CD11

CARD READER DIAGNOSTIC
MD-11-DZCDA-C

EP-DZCDA-C-DL-A

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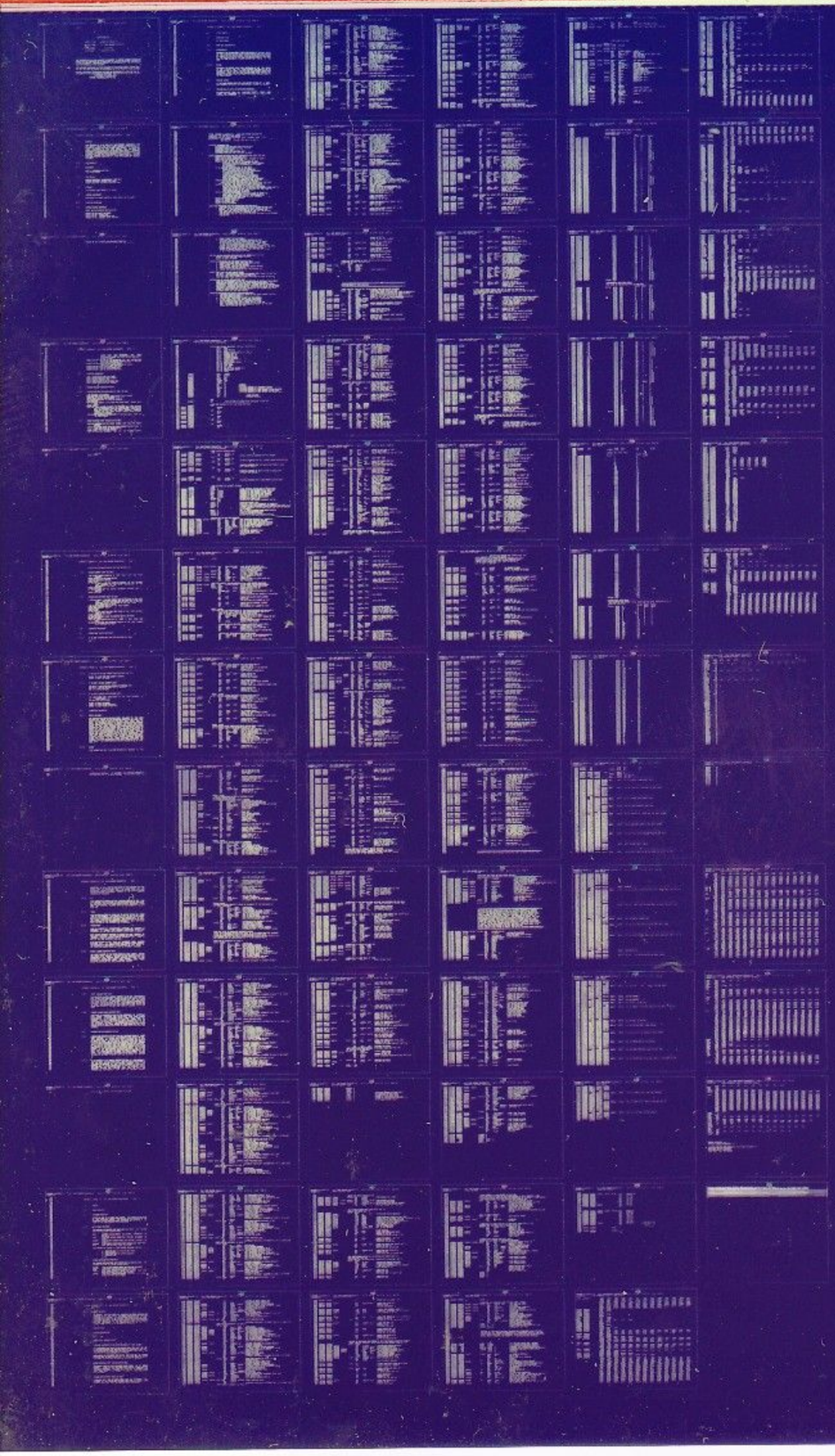
MADE IN USA



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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZCDA-C-D

PRODUCT NAME: CD11 CARD READER DIAGNOSTIC

DATE RELEASED: 21-JAN-76

MAINTAINER: DIAGNOSTIC GROUP

1.0 ABSTRACT

THIS PROGRAM IS TO BE USED AS A CARD READER DIAGNOSTIC FOR THE PDP-11 WITH THE CD11 CARD READER INTERFACE TO THE DOCUMATION M1000 OR M1200 PUNCHED CARD READER. IT TESTS ALL LOGIC FUNCTIONS OF THE CARD READER, AND INCLUDES AN EXERCISER FOR ALPHANUMERIC AND BINARY TEST DECKS. SEPARATE STARTING ADDRESSES ALLOW THE ERROR SENSING FUNCTIONS OF THE DOCUMATION M 1000 AND M1200 READER TO BE CHECKED. ANOTHER STARTING ADDRESS TESTS SPECIAL DECKS WHICH HAVE ALL COLUMNS AND CARDS PUNCHED IDENTICALLY, TO AID IN DIAGNOSING SPECIAL PROBLEMS.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-11/ STANDARD COMPUTERS
CD11 CARD READER

2.2 TEST DECKS

MAINDEC-89-D2A1-C ALPHANUMERIC TEST DECK
MAINDEC-89-D2A2-C BINARY TEST DECK
SPARE CARDS FOR THE ERROR FUNCTION TEST

2.3 STORAGE

THE ROUTINE USES MEMORY 0 TO 16100.

3.0 LOADING PROCEDURE

PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.

4.0 STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

BASIC SWITCH REGISTER SETTINGS ARE:

SW15=1 OR UP---HALT ON ERROR
SW14=1 OR UP---SCOPE LOOP
SW13=1 OR UP---INHIBIT PRINT OUT
SW12=1 OR UP---INHIBIT TRACE TRAPPING

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                                SW11=1 OR UP---INHIBIT SUB-PROGRAM ITERATION
                                SW07=1 OR UP---LOOP THRU THE INSTRUCTION TEST PORTION
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(NOTE THAT THE PROCESSOR MAY HANG LEGITIMATELY WHEN THE INPUT HOPPER GOES EMPTY IF SW7 IS SET)

SW06=1 OR UP---RETURN TO THE BEGINNING OF THE INSTRUCTION TEST WHEN CONTINUING FROM ONE DECK TO ANOTHER

SW05=1 OR UP---HALT BETWEEN TEST DECKS (SEE 5.2.1 FOR EXPLANATION OF SW5=0)

SW04=1 OR UP---RUN THE BINARY TEST DECK

SW03=1 OR UP---RUN IN IMAGE MODE ONLY

SW02=1 OR UP---RUN IN PACKING MODE ONLY

4.2 STARTING ADDRESSES

200 = INSTRUCTION AND DATA TEST
210 = ERROR FUNCTION TEST (M1000)
220 = SINGLE SUBTEST LOOP
240 = READ SINGLE DATA PATTERN TEST
250 = ERROR FUNCTION TEST (M1200)

4.3 PROGRAM AND/OR OPERATOR ACTION

4.3.1 INSTRUCTION AND DATA RELIABILITY TEST (SA 200)

LOAD PROGRAM INTO MEMORY.
LOAD ONE TEST DECK IN THE CARD READER INPUT HOPPER.
PRESS RESET ON THE CARD READER.
SET SWITCH REGISTER TO STARTING ADDRESS.
LOAD ADDRESS.
SET SWITCHES (SEE 4.1)-ALL DOWN FOR WORST CASE, ALPHA TEST DECK.
PRESS START.
WHEN THE INPUT HOPPER IS EMPTY THE PROGRAM WILL HANG WAITING FOR AN INTERRUPT FROM THE CARD READER. LOAD ONE OR MORE TEST DECKS INTO THE INPUT HOPPER. PRESSING "RESET" ON THE CARD READER SHOULD CAUSE PROGRAM EXECUTION TO RESUME.
THIS ENTIRE SEQUENCE IS NECESSARY TO RUN THE FULL TEST ON THE CARD READER.

4.3.2 ERROR FUNCTION TEST (SA 210 OR SA 250)

STARTING ADDRESS 210 FOR M1000 READER AND 250 FOR M1200 READER.
LOAD A FEW SPARE CARDS INTO THE INPUT HOPPER (DO NOT LOAD A TEST DECK-THIS IS DESTRUCTIVE!)
PRESS "RESET" ON THE CARD READER.
LOAD THE STARTING ADDRESS, THEN SET THE DESIRED SWITCH

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149                                                    OPTIONS.
150                                            PRESS START.
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FOLLOW THE INSTRUCTIONS AS THEY ARE PRINTED OUT.

4.3.3 SINGLE SUBTEST LOOP (SA 220)

LOAD CARDS (SPARE CARDS OR A TEST DECK) INTO THE INPUT HOPPER.
PRESS "RESET" ON THE CARD READER.
LOAD THE STARTING ADDRESS.
PRESS START.
AT THE 1ST HALT; LOAD THE STARTING ADDRESS OF THE DESIRED TEST (ADDRESS OF THE SCOPE INSTRUCTION AT THE BEGINNING OF THE TEST.)
PRESS CONTINUE.
AT THE 2ND HALT SET THE SWITCH REGISTER OPTIONS (BIT 11 MUST=0).
PRESS CONTINUE.

4.3.4 SINGLE DATA PATTERN TEST (SA 240)

A SPECIAL DECK (1 OR MORE CARDS) MUST BE PUNCHED TO RUN THIS TEST. ANY DATA PATTERN MAY BE USED, BUT IT MUST BE IDENTICAL IN ALL 80 COLUMNS OF ALL THE CARDS (I.E. ONLY ONE PIECE OF DATA).
LOAD THIS PREPARED DECK INTO THE INPUT HOPPER.
PRESS CARD READER "RESET".
LOAD SA 240.
PRESS START.
AT THE INITIAL HALT SET THE CARD IMAGE OF THE DATA PATTERN USED IN SW11-SW00.
PRESS CONTINUE.
ON THE SECOND HALT LOAD THE DESIRED SWITCH SETTINGS.
PRESS CONTINUE.
WHEN THE CARD READER RUNS OUT OF CARDS IT WILL RING THE BELL.
RELOADING THE DECK AND PRESSING "RESET" ON THE CARD READER WILL CONTINUE THE TEST.

5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

5.1.1 AT SA 200 (INSTRUCTION AND DATA RELIABILITY TEST)

SEE 4.1

5.1.2 AT SA 210 OR SA 250 (ERROR FUNCTION TEST FOR CD11)

SW14=1 TO LOOP THRU THE CURRENT SUBTEST
SW15=1 TO HALT ON ERROR

5.1.3 AT SA 220 (SINGLE SUBTEST LOOP)

1ST HALT - LOAD STARTING ADDRESS OF DESIRED TEST
2ND HALT - SET SR OPTIONS (BIT 11 MUST=0)
SEE 4.1 FOR SR OPTIONS

5.1.4 AT SA 240 (SINGLE DATA PATTERN TEST)

1ST HALT-LOAD THE CARD-IMAGE OF THE DATA PATTERN IN SW11-SW00.
2ND HALT-SET SR OPTIONS.

SW15=1 TO HALT ON ERROR
SW03=1 TO TEST IMAGE MODE ONLY
SW02=1 TO TEST PACKING MODE ONLY

5.2 SUBROUTINE ABSTRACTS

5.2.1 BEGIN (SA 200)

THE INSTRUCTION TESTS ARE RUN FIRST, FOLLOWED BY THE DATA RELIABILITY TESTS ON THE REMAINING CARDS IN THE FIRST TEST DECK. AT THE END OF THE DECK THE BELL WILL RING, AND IF SW5=1 THE PROGRAM HALTS. IF SW5=0, PROGRAM ACTION DEPENDS ON THE NUMBER OF TEST DECKS LOADED. IF THERE ARE STILL CARDS IN THE INPUT HOPPER, THE PROGRAM WILL RUN THE DATA RELIABILITY TEST ON THE ENTIRE DECK. IF THE INPUT HOPPER IS EMPTY AT THE END OF A DECK, THE PROGRAM WILL RUN A SET OF TESTS OF OFF-LINE OPERATIONS. AT THE END OF THESE TESTS, IT WAITS FOR THE CARD READER TO BE PUT BACK ON-LINE. FURTHER CHECKS ARE MADE OF THE OFF-LINE TO ON-LINE OPERATIONS, AND THEN THE DATA RELIABILITY TEST IS RUN ON THE ENTIRE DECK. IF SW5=1, HITTING CONTINUE WILL RESUME PROGRAM OPERATION AFTER THE HALT. IF ALL OTHER SWITCHES WERE DOWN, FOR EXAMPLE, THE DATA RELIABILITY TEST WOULD THEN BE RUN ON THE NEXT DECK. THE OTHER SWITCHES AFFECT PROGRAM FLOW AS NOTED IN 4.1.

5.2.2 SCOPE

THIS SUBROUTINE CALL IS PLACED BETWEEN EACH SUBTEST IN THE

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   261                                  INSTRUCTION  SECTION.   IT  RECORDS  THE STARTING ADDRESS OF
   262                                  EACH SUB-TEST AS IT IS BEING ENTERED.  IF A  SCOPE  LOOP  IS
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REQUESTED, IT WILL JUMP TO THE START OF THE SUBTEST THAT THE SCOPE LOOP IS REQUESTED FOR. IF SCOPE LOOP IS NOT REQUESTED, THERE WILL BE 1 ITERATION ON THAT SUBTEST BEFORE THE NEXT SUBTEST IS ENTERED. SWITCH 11 ON A 1 INHIBITS ITERATION OF SUBTESTS.

