         32C16710
0BFC 0 0000         ANDEM DC      *-*                              32C16720
0BFD 0 0000         OREM  DC      *-*                              32C16730
0BFE 0 BF00         ANDOR DC      /BF00        EMIT CK CONSTANT    32C16740
0BFF 0 0000               DC      /0000                            32C16750
0C00 0 0000         EXPCT DC      *-*          EXPECTED INTRPT DSW 32C16760
0C01 0 0000               DC      *-*                              32C16770
0C02 0 0000               DC      *-*                              32C16780
0C03 0 0000         IDLCT DC      *-*          IDLE COUNT          32C16790
0C04 0 EF00         KEF00 DC      /EF00                            32C16800
0C05 0 FF00         KFF00 DC      /FF00                            32C16810
0C06 0 7F00         K7F00 DC      /7F00                            32C16820
0C07 0 7700         K7700 DC      /7700                            32C16830
0C08 0 0001         K0001 DC      /0001                            32C16840
0C09 0 0000         SPCSW DC      *-*          SPACE WITH PRINT ON SW 32C16850
0C0A 0 0000         RTRNS DC      *-*                              32C16860
0C0B 0 0000         STPCT DC      *-*          STOP PRINTER COUNT  32C16870
0C0C 0 0000         CHARC DC      *-*          TEMPORARY STORAGE   32C16880
0C0D 0 0000         CKESW DC      *-*          ERROR SWITCH        32C16890
0C0E 0 0000         EMTCT DC      *-*          EMIT COUNTER        32C16900
0C0F 0 1200         K1200 DC      /1200                            32C16910
0C10 0 0000         EMIT  DC      *-*                              32C16920
                    *                                              32C16930
                    *-------------------------------------         32C16940
                    *           SKIP INTERRUPT                     32C16950
                    *-------------------------------------         32C16960
                    *                                              32C16970
0C11 0 C0E2         SKINT LD      WAS          LD DSW              32C16980
0C12 0 1001               SLA     1                                32C16990
0C13 1 4C10 0C29          BSC   L SPINT,-      BR IF NOT SKIP      32C17000
                    *                                              32C17010
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0C15 0 C0EB              LD      EXPCT&1    LD EXPCT SKIP DSW       32C17020
0C16 0 E8EB              OR      EXPCT&2    BUILD EXPECTED DSW      32C17030
0C17 0 D0EA              STO     EXPCT&2                            32C17040
0C18 1 7400 0948         MDX   L SKPTO      CK SKIP TO              32C17050
0C1A 0 7001              MDX     SKIN1                              32C17060
0C1B 0 7003              MDX     SKIN2                              32C17070
                    *                                              32C17080
0C1C 1 74FF 0949    SKIN1 MDX   L SKCNT,-1   STOP CARRIAGE AFTER 16 32C17090
0C1E 0 7003              MDX     SKIN3       SKIP INTRPTS WITHOUT   32C17100
                    *                        A MATCH               32C17110
0C1F 1 0C00 0BF6    SKIN2 XIO   L STPCA-1    STOP CARRIAGE          32C17120
0C21 0 7016              MDX     SPIN2                              32C17130
                    *                                              32C17140
0C22 0 C0D1         SKIN3 LD      WAS                              32C17150
0C23 0 1008              SLA     8           COMPARE PRESENT CHANNEL 32C17160
0C24 1 F400 0948         EOR   L SKPTO        WITH DESIRED          32C17170
0C26 1 4C20 0C42         BSC   L IOUT2,Z     BR IF NOT EQUAL        32C17180
0C28 0 70F6              MDX     SKIN2                              32C17190
                    *                                              32C17200
                    *-------------------------------------         32C17210
                    *           SPACE INTERRUPT                    32C17220
                    *-------------------------------------         32C17230
                    *                                              32C17240
0C29 0 C0CA         SPINT LD      WAS                              32C17250
0C2A 0 1002               SLA     2                                32C17260
0C2B 1 4C10 0C3B          BSC   L IOUT,-       BR IF NOT SPACE     32C17270
0C2D 0 6310               LDX     3 16        SET TO HOLD PRNTR ON   32C17280
0C2E 0 C0D2               LD      EXPCT&1     LD EXPCT SPACE DSW     32C17290
0C2F 0 E8D2               OR      EXPCT&2     BUILD EXPECTED DSW     32C17300
0C30 0 E0D3               AND     KEF00                              32C17310
0C31 0 D0D0               STO     EXPCT&2                            32C17320
0C32 0 C0D6               LD      SPCSW       CK SPACE-PRINT ON SW   32C17330
0C33 1 4C20 0BA7          BSC   L PI2,Z        BR IF ON               32C17340
                    *                                              32C17350
0C35 0 C0CE         SPIN1 LD      KEF00                            32C17360
0C36 0 E0C9               AND     EXPCT       REMOVE CARRIAGE BUSY   32C17370
0C37 0 D0C8               STO     EXPCT                              32C17380
0C38 0 1810         SPIN2 SRA     16                                 32C17390
0C39 0 D0C7               STO     EXPCT&1     RESET SKIP/SPACE EXPCT 32C17400
0C3A 0 7003               MDX     IOUT1                              32C17410
                    *                                              32C17420
                    *-------------------------------------         32C17430
                    *           RETURN FROM INTERRUPT              32C17440
                    *-------------------------------------         32C17450
                    *                                              32C17460
0C3B 0 C0CE         IOUT  LD      RTRNS                            32C17470
0C3C 1 4C28 0C42          BSC   L IOUT2,Z&    GO RTRN IF NOT PRINT   32C17480
                    *                                              32C17490
0C3E 1 6700 0B19    IOUT1 LDX   L3 RTRN                            32C17500
0C40 1 6F00 05E6          STX   L3 MLSCF&1    SET MLSCF              32C17510
                    *                                              32C17520
0C42 0 6600 0000    IOUT2 LDX   L2 *-*        RESTORE XR2            32C17530
0C44 1 7400 0B17          MDX   L EBITS       SKIP IF NO DSW ER      32C17540
0C46 0 700A               MDX     IOUT3                              32C17550
                    *                                              32C17560
0C47 0 C0AC               LD      WAS         LD DSW                 32C17570
0C48 1 D400 0ADB          STO   L IDSW        STO DSW WAS            32C17580
0C4A 0 F0B7               EOR     EXPCT&2     COMPARE WITH EXPECTED DSW 32C17590
0C4B 0 E0B8               AND     KEF00                              32C17600
0C4C 1 D400 0B17          STO   L EBITS       SAVE ER BITS           32C17610
0C4E 0 F0A5               EOR     WAS         BUILD DSW S/B          32C17620
0C4F 1 D400 0ADC          STO   L IDSW&1      STO DSW S/B            32C17630
0C51 1 4C80 0B6A    IOUT3 BSC   I PIRT                             32C17640
                    *                                              32C17650
                    ***************************************        32C17660
                    *           CHECK EMIT                         32C17670
                    ***************************************        32C17680
                    * THIS SUBROUTINE FINDS THE FIRST CHARACTER     32C17690
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                        * EMITTED IN THE TABLE                                  32C17700
                        *---------------------------------------               32C17710
                        *                                                       32C17720
0C53 0 0000     CKEMT DC      *-*                                               32C17730
0C54 0 C0B8           LD      CKESW                                             32C17740
0C55 1 4CA0 0C53      BSC  I  CKEMT,Z                                           32C17750
0C57 0 C0B8           LD      EMIT                                              32C17760
0C58 1 D400 0AD5      STO  L  EMTWS     STO EMIT WAS                            32C17770
                        *                                                       32C17780
0C5A 1 7400 08FA      MDX  L  EMTSW     CK FOR FIRST EMIT                       32C17790
0C5C 0 7038           MDX     CKEM6     BR IF NOT FIRST                         32C17800
                        *                                                       32C17810
0C5D 0 C0B2           LD      EMIT                                              32C17820
0C5E 0 E89E           OR      OREM      CK FOR MISSING EMIT BITS                32C17830
0C5F 0 D09D           STO     OREM      FF00 IF OK                              32C17840
0C60 0 C0AF           LD      EMIT                                              32C17850
0C61 0 E09A           AND     ANDEM     CK FOR SHORTED EMIT BITS                32C17860
0C62 0 D099           STO     ANDEM     0000 IF OK                              32C17870
0C63 0 F099           EOR     OREM      CK FOR EMIT BITS OK                     32C17880
0C64 0 F0A0           EOR     KFF00                                             32C17890
0C65 1 4C20 0C7B      BSC  L  CKEM5,Z   CONT IF ALL EMIT BITS OK                32C17900
                        *                                                       32C17910
0C67 0 63D0           LDX     3 -48     FIND FIRST CHARACTER                    32C17920
0C68 1 C700 0CF0 CKEM1 LD  L3 CHAR&48    EMITTED IN                              32C17930
0C6A 0 90A5           S       EMIT      SEQUENCE TABLE                          32C17940
0C6B 1 4C18 0C73      BSC  L  CKEM2,&-  FOUND IF BR                             32C17950
0C6D 0 7301           MDX     3 1       GO TO NEXT TABLE ENTRY                  32C17960
0C6E 0 70F9           MDX     CKEM1                                             32C17970
0C6F 1 6700 0A37      LDX  L3 ERR7                                              32C17980
0C71 0 6B9B           STX     3 CKESW                                           32C17990
0C72 0 7006           MDX     CKEM4                                             32C18000
                        *                                                       32C18010
0C73 0 6886     CKEM2 STX     EMTSW     RESET 1ST SCAN SW                       32C18020
0C74 0 7301           MDX     3 1       DECREMENT XR FOR NEXT CHAR              32C18030
0C75 0 7001           MDX     CKEM3     AND SAVE                                32C18040
0C76 0 63D0           LDX     3 -48     IF XR3 # 0, RESET                       32C18050
0C77 1 6F00 0C0C CKEM3 STX  L3 CHARC                                            32C18060
0C79 1 4C80 0C53 CKEM4 BSC  I  CKEMT                                            32C18070
                        *                                                       32C18080
0C7B 1 74FF 0C0E CKEM5 MDX  L  EMTCT,-1   CNT 100 EMITS                         32C18090
0C7D 0 70C4           MDX     IOUT2       THEN SKIP                           32C18100
0C7E 1 6700 0A2F      LDX  L3 ERR6                                              32C18110
0C80 0 6B8C           STX     3 CKESW     SET ER SW FOR ER 6                  32C18120
0C81 1 CC00 0BFC      LDD  L  ANDEM       LD ERROR CODE                       32C18130
0C83 1 DC00 0AD2      STD  L  ERM4        SET IN MESSAGE                      32C18140
0C85 1 CC00 0BFE      LDD  L  ANDOR       REINITIALIZE EMIT                   32C18150
0C87 1 DC00 0BFC      STD  L  ANDEM       CHECK WORD                          32C18160
0C89 0 6364           LDX     3 100                                           32C18170
0C8A 0 6B83           STX     3 EMTCT     RESET EMIT CK CNT                   32C18180
0C8B 1 0C00 0BF2      XIO  L  STPPT-1     STOP PRINTER                        32C18190
0C8D 0 1810           SRA     16                                              32C18200
0C8E 1 D400 0C00      STO  L  EXPCT                                           32C18210
0C90 1 D400 0B16      STO  L  TBDSW                                           32C18220
0C92 1 D400 0BFA      STO  L  EMTSW       RESET 1ST EMIT SW                   32C18230
0C94 0 70A9           MDX     IOUT1                                           32C18240
                        *                                                       32C18250
                        *---------------------------------------              32C18260
                        * THIS SUBROUTINE CHECKS THE CHARACTER EMITTED          32C18270
                        * WITH THE TABLE OF CHARACTERS IN THE PROPER SEQ        32C18280
                        *---------------------------------------              32C18290
                        *                                                       32C18300
0C95 1 6780 0C0C CKEM6 LDX  I3 CHARC      RESET XR3 AND  CHECK IF             32C18310
0C97 1 C700 0CF0       LD   L3 CHAR&48    CHAR EMITTED                        32C18320
0C99 1 D400 0AD6       STO  L  EMTSB      STO EMIT S/B                        32C18330
0C9B 1 9400 0C10       S    L  EMIT       IS IN THE PROPER SEQUENCE           32C18340
0C9D 1 4C18 0C73       BSC  L  CKEM2,&-   YES, IF BRANCH                      32C18350
0C9F 1 6700 0A3F       LDX  L3 ERR8                                           32C18360
0CA1 1 6F00 0C0D       STX  L3 CKESW      SET ERROR SW                        32C18370
```