5.2.3 HLT

THIS SUBROUTINE PRINTS OUT THE LOCATION COUNTER AT THE TIME OF FAILURE. THE CONTENTS OF THE PROCESSOR STATUS REGISTER, AND THE CONTENTS OF THE CARD READER STATUS REGISTER. NOTE THAT THE LOCATION COUNTER WILL BE THE ADDRESS OF THE HLT PLUS TWO.

5.2.4 TTRAP

THIS ROUTINE ALLOWS THE TRACE BIT TO BE SET AFTER THE FIRST LOOP OF THE PROGRAM. THE TRACE BIT WILL BE SET ON ALTERNATE LOOPS OF THE INSTRUCTION AND DATA TEST UNLESS SW12 IS SET. THE FIRST INSTRUCTION EXECUTED UPON TRAPPING IS AN "RTI" WHICH RETURNS TO THE INTERRUPTED SEQUENCE. THIS CONTINUES UNTIL THE END OF THE PROGRAM LOOP IS REACHED.

5.2.5 TRAPCATCHER

THIS IS A SERIES OF INSTRUCTIONS STARTING AT LOCATION 0 DESIGNED TO DETECT AND ISOLATE UNEXPECTED TRAPS AND INTERRUPTS TO THE TRAP AND INTERRUPT VECTOR AREA OF MEMORY.

EACH VECTOR ENTRANCE ADDRESS IS LOADED WITH THE ADDRESS OF THE NEXT LOCATION. THE NEXT LOCATION IS LOADED WITH A HALT (000000). THUS AN ILLEGAL TRAP OR INTERRUPT WILL CAUSE A HALT AT THE TRAP LOCATION PLUS TWO.

IF A HALT OCCURS IN THE TRAP OR INTERRUPT AREA, EXAMINE REGISTER SIX. IT WILL CONTAIN THE CURRENT STACK ADDRESS. THE CONTENTS OF THE CURRENT STACK ADDRESS IS THE VALUE OF THE LOCATION COUNTER WHEN THE TRAP OR INTERRUPT OCCURRED.

5.2.6 ERCD11 (ERROR FUNCTION TEST)

THE FIRST SUBTEST OF THE ERROR FUNCTION TEST (TESTA) CHECKS THE DATA LATE ERROR. THE REST OF THE SUBTESTS CHECK THE OPERATION OF THE VARIOUS ERROR SENSING FEATURES OF THE DOCUMATION M1000 AND M1200 CARD READER. CARD READER OFF-LINE, INPUT HOPPER EMPTY, OUTPUT STACKER FULL, PICK ERROR, STACK ERROR, AND READ ERROR ARE CHECKED.

5.2.7 TESTX (SINGLE TEST LOOP)

THIS ROUTINE ALLOWS A SINGLE SUBTEST TO BE RUN CONTINUOUSLY FOR SCOPE LOOP PURPOSES. WHILE A SCOPE LOOP SWITCH OPTIONS EXISTS, IT REQUIRES THAT YOU ARE WITHIN THE TEST IN WHICH YOU WISH TO LOOP. IN SOME CASES (SUCH AS WITH INTERMITTENT FAILURES) THAT'S NOT EASY TO DO. THIS SUBROUTINE ALLOWS YOU TO LOAD THE ADDRESS OF ANY TEST FROM TEST1 THRU TEST22 AND TESTA THRU TESTH AT THE HALT AND THEN GO DIRECTLY TO THAT TEST.

5.2.8 CKSAME (SINGLE DATA PATTERN TEST)

THIS TEST IS DESIGNED TO AID IN THE DIAGNOSIS OF DIFFICULT DATA ERROR PROBLEMS AND FACILITATE SOME CARD READER ADJUSTMENTS. IT CONTINUOUSLY READS CARDS WHICH HAVE ALL COLUMNS PUNCHED IDENTICALLY (AND ALL CARDS MUST BE IDENTICAL), CHECKING THE DATA AGAINST A PATTERN SET UP ON THE SWITCHES INITIALLY. ANY ERRORS ARE PRINTED OUT, ALONG WITH A COUNT OF THE TOTAL NUMBER OF CARDS READ AND THE TOTAL NUMBER OF DATA ERRORS WHICH HAVE OCCURRED SINCE THE TEST WAS STARTED.

5.3 PROGRAM AND/OR OPERATOR ACTION

5.3.1 LOADING AND STARTING AT 200 WITH ALL SWITCHES DOWN IS WORST CASE TESTING. A SINGLE ALPHANUMERIC DECK SHOULD BE RUN. THIS EXECUTES AN INSTRUCTION TEST FOLLOWED BY A DATA RELIABILITY TEST. AT THE END OF THE DECK CHECKS ARE MADE OF THE FLAG SETTINGS WHICH SHOULD BE AFFECTED, AND THE PROGRAM WAITS FOR AN INTERRUPT FROM THE READER COMING BACK ON-LINE. AT THE END OF THE FIRST DECK THE OPERATOR SHOULD LOAD ONE OR MORE DECKS IN THE INPUT HOPPER AND PRESS "RESET" ON THE CARD READER. IF THE CARD READER IS WORKING PROPERLY, THE ENTIRE DECK WILL BE RUN THRU THE DATA RELIABILITY PORTION OF THE TEST. IF, AFTER READING BC CARDS, THE INPUT HOPPER IS NOT EMPTY, THE PROGRAM WILL CONTINUE TO THE NEXT DECK. SWITCH OPTIONS MAY BE USED TO ALTER THIS FLOW AS NOTED IN SECTION 4.1.

5.3.2 TO GO DIRECTLY TO A SINGLE SUBTEST AND RUN IT CONTINUOUSLY, USE SA 220. AT THE FIRST HALT, SET THE SWITCH REGISTER TO THE STARTING ADDRESS OF THE DESIRED SUBTEST (I.E. THE ADDRESS OF THE SCOPE INSTRUCTION AT THE START OF THE TEST), AND CONTINUE. AT THE SECOND HALT, SET THE DESIRED SWITCH REGISTER OPTIONS AND CONTINUE (SW11 MUST BE = 0). THE PROGRAM WILL CONTINUOUSLY LOOP THRU THE DESIRED SUBTEST

374 UNTIL SW11 IS SET OR THE PROCESSOR IS HALTED.

6.0 ERRORS

6.1 ERROR PRINTOUT

6.1.1 STANDARD PRINTOUT

PRINTOUTS ARE IN A THREE-WORD FORMAT. THE FIRST IS THE PC+2 OF THE DETECTED ERROR. THE SECOND IS THE CONTENTS OF THE PROCESSOR STATUS REGISTER WHEN THE ERROR WAS DETECTED. THE THIRD IS THE CARD READER STATUS REGISTER.

6.1.2 DATA ERROR PRINTOUT

THE HEADING IS PRINTED OUT ONCE PER TEST DECK. THE COLUMNS HAVE THE FOLLOWING SIGNIFICANCE:

DECK =EITHER ALPHANUMERIC OR BINARY, DEPENDING ON SWITCH 4
CARD =THE CARD NUMBER WHERE THE FAILURE OCCURRED (IN OCTAL)
COLUMN =THE COLUMN NUMBER WHERE THE FAILURE OCCURED (IN OCTAL)
PATTERN =THE CORRECT CARD DATA THAT SHOULD HAVE BEEN READ
READ =WHAT WAS ACTUALLY READ INTO CORE

DATA ERRORS NOT TRACED TO CARD READER HARDWARE INCLUDE:

A. SW04 NOT SET TO TYPE OF DECK USED
B. CARD MISSING
C. CARD DECK OUT OF PROPER SEQUENCE
D. DAMAGED CARD

6.1.3 SINGLE DATA PATTERN PRINTOUT

THE SINGLE DATA PATTERN TEST PRINTS OUT A HEADING ONCE. THE COLUMNS HAVE THE FOLLOWING SIGNIFICANCE:

COLUMN =THE COLUMN NUMBER WHERE THE FAILURE OCCURRED.
READ =DATA THAT WAS ACTUALLY READ INTO CORE
CARDS =THE TOTAL NUMBER OF CARDS (IN OCTAL) THAT HAVE BEEN RUN SINCE THE TEST WAS STARTED.
ERRORS =THE TOTAL NUMBER OF ERRORS DETECTED (IN OCTAL) SINCE THE TEST WAS STARTED.

6.2 ERROR RECOVERY

IN GENERAL, TEST FAILURES WILL PRINTOUT AN ERROR MESSAGE AND CONTINUE. IF THE "HALT ON ERROR" SWITCH IS SET, HITTING CONTINUE WILL RECOVER. IF THE PROGRAM HANGS UP IN A LOOP, THE ERROR IS LIKELY TO BE A SIGNAL WHICH WAS NEVER RECEIVED. IF A HALT OCCURS IN THE TRAP AND VECTOR AREA THE PROGRAM MUST BE RESTARTED. IF THE PROGRAM HALTS IN THE MAIN FLOW, CONSULT THE LISTING IF NO MESSAGE IS TYPED OUT.

7.0 RESTRICTIONS

7.1 STARTING PROCEDURE

NONE

7.2 OPERATIONAL RESTRICTIONS

7.2.1 COMBINED INSTRUCTION AND DATA RELIABILITY TEST (SA200)

IF A STANDARD TEST DECK IS NOT BEING USED, SW7 MUST BE SET TO INHIBIT RUNNING THE DATA RELIABILITY PORTION OF THE TEST. THE PROCESSOR MAY HANG WHEN THE INPUT HOPPER GOES EMPTY, AND THIS IS NOT TO BE REGARDED AS A FAILURE.

WHEN USING THE STANDARD TEST DECKS, THEY MUST BE IN PROPER SEQUENCE AND IN GOOD CONDITION. IT IS A GOOD IDEA TO NUMBER THE CARDS IN EACH DECK AS SOON AS THE DECK IS RECEIVED.

7.2.2 ERROR FUNCTION TEST (SA 210 OR SA 250)

THE ERROR FUNCTION TEST REQUIRES SPARE CARDS, AS IT BENDS SEVERAL. ALSO, TO RUN THE DARK-LIGHT CHECK, A CARD MUST BE SPECIALLY PREPARED. THE TEST WILL TYPE OUT A REQUEST FOR THAT CARD WHEN IT IS NEEDED. TO MAKE IT, TEAR ONE CORNER OFF ONE CARD.

7.2.3 SINGLE DATA PATTERN TEST (SA 240)

A SPECIAL DECK (ONE OR MORE CARDS) MUST BE PREPARED. ALL COLUMNS OF ALL CARDS ARE PUNCHED IDENTICALLY, USING A DATA PATTERN WHICH WILL TEST THE PROBLEM BEING DIAGNOSED.

8.0 MISCELLANEOUS

8.1 EXECUTION TIME

NOT APPLICABLE

8.2 CARD DECK DESCRIPTION

8.2.1 ALPHANUMERIC

REFERENCE THE ALPHANUMERIC TABLE BEGINNING AT THE TAG ALPCD IN THE LISTING FOR THE IMAGE CODES PUNCHED FOR EACH OF THE 80 COLUMNS OF THE FIRST CARD. THIS IS FOLLOWED BY THE TABLE OF THE PACKED FORM OF THE EACH SUCCESSIVE CARD IN THE DECK USES THE SAME SEQUENCE OF CODES ROTATED ONE COLUMN TO THE LEFT.

8.2.2 BINARY

REFERENCE THE BINARY DATA TABLE BEGINNING AT THE TAG BINCD IN THE LISTING FOR THE CODES PUNCHED FOR EACH OF THE 80 COLUMNS OF THE 1ST CARD. AS WITH THE ALPHANUMERIC DECK EACH SUCCESSIVE CARD HAS THE SAME SEQUENCE OF CODES ROTATED ONE COLUMN TO THE LEFT, AND THE TABLE FOR PACKED DATA FOLLOWS IN THE SAME FASHION.

8.3 SPECIAL NOTES

IF THE CARD READER GOES OFF-LINE BEFORE THE END OF A CARD, BUSY REMAINS SET UNTIL THE CARD ACTUALLY CLEARS THE READER.

8.4 TESTING CD11'S WITH NON-STANDARD ADDRESSES

BY SUBSTITUTING INTO THE LOCATIONS "CDST", "CDCC", AND "CDBA" THE ADDRESSES OF THESE REGISTERS OF A CARD READER ASSIGNED NON-STANDARD

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                        .TITLE  MAINDEC-11-DZCDA-C-D    CD11 CARD READER DIAGNOSTICS
                        ;DIAGNOSTIC FOR THE CD11 CARD READER
                        ;COPYRIGHT 1973 BY DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                        ;PROGRAMMER:  KEN CHAPMAN
                        ;             SUB MALLICK  (CHANGED FROM REV A TO REV B )


                        ;STARTING ADDRESSES ARE:
                        ;       200=INSTRUCTION AND DATA TEST FOR THE CD11
                        ;       210=ERROR FUNCTION TEST OF CD11 (M-1000)
                        ;       220=SINGLE TEST LOOP
                        ;       240=READ SINGLE DATA PATTERN TEST
                        ;       250=ERROR FUNCTION TEST FOR CD11 (M-1200)

                        ;SWITCH REGISTER SETTINGS FOR THE INSTRUCTION AND DATA TEST ARE:
                        ;       SW02=1 RUN IN DATA IMAGE MODE ONLY
                        ;       SW03=1 RUN IN DATA PACKING MODE ONLY (IGNORED IF SW02=1)
                        ;       SW04=1 FOR THE BINARY TEST DECK
                        ;       SW05=1 TO HALT AT THE END OF A STANDARD 80 CARD
                        ;              TEST DECK.(HITTING CONTINUE WILL START TESTING
                        ;              OF THE NEXT DECK IN ACCORDANCE WITH CURRENT
                        ;              SWR SETTINGS).
                        ;       =0 TO CONTINUE FROM ONE DECK TO THE NEXT.
                        ;              AFTER THE LAST DECK IN THE HOPPER IS
                        ;              RUN, THE PROGRAM WAITS FOR THE CARD READER
                        ;              TO COME BACK ON-LINE,AND RUNS THRU
                        ;              A SERIES OF CHECKS OF OFF-LINE AND
                        ;              COMING ON-LINE OPERATIONS OF THE READER.
                        ;              WHEN THE READER IS BACK ON-LINE AND THE
                        ;              CHECKS ARE COMPLETE, THE DATA TEST IS RESUMED.
                        ;       SW06=1 TO RUN THE COMBINED INSTRUCTION AND DATA TEST
                        ;              WHEN CONTINUING FROM ONE DECK TO THE NEXT
                        ;           =0 TO RUN ONLY THE DATA TEST ON EVERY DECK AFTER THE FIRST
                        ;       SW07=1 TO RUN ONLY THE INSTRUCTION TEST CONTINUALLY.
                        ;              SETTING SW06 AND SW07 AT THE END OF A DECK WILL
                        ;              CAUSE THE INSTRUCTION TEST TO BE RUN CONTINUOUSLY FROM THEN ON
                        ;              (NOTE THAT IF SW7 IS SET, THE PROGRAM MAY HANG WHEN THE
                        ;              CARD READER RUNS OUT OF CARDS)
                        ;       SW11=1 TO INHIBIT SUBPROGRAM ITERATION
                        ;              (NOTE THAT IF PROGRAM FLOW IS ALLOWED TO ENTER THE
                        ;              DATA SUBTEST WHEN SW11 IS SET, DATA ERRORS WILL
                        ;              OCCUR SINCE THE CARD COUNT WILL BE INCORRECT.)
                        ;       SW12=1 TO INHIBIT TRACE TRAPPING
                        ;       SW13=1 TO INHIBIT PRINTOUT
                        ;       SW14=1 FOR SCOPE LOOP
                        ;       SW15=1 TO HALT ON ERROR

                        ;OPERATING PROCEDURE FOR THE INSTRUCTION AND DATA TEST:
                        ;       1.  LOAD TEST DECK IN CARD READER AND PRESS "START" ON THE CARD
                        ;           READER.  IF THE DECK BEING USED IS NOT A STANDARD TEST
                        ;           DECK, ONLY THE INSTRUCTION PORTION OF THE TEST CAN BE RUN.
                        ;           (SW7 MUST BE SET TO ONE TO INDICATE THIS).
                        ;       2.  LOAD SA 200, THEN SET THE SWITCH REGISTER SWITCHES TO THE DESIRED
                        ;           COMBINATION
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587                             ;       3.  PRESS "START" ON THE CONSOLE
588                             ;       4.  NOTE THAT RUNNING THE COMPLETE INSTRUCTION TEST
589                             ;           REQUIRES THAT THE INPUT HOPPER MUST RUN OUT OF CARDS
590                             ;           AT THE END OF A TEST DECK AT LEAST ONCE.  WHEN THIS
591                             ;           OCCURS, THE PROCESSOR SHOULD CONTINUE TO RUN.  LOADING
592                             ;           A DECK INTO THE INPUT HOPPER AND PRESSING "START" ON THE CARD
593                             ;           READER SHOULD CAUSE THE BELL TO RING AND THE CARD
594                             ;           READER TO RESUME READING CARDS.  IF THIS DOES NOT OCCUR,
595                             ;           IT IS A FAULT AND SHOULD BE FIXED.
596
597
598                             ;SPECIAL SWITCH REGISTER SETTINGS FOR THE ERROR FUNCTION TEST:
599                             ;       SW14=1 TO LOOP THRU THE CURRENT SUBTEST
600                             ;       SW15=1 TO HALT ON ERROR
601
602                             ;OPERATING PROCEDURE FOR THE ERROR FUNCTION TEST:
603                             ;       1.  LOAD A FEW SPARE CARDS INTO THE INPUT HOPPER.
604                             ;       2.  PRESS "START" ON THE CARD READER.
605                             ;       3.  LOAD THE SA, THEN SET THE DESIRED SWITCH OPTIONS.
606                             ;       4.  PRESS "START" ON THE CONSOLE.
607                             ;       5.  FOLLOW THE INSTRUCTIONS AS THEY ARE PRINTED OUT.
608
609                             ;SINGLE TEST LOOP (SA 220) HALTS TWICE!
610                             ;       1ST HALT - LOAD STARTING ADDRESS OF DESIRED TEST (TEST1 TO TEST 24)
611                             ;       2ND HALT - SET SWR OPTIONS (BIT 11 MUST = 0)
612                             ;       THIS TEST USES TRACE TRAPPING WHERE APPLICABLE IF SW12 IS NOT SET
613
614                             ;DESCRIPTION OF SINGLE DATA PATTERN TEST
615                             ;       THIS TEST IS DESIGNED TO AID IN THE LOCATION OF DIFFICULT DATA ERROR
616                             ;       PROBLEMS AND PERHAPS HELP IN SOME CARD READER ADJUSTMENTS.  IT
617                             ;       CONTINUOUSLY READS CARDS WHICH HAVE ALL COLUMNS PUNCHED OR MARKED
618                             ;       IDENTICALLY, CHECKING THE DATA AGINST A PATTERN SET UP ON THE SWITCHES
619                             ;       INITIALLY. ANY ERRORS ARE PRINTED OUT, ALONG WITH A COUNT OF THE TOTAL
620                             ;       NUMBER OF CARDS READ AND THE TOTAL NUMBER OF DATA ERRORS WHICH HAVE
621                             ;       OCCURRED SINCE THE TEST WAS STARTED.
622
623                             ;OPERATING PROCEDURE FOR SINGLE DATA PATTERN TEST:
624                             ;       1.  LOAD TEST DECK OF IDENTICAL CARDS IN THE INPUT HOPPER, AND PUT
625                             ;           THE CARD READER ON-LINE.
626                             ;       2.  LOAD SA 240, THEN PRESS "START" ON THE CONSOLE.
627                             ;       3.  AT THE INITIAL HALT SET THE CORRECT CARD-IMAGE
628                             ;           DATA PATTERN IN SW11-SW00, THEN PRESS CONTINUE.
629                             ;       4.  WHEN THE READER RUNS OUT OF CARDS IT WILL RING THE
630                             ;           BELL.  RELOADING THE DECK AND PRESSING "START" ON THE CARD
631                             ;           READER WILL CONTINUE THE TEST.
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                                ;STATUS AND CONTROL REGISTER (CDST) BIT DESIGNATION
                                ;       BIT 0   READ
                                ;       BIT 1   DATA PACKING
                                ;       BIT 2   BUSY
                                ;       BIT 3   READER TRANSITION TO ON LINE
                                ;       BIT 4   ADDRESS BIT 16
                                ;       BIT 5   ADDRESS BIT 17
                                ;       BIT 6   INTERUPT ENABLE
                                ;       BIT 7   CONTROLLER READY
                                ;       BIT 8   POWER CLEAR
                                ;       BIT 9   NON-EXISTENT MEMORY
                                ;       BIT 10  DATA LATE
                                ;       BIT 11  DATA ERROR
                                ;       BIT 12  OFF LINE
                                ;       BIT 13  END OF FILE (M1200 ONLY)
                                ;       BIT 14  CARD READER ERROR
                                ;       BIT 15  ERROR

177570                                  SWR=    177570
177776                                  PS=     177776
000240                                  NOP=    240
104000                                  HLT=    EMT
104400                                  SCOPE=  TRAP
000004                                  TYPE=   IOT
000000                                  DUMMY=  0
000000                                  R0=     %0              ;SCRATCH
000001                                  R1=     %1              ;SCRATCH
000002                                  ADINT=  %2              ;CONTAINS ADDRESS OF INTERRUPT VECTOR
000003                                  CDS=    %3              ;CONTAINS ADDRESS OF CARD READER STATUS REGISTER
000004                                  CDC=    %4              ;CONTAINS ADDRESS OF CARD READER COLUMN COUNT
000005                                  CDA=    %5              ;CONTAINS ADDRESS OF CARD READER BUS ADDRESS REG.
000005                                  TTY=    %5
000006                                  SP=     %6                      ;STACK POINTER
000007                                  PC=     %7                      ;PROGRAM COUNTER

                                .ABS
000000                          .=0             ;TRAP CATCHER IS LOADED INTO LOCATIONS 0 THRU 377

                                ;LOAD TRAP VECTORS FOR HLT AND SCOPE ROUTINES
000014                          .=14
000014  000514                          TRTRAP
000016  000340                          340
000020                          .=20
000020  012446                          $TYPE
000022  000340                          340
000024                          .=24
000024  015712                          POWR
000026  000340                          340
000030                          .=30
000030  012224                          PRINT
000032  000340                          340
000034                          .=34
000034  012350                          SCOPEC
000036  000340                          340
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                                        ;LOAD STARTING ADDRESS AREA
                000200                  .=200
000200  012706  000500                          MOV     #STACK, SP
000204  000167  000570                          JMP     BEGIN           ;NORMAL STARTING ADDRESS FOR CD11 READER
                000210                  .=210
000210  012706  000500                          MOV     #STACK, SP
000214  000167  006322                          JMP     ERCD11          ;STARTING ADDRESS FOR CD11 (M1000) ERROR FUNCTION TEST
                000220                  .=220
000220  012706  000500                          MOV     #STACK, SP
000224  000167  011016                          JMP     TESTX           ;STARTING ADDRESS FOR LOOP WHICH CONTINUALLY RUNS
                                                                        ;ANY SINGLE SUBTEST
                000240                  .=240
000240  012706  000500                          MOV     #STACK, SP      ;
000244  000167  011106                          JMP     CKSAME          ;STARTING ADDRESS OF TEST TO READ A SINGLE DATA
                                                                        ;PATTERN CONTINUOUSLY


                000250                  .=250
000250  012706  000500                          MOV     #STACK, SP
000254  000167  006252                          JMP     ER1200          ;STARTING ADDRESS FOR M-1200 ERROR FUNCTION TEST


                                        ;LOAD POINTERS AND GENERAL STORAGE
                000500                  .=500
000500  000000                  STACK:  0                               ;STACK POINTER INITIALIZED TO POINT HERE
000502  177160                  CDST:   177160                          ;ADDRESS OF CARD READER STATUS REGISTER
000504  177162                  CDCC:   177162                          ;ADDRESS OF CARD READER COLUMN COUNT
000506  177164                  CDBA:   177164                          ;ADDRESS OF CARD READER BUS ADDRESS
000510  177564                  TPS:    177564                          ;ADDRESS OF TELETYPE STATUS REGISTER
000512  177566                  TPB:    177566                          ;ADDRESS OF TELETYPE DATA BUFFER
000514  000002                  TRTRAP: RTI                             ;RETURN FROM TRACE LOOP
000516  000230                  INTVC:  230                             ;ADDRESS OF CARD READER INTERRUPT VECTOR
000520  000232                          232
000522  000000                  COUNT:  0                               ;USED FOR TIMING, ETC.
000524  000000                  INTFLG: 0                               ;CONTAINS LEVEL THAT INTERRUPT IS FOUND AT
000526  000000                  TRFLG:  0                               ;TOGGLED TO SWITCH BETWEEN TRACE TRAPPING AND NORMAL F.O
000530  000000                  PROC:   0                               ;STORES PROCESSOR STATUS WHEN TRACE TRAP MUST BE CLEARED
                                                                        ;IN A SUBTEST
000532  000000                  ERFLG:  0                               ;SET TO ZERO TO OUTPUT DATA ERROR HEADING
000534  000000                  CKRF:   0                               ;FLAG FOR CHECKERBOARD DECK
000536  000000                  COUNTG: 0                               ;USED AS COUNTER IN TESTG
000540  000000                  CD1000: 0                               ;M-1200 OR M-1000 CARD READER DETECTOR

                                        ;INITIALIZE CSR AND DBR POINTERS
000542  012767  000001  011660  SETUP:  MOV     #1,     ITMAX   ;SET ITERATION MAXIMUM TO 1 ITERATION
000550  016703  177726                  MOV     CDST,   CDS     ;SET UP STATUS REGISTER POINTER
000554  016704  177724                  MOV     CDCC,   CDC     ;SET UP COLUMN COUNT REGISTER POINTER
000560  016705  177722                  MOV     CDBA,   CDA     ;SET UP BUS ADDRESS REGISTER POINTER
000564  016702  177726                  MOV     INTVC,  ADINT   ;LOAD ADDRESS OF INTERRUPT VECTOR
000570  016712  177724                  MOV     INTVC+2,(ADINT) ;SET UP CD11 TRAP VECTOR
000574  005077  177720                  CLR     @INTVC+2        ; TO HALT
000600  005067  177720                  CLR     INTFLG          ;INITIALIZE INTERRUPT FLAG
000604  005067  177716                  CLR     TRFLG           ;INITIALIZE TRACE FLAG
000610  012767  000340  177160          MOV     #340,   PS      ;SETUP PROCESSOR STATUS
000616  000207                          RTS     %7              ;RETURN
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                        001000                  .=1000
001000  012767  001000  011426  BEGIN:  MOV     #BEGIN,RETURN   ;SAVE RETURN FOR POWER FAIL
001006  004767  177530          JSR     %7,     SETUP           ;INITIALIZE POINTERS AND FLAGS
001012  000416                  BR      TEST                    ;GO TO INSTRUCTION TESTS
001014  005767  177506  RESTRT: TST     TRFLG                   ;CHECK FOR TRACE TRAPPING
001020  001004                  BNE     TRAPX                   ;IF SET, TRACE TRAP
001022  012767  000340  176746  NOTRP:  MOV     #340,   PS      ;IF ZERO, CLEAR TRACE BIT
001030  000407                  BR      TEST                    ;GO TO INSTRUCTION TESTS
001032  032767  010000  176530  TRAPX:  BIT     #10000, SWR     ;CHECK SW12
001040  001370                  BNE     NOTRP                   ;BRANCH IF SET TO CLEAR TRACE BIT
001042  012767  000360  176726          MOV     #360,   PS      ;SET TRACE BIT