```
0CA3 1 4C80 0C53        BSC  I  CKEMT                                          32C18380
                        *                                                      32C18390
                        ****************************************               32C18400
                        *          MESSAGE SET UP                              32C18410
                        ****************************************               32C18420
                        * THIS SUBROUTINE SCANS THE PRINTER MESSAGE             32C18430
                        * AND SETS THE PRINT BUFFER FOR THE NEXT EMIT.          32C18440
                        *---------------------------------------              32C18450
                        *                                                      32C18460
0CA5 0 63E0     MSCAN LDX   3 -32         SET TO SCAN BUFFER                   32C18470
0CA6 0 10A0           SLT     32                                               32C18480
0CA7 0 DC00 0020      STD  L  32                                               32C18490
                        *                                                      32C18500
0CA9 0 6200           LDX     2 0                                              32C18510
0CAA 1 4C20 0CAF MS1  BSC  L  MS2,Z       CK FOR NEXT BUF WORD                 32C18520
0CAC 0 7201           MDX     2 1                                              32C18530
0CAD 1 C400 09C6      LD   L  K8000                                            32C18540
                        *                                                      32C18550
0CAF 0 D00F     MS2   STO     TEMP        SAVE MSG CHAR POSITION               32C18560
0CB0 1 C700 0E05      LD    L3 BUF&32     LD NEXT MSG CHARACTER                32C18570
0CB2 1 F400 0C10      EOR   L  EMIT       COMPARE CHAR WITH EMIT               32C18580
0CB4 1 4C20 0CB9      BSC   L  MS3,Z      BR IF NOT EQUAL                      32C18590
0CB6 0 C008           LD       TEMP       IF EQUAL SET BIT IN                  32C18600
0CB7 0 EA1F           OR    2 31          PRINT BUFFER                         32C18610
0CB8 0 D21F           STO   2 31                                               32C18620
                        *                                                      32C18630
0CB9 0 C005     MS3   LD       TEMP       SHIFT TO NEXT MSG                    32C18640
0CBA 0 1801           SRA      1          CHAR POSITION                        32C18650
0CBB 0 7301           MDX   3 1           ADV TO NEXT CHAR                     32C18660
0CBC 0 70ED           MDX      MS1                                             32C18670
0CBD 1 4C00 0C3B      BSC   L  IOUT                                            32C18680
                        *                                                      32C18690
0CBF 0 0000     TEMP  DC      *-*                                              32C18700
                        *                                                      32C18710
                        ****************************************               32C18720
                        *          EMIT CHARACTERS                             32C18730
                        ****************************************               32C18740
                        * THIS IS THE TABLE OF CHARACTERS IN THE                32C18750
                        * PROPER SCAN EMIT SEQUENCE                            32C18760
                        *---------------------------------------              32C18770
                        *                                                      32C18780
0CC0   0017     CHAR  EBC     .X Z B D H S U 1 3 5 7 8 0 $ * ) ( .             32C18790
0CD1   0017           EBC     ./ & K M O Q E W Y A C F I T V 2 4 .             32C18800
0CE2   0015           EBC     .6 9 = . , - + * J L N P R G X .                32C18810
                        *                                                      32C18820
0CF1 0 F100     CHARF DC      /F100    1                                       32C18830
0CF2 0 F200           DC      /F200    2                                       32C18840
0CF3 0 F300           DC      /F300    3                                       32C18850
0CF4 0 F400           DC      /F400    4                                       32C18860
0CF5 0 F500           DC      /F500    5                                       32C18870
0CF6 0 F600           DC      /F600    6                                       32C18880
0CF7 0 F700           DC      /F700    7                                       32C18890
0CF8 0 F800           DC      /F800    8                                       32C18900
0CF9 0 F900           DC      /F900    9                                       32C18910
0CFA 0 F000           DC      /F000    0                                       32C18920
0CFB 0 7E00           DC      /7E00    #                                       32C18930
0CFC 0 5B00           DC      /5B00    $                                       32C18940
0CFD 0 4B00           DC      /4B00    .                                       32C18950
0CFE 0 7D00           DC      /7D00    #                                       32C18960
0CFF 0 6B00           DC      /6B00    ,                                       32C18970
0D00 0 5D00           DC      /5D00    <                                       32C18980
0D01 0 6000           DC      /6000    -                                       32C18990
0D02 0 4D00           DC      /4D00    %                                       32C19000
0D03 0 4E00           DC      /4E00    &                                       32C19010
0D04 0 6100           DC      /6100    /                                       32C19020
0D05 0 5C00           DC      /5C00    *                                       32C19030
0D06 0 5000           DC      /5000    &                                       32C19040
0D07 0 D100           DC      /D100    J                                       32C19050
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0D08 0 D200          DC      /D200     K                    32C19060
0D09 0 D300          DC      /D300     L                    32C19070
0D0A 0 D400          DC      /D400     M                    32C19080
0D0B 0 D500          DC      /D500     N                    32C19090
0D0C 0 D600          DC      /D600     O                    32C19100
0D0D 0 D700          DC      /D700     P                    32C19110
0D0E 0 D800          DC      /D800     Q                    32C19120
0D0F 0 D900          DC      /D900     R                    32C19130
0D10 0 C500          DC      /C500     E                    32C19140
0D11 0 C700          DC      /C700     G                    32C19150
0D12 0 E600          DC      /E600     W                    32C19160
0D13 0 E700          DC      /E700     X                    32C19170
0D14 0 E800          DC      /E800     Y                    32C19180
0D15 0 E900          DC      /E900     Z                    32C19190
0D16 0 C100          DC      /C100     A                    32C19200
0D17 0 C200          DC      /C200     B                    32C19210
0D18 0 C300          DC      /C300     C                    32C19220
0D19 0 C400          DC      /C400     D                    32C19230
0D1A 0 C600          DC      /C600     F                    32C19240
0D1B 0 C800          DC      /C800     H                    32C19250
0D1C 0 C900          DC      /C900     I                    32C19260
0D1D 0 E200          DC      /E200     S                    32C19270
0D1E 0 E300          DC      /E300     T                    32C19280
0D1F 0 E400          DC      /E400     U                    32C19290
0D20 0 E500          DC      /E500     V                    32C19300
0D21 0 F100          DC      /F100     1                    32C19310
                     *                                      32C19320
                     ****************************************32C19330
                     *          ALPHA MESSAGES              *32C19340
                     ****************************************32C19350
                     *                                      32C19360
0D22 0 923E AWAS     DC      /923E     WAS S/B              32C19370
0D23 0 9A21          DC      /9A21                          32C19380
0D24 0 219A          DC      /219A                          32C19390
0D25 0 BC1A          DC      /BC1A                          32C19400
0D26 0 2100          DC      /2100                          32C19410
0D27 0 FFFF          DC      /FFFF                          32C19420
                     *                                      32C19430
0D28 0 2184 ASDSW    DC      /2184     STATIC DSW ERR       32C19440
0D29 0 9A9E          DC      /9A9E                          32C19450
0D2A 0 3E9E          DC      /3E9E                          32C19460
0D2B 0 221E          DC      /221E                          32C19470
0D2C 0 2132          DC      /2132                          32C19480
0D2D 0 9A92          DC      /9A92                          32C19490
0D2E 0 2136          DC      /2136                          32C19500
0D2F 0 6262          DC      /6262                          32C19510
0D30 0 FFFF          DC      /FFFF                          32C19520
                     *                                      32C19530
0D31 0 2184 ABDSW    DC      /2184     BUSY DSW ERR         32C19540
0D32 0 1AB2          DC      /1AB2                          32C19550
0D33 0 9AA6          DC      /9AA6                          32C19560
0D34 0 2132          DC      /2132                          32C19570
0D35 0 9A92          DC      /9A92                          32C19580
0D36 0 2136          DC      /2136                          32C19590
0D37 0 6262          DC      /6262                          32C19600
0D38 0 FFFF          DC      /FFFF                          32C19610
                     *                                      32C19620
0D39 0 2184 ADSW1    DC      /2184     LEV1 DSW ERR         32C19630
0D3A 0 5E36          DC      /5E36                          32C19640
0D3B 0 B6FC          DC      /B6FC                          32C19650
0D3C 0 2132          DC      /2132                          32C19660
0D3D 0 9A92          DC      /9A92                          32C19670
0D3E 0 2136          DC      /2136                          32C19680
0D3F 0 6262          DC      /6262                          32C19690
0D40 0 FFFF          DC      /FFFF                          32C19700
                     *                                      32C19710
0D41 0 329A ADSW     DC      /329A     DSW                  32C19720
0D42 0 9221          DC      /9221                          32C19730
```



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0D43 0 FFFF          DC      /FFFF                          32C19740
                     *                                      32C19750
0D44 0 2121 ANINT    DC      /2121     NO INTRPT            32C19760
0D45 0 8476          DC      /8476                          32C19770
0D46 0 5221          DC      /5221                          32C19780
                     *                                      32C19790
0D47 0 2276 AINT     DC      /2276                          32C19800
0D48 0 9E62          DC      /9E62                          32C19810
0D49 0 569E          DC      /569E                          32C19820
0D4A 0 FFFF          DC      /FFFF                          32C19830
                     *                                      32C19840
0D4B 0 329A ADPR     DC      /329A     DSW -PRINTER         32C19850
0D4C 0 9221          DC      /9221                          32C19860
0D4D 0 2184          DC      /2184                          32C19870
                     *                                      32C19880
0D4E 0 5662 APRTR    DC      /5662     PRINTER              32C19890
0D4F 0 769E          DC      /769E                          32C19900
0D50 0 6200          DC      /6200                          32C19910
0D51 0 FFFF          DC      /FFFF                          32C19920
                     *                                      32C19930
0D52 0 9A9E ASTPD    DC      /9A9E     STOPPED              32C19940
0D53 0 5256          DC      /5256                          32C19950
0D54 0 5636          DC      /5636                          32C19960
0D55 0 3200          DC      /3200                          32C19970
0D56 0 FFFF          DC      /FFFF                          32C19980
                     *                                      32C19990
0D57 0 3222 ADNTO    DC      /3222     DID NOT TURN OFF     32C20000
0D58 0 3221          DC      /3221                          32C20010
0D59 0 7652          DC      /7652                          32C20020
0D5A 0 9E21          DC      /9E21                          32C20030
0D5B 0 9EB2          DC      /9EB2                          32C20040
0D5C 0 6276          DC      /6276                          32C20050
0D5D 0 2152          DC      /2152                          32C20060
0D5E 0 1212          DC      /1212                          32C20070
0D5F 0 FFFF          DC      /FFFF                          32C20080
                     *                                      32C20090
0D60 0 5256 AEBF     DC      /5256     EMIT BIT FAILURE     32C20100
0D61 0 3676          DC      /3676                          32C20110
0D62 0 219A          DC      /219A                          32C20120
0D63 0 2652          DC      /2652                          32C20130
0D64 0 629E          DC      /629E                          32C20140
0D65 0 2184          DC      /2184                          32C20150
0D66 0 3672          DC      /3672                          32C20160
0D67 0 229E          DC      /229E                          32C20170
0D68 0 211A          DC      /211A                          32C20180
0D69 0 229E          DC      /229E                          32C20190
0D6A 0 2112          DC      /2112                          32C20200
0D6B 0 3E22          DC      /3E22                          32C20210
0D6C 0 5EB2          DC      /5EB2                          32C20220
0D6D 0 6236          DC      /6236                          32C20230
0D6E 0 FFFF          DC      /FFFF                          32C20240
                     *                                      32C20250
0D6F 0 3672 AEMT     DC      /3672     EMIT INVALD          32C20260
0D70 0 229E          DC      /229E                          32C20270
0D71 0 2184          DC      /2184                          32C20280
0D72 0 2276          DC      /2276                          32C20290
0D73 0 B63E          DC      /B63E                          32C20300
0D74 0 5E32          DC      /5E32                          32C20310
0D75 0 FFFF          DC      /FFFF                          32C20320
                     *                                      32C20330
0D76 0 2184 AESER    DC      /2184     EMIT SEQ ERR         32C20340
0D77 0 3672          DC      /3672                          32C20350
0D78 0 229E          DC      /229E                          32C20360
0D79 0 2100          DC      /2100                          32C20370
0D7A 0 9A36 ASER     DC      /9A36                          32C20380
0D7B 0 6621          DC      /6621                          32C20390
0D7C 0 3662          DC      /3662                          32C20400
0D7D 0 6200          DC      /6200                          32C20410
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0D7E 0 FFFF          DC    /FFFF                                  32C20420
                     *                                            32C20430
0D7F 0 7222  AMC     DC    /7222    MISSING CHANNEL               32C20440
0D80 0 9A9A          DC    /9A9A                                  32C20450
0D81 0 2276          DC    /2276                                  32C20460
0D82 0 1621          DC    /1621                                  32C20470
0D83 0 1E26  ACHAN   DC    /1E26                                  32C20480
0D84 0 3E76          DC    /3E76                                  32C20490
0D85 0 7636          DC    /7636                                  32C20500
0D86 0 5E00          DC    /5E00                                  32C20510
0D87 0 FFFF          DC    /FFFF                                  32C20520
                     *                                            32C20530
0D88 0 72B2  AMSP    DC    /72B2    MULT SPACE                    32C20540
0D89 0 5E9E          DC    /5E9E                                  32C20550
0D8A 0 2100          DC    /2100                                  32C20560
                     *                                            32C20570
0D8B 0 9A56  ASPC    DC    /9A56    SPACE                         32C20580
0D8C 0 3E1E          DC    /3E1E                                  32C20590
0D8D 0 3600          DC    /3600                                  32C20600
0D8E 0 FFFF          DC    /FFFF                                  32C20610
                     *                                            32C20620
0D8F 0 72B2  AMSK    DC    /72B2    MULT SKIP                     32C20630
0D90 0 5E9E          DC    /5E9E                                  32C20640
0D91 0 2100          DC    /2100                                  32C20650
                     *                                            32C20660
0D92 0 9A5A  ASKP    DC    /9A5A    SKIP                          32C20670
0D93 0 2256          DC    /2256                                  32C20680
0D94 0 FFFF          DC    /FFFF                                  32C20690
                     *                                            32C20700
0D95 0 5662  APRT    DC    /5662    PRINT                         32C20710
0D96 0 2276          DC    /2276                                  32C20720
0D97 0 9E00          DC    /9E00                                  32C20730
0D98 0 FFFF          DC    /FFFF                                  32C20740
                     *                                            32C20750
0D99 0 9A56  ASPIN   DC    /9A56    SPACE- PRINT ON               32C20760
0D9A 0 3E1E          DC    /3E1E                                  32C20770
0D9B 0 3684          DC    /3684                                  32C20780
0D9C 0 2156          DC    /2156                                  32C20790
0D9D 0 6222          DC    /6222                                  32C20800
0D9E 0 769E          DC    /769E                                  32C20810
0D9F 0 2152          DC    /2152                                  32C20820
0DA0 0 7600          DC    /7600                                  32C20830
0DA1 0 FFFF          DC    /FFFF                                  32C20840
                     *                                            32C20850
0DA2 0 9A36  ASNER   DC    /9A36    SENSE ERR                     32C20860
0DA3 0 769A          DC    /769A                                  32C20870
0DA4 0 3621          DC    /3621                                  32C20880
0DA5 0 3662          DC    /3662                                  32C20890
0DA6 0 6200          DC    /6200                                  32C20900
0DA7 0 FFFF          DC    /FFFF                                  32C20910
                     *                                            32C20920
0DA8 0 923E  AINVC   DC    /923E    WAS -INVALD CHANNEL CODE      32C20930
0DA9 0 9A21          DC    /9A21                                  32C20940
0DAA 0 2184          DC    /2184                                  32C20950
0DAB 0 2276          DC    /2276                                  32C20960
0DAC 0 B63E          DC    /B63E                                  32C20970
0DAD 0 5E32          DC    /5E32                                  32C20980
0DAE 0 211E          DC    /211E                                  32C20990
0DAF 0 263E          DC    /263E                                  32C21000
0DB0 0 7676          DC    /7676                                  32C21010
0DB1 0 365E          DC    /365E                                  32C21020
0DB2 0 211E          DC    /211E                                  32C21030
0DB3 0 5232          DC    /5232                                  32C21040
0DB4 0 3600          DC    /3600                                  32C21050
0DB5 0 FFFF          DC    /FFFF                                  32C21060
                     *                                            32C21070
0DB6 0 095E  ALOP    DC    /095E    LAST OP-                      32C21080
0DB7 0 3E9A          DC    /3E9A                                  32C21090
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0DB8 0 9E21          DC    /9E21                                  32C21100
0DB9 0 5256          DC    /5256                                  32C21110
0DBA 0 8421          DC    /8421                                  32C21120
0DBB 0 FFFF          DC    /FFFF                                  32C21130
                     *                                            32C21140
0DBC 0 7662  ANRDY   DC    /7662    NRDY                          32C21150
0DBD 0 32A6          DC    /32A6                                  32C21160
0DBE 0 FFFF          DC    /FFFF                                  32C21170
                     *                                            32C21180
0DBF 0 9A36  ABSW    DC    /9A36    SET SW 1-7 TO COL             32C21190
0DC0 0 9E21          DC    /9E21                                  32C21200
0DC1 0 9A92          DC    /9A92                                  32C21210
0DC2 0 21FC          DC    /21FC                                  32C21220
0DC3 0 84D4          DC    /84D4                                  32C21230
0DC4 0 2112          DC    /2112                                  32C21240
0DC5 0 5262          DC    /5262                                  32C21250
0DC6 0 211E          DC    /211E                                  32C21260
0DC7 0 525E          DC    /525E                                  32C21270
0DC8 0 21E4          DC    /21E4    8-15 FOR CHAR                 32C21280
0DC9 0 84FC          DC    /84FC                                  32C21290
0DCA 0 F421          DC    /F421                                  32C21300
0DCB 0 1252          DC    /1252                                  32C21310
0DCC 0 6221          DC    /6221                                  32C21320
0DCD 0 1E26          DC    /1E26                                  32C21330
0DCE 0 3E62          DC    /3E62                                  32C21340
0DCF 0 8141          DC    /8141    TURN ON 0 TO START PRINT      32C21350
0DD0 0 9EB2          DC    /9EB2                                  32C21360
0DD1 0 6276          DC    /6276                                  32C21370
0DD2 0 2152          DC    /2152                                  32C21380
0DD3 0 7621          DC    /7621                                  32C21390
0DD4 0 C421          DC    /C421                                  32C21400
0DD5 0 9E52          DC    /9E52                                  32C21410
0DD6 0 219A          DC    /219A                                  32C21420
0DD7 0 9E3E          DC    /9E3E                                  32C21430
0DD8 0 629E          DC    /629E                                  32C21440
0DD9 0 2156          DC    /2156                                  32C21450
0DDA 0 6222          DC    /6222                                  32C21460
0DDB 0 769E          DC    /769E                                  32C21470
0DDC 0 FFFF          DC    /FFFF                                  32C21480
                     *                                            32C21490
0DDD 0 2184  ACBSY   DC    /2184    CARRIAGE BSY                  32C21500
0DDE 0 1E3E          DC    /1E3E                                  32C21510
0DDF 0 6262          DC    /6262                                  32C21520
0DE0 0 223E          DC    /223E                                  32C21530
0DE1 0 1636          DC    /1636                                  32C21540
0DE2 0 211A          DC    /211A                                  32C21550
0DE3 0 9AA6          DC    /9AA6                                  32C21560
0DE4 0 FFFF          DC    /FFFF                                  32C21570
                     *                                            32C21580
                     ********************************************* 32C21590
                     *        PRINTER MSG BUFFER AND TABLE       * 32C21600
                     ********************************************* 32C21610
                     *                                            32C21620
0DE5   0020  BUF     BSS   32       PRINTER MSG BUFFER            32C21630
                     *                                            32C21640
0E05 1 0E7B  PMTAB   DC    PMG16    PRINTER MESSAGE TABLE         32C21650
0E06 1 0E7E          DC    PMG17                                  32C21660
0E07 1 0E76          DC    PMG15                                  32C21670
0E08 1 0E67          DC    PMG11                                  32C21680
0E09 1 0E6A          DC    PMG12                                  32C21690
0E0A 1 0E6E          DC    PMG13                                  32C21700
0E0B 1 0E23          DC    PMG01                                  32C21710
0E0C 1 0E29          DC    PMG02                                  32C21720
0E0D 1 0E33          DC    PMG03                                  32C21730
0E0E 1 0E36          DC    PMG04                                  32C21740
0E0F 1 0E39          DC    PMG05                                  32C21750
0E10 1 0E45          DC    PMG06                                  32C21760
0E11 1 0E64          DC    PMG10                                  32C21770
```

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0E12 1 0E61          DC     PMG09                          32C21780
0E13 1 0E58          DC     PMG8I                          32C21790
0E14 1 0E67          DC     PMG11                          32C21800
0E15 1 0E82          DC     PMG19                          32C21810
0E16 1 0E84          DC     PMG20                          32C21820
0E17 1 0E86          DC     PMG21                          32C21830
0E18 1 0E88          DC     PMG22                          32C21840
0E19 1 0E51          DC     PMG07                          32C21850
0E1A 1 0E8A          DC     PMG24                          32C21860
0E1B 1 0E8C          DC     PMG25                          32C21870
0E1C 1 0E8E          DC     PMG26                          32C21880
0E1D 1 0E90          DC     PMG27                          32C21890
0E1E 1 0E71          DC     PMG14                          32C21900
0E1F 1 0E80          DC     PMG18                          32C21910
0E20 1 0E6A          DC     PMG12                          32C21920
0E21 1 0E6E          DC     PMG13                          32C21930
0E22 1 0E5E          DC     PMG08                          32C21940
                     *                                     32C21950
0E23 0 D9E3 PMG01    DC     /D9E3     RT1 EMIT             32C21960
0E24 0 F100          DC     /F100                          32C21970
0E25 0 0000          DC     /0000                          32C21980
0E26 0 C5D4          DC     /C5D4                          32C21990
0E27 0 C9E3          DC     /C9E3                          32C22000
0E28 0 FFFF          DC     /FFFF                          32C22010
                     *                                     32C22020
0E29 0 D9E3 PMG02    DC     /D9E3     RT2 SCAN CHECK       32C22030
0E2A 0 F200          DC     /F200                          32C22040
0E2B 0 0000          DC     /0000                          32C22050
0E2C 0 E2C3          DC     /E2C3                          32C22060
0E2D 0 C1D5          DC     /C1D5                          32C22070
0E2E 0 0000          DC     /0000                          32C22080
0E2F 0 C3C8          DC     /C3C8                          32C22090
0E30 0 C5C3          DC     /C5C3                          32C22100
0E31 0 D200          DC     /D200                          32C22110
0E32 0 FFFF          DC     /FFFF                          32C22120
                     *                                     32C22130
0E33 0 D9E3 PMG03    DC     /D9E3     RT3                  32C22140
0E34 0 F300          DC     /F300                          32C22150
0E35 0 FFFF          DC     /FFFF                          32C22160
                     *                                     32C22170
0E36 0 D9E3 PMG04    DC     /D9E3     RT4                  32C22180
0E37 0 F400          DC     /F400                          32C22190
0E38 0 FFFF          DC     /FFFF                          32C22200
                     *                                     32C22210
0E39 0 D9E3 PMG05    DC     /D9E3     RT5 RIPPLE PATTERN   32C22220
0E3A 0 F500          DC     /F500                          32C22230
0E3B 0 0000          DC     /0000                          32C22240
0E3C 0 D9C9          DC     /D9C9                          32C22250
0E3D 0 D7D7          DC     /D7D7                          32C22260
0E3E 0 D3C5          DC     /D3C5                          32C22270
0E3F 0 0000          DC     /0000                          32C22280
0E40 0 D7C1          DC     /D7C1                          32C22290
0E41 0 E3E3          DC     /E3E3                          32C22300
0E42 0 C5D9          DC     /C5D9                          32C22310
0E43 0 D500          DC     /D500                          32C22320
0E44 0 FFFF          DC     /FFFF                          32C22330
                     *                                     32C22340
0E45 0 D9E3 PMG06    DC     /D9E3     RT6 ALL CHARACTERS   32C22350
0E46 0 F600          DC     /F600                          32C22360
0E47 0 0000          DC     /0000                          32C22370
0E48 0 C1D3          DC     /C1D3                          32C22380
0E49 0 D300          DC     /D300                          32C22390
0E4A 0 0000          DC     /0000                          32C22400
0E4B 0 C3C8          DC     /C3C8                          32C22410
0E4C 0 C1D9          DC     /C1D9                          32C22420
0E4D 0 C1C3          DC     /C1C3                          32C22430
0E4E 0 E3C5          DC     /E3C5                          32C22440
0E4F 0 D9E2          DC     /D9E2                          32C22450
```