                        ;TEST FOR CORRECT INITIALIZATION OF ALL CARD READER REGISTERS
001050  012767  001060  011356  TEST:   MOV     #TEST1A,RETURN  ;SETUP SCOPE LOOP RETURN ADDRESS
001056  104400          TEST1:  SCOPE                           ;SO ALL TESTS START WITH SCOPE
001060  004767  011114  TEST1A: JSR     %7,     CKOFFL          ;CHECK FOR OFF-LINE SET
001064  000005                  RESET                           ;SEND OUT INIT
001066  022713  000200          CMP     #200,   @CDS            ;CHECK FOR STATUS REGISTER BIT 7 SET
001072  001401                  BEQ     .+4                     ;BRANCH IF OK
001074  104000                  HLT                             ;STATUS REGISTER NOT CORRECTLY INITIALIZED

001076  005714                  TST     @CDC                    ;CHECK FOR COLUMN COUNT CLEARED
001100  001401                  BEQ     .+4                     ;BR IF OK
001102  104000                  HLT                             ;COLUMN COUNT NOT CLEARED BY INIT

001104  005715                  TST     @CDA                    ;CHECK FOR BUS ADDRESS CLEARED
001106  001401                  BEQ     .+4                     ;BR IF OK
001110  104000                  HLT                             ;BUS ADDRESS NOT CLEARED BY INIT

001112  104400          TEST2:  SCOPE
                        ;TEST THAT ONLY THE PROPER BITS OF THE STATUS REGISTER ARE READ/WRITE
                                ;ONLY BITS 1,4,5, AND 6 OF THE STATUS REGISTER SHOULD BE
                                ;ABLE TO BE SET TO ONE AND READ BACK AS ONE
001114  052713  177376          BIS     #177376,@CDS            ;SET ALL BITS BUT 0 AND 8
001120  022713  000362          CMP     #362,   @CDS            ;ONLY BITS 1,4,5,6, AND 7 SHOULD BE SET
001124  001402                  BEQ     .+6                     ;BRANCH IF OK
001126  104000                  HLT                             ;STATUS REGISTER DIDN'T CONTAIN 362
001130  000413                  BR      TEST3                   ;BRANCH AFTER FAILURE

                                ;CLEARING STATUS REGISTER SHOULD CLEAR BITS 1,4,5, AND 6
001132  005013                  CLR     @CDS                    ;CLEAR BITS 1,4,5, AND 6
001134  022713  000200          CMP     #200,   @CDS            ;CHECK FOR ALL BITS CLEAR BUT 7
001140  001401                  BEQ     .+4                     ;BRANCH IF OK
001142  104000                  HLT                             ;STATUS REGISTER DIDN'T CONTAIN 200

                                ;SETTING ALL BITS SHOULD DO A POWER CLEAR
001144  012713  177777          MOV     #177777,@CDS            ;SET ALL BITS OF THE STATUS REGISTER
001150  022713  000200          CMP     #200,   @CDS            ;CHECK FOR ALL BITS CLEAR BUT 7
001154  001401                  BEQ     .+4                     ;BRANCH IF OK
001156  104000                  HLT                             ;STATUS REGISTER DIDN'T CONTAIN 200
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                                        TEST3:  SCOPE
                                        ;TEST THE COLUMN COUNT REGISTER FOR READ/WRITE-ABILITY
001160  104400                                  MOV     #177777,@CDC    ;LOAD ALL BITS
001162  012714  177777                         CMP     #177777,@CDC    ;TEST TO SEE IF IT CAN BE READ
001166  022714  177777                         BEQ     .+4             ;BRANCH IF OK
001172  001401                                 HLT                     ;CDCC FAILED TO READ/WRITE
001174  104000
001176  022713  000200                         CMP     #200,   @CDS    ;CHECK STATUS REG
001202  001401                                 BEQ     .+4             ;BRANCH IF OK
001204  104000                                 HLT                     ;STATUS REG CHANGED
001206  052713  000400                         BIS     #400,   @CDS    ;DO A POWER CLEAR
001212  005714                                 TST     @CDC            ;CHECK FOR COLUMN COUNT CLEARED
001214  001401                                 BEQ     .+4             ;BRANCH IF OK
001216  104000                                 HLT                     ;COLUMN COUNT NOT CLEARED BY POWER CLEAR
001220  022713  000200                         CMP     #200,   @CDS    ;CHECK STATUS REG
001224  001401                                 BEQ     .+4             ;BRANCH IF OK
001226  104000                                 HLT                     ;STATUS REG CHANGED
001230  104400                        TEST4:  SCOPE
                                        ;TEST THE BUS ADDRESS REGISTER FOR READ/WRITE-ABILITY
001232  012715  177777                         MOV     #177777,@CDA    ;LOAD ALL BITS
001236  022715  177777                         CMP     #177777,@CDA    ;TEST TO SEE IF IT CAN BE READ
001242  001401                                 BEQ     .+4             ;BRANCH IF OK
001244  104000                                 HLT                     ;CDBA FAILED TO READ/WRITE
001246  022713  000200                         CMP     #200,   @CDS    ;CHECK STATUS REG
001252  001401                                 BEQ     .+4             ;BRANCH IF OK
001254  104000                                 HLT                     ;STATUS REG CHANGED
001256  052713  000400                         BIS     #400,   @CDS    ;DO A POWER CLEAR
001262  005715                                 TST     @CDA            ;CHECK FOR BUS ADDRESS CLEARED
001264  001401                                 BEQ     .+4             ;BRANCH IF OK
001266  104000                                 HLT                     ;BUS ADDRESS NOT CLEARED BY POWER CLEAR
001270  022713  000200                         CMP     #200,   @CDS    ;CHECK STATUS REG
001274  001401                                 BEQ     .+4             ;BRANCH IF OK
001276  104000                                 HLT                     ;STATUS REG CHANGED
001300  104400                        TEST5:  SCOPE
                                        ;START SHOULD CAUSE CONTROLLER READY WITHIN ABOUT 1 SECOND
                                        ;BIT 0 SHOULD ALWAYS READ AS BEING EQUAL TO ZERO
001302  004767  010672                         JSR     %7,     CKOFFL  ;CHECK FOR OFF-LINE SET
001306  012714  177777                         MOV     #-1,    @CDC    ;SET UP COLUMN COUNT TO READ 1 COLUMN
001312  012715  016000                         MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
001316  016767  176454  177204                 MOV     PS,     PROC    ;STORE CURRENT PROCESSOR STATUS
001324  005067  176446                         CLR     PS              ;CLEAR TRACE BIT
001330  005067  177166                         CLR     COUNT           ;INITIALIZE COUNTER
001334  005213                                 INC     @CDS            ;START READING A CARD
001336  105713                                 TSTB    @CDS            ;CHECK FOR CONTROLLER READY CLEARED
001340  100001                                 BPL     .+4             ;BRANCH IF OK
001342  104000                                 HLT                     ;CONTROLLER READY DIDN'T CLEAR
001344  032713  000001                 LOOP5:  BIT     #1,     @CDS    ;CHECK BIT 0
001350  001402                                 BEQ     .+6             ;BRANCH IF NOT SET
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                                                HLT                     ;BIT 0 READ AS A ONE
                                                BR      TEST6           ;BRANCH AFTER FAILURE
                                                INC     COUNT           ;WAIT ABOUT
                                                BNE     LOOP5
                                                MOV     PROC,   PS      ;RESTORE PROCESSOR STATUS
                                                TSTB    @CDS            ;CHECK CONTROLLER READY
                                                BMI     .+4             ;CONTINUE IF  SET
                                                HLT                     ;CONTROLLER READY DIDN'T SET WITHIN 1 SEC
                                                TST     @CDS
                                                BPL     .+6
                                                HLT                     ;ERROR BIT SET
                                                BR      TEST6
                                                BIT     #177577,@CDS    ;CHECK FOR ANY OTHER BITS
                                                BEQ     .+4             ;BRANCH IF OK
                                                HLT                     ;EXTRA BIT(S) SET

001420  104400                          TEST6:  SCOPE
                                        ; (BIT 2) SHOULD NOT BE SET BY READING A CARD
                                        ;IT SHOULD REMAIN NOT SET
                                        ;THIS SHOULD HAPPEN WITHIN ABOUT 1 SECOND
001422  004767  010552                          JSR     %7,CKOFFL       ;CHECK FOR OFF-LINE SET
001426  005013                                  CLR     @CDS            ;INITIALIZE STATUS REGISTER
001430  012714  177754                          MOV     #-20.,  @CDC    ;SET UP COLUMN COUNT TO READ 20 COLUMNS
001434  012715  016000                          MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
001440  005213                                  INC     @CDS            ;READ A CARD
001442  032713  000004                          BIT     #4,@CDS         ;CHECK BUSY
001446  001401                                  BEQ     .+4             ;
001450  104000                                  HLT                     ;BUSY SET
001452  005067  177044                          CLR     COUNT           ;SET UP WAIT COUNTER
001456  016767  176314  177044                  MOV     PS,     PROC    ;SAVE PROCESSOR STATUS
001464  005067  176306                          CLR     PS              ;CLR THE T BIT
001470  105713                        LOOP6A: TSTB    @CDS            ;CHECK READY
001472  100405                                BMI     LOOP6B          ;BRANCH IF READY
001474  005367  177022                          DEC     COUNT           ;WAIT ABOUT 1 SEC.
001500  001373                                  BNE     LOOP6A
001502  104000                                  HLT                     ;READING A CARD DIDN'T SET READY
001504  000411                                  BR      TEST7
001506  016767  177016  176262      LOOP6B: MOV     PROC,PS         ;RESTORE THE STATUS
001514  105713                        LOOP6:  TSTB    @CDS            ;CHECK CONTROLLER READY
001516  100401                                BMI     DONE6           ;BRANCH IF SET
001520  104000                                HLT                     ;RESTORING STATUS RESET READY

001522  005713                        DONE6:  TST     @CDS            ;CHECK ERROR BIT 15
001524  100001                                BPL     .+4             ;BRANCH IF OK
001526  104000                                HLT                     ;ERROR BIT 15 WAS SET

001530  104400                          TEST7:  SCOPE
                                        ;CONTROLLER READY SHOULD CAUSE AN INTERRUPT
001532  004767  010376                          JSR     %7,     INIT    ;INITIALIZE
001536  012712  001622                          MOV     #TINT7,@ADINT   ;LOAD RETURN POINTER
001542  052767  000340  176226                  BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
001550  016762  176222  000002                  MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
001556  042767  000340  176212                  BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
001564  012714  177741                          MOV     #-31.,  @CDC    ;SET UP COLUMN COUNT TO READ 31 COLUMNS
001570  012715  016000                          MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
001574  012713  000101                          MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
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                                                TSTB    @CDS            ;WAIT FOR CONTROLLER READY
                                                BPL     .-2
                                                MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
                                                BIC     #100,   @CDS    ;CLEAR INTERRUPT ENABLE
                                                HLT                     ;NO INTERRUPT OCCURRED
                                                BR      CONT7
                                        TINT7:  TSTB    @CDS            ;CHECK CONTROLLER READY
                                                BMI     .+4             ;BRANCH IF SET
                                                HLT                     ;CONTROLLER READY NOT SET
                                                CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
                                                TST     @CDS            ;MAKE SURE NO ERROR OCCURRED
                                                BPL     .+4
                                                HLT                     ;BIT 15 WAS SET
                                                CLR     @CDS            ;DISABLE INTERRUPTS
                                        CONT7:  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
                                                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS

                                        TEST10: SCOPE
                                        ;CONTROLLER READY SHOULDN'T CAUSE AN INTERRUPT IF THE PROCESSOR IS
                                        ;AT LEVEL 7 PRIORITY
                                                JSR     %7,     INIT    ;INITIALIZE
                                                MOV     #TINT10,@ADINT  ;SETUP RETURN
                                                BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7 PRIORITY
                                                MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
                                                MOV     #-61.,  @CDC    ;SET UP COLUMN COUNT TO READ 61 COLUMNS
                                                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
                                                MOV     #101,   @CDS    ;SET INTERRUPT ENABLE AND READ
                                                TSTB    @CDS            ;WAIT FOR CONTROLLER READY
                                                BPL     .-2
                                                BR      .+6             ;CONTINUE IF NO INTERRUPT OCCURRED
                                        TINT10: HLT                     ;AN INTERRUPT OCCURRED
                                                CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
                                                CLR     @CDS            ;CLEAR INTERRUPT ENABLE
                                                MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
                                                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS

                                        ;FIND THE LEVEL AT WHICH AN INTERRUPT OCCURS
                                        ;PRINT OUT A MESSAGE STATING THIS LEVEL IF IT IS OTHER THAN THE STANDARD
                                        ;(LEVEL 6) MAKE CERTAIN THAT IT ALWAYS OCCURS AT THIS LEVEL
                                        ;THE MESSAGE STATING THE LEVEL IS PRINTED ONLY ONCE, AND THE PROGRAM MUST
                                        ;BE STARTED OVER AT LOCATION 200 FOR IT TO BE PRINTED AGAIN