```
0E50 0 FFFF          DC     /FFFF                          32C22460
                     *                                     32C22470
0E51 0 D9E3 PMG07    DC     /D9E3     RT7 STRESS           32C22480
0E52 0 F700          DC     /F700                          32C22490
0E53 0 0000          DC     /0000                          32C22500
0E54 0 E2E3          DC     /E2E3                          32C22510
0E55 0 D9C5          DC     /D9C5                          32C22520
0E56 0 E2E2          DC     /E2E2                          32C22530
0E57 0 FFFF          DC     /FFFF                          32C22540
                     *                                     32C22550
0E58 0 C9D5 PMG8I    DC     /C9D5                          32C22560
0E59 0 C9E3          DC     /C9E3                          32C22570
0E5A 0 C9C1          DC     /C9C1                          32C22580
0E5B 0 D3C9          DC     /D3C9                          32C22590
0E5C 0 E9C5          DC     /E9C5                          32C22600
0E5D 0 0000          DC     /0000                          32C22610
0E5E 0 D9E3 PMG08    DC     /D9E3     RT8                  32C22620
0E5F 0 F800          DC     /F800                          32C22630
0E60 0 FFFF          DC     /FFFF                          32C22640
                     *                                     32C22650
0E61 0 D9E3 PMG09    DC     /D9E3     RT9                  32C22660
0E62 0 F900          DC     /F900                          32C22670
0E63 0 FFFF          DC     /FFFF                          32C22680
                     *                                     32C22690
0E64 0 D9E3 PMG10    DC     /D9E3     RTA                  32C22700
0E65 0 C100          DC     /C100                          32C22710
0E66 0 FFFF          DC     /FFFF                          32C22720
                     *                                     32C22730
0E67 0 E3C5 PMG11    DC     /E3C5     TEST                 32C22740
0E68 0 E2E3          DC     /E2E3                          32C22750
0E69 0 FFFF          DC     /FFFF                          32C22760
                     *                                     32C22770
0E6A 0 E2D7 PMG12    DC     /E2D7     SPACE                32C22780
0E6B 0 C1C3          DC     /C1C3                          32C22790
0E6C 0 C500          DC     /C500                          32C22800
0E6D 0 FFFF          DC     /FFFF                          32C22810
                     *                                     32C22820
0E6E 0 E2D2 PMG13    DC     /E2D2     SKIP                 32C22830
0E6F 0 C9D7          DC     /C9D7                          32C22840
0E70 0 FFFF          DC     /FFFF                          32C22850
                     *                                     32C22860
0E71 0 C3C8 PMG14    DC     /C3C8     CHANNEL              32C22870
0E72 0 C1D5          DC     /C1D5                          32C22880
0E73 0 D5C5          DC     /D5C5                          32C22890
0E74 0 D300          DC     /D300                          32C22900
0E75 0 FFFF          DC     /FFFF                          32C22910
                     *                                     32C22920
0E76 0 60D7 PMG15    DC     /60D7     -PRINTER             32C22930
0E77 0 D9C9          DC     /D9C9                          32C22940
0E78 0 D5E3          DC     /D5E3                          32C22950
0E79 0 C5D9          DC     /C5D9                          32C22960
0E7A 0 FFFF          DC     /FFFF                          32C22970
                     *                                     32C22980
0E7B 0 D6C6 PMG16    DC     /D6C6     OFF                  32C22990
0E7C 0 C600          DC     /C600                          32C23000
0E7D 0 FFFF          DC     /FFFF                          32C23010
                     *                                     32C23020
0E7E 0 D6D5 PMG17    DC     /D6D5     ON                   32C23030
0E7F 0 FFFF          DC     /FFFF                          32C23040
                     *                                     32C23050
0E80 0 E3D6 PMG18    DC     /E3D6     TO                   32C23060
0E81 0 FFFF          DC     /FFFF                          32C23070
                     *                                     32C23080
0E82 0 F100 PMG19    DC     /F100     1                    32C23090
0E83 0 FFFF          DC     /FFFF                          32C23100
                     *                                     32C23110
0E84 0 F200 PMG20    DC     /F200     2                    32C23120
0E85 0 FFFF          DC     /FFFF                          32C23130
```

```
                        *
0E86  0 F300            PMG21 DC      /F300       3
0E87  0 FFFF                  DC      /FFFF
                        *
0E88  0 F400            PMG22 DC      /F400       4
0E89  0 FFFF                  DC      /FFFF
                        *
                        *
0E8A  0 F600            PMG24 DC      /F600       6
0E8B  0 FFFF                  DC      /FFFF
                        *
0E8C  0 F900            PMG25 DC      /F900       9
0E8D  0 FFFF                  DC      /FFFF
                        *
0E8E  0 F1F2            PMG26 DC      /F1F2       12
0E8F  0 FFFF                  DC      /FFFF
                        *
0E90  0 F3F9            PMG27 DC      /F3F9       39
0E91  0 FFFF                  DC      /FFFF
                        *
0E92    0014                  BSS     20          PATCH AREA
                        *
0EA6    05E8                  END     BGIN
  NO STATEMENTS FLAGGED IN THE ABOVE ASSEMBLY
```



```
32C23140
32C23150
32C23160
32C23170
32C23180
32C23190
32C23200
32C23210
32C23220
32C23230
32C23240
32C23250
32C23260
32C23270
32C23280
32C23290
32C23300
32C23310
32C23320
32C23330
32C23340
32C23350
32C23360
```



```
ABDSW   0D31  0A97
ABSW    0D8F  08BB
ACBSY   0DDD  0AB3
ACHAN   0D83  0AAC 0AB0
ADNTO   0D57  0AA5
ADPR    0D4B  0A9A
ADSW    0D41  0A98 0AB2
ADSW1   0D39  0A9D
AEBF    0D60  0A9E
AEMT    0D6F  0AA0
AESER   0D76  0AA3
AINT    0D47  0AA7 0AA9
AINVC   0DA8  0AAE
ALOP    0DB6  0AC9
ALPHA   0AD0  0AB7
AMC     0D7F  0AAA
AMSK    0D8F  0AA8
AMSP    0D88  0AA6
ANDEM   0BFC  0600 0C61 0C62 0C81 0C87
ANDOR   0BFE  05FE 0C85
ANINT   0D44  0A99
ANRDY   0DBC  0B67
APRT    0D95  08F9
APRTR   0D4E  0AA4
ASDSW   0D28  0A95
ASER    0D7A  0AAD
ASKP    0D92  0937
ASNER   0DA2  0AB1
ASPC    0D8B  091D
ASPIN   0D99  08B6
ASTPD   0D52  0A9B
AWAS    0D22  0A94 0A96 0A9C 0AA2
A1      09DF  06FD 0710 09E7
A110    09E3  09E6
BDSW    0AD9  0AE2 0AEB 0B03 0B04 0B19 0B1A 0BAE 0BBE
BEGIN   0160  05F1
BGIN    05E8  05F0 0EA6
BLANK   08F2  09B6 0BEC 0BF0
BSWS    08B4  0874 08B0
BUF     0DE5  0966 09D9 0CB0
CHANL   0AD4  0A58
CHAR    0CC0  05E8 05E9 05ED 06F2 099E 0C68 0C97
CHARC   0C0C  0C77 0C95
CHARF   0CF1  05E8
CHID    08B9  0883 0892
CHMSG   07DE  074C 07C2 07F4 07FB 07FD 081D 0829 084A 085E
CHM1    07F9  07F6
CHM2    07FB  07DF 0A78
CHNUM   0A5F  0A56
CHTBL   07FF  07F0
CHWAS   0ADD  0910 0912 0B27
CH1SQ   07D6
CH12S   07CF  072E 07B4 07B7 07E8 07EA
CH2SQ   07D5
CH3SQ   07D4
CH4SQ   07D3
CH5SQ   07D2
CH6SQ   07D1
CH9SQ   07D0
CKEMT   0C53  0B8B 0C55 0C79 0CA3
CKEM1   0C68  0C6E
CKEM2   0C73  0C6B 0C9D
CKEM3   0C77  0C75
CKEM4   0C79  0C72
CKEM5   0C7B  0C65
CKEM6   0C95  0C5C
CKESW   0C0D  0AF0 0B20 0C54 0C71 0C80 0CA1
CLEAR   09CC  064B 08C0 09DD 0BC5
```

```
CL10    09CF  09D2
CL20    09D9  09DC
CNTRL   0609  0608 0643 0666 068D 06C4 06DA 0707 071F 07CD 0833 086B 0B11
CN10    060D
CN20    0614  060B
CN30    061A  060F
DLYCT   0B63  0B35 0B3D 0B46 0B4F 0B54 0B5B
DSWSB   0AD8
DSWW    0AD7  08EF 0A75 0B02 0B39
EBITS   0B17  0A23 0AEF 0B1D 0C44 0C4C
EMIT    0C10  06F0 0890 09A0 0BF8 0C57 0C5D 0C60 0C6A 0C9B 0CB2
EMTCT   0C0E  05FC 0C7B 0C8A
EMTSB   0AD6  0C99
EMTSW   0BFA  094E 0B99 0C5A 0C73 0C92
EMTWS   0AD5  0C58
END     0164  0618
ERLCK   0166  09EC
ERM3    0AD1
ERM4    0AD2  0A80 0C83
ERROR   0162  0ABD 0AC2
ERR1    09F3  09FA 0B40
ERR10   0A4B  0A2B
ERR11   0A50  0A28
ERR12   0A55  077A 0A5D
ERR13   0A67  07BC 0A6E
ERR14   0A70  07E5
ERR15   0A7A  0A83 0B2F
ERR16   0A85  0915 0A8A
ERR17   0A8C  08F4 0A91
ERR2    09FC  0A04 0B05 0B1B
ERR3    0A06  0B07
ERR3X   0A10  0A0C 0A17
ERR4    0A14  0A0F
ERR5    0A18  0A2D 0B1E
ERR5X   0A2D  0A22 0A4A 0A4F 0A54
ERR6    0A2F  0A35 0C7E
ERR7    0A37  0A3D 0C6F
ERR8    0A3F  0A44 0C9F
ERR9    0A46  0A25
ETYPE   0AB4  09F8 0A02 0A10 0A1D 0A33 0A3B 0A43 0A49 0A4E 0A53 0A5C 0A6B 0A77
              0A82 0A89 0A90 0AC6
ETYP1   0AC2  0A8C
ETYP2   0AC6  0ABF
EXPCT   0C00  08EB 091B 092B 0933 0935 0950 0A0A 0B78 0B87 0B88 0B96 0BB2 0BB5
              0BC9 0C15 0C16 0C17 0C2E 0C2F 0C31 0C36 0C37 0C39 0C4A 0C8E
FORMS   0B4D  08F7 0917 092D 0B52
FORM1   0B50  0B5C
FORM2   0B5C  0B56
ICNT    0B14  06F6 0895 09A4 0A0D 0A1F 0AEE 0B7D
IDLCT   0C03  0853 08D9 08E2 0989 0B90 0B9C
IDLE    08E1  063C 0659 06B7 06EC 0718 084F 088E 08E6 099A
IDSW    0ADB  0C48 0C4F
ILO     017A
IL1     018A  0606
IL2     019A
IL3     01AA
IL4     018A
INTLZ   088D  0631 0645 0667 069E 06C6 06E0 0709 0726 0790 0807 0835 086D 08C8
              08D2 08D4
INT1    08CF  08CC
INT2    08D2  08CA
IN89A   0721  078C 0793 080B 0838
IOUT    0C3B  0C2B 0CBD
IOUT1   0C3E  0C3A 0C94
IOUT2   0C42  0B75 0BC0 0C26 0C3C 0C7D
IOUT3   0C51  0C46
I89AX   0785  0723 078E
KEF00   0C04  0C30 0C35 0C4B
```



```
KFF00   0C05  0775 0B37 0C64
K00FF   0ADF  0A7F 0B26
K0001   0C08  0BE5
K0030   08B7
K1000   09CB  0923 0931 093D
K1200   0C0F  08AB
K7F00   0C06  0AE9 0BBD
K7700   0C07  0AE7
K8000   09C6  0738 080D 083A 08A5 096E 09AC 0CAD
LINES   06DC  06CD 06D7 070D 071C
LOCK    09E9  063E 065D 0685 06BC 06D2 0702 071A 076C 07C8 0828 0861 08AD 09EF
LOG     0163  0870 0B42 0B57
LOGBY   0167
LOOP    0AC5  0637 064D 066C 06A3 06CE 06E5 070E 073F 079E 0810 083D 0886 08C2
              09F1
LPCNT   06DE  0635 0640 0649 0661 0676 0687 06AD 068E 06E8 06F9 072B 0771 0795
              07CA 0889 0898 0995 09A7
LRTN    0630  0624
LTSEQ   07DC  075A 075D 07EC
MLSCF   05E5  0621 0879 0AF7 0AFA 0B49 0B5E 0C40
MSCAN   0CA5  0BCE
MSGSW   09CA  098B 09D6 0BCC
MSG1    0A94  09F6
MSG10   0AA6  0A4D
MSG11   0AA8  0A52
MSG12   0AAA  0A5B
MSG13   0AAC  0A6A
MSG14   0AAE  0A76
MSG15   0AB0  0A81 0A88
MSG17   0AB2  0A8F
MSG2    0A96  0A00
MSG3    0A98  0A08
MSG4    0A9A  0A15
MSG5    0A9C  0A1C
MSG6    0A9E  0A32
MSG7    0AA0  0A3A
MSG8    0AA2  0A42
MSG9    0AA4  0A48
MS1     0CAA  0CBC
MS2     0CAF  0CAA
MS3     0CB9  0CB4
NO49    06DD
NO50    06DF
NRTN    062F  0625
ONES    09C8  09E1 0A6C
OPMSW   0AC0  0ABA 0AC1 0AED
OPSW    0ACA  08FB 091F 0939 0BB8
OREM    0BFD  0C5E 0C5F 0C63
PCOLM   0885  0880 089C
PID     05DC  05F3
PINT    0B86
PIRT    0B6A  0604 0B72 0C51
PIRT1   0B75  086C
PI1     0B9C  0B91
PI2     0BA7  0BA3 0C33
PI3     0BC2  0B8E 0BE0
PI4     0BCB  0BC4 0BF1
PI5     0BD5  09B8 0BEA
PI6     0BD7  09BA 0BEB
PI7     0BE5  0BDD
PMG01   0E23  0E0B
PMG02   0E29  0E0C
PMG03   0E33  0E0D
PMG04   0E36  0E0E
PMG05   0E39  0E0F
PMG06   0E45  0E10
PMG07   0E51  0E19
PMG08   0E5E  0E22
```

```
PMG09   0E61  0E12
PMG10   0E64  0E11
PMG11   0E67  0E08 0E14
PMG12   0E6A  0E09 0E20
PMG13   0E6E  0E0A 0E21
PMG14   0E71  0E1E
PMG15   0E76  0E07
PMG16   0E7B  0E05
PMG17   0E7E  0E06
PMG18   0E80  0E1F
PMG19   0E82  0E15
PMG20   0E84  0E16
PMG21   0E86  0E17
PMG22   0E88  0E18
PMG24   0E8A  0E1A
PMG25   0E8C  0E1B
PMG26   0E8E  07F2 0E1C
PMG27   0E90  0E1D
PMG8I   0E58  0E13
PMSG    0957  0682 06B9 073C 0799 07F7 08CD 095F 098F 0991
PMS1    0969  0968 0976
PMS2    0973  0982 0984
PMS3    0981  097D
PMS4    0985  095B 096C
PMS5    098F
PMTAB   0E05  0970
PRCOM   08E8  08DD 08E5 0905 098D
PRC1    08ED  08F6
PRC2    08F7  08F2
PRINT   08D6  0700 0713 08AB 08DF 098F
RAD     050E  061E
RBSWS   08B0  0873
RDEMT   08F8  0886
RDYMK   0862  0B3C
RDY1    0B36  0B47
RDY2    0B47  0B3F
READY   0B33  08C4 0B3A
RID     05DD  05F5 060D 0613 0614 0616 061A 0B0D
RIDCK   0624  060E
RIPL    0993  06D0 09C1
RIPL1   0994  09A6
RIPL2   0997  09A9
RIPL3   099C  06CA 06D4 09B2
RIPL4   09AC  09A2 09AB
RIPL5   09B6  09B0
RQKB    01BC
RQTY    01BB
RTNOM   0625  0617
RTNSW   0165  061F
RTRN    0B19  0C3E
RTRNS   0C0A  0B82 0BA4 0C3B
RTRN1   0B31  0B2B
RTTBL   0626  061C 0624 0625
RT2EX   0956  0652 065B 0AE4 0B89
RT2SW   0B74  064F 0B6B 0B71
SAVE    09C4  0965 096A 096F
SAVE3   069D  067A 067B 0680 06B1
SCNCT   0BF6  08E9 0B8D 0BC2
SCNT    069C  067C 067F
SENSE   0B15  0745 0787 08ED 090E 0942 0AE3 0B01 0B25 0B36 0B50 0B8B
SEQSW   07D7  073A 0753 076E 0784 07E7 07ED 07EF
SETUP   0B88  0872
SHFT2   07DB  0736 0761 0763 076A
SHIFT   07DA  0734 0758 0764 0765 0768 07A0 07AC
SKCNT   0949  0930 0C1C
SKINT   0C11  0B84 0B95 0B9B 0B9E 0BA6 0BCA 0BEE
SKIN1   0C1C  0C1A
SKIN2   0C1F  0C1B 0C28
```



```
SKIN3   0C22  0C1E
SKIP    0929  07A8 0824 0859 0945
SKPTO   0948  092A 0C18 0C24
SKP1    0942  0947
SPACE   0907  067D 0743 0785 0797 0812 083F 08C6 08C7 08D0 08D1 08DE 0927
SPCSW   0C09  06B2 0BA1 0BA7 0C32
SPC1    0919  090B
SPINT   0C29  0C13
SPIN1   0C35
SPIN2   0C38  0C21
SRSET   0BF5  0664 0B6E 0B7F
START   0161  0622 0AFC 0B0B 0B0F
STCAR   09C7  093B
STM     0864  0844 0B59
STOP    094A  0741 07A3 081F 08BE 0908 0941 0954 095D 0A88
STPCA   0BF7  0C1F
STPCT   0C0B  0B93 0BA5 0BAA
STPPT   0BF3  094B 0B9A 0C8B
STPRT   09C5  0901
STRT    05F4  05E3 05E4
STSPA   0BFB  0921 0BBA
SVKB    01BD
SW0     05DF  0958 09EA
SW1     05E0  060A 0612 0B09
SW2     05E1  05F6 0814 0841 0BD0
SW3     05E2  0603 08D7
SW89A   078F  05F9 0722 0725
TABLE   0ACD  0AB5 0AB6 0AC4
TBDSW   0B16  08FF 0952 0AE1 0B97 0BAC 0C90
TEMP    0CBF  0CAF 0CB6 0CB9
TEMPB   08B2  089F 08A1 08A3
TEMP8   07D8  0777 077E 0780 079D 07BB 07BE 07E1 07FA 080F 0819 0821 082D 082F
              083C 0846 0855 0863 0866 0A72
TERM    09C9  0975 0978
TSTA    0835  062F
TSTB    086D  0630
TST1    0631  0626
TST2    0645  0627
TST3    0667  0628
TST4    069E  0629
TST5    06C6  062A
TST6    06E0  062B
TST7    0709  062C
TST8    0790  062D
TST9    0807  062E
T0AA    083F  0869
T0AB    084A  0844
T0AC    0863  0848
T0BA    0873  0877 0897 08AF
T0BB    087D  0875
T0BC    088B  089A
T0BD    0890
T0BE    089C  0893
T0BF    08AA  0884 089B
T01A    0639  0642
T02A    064F  0663
T03A    066E  068C
T03A1   067B  0689
T03B    0684  0672
T03C    067D  0681
T04A    06A5  06C3
T04A1   06B1  06C0
T04B    06BB  06A9
T05A    06CC
T05C    06D0  06D9
T05D    06D4
T06A    06E3
T06B    06E7  06F8 0706
```