                                        ;TEST FOR AN INTERRUPT ON LEVEL 7
                                        TEST11: SCOPE
                                                JSR     %7,     INIT    ;INITIALIZE
                                                MOV     #TINT11,@ADINT  ;SETUP RETURN ADDRESS
                                                BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
                                                MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
                                                BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
                                                BIS     #300,   PS      ;SET PROCESSOR TO LEVEL 6 PRIORITY
                                                MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
                                                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
                                                MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
                                                TSTB    @CDS            ;WAIT FOR CONTROLLER READY
                                                BPL     .-2
                                                MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
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                                                CLR     @CDS            ;DISABLE INTERRUPTS
                                                MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
                                                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
                                                TST     INTFLG          ;TEST FOR A PREVIOUS INTERLPT
                                                BEQ     TEST12          ;BRANCH IF NONE
                                                CMP     INTFLG, #100007 ;CHECK PREVIOUS LEVEL
                                                BMI     TEST12          ;BRANCH IF LOWER
                                                HLT                     ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 7 OR HIGHER
                                                BR      TEST12
                                        TINT11: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
                                                BMI     .+4             ;BRANCH IF SET
                                                HLT                     ;CONTROLLER READY WASN'T SET
                                                CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
                                                MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
                                                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
                                                CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
                                                TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
                                                BMI     SET7    ;BRANCH IF FLAG SET
                                                MOV     #100007,INTFLG ;SET FLAG AND LEVEL
                                                TYPE,   MSG4            ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
                                                MOV     #7,PRINT1       ;TYPE #7 IN OCTAL
                                                JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
                                                BR      TEST12
                                        SET7:   CMP     INTFLG, #100007 ;CHECK PREVIOUS LEVEL
                                                BPL     TEST12
                                                HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
                                        ;TEST FOR AN INTERRUPT ON LEVEL 6
                                        TEST12: SCOPE
                                                JSR     %7,     INIT    ;INITIALIZE
                                                MOV     #TINT12,@ADINT  ;SETUP RETURN ADDRESS
                                                BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
                                                MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
                                                BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
                                                BIS     #240,   PS      ;SET PROCESSOR TO LEVEL 5 PRIORITY
                                                MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
                                                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
                                                MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
                                                TSTB    @CDS            ;WAIT FOR CONTROLLER READY
                                                BPL     .-2
                                                MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
                                                CLR     @CDS            ;DISABLE INTERRUPTS
                                                MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
                                                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
                                                TST     INTFLG          ;TEST FOR A PREVIOUS INTERUPT
                                                BEQ     TEST13          ;BRANCH IF NONE
                                                CMP     INTFLG, #100006 ;CHECK PREVIOUS LEVEL
                                                BMI     TEST13          ;BRANCH IF LOWER
                                                HLT                     ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 6 OR HIGHER
                                                BR      TEST13
                                        TINT12: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
                                                BMI     .+4             ;BRANCH IF SET
                                                HLT                     ;CONTROLLER READY WASN'T SET
                                                CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
                                                MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
                                                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
                                                CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
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1024  002322  005767  176176                    TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1025  002326  100413                            BMI     SET6    ;BRANCH IF FLAG SET
1026  002330  012767  100006  176166            MOV     #100006,INTFLG ;SET FLAG AND LEVEL
1027  002336  000004  014056                    TYPE,   MSG4            ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1028  002342  012767  000006  010204            MOV     #6,PRINT1       ;TYPE #5 IN OCTAL
1029  002350  004767  010244                    JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
1030  002354  000405                            BR      TEST13
1031  002356  026727  176142  100006  SET6: CMP       INTFLG, #100006 ;CHECK PREVIOUS LEVEL
1032  002364  100001                            BPL     TEST13
1033  002366  104000                            HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1034                                    ;TEST FOR AN INTERRUPT ON LEVEL 5
1035  002370  104400                    TEST13: SCOPE
1036  002372  004767  007536                    JSR     %7,     INIT    ;INITIALIZE
1037  002376  012712  002514                    MOV     #TINT13,@ADINT  ;SETUP RETURN ADDRESS
1038  002402  052767  000340  175366            BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
1039  002410  016762  175362  000002            MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
1040  002416  042767  000340  175352            BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
1041  002424  052767  000200  175344            BIS     #200,   PS      ;SET PROCESSOR TO LEVEL 4 PRIORITY
1042  002432  012714  177660                    MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1043  002436  012715  016000                    MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1044  002442  012713  000101                    MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
1045  002446  105713                            TSTB    @CDS            ;WAIT FOR CONTROLLER READY
1046  002450  100376                            BPL     .-2
1047  002452  016267  000002  175316            MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1048  002460  005013                            CLR     @CDS            ;DISABLE INTERRUPTS
1049  002462  012712  000232                    MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1050  002466  005037  000232                    CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1051  002472  005767  176026                    TST     INTFLG          ;TEST FOR A PREVIOUS INTERUPT
1052  002476  001442                            BEQ     TEST14          ;BRANCH IF NONE
1053  002500  026727  176020  100005            CMP     INTFLG, #100005 ;CHECK PREVIOUS LEVEL
1054  002506  100436                            BMI     TEST14          ;BRANCH IF LOWER
1055  002510  104000                            HLT                     ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 5 OR HIGHER
1056  002512  000434                            BR      TEST14
1057  002514  105713                    TINT13: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
1058  002516  100401                            BMI     .+4             ;BRANCH IF SET
1059  002520  104000                            HLT                     ;CONTROLLER READY WASN'T SET
1060  002522  005013                            CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
1061  002524  012712  000232                    MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1062  002530  005037  000232                    CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1063  002534  022626                            CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
1064  002536  005767  175762                    TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1065  002542  100413                            BMI     SET5    ;BRANCH IF FLAG SET
1066  002544  012767  100005  175752            MOV     #100005,INTFLG ;SET FLAG AND LEVEL
1067  002552  000004  014056                    TYPE,   MSG4            ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1068  002556  012767  000005  007770            MOV     #5,PRINT1       ;TYPE #5 IN OCTAL
1069  002564  004767  010030                    JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
1070  002570  000405                            BR      TEST14
1071  002572  026727  175726  100005  SET5: CMP       INTFLG, #100005 ;CHECK PREVIOUS LEVEL
1072  002600  100001                            BPL     TEST14
1073  002602  104000                            HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1074                                    ;TEST FOR AN INTERRUPT ON LEVEL 4
1075  002604  104400                    TEST14: SCOPE
1076  002606  004767  007322                    JSR     %7,     INIT    ;INITIALIZE
1077  002612  012712  002730                    MOV     #TINT14,@ADINT  ;SETUP RETURN ADDRESS
1078  002616  052767  000340  175152            BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
1079  002624  016762  175146  000002            MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
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1080  002632  042767  000340  175136          BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
1081  002640  052767  000140  175130          BIS     #140,   PS      ;SET PROCESSOR TO LEVEL 3 PRIORITY
1082  002646  012714  177660                  MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1083  002652  012715  016000                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1084  002656  012713  000101                  MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
1085  002662  105713                          TSTB    @CDS            ;WAIT FOR CONTROLLER READY
1086  002664  100376                          BPL     .-2
1087  002666  016267  000002  175102          MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1088  002674  005013                          CLR     @CDS            ;DISABLE INTERRUPTS
1089  002676  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1090  002702  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1091  002706  005767  175612                  TST     INTFLG          ;TEST FOR A PREVIOUS INTERUPT
1092  002712  001433                          BEQ     TEST15          ;BRANCH IF NONE
1093  002714  026727  175604  100004          CMP     INTFLG, #100004 ;CHECK PREVIOUS LEVEL
1094  002722  100427                          BMI     TEST15          ;BRANCH IF LOWER
1095  002724  104000                          HLT                     ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 4 OR HIGHER
1096  002726  000425                          BR      TEST15
1097  002730  105713                  TINT14: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
1098  002732  100401                          BMI     .+4             ;BRANCH IF SET
1099  002734  104000                          HLT                     ;CONTROLLER READY WASN'T SET
1100  002736  005013                          CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
1101  002740  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1102  002744  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1103  002750  022626                          CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
1104  002752  005767  175546                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1105  002756  100404                          BMI     SET4    ;BRANCH IF FLAG SET
1106  002760  012767  100004  175536          MOV     #100004,INTFLG ;SET FLAG AND LEVEL
1107  002766  000405                          BR      TEST15
1108  002770  026727  175530  100004  SET4: CMP     INTFLG, #100004 ;CHECK PREVIOUS LEVEL
1109  002776  100001                          BPL     TEST15
1110  003000  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1111                                  ;TEST FOR AN INTERRUPT ON LEVEL 3
1112  003002  104400                  TEST15: SCOPE
1113  003004  004767  007124                  JSR     %7,     INIT    ;INITIALIZE
1114  003010  012712  003126                  MOV     #TINT15,@ADINT  ;SETUP RETURN ADDRESS
1115  003014  052767  000340  174754          BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
1116  003022  016762  174750  000002          MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
1117  003030  042767  000340  174740          BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
1118  003036  052767  000100  174732          BIS     #100,   PS      ;SET PROCESSOR TO LEVEL 2 PRIORITY
1119  003044  012714  177660                  MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1120  003050  012715  016000                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1121  003054  012713  000101                  MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
1122  003060  105713                          TSTB    @CDS            ;WAIT FOR CONTROLLER READY
1123  003062  100376                          BPL     .-2
1124  003064  016267  000002  174704          MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1125  003072  005013                          CLR     @CDS            ;DISABLE INTERRUPTS
1126  003074  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1127  003100  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1128  003104  005767  175414                  TST     INTFLG          ;TEST FOR A PREVIOUS INTERUPT
1129  003110  001442                          BEQ     TEST16          ;BRANCH IF NONE
1130  003112  026727  175406  100003          CMP     INTFLG, #100003 ;CHECK PREVIOUS LEVEL
1131  003120  100436                          BMI     TEST16          ;BRANCH IF LOWER
1132  003122  104000                          HLT                     ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 3 OR HIGHER
1133  003124  000434                          BR      TEST16
1134  003126  105713                  TINT15: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
1135  003130  100401                          BMI     .+4             ;BRANCH IF SET
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1136  003132  104000                          HLT                             ;CONTROLLER READY WASN'T SET
1137  003134  005013                          CLR     @CDS                    ;DISABLE FURTHER INTERRUPTS
1138  003136  012712  000232                  MOV     #232,   @ADINT          ;CHANGE INTERRUPT RETURN ADDRESS
1139  003142  005037  000232                  CLR     @#232                   ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1140  003146  022626                          CMP     (SP)+,  (SP)+           ;RESTORE STACK POINTER
1141  003150  005767  175350                  TST     INTFLG                  ;CHECK FOR PREVIOUS FLAG
1142  003154  100413                          BMI     SET3    ;BRANCH IF FLAG SET
1143  003156  012767  100003  175340          MOV     #100003,INTFLG ;SET FLAG AND LEVEL
1144  003164  000004  014056                  TYPE,   MSG4                    ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1145  003170  012767  000003  007356          MOV     #3,PRINT1               ;TYPE #3 IN OCTAL
1146  003176  004767  007416                  JSR     %7,PRINTS               ;AND SUPRESS LEADING ZERO'S
1147  003202  000405                          BR      TEST16
1148  003204  026727  175314  100003  SET3: CMP     INTFLG, #100003 ;CHECK PREVIOUS LEVEL
1149  003212  100001                          BPL     TEST16
1150  003214  104000                          HLT                             ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1151                                  ;TEST FOR AN INTERRUPT ON LEVEL 2
1152  003216  104400                  TEST16: SCOPE
1153  003220  004767  006710                  JSR     %7,     INIT            ;INITIALIZE
1154  003224  012712  003342                  MOV     #TINT16,@ADINT          ;SETUP RETURN ADDRESS
1155  003230  052767  000340  174540          BIS     #340,   PS              ;SET PROCESSOR PRIORITY TO 7
1156  003236  016762  174534  000002          MOV     PS,     2(ADINT)        ;SETUP RETURN PROCESSOR STATUS
1157  003244  042767  000340  174524          BIC     #340,   PS              ;SET PROCESSOR PRIORITY TO 0
1158  003252  052767  000040  174516          BIS     #040,   PS              ;SET PROCESSOR TO LEVEL 1 PRIORITY
1159  003260  012714  177660                  MOV     #-80.,  @CDC            ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1160  003264  012715  016000                  MOV     #BUFBEG,@CDA            ;SET UP BUS ADDRESS
1161  003270  012713  000101                  MOV     #101,   @CDS            ;SET INTERUPT ENABLE AND READ
1162  003274  105713                          TSTB    @CDS                    ;WAIT FOR CONTROLLER READY
1163  003276  100376                          BPL     .-2
1164  003300  016267  000002  174470          MOV     2(ADINT),PS             ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1165  003306  005013                          CLR     @CDS                    ;DISABLE INTERRUPTS
1166  003310  012712  000232                  MOV     #232,   @ADINT          ;CHANGE INTERRUPT RETURN ADDRESS
1167  003314  005037  000232                  CLR     @#232                   ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1168  003320  005767  175200                  TST     INTFLG                  ;TEST FOR A PREVIOUS INTERUPT
1169  003324  001442                          BEQ     TEST17                  ;BRANCH IF NONE
1170  003326  026727  175172  100002          CMP     INTFLG, #100002 ;CHECK PREVIOUS LEVEL
1171  003334  100436                          BMI     TEST17                  ;BRANCH IF LOWER
1172  003336  104000                          HLT                             ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 2 OR HIGHER
1173  003340  000434                          BR      TEST17
1174  003342  105713                  TINT16: TSTB    @CDS                    ;MAKE SURE CONTROLLER READY IS SET
1175  003344  100401                          BMI     .+4                     ;BRANCH IF SET
1176  003346  104000                          HLT                             ;CONTROLLER READY WASN'T SET
1177  003350  005013                          CLR     @CDS                    ;DISABLE FURTHER INTERRUPTS
1178  003352  012712  000232                  MOV     #232,   @ADINT          ;CHANGE INTERRUPT RETURN ADDRESS
1179  003356  005037  000232                  CLR     @#232                   ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1180  003362  022626                          CMP     (SP)+,  (SP)+           ;RESTORE STACK POINTER
1181  003364  005767  175134                  TST     INTFLG                  ;CHECK FOR PREVIOUS FLAG
1182  003370  100413                          BMI     SET2    ;BRANCH IF FLAG SET
1183  003372  012767  100002  175124          MOV     #100002,INTFLG ;SET FLAG AND LEVEL
1184  003400  000004  014056                  TYPE,   MSG4                    ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1185  003404  012767  000002  007142          MOV     #2,PRINT1               ;TYPE #2 IN OCTAL
1186  003412  004767  007202                  JSR     %7,PRINTS               ;AND SUPRESS LEADING ZERO'S
1187  003416  000405                          BR      TEST17
1188  003420  026727  175100  100002  SET2: CMP     INTFLG, #100002 ;CHECK PREVIOUS LEVEL
1189  003426  100001                          BPL     TEST17
1190  003430  104000                          HLT                             ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1191                                  ;TEST FOR AN INTERRUPT ON LEVEL 1
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 1192  003432  104400                    TEST17: SCOPE
 1193  003434  004767  006474                    JSR     %7,     INIT    ;INITIALIZE
 1194  003440  012712  003540                    MOV     #TINT17,@ADINT  ;SETUP RETURN ADDRESS
 1195  003444  052767  000340  174324            BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
 1196  003452  016762  174320  000002            MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
 1197  003460  042767  000340  174310            BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
 1198  003466  052767  000000  174302            BIS     #000,   PS      ;SET PROCESSOR TO LEVEL 0 PRIORITY
 1199  003474  012714  177660                    MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
 1200  003500  012715  016000                    MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
 1201  003504  012713  000101                    MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
 1202  003510  105713                            TSTB    @CDS            ;WAIT FOR CONTROLLER READY
 1203  003512  100376                            BPL     .-2
 1204  003514  016267  000002  174254            MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
 1205  003522  005013                            CLR     @CDS            ;DISABLE INTERRUPTS
 1206  003524  012712  000232                    MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
 1207  003530  005037  000232                    CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 1208  003534  104000                            HLT                     ;INTERUPT DIDN'T OCCURE WITH PROCESSOR AT LEVEL 0
 1209  003536  000434                            BR      TEST20
 1210  003540  105713                    TINT17: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
 1211  003542  100401                            BMI     .+4             ;BRANCH IF SET
 1212  003544  104000                            HLT                     ;CONTROLLER READY WASN'T SET
 1213  003546  005013                            CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
 1214  003550  012712  000232                    MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
 1215  003554  005037  000232                    CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 1216  003560  022626                            CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
 1217  003562  005767  174736                    TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
 1218  003566  100413                            BMI     SET1    ;BRANCH IF FLAG SET
 1219  003570  012767  100001  174726            MOV     #100001,INTFLG ;SET FLAG AND LEVEL
 1220  003576  000004  014056                    TYPE,   MSG4            ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
 1221  003602  012767  000001  006744            MOV     #1,PRINT1       ;TYPE #1 IN OCTAL
 1222  003610  004767  007004                    JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
 1223  003614  000405                            BR      TEST20
 1224  003616  026727  174702  100001  SET1: CMP       INTFLG, #100001 ;CHECK PREVIOUS LEVEL
 1225  003624  100001                            BPL     TEST20
 1226  003626  104000                            HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
 1227
 1228  003630  104400                    TEST20: SCOPE
 1229                                    ;TEST FOR NO INTERRUPT OCCURING WITH INTERRUPT ENABLE SET AND REST CLEARED
 1230  003632  004767  006276                    JSR     %7,     INIT    ;INITIALIZE CSR TO ZERO
 1231  003636  012712  003722                    MOV     #TINT20,        @ADINT  ;SETUP RETURN ADDRESS
 1232  003642  052767  000340  174126            BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
 1233  003650  016762  174122  000002            MOV     PS,     2(ADINT) ;STORE PROCESSOR STATUS
 1234  003656  005067  174114                    CLR     PS              ;SET PROCESSOR TO LEVEL 0
 1235  003662  012714  177777                    MOV     #-1,    @CDC    ;SET UP COLUMN COUNT TO READ 1 COLUMN
 1236  003666  012715  016000                    MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
 1237  003672  012713  000100                    MOV     #100,   @CDS    ;ENABLE INTERRUPTS
 1238  003676  005067  174620                    CLR     COUNT           ;INITIALIZE COUNTER
 1239  003702  005267  174614                    INC     COUNT           ;WAIT AWHILE
 1240  003706  001375                            BNE     .-4
 1241  003710  016267  000002  174060            MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO LEVEL 7
 1242  003716  005013                            CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
 1243  003720  000403                            BR      CONT20
 1244  003722  104000                    TINT20: HLT                     ;AN INTERRUPT OCCURRED
 1245  003724  022626                            CMP     (SP)+,  (SP)+   ;RESTORE STACK
 1246  003726  005013                            CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
 1247  003730  005037  000232            CONT20: CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
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1248  003734  012712  000232                  MOV     #232,   @ADINT  ;CAUSE A HALT IF AN INTERRUPT OCCURS
1249
1250  003740  104400                  TEST21: SCOPE
1251                                  ;CHECK FOR SIMULTANEOUS INTERRUPTS ON MORE THAN ONE LEVEL
1252  003742  004767  006166                  JSR     %7,     INIT    ;INITIALIZE CSR TO ZERO
1253  003746  012712  004012                  MOV     #TINT21,        @ADINT  ;SETUP RETURN ADDRESS
1254  003752  052767  000340  174016          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1255  003760  016762  174012  000002          MOV     PS,     2(ADINT) ;STORE PROCESSOR STATUS
1256  003766  042767  000340  174002          BIC     #340,   PS      ;SET PROCESSOR TO LEVEL 0
1257  003774  012714  177777                  MOV     #-1,    @CDC    ;SET UP COLUMN COUNT TO READ 1 COLUMN
1258  004000  012715  016000                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1259  004004  012713  000101                  MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
1260  004010  000777                          BR      .               ;WAIT FOR INTERRUPT
1261  004012  022626                  TINT21: CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
1262  004014  012712  004036                  MOV     #TINA21,@ADINT  ;CHANGE RETRUN ADDRESS
1263  004020  005067  173752                  CLR     PS              ;SET PROCESSOR TO LEVEL 0
1264  004024  000240                          NOP                     ;WAIT
1265  004026  016267  000002  173742          MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO LEVEL 7
1266  004034  000402                          BR      CONT21
1267  004036  022626                  TINA21: CMP     (SP)+,  (SP)+   ;RESTORE STACK
1268  004040  104000                          HLT                     ;THE INTERRUPT OCCURRED AT 2 LEVELS
1269  004042  005013                  CONT21: CLR     @CDS            ;DISABLE INTERRUPTS
1270  004044  005037  000232                  CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
1271  004050  012712  000232                  MOV     #232,   @ADINT  ;CAUSE A HALT IF AN INTERRUPT OCCURS
1272
1273  004054  104400                  TEST22: SCOPE
1274                                  ;CHECK THAT NON-EXISTANT MEMORY IS DETECTED PROPERLY
1275  004056  004767  006052                  JSR     %7,     INIT    ;INITIALIZE CSR TO ZERO
1276  004062  012712  004126                  MOV     #TINT22,@ADINT  ;SETUP RETURN ADDRESS
1277  004066  052767  000340  173702          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1278  004074  016762  173676  000002          MOV     PS,     2(ADINT) ;STORE PROCESSOR STATUS
1279  004102  042767  000340  173666          BIC     #340,   PS      ;SET PROCESSOR TO LEVEL 0
1280  004110  012714  177773                  MOV     #-5,    @CDC    ;SET UP COLUMN COUNT TO READ 1 COLUMN
1281  004114  012715  160000                  MOV     #160000,@CDA    ;SET UP BUS ADDRESS TO NON-EXISTANT MEMORY
1282  004120  012713  000161                  MOV     #161,   @CDS    ;SET INTERUPT ENABLE AND READ, X MEM BITS SET
1283  004124  000777                          BR      .               ;WAIT FOR INTERRUPT
1284  004126  022626                  TINT22: CMP     (SP)+,  (SP)+   ;RESTORE STACK
1285  004130  005037  000232                  CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
1286  004134  012712  000232                  MOV     #232,   @ADINT  ;CAUSE A HALT IF AN INTERRUPT OCCURS
1287  004140  105713                          TSTB    @CDS            ;CHECK FOR CONTROLLER READY
1288  004142  100401                          BMI     .+4             ;BRANCH IF SET OK
1289  004144  104000                          HLT                     ;CONTROLLER READY DIDN'T SET
1290
1291  004146  005713                          TST     @CDS            ;CHECK FOR ERROR (BIT 15)
1292  004150  100401                          BMI     .+4             ;BRANCH IF SET OK
1293  004152  104000                          HLT                     ;ERROR BIT 15 NOT SET
1294
1295  004154  032713  001000                  BIT     #1000,  @CDS    ;CHECK FOR NON-EXISTANT MEMORY (BIT 9)
1296  004160  001001                          BNE     .+4             ;BRANCH IF SET OK
1297  004162  104000                          HLT                     ;BIT 9 NOT SET
1298
1299  004164  032713  000040                  BIT     #40,    @CDS    ;CHECK FOR EXTENDED MEMORY BIT 17 SET
1300  004170  001001                          BNE     .+4             ;BRANCH IF SET OK
1301  004172  104000                          HLT                     ;EX-MEM BIT 17 GOT CLEARED
1302
1303  004174  032713  000020                  BIT     #20,    @CDS    ;CHECK FOR EX-MEM (BIT 4)
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1304  004200  001001                        BNE     .+4             ;BRANCH IF SET OK
1305  004202  104000                        HLT                     ;EX-MEM (BIT 4) GOT CLEARED
1306
1307  004204  032713  076417                BIT     #076417,@CDS    ;CHECK FOR ANY OTHER BITS
1308  004210  001401                        BEQ     .+4             ;BRANCH IF OK
1309  004212  104000                        HLT                     ;EXTRA ERROR BITS SET
1310
1311  004214  022715  160002                CMP     #160002,@CDA    ;CHECK ADDRESS BUFFER
1312  004220  001401                        BEQ     .+4             ;BRANCH IF OK
1313  004222  104000                        HLT                     ;BUS ADDRESS REG CHANGED
1314
1315  004224  022714  177774                CMP     #-4,    @CDC    ;CHECK COLUMN COUNT REG
1316  004230  001401                        BEQ     .+4             ;BRANCH IF OK
1317  004232  104000                        HLT                     ;COLUMN COUNT REG CHANGED
1318
1319                                ;CHECK SW7 AND RETURN TO TEST1 IF SET, AFTER RINGING BELL
1320                                ;OTHERWISE GO INTO THE DATA TEST
1321  004234  104400                ENDCK:  SCOPE
1322  004236  032767  000200  173324        BIT     #200,SWR
1323  004244  001406                        BEQ     DATST
1324  004246  004767  005710                JSR     %7,BELL
1325  004252  005167  174250                COM     TRFLG           ;TOGGLE TRACE FLAG
1326  004256  000167  174532                JMP     RESTRT
1327
1328
1329
1330
1331
1332
1333
1334                                ;*****************************************************************
1335                                ;DATA RELIABILITY TEST FOR CD11
1336                                ;*****************************************************************
1337
1338                                ;CHECK SWR FOR TYPE OF DECK BEING TESTED, AND INITIALIZE POINTERS
1339  004262  005067  002236        DATST:  CLR     CLCNT           ;MAKE SURE COLUMN COUNT IS ZERO
1340  004266  005067  002230                CLR     CDCNT           ;SETUP CARD COUNT TO ENTER DATA TABLE AT BEGINNING
1341  004272  005067  174234                CLR     ERFLG           ;FLAG SET PREVENTS PRINTING OUT ERROR HEADING
1342  004276  032767  000020  173264        BIT     #20,    SWR     ;CHECK BIT 4 OF SWR FOR TYPE OF DECK
1343  004304  001412                        BEQ     ALP1            ;BRANCH IF NOT SET TO LOAD ALPHANUMERIC POINTERS
1344  004306  012767  013324  002202        MOV     #BINCD, TSTART  ;BIT 2 SET, LOAD BINARY TABLE POINTERS
1345  004314  012767  013564  002176        MOV     #BINEND+2,TEND
1346  004322  012767  015127  001632        MOV     #MSG15, DECK
1347  004330  000411                        BR      CONTD           ;BRANCH AROUND ALPHANUMERIC POINTERS
1348  004332  012767  012744  002156  ALP1: MOV     #ALPCD, TSTART  ;LOAD ALPHANUMERIC TABLE POINTERS
1349  004340  012767  013204  002152        MOV     #ALPEND+2,TEND
1350  004346  012767  015116  001606        MOV     #MSG14, DECK
1351  004354  005767  174146        CONTD:  TST     TRFLG           ;CHECK TRACE TRAP FLAG
1352  004360  001004                        BNE     TRP1            ;BRANCH IF FLAG WAS SET
1353  004362  012767  000340  173406  NOTRP1: MOV     #340,   PS      ;CLEAR TRACE BIT
1354  004370  000407                        BR      DCNT1
1355  004372  032767  010000  173170  TRP1:   BIT     #10000, SWR     ;CHECK SW12 TO INHIBIT TRACE TRAPPING
1356  004400  001370                        BNE     NOTRP1          ;BRANCH IF SET
1357  004402  012767  000360  173366        MOV     #360,   PS      ;SET TRACE BIT
1358  004410  004767  005520        DCNT1:  JSR     %7,     INIT    ;INITIALIZE CARD READER STATUS REGISTER
1359
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                                        ;SET UP INTERRUPT SERVICING, AND START READING
004414  012712  004546                  MOV     #SRVC,  @#DINT  ;SETUP RETURN POINTER
004420  042767  000340  173350          BIC     #340,   PS      ;SET PROCESSOR TO LEVEL 0
004426  016762  173344  000002          MOV     PS,     2(DINT) ;STORE CURRENT STATUS
004434  016701  002056                  MOV     TSTART, R1      ;SET UP TABLE POINTER
004440  012700  016000                  MOV     #BUFBEG,R0      ;SET UP BUFFER POINTER
004444  012767  177660  002032          MOV     #-120,  SIZE    ;SET UP "SIZE"
004452  012767  177660  002026          MOV     #-120,  OFFSET
004460  016714  002020                  MOV     SIZE,   @CDC    ;SET UP COLUMN COUNT
004464  010015                          MOV     R0,     @CDA    ;SET UP ADDRESS REG
004466  012713  000100                  MOV     #100,   @CDS    ;ENABLE INTERUPTS
004472  032767  000010  173070          BIT     #10,    SWR     ;CHECK FOR PACK MODE ONLY
004500  001406                          BEQ     CDREAD          ;BRANCH IF NOT SET
004502  032737  000004  177570          BIT     #4,     @#SWR   ;CHECK FOR IMAGE MODE ONLY
004510  001002                          BNE     CDREAD          ;BRANCH IF SET
004512  004767  001372                  JSR     %7,     PAKSET  ;SET UP FOR PACKING MODE
004516  005213                  CDREAD: INC     @CDS            ;READ
004520  032713  004000          BKGND:  BIT     #4000,  @CDS    ;CHECK FOR DATA ERROR
004524  001775                          BEQ     BKGND
004526  011467  001776                  MOV     @CDC,   DERCNT  ;SAVE THE COLUMN COUNT
004532  032713  004000          BKGND1: BIT     #4000,  @CDS    ;CHECK FOR DATA ERROR
004536  001375                          BNE     BKGND1          ;BRANCH IF SET
004540  005067  001764                  CLR     DERCNT          ;CLR COLUMN COUNT SAVER
004544  000765                          BR      BKGND