```
T06C    06E9  06FB
T06D    06EE  06E4 0704
T06E    06FD  06F4 06FC
T07A    0710  071E
T08A    073F  0773
T08A1   0758  0766
T08A2   076A  075F
T08B    076C  074A 0756
T08C    0774  076F
T08D    0778  0733 077C 0781
T08E    07A0  07CC
T08F    07A2  07C7
T08X1   07AA  07A2 07C4
T09A    0812  0831
T09B    081D  0817
T09C    082D  081B
T3CTL   068F  066B 066E 0670 0673 068A 06A2 06A5 06A7 06AA 06C1
VCHNL   07DD  074F 0751 0774 081A 0847
WAIT    0AE0  05F7 0903 0909 0925 093F 0A12 0B31
WAIT1   0AF5  0B00
WAIT2   0AFA
WAIT3   0AFE  0AF5
WAIT4   0B09  087B 0AF9 0B4B 0B60
WAS     0BF4  0747 0789 07AE 07BF 0826 085B 0A7D 0B28 0B81 0C11 0C22 0C29 0C47
              0C4E
WCNT    0818  0AF4 0AFE 0B7C
X16     0886  089E
END OF ASSEMBLY
```

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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.

LAST OP - CCCC
E0F05 000R AAAA
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.

LAST OP - PUNCH
E0F06 000R AAAA
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.

LAST OP - CCCC
E0F07 000R AAAA
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.

LAST OP - CCCC
E0F10 000R AAAA
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

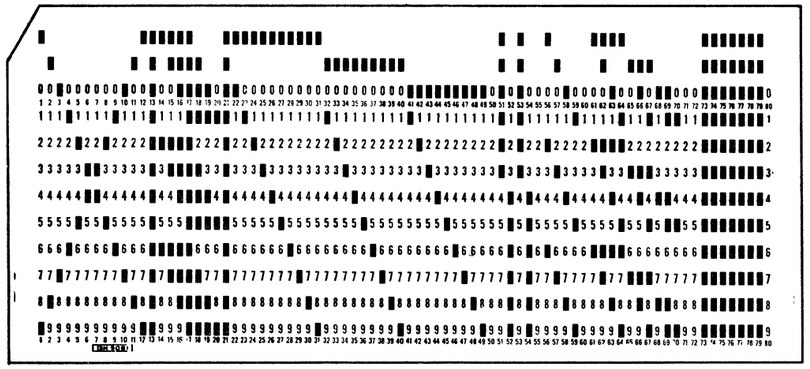
1. COLUMN INTERRUPT - LEVEL 0

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.

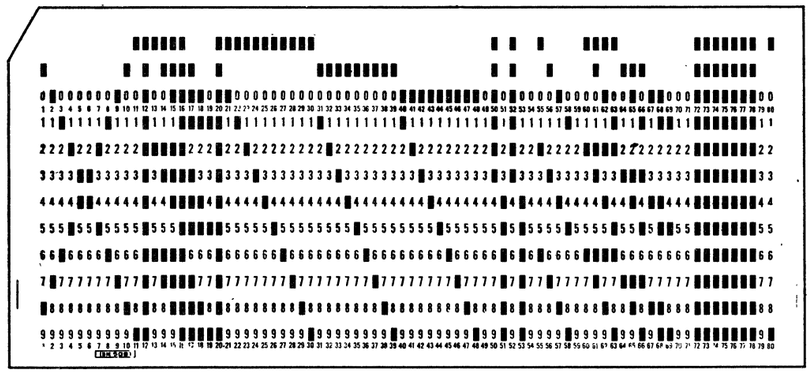
THE ROUTINE COUNTS THE NUMBER OF INTERRUPTS AND EXECUTES EITHER PUNCH OR READ COMMAND, THEN RETURNS TO THE MONITOR LEVEL 0 INTERRUPT ROUTINE.

2. OP - COMPLETE INTERRUPT - LEVEL4

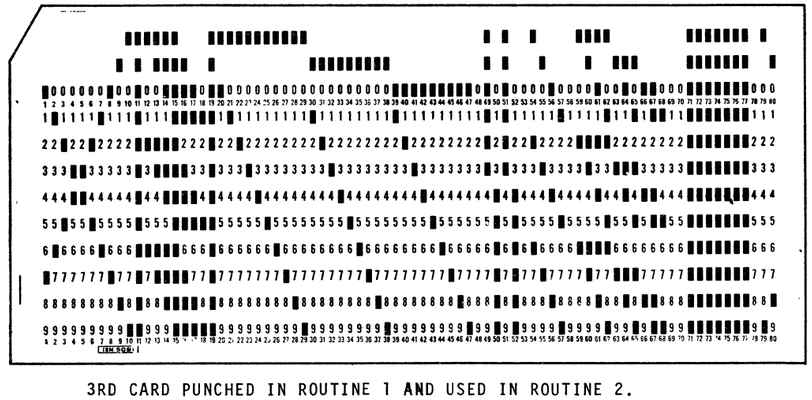
THIS ROUTINE SENSE, RESETS, AND STORES THE DSW, SETS A SWITCH INDICATING THAT THIS INTERRUPT WAS RECEIVED, THEN RETURNS TO THE MONITOR LEVEL 4 INTERRUPT ROUTINE.



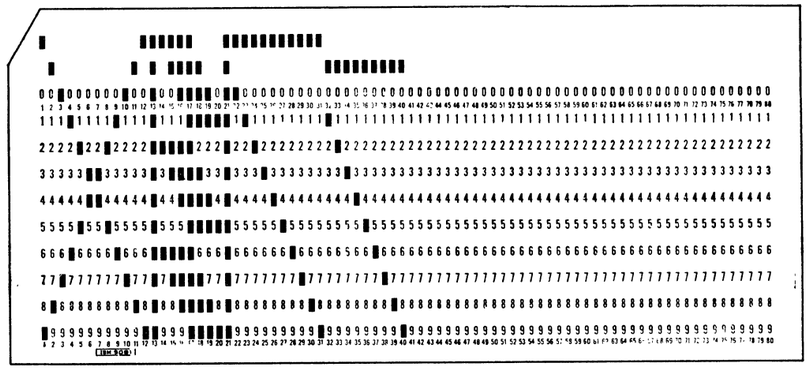
1ST CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



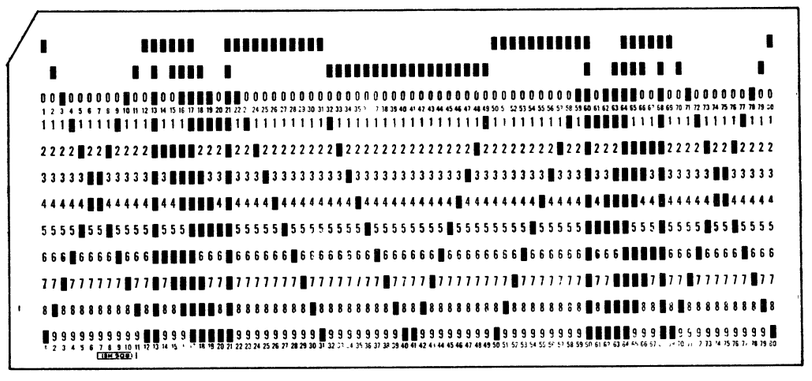
2ND CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



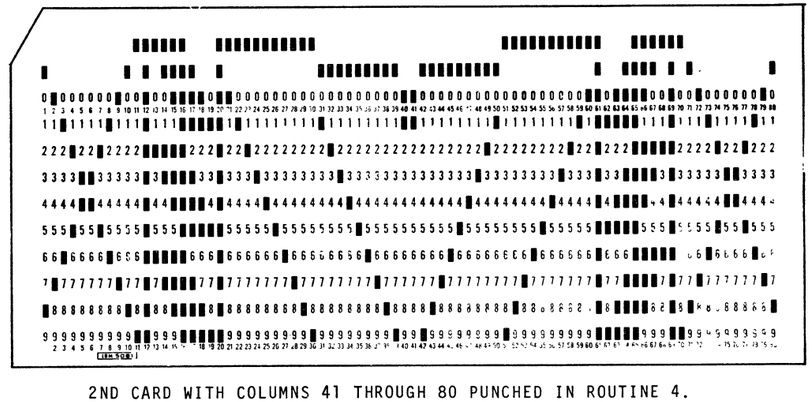
3RD CARD PUNCHED IN ROUTINE 1 AND USED IN ROUTINE 2.



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
BEGIN EQU     /160        BEGIN ROUTINE                               30F00300
START EQU     BEGIN&1     SUPERVISOR ROUTINE                          30F00310
ERROR EQU     START&1     ERROR LOG ROUTINE                           30F00320
LOG   EQU     ERROR&1     STATUS LOG ROUTINE                          30F00330
END   EQU     LOG&1       END ROUTINE                                 30F00340
*                                                                     30F00350
*-------------------------------------------                          30F00360
*     MONITOR CONTROL WORD ADDRESSES                                  30F00370
*-------------------------------------------                          30F00380
RTNSW EQU     END&1       ROUTINE START SW                            30F00390
ERLCK EQU     END&2       LOCK ON ERROR CONTROL                       30F00400
LOGBY EQU     END&3       I/O BUSY SW ADDRS                           30F00410
RLCF  EQU     END&4       RELOCATION FACTOR ADDRS                     30F00420
*                                                                     30F00430
*-------------------------------------------                          30F00440
*     INTERRUPT TRANSFER VECTOR ADDRESSES                             30F00450
*-------------------------------------------                          30F00460
ILO   EQU     /17A        INTERRUPT LEVEL ZERO                        30F00470
IL1   EQU     ILO&16      INTERRUPT LEVEL ONE                         30F00480
IL2   EQU     IL1&16      INTERRUPT LEVEL TWO                         30F00490
IL3   EQU     IL2&16      INTERRUPT LEVEL THREE                       30F00500
IL4   EQU     IL3&16      INTERRUPT LEVEL FOUR                        30F00510
RQTY  EQU     IL4&1       CONSOLE PRINTER REQUEST                     30F00520
RQKB  EQU     RQTY&1      USE KEYBOARD REQUEST                        30F00530
SVKB  EQU     RQKB&1      KB SERVICE REQUEST                          30F00540
*                                                                     30F00550
*********************************************                         30F00560
      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
```

```
0160
0161
0162
0163
0164


0165
0166
0167
0168


017A
018A
019A
01AA
01BA
01BB
01BC
01BD


0000
```



```
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 IL0       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
                *-------------------------------------------
                *
0618 1 0621     RTTBL DC    RT1         PUNCH AND FEED
0619 1 0638           DC    RT2         READ ROTATE PATTERN
061A 1 0654           DC    RT3         PUNCH 40 COLUMNS
061B 1 0669           DC    RT4         PUNCH FLIPPED PATTERN
061C 1 0694           DC    RT5         READ FLIPPED PATTERN
061D 1 06AB     NRTN  DC    RT6         READ ANY CARD
061E 1 06E6           DC    RT7         PUNCH FROM BIT SWS
061F 1 071A           DC    RT8         GANG PUNCH
0620 1 0731     LRTN  DC    RT9         MODIFY ROTATE PATTERN
                *
                *
                *********************************************
                *              ROUTINE 1 - PUNCH AND FEED
                *********************************************
                * THIS ROUTINE WILL READ A CARD, CHECK THAT THE
                * CARD IS BLANK, PUNCH THE CARD WITH A ROTATING
                * PATTERN, THEN FEED A CARD. ALL PUNCHED CARDS
                * WILL GO TO STACKER 2, ALL BLANK CARDS WILL
                * GO TO STACKER 1.
                *-------------------------------------------
                *
0621 1 6500 0A33 RT1   LDX  L1 WAREA     SET FOR START OF
0623 1 6D00 0784       STX  L1 DADRS      ROTATE PATTERN
0625 0 6101            LDX   1 1        MESSAGE NUMBER
0626 1 6700 09EB       LDX  L3 ALDBK    LD BLANKS
0628 1 4400 0967       BSI  L  TYPE     PRINT MESSAGE
                *
062A 1 4400 074A RT11  BSI  L  BLANK    CK FOR BLANK CARD
062C 1 6C00 0894       STX  L  LOOP     SET LOOP FUNCTION ADDRS
062E 0 6350            LDX   3 80       SET NUMBER OF COLUMNS
062F 1 4400 078D       BSI  L  PNCHR    PUNCH ONE CARD
0631 1 4400 07F0       BSI  L  LOCK     CHECK FOR LOCK ON FUNC
                *
0633 1 4400 073D       BSI  L  ROTAT    ROTATE THE PATTERN
0635 1 4400 075B       BSI  L  FEED     FEED A CARD
0637 0 70F2            MDX     RT11
                *
                *********************************************
                *              ROUTINE 2 - READ ROTATE PATTERN
                *********************************************
                * THIS ROUTINE WILL READ THE ROTATE PATTERN
                * PUNCHED BY ROUTINE 3. IT WILL COMPARE THE
                * PATTERN ON EACH CARD WITH THE DESIRED PATTERN
                * FOR THAT CARD.
                *-------------------------------------------
                *
0638 1 6500 0A33 RT2   LDX  L1 WAREA     SET FOR START OF
063A 1 6D00 0784       STX  L1 DADRS      ROTATE PATTERN
063C 0 6102            LDX   1 2        MESSAGE NUMBER
063D 1 6700 0A0D       LDX  L3 ASTOH    STK TO HOPPER
063F 1 4400 0967       BSI  L  TYPE     PRINT MESSAGE
                *
0641 0 6350     RT21   LDX   3 80       SET ALL BITS IN
0642 1 C400 0788       LD   L  TERM       READ AREA
0644 1 D700 0A83 RT22  STO  L3 RAREA-1
0646 0 73FF            MDX   3 -1
0647 0 70FC            MDX     RT22
                *
0648 1 6500 0A84 RT23  LDX  L1 RAREA
064A 1 4400 076C       BSI  L  READR    READ ONE CARD
064C 1 4C10 0648       BSC  L  RT23,-   REPEAT IF NO OP COMP
064E 0 6350            LDX   3 80       SET NUMBER OF COLUMNS
064F 1 4400 07A3       BSI  L  COMPR    COMPARE DATA READ
                *                         WITH DATA PUNCHED
```