                                        ;INTERRUPT SERVICE ROUTINE WHICH RUNS DATA RELIABILITY TEST
004546  105713                  SRVC:   TSTB    @CDS            ;CHECK CONTROLLER READY
004550  100401                          BMI     .+4             ;BRANCH IF SET
004552  104000                          HLT                     ;CONTROLLER READY NOT SET
004554  032713  000002                  BIT     #2,     @CDS    ;CHECK FOR DATA PACK MODE
004560  001402                          BEQ     ISR             ;BRANCH IF IMAGE MODE
004562  000167  000470                  JMP     PSR             ;JUMP TO PACK MODE ROUTINE

004566  032713  177477          ISR:    BIT     #177477,@CDS   ;CHECK ALL BITS EXCEPT 6 AND 7
004572  001157                          BNE     ISRER           ;BRANCH TO ERROR ROUTINE
004574  005714                          TST     @CDC            ;CHECK COLUMN COUNT
004576  001401                          BEQ     .+4             ;BRANCH IF OK
004600  104000                          HLT                     ;COLUMN COUNT REGISTER NOT 0

004602  010067  001702                  MOV     R0,     BUFEND
004606  166767  001672  001674          SUB     SIZE,   BUFEND
004614  166767  001664  001666          SUB     SIZE,   BUFEND
004622  026715  001662                  CMP     BUFEND, @CDA
004626  001401                          BEQ     .+4
004630  104000                          HLT

004632  016767  001646  173662  ISRNC:  MOV     SIZE,   COUNT   ;SET UP COLUMN COUNTER
004640  022021                  ISRLP:  CMP     (R0)+,  (R1)+   ;TEST THE DATA
004642  001035                          BNE     ISRDE           ;BRANCH IF DATA ERROR
004644  020167  001650          ISRRT:  CMP     R1,     TEND    ;CHECK FOR END OF TABLE
004650  100402                          BMI     .+6             ;BRANCH IF NOT
004652  016701  001640                  MOV     TSTART, R1      ;MOVE POINTER TO TOP OF TABLE
004656  005267  173640                  INC     COUNT           ;CHECK FOR END OF BUFFER
004662  001412                          BEQ     ISRBE           ;BRANCH IF BUFFER END
004664  005267  001634                  INC     CLCNT           ;KEEP TRACK OF COLUMNS
004670  026727  001630  000120          CMP     CLCNT,  #120    ;CHECK FOR END OF CARD
```