30F01390 30F01400 30F01410 30F01420 30F01430 30F01440 30F01450 30F01460 30F01470 30F01480 30F01490 30F01500 30F01510 30F01520 30F01530 30F01540 30F01550 30F01560 30F01570 30F01580 30F01590 30F01600 30F01610 30F01620 30F01630 30F01640 30F01650 30F01660 30F01670 30F01680 30F01690 30F01700 30F01710 30F01720 30F01730 30F01740 30F01750 30F01760 30F01770 30F01780 30F01790 30F01800 30F01810 30F01820 30F01830 30F01840 30F01850 30F01860 30F01870 30F01880 30F01890 30F01900 30F01910 30F01920 30F01930 30F01940 30F01950 30F01960 30F01970 30F01980 30F01990 30F02000 30F02010 30F02020 30F02030 30F02040 30F02050 30F02060


```
                *
0651 1 4400 073D       BSI  L  ROTAT    ROTATE THE PATTERN
0653 0 70ED            MDX     RT21
                *
                *********************************************
                *              ROUTINE 3 - PUNCH 40 COLUMNS
                *********************************************
                *  THIS ROUTINE WILL PUNCH THE ROTATING PATTERN
                *  IN THE FIRST 40 COLUMNS OF EACH CARD. ALL
                *  CARDS WILL GO TO STACKER 2.
                *-------------------------------------------
                *
0654 1 6500 0A33 RT3   LDX  L1 WAREA     SET FOR START OF
0656 1 6D00 0784       STX  L1 DADRS      ROTATE PATTERN
0658 0 6101            LDX   1 1        MESSAGE NUMBER
0659 1 6700 09EB       LDX  L3 ALDBK    LD BLANKS
065B 1 4400 0967       BSI  L  TYPE     PRINT MESSAGE
                *
065D 1 4400 074A RT31  BSI  L  BLANK    CK FOR BLANK CARD
065F 1 6C00 0894       STX  L  LOOP     SET LOOP FUNCTION ADDRS
0661 0 6328            LDX   3 40       SET NUMBER OF COLUMNS
0662 1 4400 078D       BSI  L  PNCHR    PUNCH ONE CARD
0664 1 4400 07F0       BSI  L  LOCK     CHECK FOR LOCK ON FUNC
                *
0666 1 4400 073D       BSI  L  ROTAT    ROTATE THE PATTERN
0668 0 70F4            MDX     RT31
                *
                *********************************************
                *              ROUTINE 4 - PUNCH FLIPPED PATTERN
                *********************************************
                *  THIS ROUTINE WILL READ THE ROTATE PATTERN
                *  PUNCHED BY ROUTINE 3 AND COMPARE IT WITH
                *  THE DESIRED PATTERN. IT WILL THEN PUNCH THE
                *  MIRROR IMAGE OF THAT PATTERN IN COLUMNS 41-80.
                *-------------------------------------------
                *
0669 1 6500 0A33 RT4   LDX  L1 WAREA     SET FOR START OF
066B 1 6D00 0784       STX  L1 DADRS      ROTATE PATTERN
066D 0 6102            LDX   1 2        MESSAGE NUMBER
066E 1 6700 0A0D       LDX  L3 ASTOH    STK TO HOPPER
0670 1 4400 0967       BSI  L  TYPE     PRINT MESSAGE
                *
0672 1 6500 0A84 RT41  LDX  L1 RAREA
0674 1 4400 076C       BSI  L  READR    READ ONE CARD
0676 1 4C10 0672       BSC  L  RT41,-   REPEAT IF NO OP COMP
0678 0 6328            LDX   3 40       SET NUMBER OF COLUMNS
0679 1 4400 07A3       BSI  L  COMPR    COMPARE DATA READ
                *                         WITH DATA PUNCHED
                *
067B 1 4400 073D       BSI  L  ROTAT    ROTATE THE PATTERN
                *
067D 0 63FE     RT42   LDX   3 -2       LOAD XR 3
067E 0 62D8            LDX   2 -40      LOAD XR 2
                *
067F 1 C600 0AAC FLIP  LD   L2 RAREA&40  DATA READ
0681 1 D700 0AD5       STO  L3 RAREA&81  NEW LOCATION
0683 0 73FF            MDX   3 -1       ADJ XR 3
0684 0 7201            MDX   2 1        ADJ XR 2
0685 0 70F9            MDX     FLIP
                *
0686 0 62D8            LDX   2 -40      LOAD XR 2
0687 0 1011            SLA     17       CLEAR ACC
0688 1 D600 0AAC CLEAR STO  L2 RAREA&40  CLEAR COL 1 TO 40
068A 0 7201            MDX   2 1
068B 0 70FC            MDX     CLEAR
                *
068C 1 6500 0A84       LDX  L1 RAREA
068E 1 6D00 0784       STX  L1 DADRS     SET PUNCH DATA ADRS
```

30F02070 30F02080 30F02090 30F02100 30F02110 30F02120 30F02130 30F02140 30F02150 30F02160 30F02170 30F02180 30F02190 30F02200 30F02210 30F02220 30F02230 30F02240 30F02250 30F02260 30F02270 30F02280 30F02290 30F02300 30F02310 30F02320 30F02330 30F02340 30F02350 30F02360 30F02370 30F02380 30F02390 30F02400 30F02410 30F02420 30F02430 30F02440 30F02450 30F02460 30F02470 30F02480 30F02490 30F02500 30F02510 30F02520 30F02530 30F02540 30F02550 30F02560 30F02570 30F02580 30F02590 30F02600 30F02610 30F02620 30F02630 30F02640 30F02650 30F02660 30F02670 30F02680 30F02690 30F02700 30F02710 30F02720 30F02730 30F02740

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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
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06D2 1 6500 0A84         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
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                        *            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
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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
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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
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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         ERR0   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
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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
                           BSS  E  0                                      30F07440
086E    0000          MSG0  DC     ACNBK    CARD NOT BLANK                 30F07450
086E 1 0976                DC     0000                                    30F07460
086F 0 0000           MSG1  DC     AWAS                                    30F07470
0870 1 097E                DC     ASDSW                                   30F07480
0871 1 098A           MSG2  DC     AWAS                                    30F07490
0872 1 097E                DC     ABDSW                                   30F07500
0873 1 0993
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0874 1 09A3           MSG3  DC     ANINT                                  30F07510
0875 1 09AB                 DC     ALV4                                   30F07520
0876 1 097E           MSG4  DC     AWAS                                   30F07530
0877 1 0A05                 DC     ADSWO                                  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     ALVO                                   30F07660
0884 0 0000           M     DC     *-*                                    30F07670
0885 0 0000           ERR5S DC     *-*      MULTI LINE CONTROL WORD       30F07680
                      *                     ERR5 SW                        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
                           BSS  E  1                                      30F08040
089C    0001          TABLE DC     *-*      MESSAGE NUMBER                 30F08050
089D 0 0000                 DC     /1C00    HEX/DECIMAL SW                 30F08060
089E 0 1C00                 DC     *-*      DATA WORD ID                   30F08070
089F 0 0000           AMSG  DC     *-*      ALPHA ADDRS 1                  30F08080
08A0 0 0000                 DC     *-*      ALPHA ADDRS 2                  30F08090
08A1 0 0000                 *                                             30F08100
                      DSW   DC     *-*      STATIC DSW WAS                 30F08110
08A2 0 0000           ZERO  DC     /0000     S/B                           30F08120
08A3 0 0000           BDSW  DC     *-*      BUSY DSW WAS                   30F08130
08A4 0 0000                 DC     /0003     S/B                           30F08140
08A5 0 0003           DSWO  DC     *-*      INT 0 DSW WAS                  30F08150
08A6 0 0000           DSWSB DC     *-*       S/B                           30F08160
08A7 0 0000           DSW4  DC     *-*      INT 4 DSW WAS                  30F08170
08A8 0 0000                 DC     *-*       S/B                           30F08180
08A9 0 0000
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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
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                           *                                              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          SNRSO 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     SNRSO-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
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0932 0 08D1                *
0933 1 7401 0904 CKRDR XIO      READ        READ COMMAND                30F09550
0935 1 4C80 0911       MDX   L  READ,1      INCREASE RD ADDR            30F09560
                       BSC   I  INTR0                                   30F09570
                       *                                                30F09580
                       ********************************************     30F09590
                       *            INTRPT 4 SERVICE ROUTINE          30F09600
                       ********************************************     30F09610
                       *                                                30F09620
0937 0 0000            INTR4 DC       *-*                               30F09630
0938 0 08D1                  XIO      SNRS4-1     SENSE DSW              30F09640
0939 0 1000                  NOP      0           USE FOR TRAP           30F09650
                       *                                                30F09660
093A 1 D400 08A8             STO   L  DSW4        SAVE DSW BITS          30F09670
093C 1 6700 08E4             LDX   L3 RTRN                               30F09680
093E 1 6F00 05E6             STX   L3 MLSCF&1     SET FOR RETURN         30F09690
0940 1 4C80 0937             BSC   I  INTR4                              30F09700
                       *                                                30F09710
                       ********************************************     30F09720
                       *            CHECK READY                       30F09730
                       ********************************************     30F09740
                       *                                                30F09750
0942 0 0000            READY DC       *-*                               30F09760
0943 0 08C2                  XIO      SENSE       SENSE DSW              30F09770
0944 1 D400 08A2             STO   L  DSW         STORE DSW              30F09780
0946 1 4C98 0942             BSC   I  READY,&-    NO BITS FOUND          30F09790
0948 0 1801                  SRA      1           REMOVE NRDY            30F09800
0949 1 4420 0807             BSI   L  ERR1,Z      BR IF OTHER THAN NRDY  30F09810
                       *                                                30F09820
094B 0 1011            BOX   SLA      17                                30F09830
094C 0 D011                  STO      BCNT        RESET BOX CNT          30F09840
                       *                                                30F09850
094D 1 6500 0953       BOX1  LDX   L1 BOX2        LD REENTRY ADDRS       30F09860
094F 1 6D00 05E6             STX   L1 MLSCF&1     SET MLSCF              30F09870
0951 1 4C00 08DA             BSC   L  WAIT4       GO TO MONITOR          30F09880
                       *                                                30F09890
0953 0 08B2            BOX2  XIO      SENSE       SENSE DSW              30F09900
0954 1 4C98 0942             BSC   I  READY,&-    RETURN IF READY        30F09910
0956 1 7403 095E             MDX   L  BCNT,3                             30F09920
0958 0 70F4                  MDX      BOX1                               30F09930
                       *                                                30F09940
0959 0 6105            NRDY  LDX    1 5           MESSAGE NUMBER         30F09950
095A 1 6700 09DF             LDX   L3 ANRDY       NOT READY              30F09960
095C 0 400A                  BSI      TYPE        PRINT MESSAGE          30F09970
095D 0 70ED                  MDX      BOX                                30F09980
                       *                                                30F09990
095E 0 0000            BCNT  DC       *-*                               30F10000
                       *                                                30F10010
                       ********************************************     30F10020
                       *            FEED LAST CARD                    30F10030
                       ********************************************     30F10040
                       *                                                30F10050
095F 1 0C00 0784       LSTCD XIO   L  FDACD-1      FEED COMMAND           30F10060
0961 0 6106                  LDX    1 6           MESSAGE NUMBER         30F10070
0962 1 6700 09FF             LDX   L3 ALCD        LAST CARD              30F10080
0964 0 4002                  BSI      TYPE        PRINT MESSAGE          30F10090
0965 1 4400 05F8             BSI   L  CNTRL       GO TO NEXT ROUTINE     30F10100
                       *                                                30F10110
                       ********************************************     30F10120
                       *            PRINT STATUS MESSAGE              30F10130
                       ********************************************     30F10140
                       *                                                30F10150
0967 0 0000            TYPE  DC       *-*                               30F10160
0968 0 6907                  STX    1 SMSG        NEW MSG NUMBER         30F10170
0969 0 6B09                  STX    3 ALPHA       UPDATE MESSAGE         30F10180
                       *                                                30F10190
096A 0 4480 0163             BSI   I  LOG         CALL ON LOG            30F10200
096C 1 0970                  DC       SMSG        ADDR OF MSG            30F10210
                                                                         30F10220
```



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                       *                                                30F10230
096D 0 D006                  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
```

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09A5 0 2176          DC    /2176     NO INTRPT                30F10910
09A6 0 5221          DC    /5221                              30F10920
09A7 0 2276          DC    /2276                              30F10930
09A8 0 9E62          DC    /9E62                              30F10940
09A9 0 569E          DC    /569E                              30F10950
09AA 0 FFFF          DC    /FFFF                              30F10960
                     *                                        30F10970
09AB 0 2184    ALV4  DC    /2184     -LEV4                    30F10980
09AC 0 5E36          DC    /5E36                              30F10990
09AD 0 B6F0          DC    /B6F0                              30F11000
09AE 0 FFFF          DC    /FFFF                              30F11010
                     *                                        30F11020
09AF 0 2184    ALV0  DC    /2184     -LEV0                    30F11030
09B0 0 5E36          DC    /5E36                              30F11040
09B1 0 B6C4          DC    /B6C4                              30F11050
09B2 0 FFFF          DC    /FFFF                              30F11060
                     *                                        30F11070
09B3 0 2184    APCK  DC    /2184     PCH CK                   30F11080
09B4 0 56B2          DC    /56B2                              30F11090
09B5 0 761E          DC    /761E                              30F11100
09B6 0 2621          DC    /2621                              30F11110
09B7 0 1E5A          DC    /1E5A                              30F11120
09B8 0 FFFF          DC    /FFFF                              30F11130
                     *                                        30F11140
09B9 0 2184    AECK  DC    /2184     ERR CK                   30F11150
09BA 0 3662          DC    /3662                              30F11160
09BB 0 6221          DC    /6221                              30F11170
09BC 0 1E5A          DC    /1E5A                              30F11180
09BD 0 FFFF          DC    /FFFF                              30F11190
                     *                                        30F11200
09BE 0 2184    ACCNT DC    /2184     COL CNT ER               30F11210
09BF 0 1E52          DC    /1E52                              30F11220
09C0 0 5E21          DC    /5E21                              30F11230
09C1 0 1E76          DC    /1E76                              30F11240
09C2 0 9E21          DC    /9E21                              30F11250
09C3 0 3662          DC    /3662                              30F11260
09C4 0 FFFF          DC    /FFFF                              30F11270
                     *                                        30F11280
09C5 0 2121    ADATA DC    /2121     COL   DATA ERR           30F11290
09C6 0 1E52          DC    /1E52                              30F11300
09C7 0 5E21          DC    /5E21                              30F11310
09C8 0 2121          DC    /2121                              30F11320
09C9 0 2184          DC    /2184                              30F11330
09CA 0 323E          DC    /323E                              30F11340
09CB 0 9E3E          DC    /9E3E                              30F11350
09CC 0 2136          DC    /2136                              30F11360
09CD 0 6262          DC    /6262                              30F11370
09CE 0 FFFF          DC    /FFFF                              30F11380
                     *                                        30F11390
09CF 0 095E    ALOP  DC    /095E     LAST OP-                 30F11400
09D0 0 3E9A          DC    /3E9A                              30F11410
09D1 0 9E21          DC    /9E21                              30F11420
09D2 0 5256          DC    /5256                              30F11430
09D3 0 8421          DC    /8421                              30F11440
09D4 0 FFFF          DC    /FFFF                              30F11450
                     *                                        30F11460
09D5 0 6236    ARD   DC    /6236     READ                     30F11470
09D6 0 3E32          DC    /3E32                              30F11480
09D7 0 FFFF          DC    /FFFF                              30F11490
                     *                                        30F11500
09D8 0 56B2    APCH  DC    /56B2     PUNCH                    30F11510
09D9 0 761E          DC    /761E                              30F11520
09DA 0 2600          DC    /2600                              30F11530
09DB 0 FFFF          DC    /FFFF                              30F11540
                     *                                        30F11550
09DC 0 1236    AFD   DC    /1236     FEED                     30F11560
09DD 0 3632          DC    /3632                              30F11570
09DE 0 FFFF          DC    /FFFF                              30F11580
```



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                     *                                        30F11590
09DF 0 7662    ANRDY DC    /7662     NRDY - PRESS 1442 START  30F11600
09E0 0 32A6          DC    /32A6                              30F11610
09E1 0 2184          DC    /2184                              30F11620
09E2 0 5662          DC    /5662                              30F11630
09E3 0 369A          DC    /369A                              30F11640
09E4 0 9A21          DC    /9A21                              30F11650
09E5 0 FCF0          DC    /FCF0                              30F11660
09E6 0 F0D8          DC    /F0D8                              30F11670
09E7 0 219A          DC    /219A                              30F11680
09E8 0 9E3E          DC    /9E3E                              30F11690
09E9 0 629E          DC    /629E                              30F11700
09EA 0 FFFF          DC    /FFFF                              30F11710
                     *                                        30F11720
09EB 0 5E32    ALDBK DC    /5E32     LOAD BLANKS              30F11730
09EC 0 2100          DC    /2100                              30F11740
09ED 0 1A5E          DC    /1A5E                              30F11750
09EE 0 3E76          DC    /3E76                              30F11760
09EF 0 5A9A          DC    /5A9A                              30F11770
09F0 0 FFFF          DC    /FFFF                              30F11780
                     *                                        30F11790
09F1 0 5E32    ANYP  DC    /5E32     LD ANY PATTERN PLUS BLANKS 30F11800
09F2 0 213E          DC    /213E                              30F11810
09F3 0 76A6          DC    /76A6                              30F11820
09F4 0 2156          DC    /2156                              30F11830
09F5 0 3E9E          DC    /3E9E                              30F11840
09F6 0 9E36          DC    /9E36                              30F11850
09F7 0 6276          DC    /6276                              30F11860
09F8 0 2156          DC    /2156                              30F11870
09F9 0 5EB2          DC    /5EB2                              30F11880
09FA 0 9A21          DC    /9A21                              30F11890
09FB 0 1A5E          DC    /1A5E                              30F11900
09FC 0 3E76          DC    /3E76                              30F11910
09FD 0 5A9A          DC    /5A9A                              30F11920
09FE 0 FFFF          DC    /FFFF                              30F11930
                     *                                        30F11940
09FF 0 5E3E    ALCD  DC    /5E3E     LAST CARD                30F11950
0A00 0 9A9E          DC    /9A9E                              30F11960
0A01 0 211E          DC    /211E                              30F11970
0A02 0 3E62          DC    /3E62                              30F11980
0A03 0 3200          DC    /3200                              30F11990
0A04 0 FFFF          DC    /FFFF                              30F12000
                     *                                        30F12010
0A05 0 2184    ADSWO DC    /2184     -LEVO DSW ERR            30F12020
0A06 0 5E36          DC    /5E36                              30F12030
0A07 0 B6C4          DC    /B6C4                              30F12040
0A08 0 2132          DC    /2132                              30F12050
0A09 0 9A92          DC    /9A92                              30F12060
0A0A 0 2136          DC    /2136                              30F12070
0A0B 0 6262          DC    /6262                              30F12080
0A0C 0 FFFF          DC    /FFFF                              30F12090
                     *                                        30F12100
0A0D 0 5E32    ASTOH DC    /5E32     LOAD FROM STK 2          30F12110
0A0E 0 2112          DC    /2112                              30F12120
0A0F 0 6252          DC    /6252                              30F12130
0A10 0 7221          DC    /7221                              30F12140
0A11 0 9A9E          DC    /9A9E                              30F12150
0A12 0 5A21          DC    /5A21                              30F12160
0A13 0 D821          DC    /D821                              30F12170
0A14 0 FFFF          DC    /FFFF                              30F12180
                     *                                        30F12190
0A15 0 9A36    ASETP DC    /9A36     SET PATT IN SW 0-11      30F12200
0A16 0 9E21          DC    /9E21     T                        30F12210
0A17 0 563E          DC    /563E     PA                       30F12220
0A18 0 9E9E          DC    /9E9E     TT                       30F12230
0A19 0 2122          DC    /2122      I                       30F12240
0A1A 0 7621          DC    /7621     N                        30F12250
0A1B 0 9A92          DC    /9A92     SW                       30F12260
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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
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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
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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
ADSW0	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
ALV0	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
DSW0	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,069D,06D2,06E6,0707,0714,071A 0723,07B6,07D7,07E7,0904
RAREB	0AD4	06B4,06CE,074B,0753
RDRST	0787	077C
READ	0904	076D,0839,083B,0932,0933

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,0708
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

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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 OX 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 LOAD	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 ERRUR MESSAGES
- PP IS THE PID OF THE PROGRAM CAUSING THE MESSAGE
  - THIS WILL BE EITHER 00 FOR MESSAGES URIGINATED 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 UF 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 INFORMATIUN 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.

LAST OP - CCCC
E2F02 OOOR AAAA 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.

LAST OP - CCCC
E2F03 OOOR AAAA 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.

LAST OP - CCCC
E2F04 OOOR 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.

LAST OP - CCCC
E2F05 OOOR AAAA 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.

LAST OP - PUNCH
E2F06 OOOR AAAA 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.

LAST OP - CCCC
E2F07 OOOR AAAA 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.

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 E0F06 OR E0F07 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
*                                                                     32F00050
*  THIS ENGINEERING CHANGE REFLECTS MAJOR                             32F00060
*  CHANGES TO THE DIAGNOSTIC MONITOR.  PREVIOUS                       32F00070
*  TESTS WILL NOT RUN WITH DIAGNOSTIC MONITOR II.                     32F00080
*                                                                     32F00090
*  THIS TEST WILL NOT RUN WITH PREVIOUS MONITORS.                     32F00100
*                                                                     32F00110
*  TESTS PRIOR TO EC 419643 DATED NOV 15, 1966                        32F00120
*  WILL NOT OPERATE PROPERLY WITH DIAGNOSTIC                          32F00130
*  MONITOR II.                                                        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 ILO      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 09B5        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
```

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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
```



```
                          *-------------------------------------------   32F02070
0677 1 0686          RTTBL DC     TST01       DELAY PUNCH DATA           32F02080
0678 1 06E7               DC      TST02       READ AND COMPARE           32F02090
0679 1 0721               DC      TST03       GRAPH PUNCH TIME           32F02100
067A 1 073C          NRTN DC      TST04       GRAPH READ TIME            32F02110
067B 1 0752          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                                     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 FACTUR     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
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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,GZ    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
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                        *                                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
                              BSS  E                                                32F04740
0760    0000            STRD  DC      *-*                                         32F04750
0760 0 0000                   DC      /1404      START READ IOCC                  32F04760
0761 0 1404             STPCH DC      *-*                                         32F04770
0762 0 0000                   DC      /1401      START PUNCH IOCC                 32F04780
0763 0 1401
```



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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
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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
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                          *                                               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  ERR0,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
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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       BSI   L ETYPE      PRINT ERR MSG               32F07480
086B 1 4C80 0856 ERR5R BSC   I ERR5                                   32F07490
                 *                                                    32F07500
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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 ; R1  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
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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
08CE   0000                BSS  E                                      32F08310
08CE 1 0A04          MSG0  DC      ACNBK     CARD NOT BLANK            32F08320
08CF 0 0000                DC      /0000                               32F08330
08D0 1 0A0C          MSG1  DC      AWAS      STATIC DSW ERROR          32F08340
08D1 1 0A1B                DC      ASDSW                               32F08350
08D2 1 0A0C          MSG2  DC      AWAS      BUSY DSW ERROR            32F08360
08D3 1 0A24                DC      ABDSW                               32F08370
08D4 1 0A18          MSG3  DC      ADSW      NO INTERRUPT              32F08380
08D5 1 0A34                DC      ANINT                               32F08390
08D6 1 0A0C          MSG5  DC      AWAS      LEVEL 4  DSW ERROR        32F08400
08D7 1 0A2C                DC      ADSW4                               32F08410
08D8 1 0A0C          MSG6  DC      AWAS      PUNCH CHECK               32F08420
08D9 1 0A3A                DC      APCK                                32F08430
08DA 1 0A0C          MSG7  DC      AWAS      ERROR CHECK               32F08440
08DB 1 0A40                DC      AECK                                32F08450
08DC 1 0A11          MSG8  DC      ADWAS     COLUMN COUNT ERROR        32F08460
08DD 1 0A45                DC      ACCNT                               32F08470
08DE 1 0A0C          MSG9  DC      AWAS      COLUMN DATA ERROR         32F08480
08DF 1 0A4C                DC      ADATA                               32F08490
08E0 1 0A7E          MSG10 DC      ATL       COL INTRPT SLOW           32F08500
08E1 0 0000                DC      /0000                               32F08510
08E2 1 0A8E          MSG11 DC      ATS       COL INTRPT FAST           32F08520
08E3 0 0000                DC      /0000                               32F08530
                           *                                           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 IN32F08690
                           *     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 0BC7           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
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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 WILL32F09270
                           *     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
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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
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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  RUCOL,&     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
```

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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
```



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                   *     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
```

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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
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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
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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
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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
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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
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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	06E8
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
CKBO1	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,06BA
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,09C8
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	0668,0675,0676
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

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TST03   0721  0679
TST04   073C  067A
TST05   0752  067B
TWO     09F1  09E6
TYAVG   07C6  06DB,071E,07C0,07D5,09ED
TYP     0650  060F
TYPE    09F2  0601,0689,06C3,06ED,0724,0743,07D0,09D3,09DE,09F9
T010    0690  06E0
T011    0693  069D
T012    069E  06DF
T013    06A1  06D5
T014    06C7  06A0,06AE,06D1,06D3
T021    06F4  0720
T022    06F7  0718
T023    06FD  06F6,070E,0714,0716
T024    0710
T031    072A  072D
T032    0732  073B
T041    0748  0751
T051    0755  075A
WAIT    0919  0778,0791,093A,095B
WAIT1   0924  092F
WAIT2   0929
WAIT3   092D  0924
WAIT4   093E  0928,09C8
WCNT    0948  0921,092D

END OF ASSEMBLY
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