```
1416  004676  001360                          BNE     ISRLP           ;BRANCH IF NOT END OF CARD
1417  004700  004767  001402                  JSR     %7,     NXCRD   ;INC TO NEXT CARD
1418  004704  005721                          TST     (R1)+           ;UPDATE TABLE POINTER FOR NEXT CARD
1419  004706  000754                          BR      ISRLP
1420
1421  004710  004767  001372          ISRBE:  JSR     %7,     NXCRD   ;GO TO NEXT CARD
1422  004714  005721          ISRNX:  TST     (R1)+
1423  004716  032767  000004  172644        BIT     #4,     SWR     ;CHECK FOR IMAGE MODE ONLY
1424  004724  001002                        BNE     ISRNX1          ;BRANCH IF SET
1425  004726  004767  001156                JSR     %7,     PAKSET  ;SET UP FOR PACKING MODE
1426  004732  000167  001066          ISRNX1: JMP     SRETRN          ;CALCULATE "SIZE" AND RETURN
1427
1428                                  ;DATA ERROR WAS DETECTED, OUTPUT ERROR PRINTOUT
1429  004736  005767  001560          ISRDE:  TST     CDCNT           ;CHECK FOR FIRST CARD
1430  004742  001045                        BNE     ISRD2           ;BRANCH IF NOT
1431  004744  005740          ISRD1:  TST     -(R0)           ;SUB 2 FROM POINTER
1432  004746  005267  001550                INC     CDCNT
1433  004752  022021                        CMP     (R0)+,  (R1)+   ;TEST THE DATA
1434  004754  001031                        BNE     1$              ;BRANCH IF NOT THE SAME
1435  004756  062701  000042                ADD     #42,    R1      ;ADD THE MAGIC NUMBER
1436  004762  020167  001532                CMP     R1,     TEND    ;CHECK FOF RAP AROUND
1437  004766  003402                        BLE     2$              ;BRANCH IF NOT
1438  004770  162701  000240                SUB     #240,   R1      ;RAP AROUND
1439  004774  026011  000042          2$:   CMP     42(R0), (R1)    ;CHECK FOR DOUBLE MATCH
1440  005000  001010                        BNE     3$              ;BRANCH IF NOT
1441  005002  162701  000042                SUB     #42,    R1      ;SUBTRACT THE MAGIC NUMBER
1442  005006  020167  001504                CMP     R1,     TSTART  ;CHECK FOR RAP AROUND
1443  005012  003314                        BGT     ISRRT           ;BRANCH IF NOT
1444  005014  062701  000240                ADD     #240,   R1      ;RAP AROUND
1445  005020  000711                        BR      ISRRT           ;GO CHECK REST OF DATA
1446
1447  005022  162701  000042          3$:   SUB     #42,    R1      ;SUBTRACT MAGIC NUMBER
1448  005026  020167  001464                CMP     R1,     TSTART  ;CHECK FOR RAP AROUND
1449  005032  003002                        BGT     1$              ;BRANCH IF NOT
1450  005034  062701  000240                ADD     #240,   R1      ;RAP AROUND
1451  005040  020167  001454          1$:   CMP     R1,     TEND
1452  005044  001337                        BNE     ISRD1
1453  005046  016701  001444                MOV     TSTART, R1
1454  005052  005067  001444                CLR     CDCNT           ;RESET CARD COUNTER
1455  005056  032767  020000  172504  ISRD2:  BIT     #20000,SWR      ;CK SW13 FOR INHIBIT PRINTOUT
1456  005064  001015                        BNE     ISRDE4          ;BRANCH IF SET
1457  005066  004767  001050                JSR     %7,     TYHEAD  ;TYPE HEADING, DECK, CDCNT, CLCNT
1458  005072  014167  005456                MOV     -(R1),PRINT1    ;TYPE -(R1) IN OCTAL
1459  005076  004767  005506                JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
1460  005102  000004  013711                TYPE,   SPACE
1461  005106  014067  005442                MOV     -(R0),PRINT1    ;TYPE -(R0) IN OCTAL
1462  005112  004767  005472                JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
1463  005116  022021                        CMP     (R0)+,  (R1)+   ;RESET POINTERS
1464  005120  005767  172444          ISRDE4: TST     SWR             ;CHECK FOR HALT ON ERROR
1465  005124  100001                        BPL     .+4             ;BRANCH IF HALT ON ERROR NOT SET
1466  005126  000000                        HALT                    ;HALT ON ERROR SET
1467  005130  000645                        BR      ISRRT
1468
1469                                  ;INTERUPT DUE TO SOME KIND OF ERROR
1470                                  ;THESE ERRORS ARE DESASTEROUS, THEREFORE THE DATA TEST IS RESTARTED
1471  005132  100402          ISRER:  BMI     ISRE1           ;BRANCH ON ERROR BIT 15
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1472  005134  104000                          HLT                             ;ERROR BIT 15 NOT SET
1473  005136  000445                          BR      ISRST
1474
1475  005140  032713  010000        ISRE1:    BIT     #10000, @CDS            ;CHECK FOR OFF-LINE
1476  005144  001412                          BEQ     ISRE2
1477  005146  032713  040000                  BIT     #40000, @CDS            ;CHECK FOR CARD READER ERROR
1478  005152  001002                          BNE     .+6                     ;BRANCH IF SET
1479  005154  104000                          HLT                             ;OFF-LINE BUT NOT CARD READER ERROR
1480  005156  000411                          BR      ISRE3
1481
1482  005160  004767  001062                  JSR     %7,     LASTCD          ;CHECK FOR LAST CARD
1483  005164  002222                          BGE     ISRNC                   ;BRANCH IF BOTH CARD
1484  005166  104000                          HLT                             ;CARD READER ERROR BUT NOT BOTH CARD
1485  005170  000430                          BR      ISRST
1486
1487  005172  032713  040000        ISRE2:    BIT     #40000, @CDS            ;CHECK FOR CARD READER ERROR
1488  005176  001401                          BEQ     .+4                     ;BRANCH IF NOT
1489  005200  104000                          HLT                             ;CARD READER ERROR BUT NOT OFF LINE
1490
1491  005202  032713  020000        ISRE3:    BIT     #20000, @CDS
1492  005206  001401                          BEQ     .+4
1493  005210  104000                          HLT                             ;END OF FILE ERROR (M1200 ONLY)
1494
1495  005212  032713  004000                  BIT     #4000,  @CDS
1496  005216  001401                          BEQ     .+4
1497  005220  104000                          HLT                             ;DATA ERROR
1498
1499  005222  032713  002000                  BIT     #2000,  @CDS
1500  005226  001401                          BEQ     .+4
1501  005230  104000                          HLT                             ;DATA LATE ERROR
1502
1503  005232  032713  001000                  BIT     #1000,  @CDS
1504  005236  001401                          BEQ     .+4
1505  005240  104000                          HLT                             ;NON-EXISTANT MEMORY ERROR
1506  005242  032713  077000                  BIT     #077000,@CDS            ;CHECK ALL ERROR BITS
1507  005246  001001                          BNE     .+4                     ;BRANCH IF AT LEAST ONE
1508  005250  104000                          HLT                             ;NONE OF THE ERROR BITS SET
1509  005252  000167  001220          ISRST:  JMP     DATRST                  ;RESTART THE ENTIRE DATA TEST
1510
1511  005256  032713  177475          PSR:    BIT     #177475,@CDS           ;CHECK ALL BITS EXCEPT 1,6 AND 7
1512  005262  001170                          BNE     PSRER                   ;BRANCH TO ERROR ROUTINE
1513  005264  005714                          TST     @CDC                    ;CHECK COLUMN COUNT REG.
1514  005266  001401                          BEQ     .+4                     ;BRANCH IF OK
1515  005270  104000                          HLT                             ;
1516  005272  010067  001212                  MOV     R0,     BUFEND
1517  005276  166767  001202  001204          SUB     SIZE,   BUFEND
1518  005304  026715  001200                  CMP     BUFEND, @CDA
1519  005310  001401                          BEQ     .+4
1520  005312  104000                          HLT
1521  005314  016767  001164  173200  PSRNC:  MOV     SIZE,   COUNT           ;SET UP COLUMN COUNTER
1522  005322  122021                  PSRLP:  CMPB    (R0)+,  (R1)+           ;TEST THE DATA
1523  005324  001047                          BNE     PSRDE                   ;BRANCH IF DATA ERROR
1524  005326  020167  001166          PSRRT:  CMP     R1,     TEND            ;CHECK FOR END OF TABLE
1525  005332  100402                          BMI     .+6                     ;BRANCH IF NOT
1526  005334  016701  001156                  MOV     TSTART, R1              ;MOVE POINTER TO TOP OF TABLE
1527  005340  005267  173156                  INC     COUNT                   ;CHECK FOR END OF BUFFER
```

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 1528  005344  001412                          BEQ     PSRBE           ;BRANCH IF BUFFER END
 1529  005346  005267  001152                  INC     CLCNT           ;KEEP TRACK OF COLUMNS
 1530  005352  026727  001146  000120          CMP     CLCNT,  #120    ;CHECK FOR END OF CARD
 1531  005360  001360                          BNE     PSRLP           ;BRANCH IF NOT END OF CARD
 1532  005362  004767  000720                  JSR     %7,     NXCRD   ;GO TO NEXT CARD
 1533  005366  105721                          TSTB    (R1)+           ;UPDATE TABLE POINTER FOR NEXT CARD
 1534  005370  000754                          BR      PSRLP
 1535
 1536  005372  004767  000710          PSRBE:  JSR     %7,     NXCRD   ;GO TO NEXT CARD
 1537  005376  105721          PSRNX:  TSTB    (R1)+
 1538  005400  032767  000010  172162          BIT     #10,    SWR
 1539  005406  001014                          BNE     PSRNX1
 1540  005410  162767  000240  001100          SUB     #160.,  TSTART  ;MOVE TABLE POINTER TO IMAGE TABLE
 1541  005416  162767  000120  001074          SUB     #80.,   TEND
 1542  005424  162701  000240                  SUB     #160.,  R1      ;UPDATE TABLE POINTER
 1543  005430  066701  001066                  ADD     CDCNT,  R1      ;COMPENSATE FOR BYTES
 1544  005434  042713  000002                  BIC     #2,     @CDS    ;CLR PACKING MODE BIT
 1545  005440  000167  000360          PSRNX1: JMP     SRETRN          ;CALCULATE "SIZE" AND READ MORE CARDS
 1546
 1547                                  ;DATA ERROR WAS DETECTED, OUTPUT ERROR PRINTOUT
 1548  005444  005767  001052          PSRDE:  TST     CDCNT
 1549  005450  001045                          BNE     PSRD2
 1550  005452  105740          PSRD1:  TSTB    -(R0)           ;SUB 1 FROM POINTER
 1551  005454  005267  001042                  INC     CDCNT
 1552  005460  122021                          CMPB    (R0)+,  (R1)+   ;TEST THE DATA
 1553  005462  001031                          BNE     1$              ;BRANCH IF NOT THE SAME
 1554  005464  062701  000021                  ADD     #21,    R1      ;ADD THE MAGIC NUMBER
 1555  005470  020167  001024                  CMP     R1,     TEND    ;CHECK FOR RAP AROUND
 1556  005474  003402                          BLE     2$              ;BRANCH IF NOT
 1557  005476  162701  000120                  SUB     #120,   R1      ;RAP AROUND
 1558  005502  126011  000021          2$:     CMPB    21(R0), (R1)    ;CHECK FOR DOUBLE MATCH
 1559  005506  001010                          BNE     3$              ;BRANCH IF NOT
 1560  005510  162701  000021                  SUB     #21,    R1      ;SUBTRACT THE MAGIC NUMBER
 1561  005514  020167  000776                  CMP     R1,     TSTART  ;CHECK FOR RAP AROUND
 1562  005520  003302                          BGT     PSRRT           ;BRANCH IF NOT
 1563  005522  062701  000120                  ADD     #120,   R1      ;RAP AROUND
 1564  005526  000677                          BR      PSRRT           ;GO CHECK REST OF DATA
 1565
 1566  005530  162701  000021          3$:     SUB     #21,    R1      ;SUBTRACT MAGIC NUMBER
 1567  005534  020167  000756                  CMP     R1,     TSTART  ;CHECK FOR RAP AROUND
 1568  005540  003002                          BGT     1$              ;BRANCH IF NOT
 1569  005542  062701  000120                  ADD     #120,   R1      ;RAP AROUND
 1570  005546  020167  000746          1$:     CMP     R1,     TEND
 1571  005552  001337                          BNE     PSRD1
 1572  005554  016701  000736                  MOV     TSTART, R1
 1573  005560  005067  000736                  CLR     CDCNT           ;RESET CARD COUNTER
 1574  005564  032767  020000  171776  PSRD2:  BIT     #20000,SWR      ;CK SW13 FOR INHIBIT PRINTOUT
 1575  005572  001017                          BNE     PSRDE3          ;BRANCH IF SET
 1576  005574  004767  000342                  JSR     %7,     TYHEAD  ;TYPE HEADING, DECK, CDCNT, CLCNT
 1577  005600  000004  013711                  TYPE,   SPACE
 1578  005604  114167  004745                  MOVB    -(R1),  PRINT1+1 ;MOVE BYTE INTO PRINT BUFFER
 1579  005610  004767  004754                  JSR     %7,     PRINTB  ; AND PRINT IT
 1580  005614  000004  013706                  TYPE,   SPACE-3
 1581  005620  114067  004731                  MOVB    -(R0),  PRINT1+1 ;MOVE BYTE INTO PRINT BUFFER
 1582  005624  004767  004740                  JSR     %7,     PRINTB  ; AND PRINT IT
 1583  005630  122021                          CMPB    (R0)+,  (R1)+   ;RESET POINTERS
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1584  005632  005767  171732          PSRDE3: TST     SWR             ;CHECK FOR HALT ON ERROR
1585  005636  100001                          BPL     .+4             ;BRANCH IF HALT ON ERROR NOT SET
1586  005640  000000                          HALT                    ;HALT ON ERROR SET
1587  005642  000631                          BR      PSRRT
1588
1589                                  ;INTERUPT DUE TO SOME KIND OF ERROR
1590  005644  100402                  PSRER:  BMI     PSRE1           ;BRANCH ON ERROR BIT 15
1591  005646  104000                          HLT                     ;ERROR BIT 15 NOT SET
1592  005650  000463                          BR      PSRST
1593
1594  005652  032713  004000          PSRE1:  BIT     #4000,  @CDS
1595  005656  001414                          BEQ     PSRE2           ;BRANCH IF NOT
1596  005660  032713  000002                  BIT     #2,     @CDS
1597  005664  001001                          BNE     .+4
1598  005666  104000                          HLT
1599  005670  032767  000020  171672          BIT     #20,    SWR
1600  005676  001001                          BNE     .+4             ;BRANCH IF BINARY DECK
1601  005700  104000                          HLT
1602  005702  012767  177660  172612          MOV     #-120,  COUNT   ;ONLY READ ONE CARD
1603  005710  032713  010000          PSRE2:  BIT     #10000, @CDS    ;CHECK FOR OFF-LINE
1604  005714  001415                          BEQ     PSRE3
1605  005716  032713  040000                  BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
1606  005722  001002                          BNE     .+6             ;BRANCH IF SET
1607  005724  104000                          HLT                     ;OFF-LINE BUT NOT CARD READER ERROR
1608  005726  000414                          BR      PSRE4
1609
1610  005730  004767  000312                  JSR     %7,     LASTCD  ;CHECK FOR LAST CARD
1611  005734  002402                          BLT     1$              ;BRANCH IF NOT
1612  005736  000167  177352                  JMP     PSRNC           ;BRANCH IF BOTH CARD
1613  005742  104000          1$:             HLT                     ;CARD READER ERROR BUT NOT BOTH CARD
1614  005744  000167  000526                  JMP     DATRST          ;RESTART THE ENTIRE TEST
1615
1616  005750  032713  040000          PSRE3:  BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
1617  005754  001401                          BEQ     .+4             ;BRANCH IF NOT
1618  005756  104000                          HLT                     ;CARD READER ERROR BUT NOT OFF LINE
1619
1620  005760  032713  020000          PSRE4:  BIT     #20000, @CDS
1621  005764  001401                          BEQ     .+4
1622  005766  104000                          HLT                     ;END OF FILE ERROR (M1200 ONLY)
1623
1624  005770  032713  002000                  BIT     #2000,  @CDS
1625  005774  001401                          BEQ     .+4
1626  005776  104000                          HLT                     ;DATA LATE ERROR
1627
1628  006000  032713  001000                  BIT     #1000,  @CDS
1629  006004  001401                          BEQ     .+4
1630  006006  104000                          HLT                     ;NON-EXISTANT MEMORY ERROR
1631  006010  032713  077000                  BIT     #077000,@CDS    ;CHECK ALL ERROR BITS
1632  006014  001001                          BNE     .+4             ;BRANCH IF AT LEAST ONE
1633  006016  104000                          HLT                     ;NONE OF THE ERROR BITS SET
1634  006020  000167  177276          PSRST:  JMP     PSRLP           ;GO CHECK THE DATA
1635
1636                                  ;RETURN PORTION OF INTERUPT SERVICE ROUTINE
1637                                  ;CALCULATES A NEW "SIZE" (NUMBER OF COUMNS TO BE READ)
1638                                  ;SETS UP THE CARD READER BUFFERS, AND ISUES THE READ COMMAND
1639                                  ;THEN DOES AN RTI TO THE BACKGROUND ROUTINE
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1640  006024  066767  000456  000452  SRETRN: ADD     OFFSET, SIZE
1641  006032  100404                          BMI     SRETR1
1642  006034  012767  177660  000444          MOV     #-120.  OFFSET
1643  006042  000770                          BR      SRETRN
1644  006044  032767  001000  000432  SRETR1: BIT     #001000,SIZE
1645  006052  001004                          BNE     SRETR4
1646  006054  012767  000120  000424  SRETR3: MOV     #120.   OFFSET
1647  006062  000760                          BR      SRETRN
1648  006064  004767  000156          SRETR4: JSR     %7,     LASTCD  ;CHECK FOR MORE THAN 80 CARDS
1649  006070  003371                          BGT     SRETR3          ;BRANCH IF GREATER
1650  006072  016714  000406                  MOV     SIZE,   @CDC    ;SET UP COLMN COUNT
1651  006076  012700  016000                  MOV     #BUFBEG,R0      ;RESET TABLE POINTER
1652  006102  010015                          MOV     R0,     @CDA    ;SET UP ADDRESS REG
1653  006104  005213                          INC     @CDS            ;READ
1654  006106  000002                          RTI
1655
1656
1657                                  ;SUBROUTINE TO SET PACKING MODE AND MOVE THE POINTERS FOR THE DATA.
1658  006110  062767  000240  000400  PAKSET: ADD     #160.,  TSTART  ;MOVE TABLE POINTER TO PACKED TABLE
1659  006116  062767  000120  000374          ADD     #80.,   TEND
1660  006124  062701  000240                  ADD     #160.,  R1      ;UPDATE TABLE POINTER
1661  006130  166701  000366                  SUB     CDCNT,  R1      ;COMPENSATE FOR BYTES
1662  006134  052713  000002                  BIS     #2,     @CDS    ;SET PACKING MODE BIT
1663  006140  000207                          RTS     %7
1664
1665                                  ;SUBROUTINE TO TYPE HEADING, TYPE OF DECK, CARD COUNT, AND COLUMN COUNT
1666  006142  005767  172364          TYHEAD: TST     ERFLG           ;CHECK FOR FIRST ERROR
1667  006146  001004                          BNE     NOHEAD          ;BRANCH IF NOT
1668  006150  005267  172356                  INC     ERFLG           ;SET FLAG
1669  006154  000004  015047                  TYPE,   MSG13           ;TYPE HEADING FOR DATA ERRORS
1670  006160  000004                  NOHEAD: TYPE                    ;OUTPUT TYPE OF DECK
1671  006162  000000                  DECK:   DUMMY                   ;POINTER TO DECK TITLE
1672  006164  000004  013711                  TYPE,   SPACE
1673  006170  005267  000326                  INC     CDCNT           ;ADJUST CADR COUNT
1674  006174  016767  000322  004352          MOV     CDCNT,PRINT1    ;TYPE CDCNT IN OCTAL
1675  006202  004767  004402                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
1676  006206  005367  000310                  DEC     CDCNT           ;READJUST CADR COUNT
1677  006212  000004  013711                  TYPF,   SPACE
1678  006216  005267  000302                  INC     CLCNT           ;ADJUST COLUMN COUNT
1679  006222  016767  000276  004324          MOV     CLCNT,PRINT1    ;TYPE CLCNT IN OCTAL
1680  006230  004767  004354                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
1681  006234  005367  000264                  DEC     CLCNT           ;READJUST COLUMN COUNT
1682  006240  000004  013711                  TYPE,   SPACE
1683  006244  000207                          RTS     %7
1684
1685                                  ;SUBROUTINE TO CHECK FOR LAST CARD
1686  006246  016767  000232  000236  LASTCD: MOV     SIZE,   TEMP1
1687  006254  016767  000242  000232          MOV     CDCNT,  TEMP2
1688  006262  005267  000226          LSTCD1: INC     TEMP2
1689  006266  062767  000120  000216          ADD     #120.,  TEMP1
1690  006274  100772                          BMI     LSTCD1
1691  006276  026727  000212  000120          CMP     TEMP2,  #80.
1692  006304  000207                          RTS     %7
1693
1694                                  ;SUBROUTINE TO KEEP TRACK OF CARDS
1695  006306  005067  000212          NXCRD:  CLR     CLCNT           ;RESET COLUMN COUNT
```

```
 1696  006312  005267  000204                    INC     CDCNT           ;KEEP TRACK OF CARDS
 1697  006316  026727  000200  000120            CMP     CDCNT,  #120    ;CHECK FOR BOTH CARD
 1698  006324  002001                            BGE     ALLDON
 1699  006326  000207                            RTS     %7              ;RETURN
 1700
 1701  006330  005726                    ALLDON: TST     (6)+            ;CORRECT STACK POINTER TO REPLACE RTS
 1702  006332  022626                            CMP     (6)+,   (6)+    ;CORRECT STACK POINTER TO REPLACE RTI
 1703  006334  004767  003622                    JSR     %7,BELL         ;RING BELL
 1704  006340  013700  000042                    MOV     @#42,   %0      ;LOAD CONTENTS OF SOFT VECTOR 42
 1705  006344  001405                            BEQ     HOOK1           ;BRANCH IF NO HOOK
 1706  006346  000005                            RESET                   ;CLEAR ALL I/O
 1707  006350  004710                            JSR     %7,     (R0)    ;RETURN TO MONITOR
 1708  006352  000240                            NOP
 1709  006354  000240                            NOP
 1710  006356  000240                            NOP
 1711  006360  032767  000040  171202    HOOK1:  BIT     #40,SWR         ;CHECK SWR FOR HALT AT END OF DECK
 1712  006366  001402                            BEQ     ONLINE          ;CONTINUE IF NOT SET
 1713  006370  000000                            HALT                    ;END OF DECK,SW5 SET
 1714  006372  000427                            BR      DECKCK
 1715
 1716  006374  032713  010000            ONLINE: BIT     #10000, @CDS    ;CHECK FOR OFF-LINE
 1717  006400  001424                            BEQ     DECKCK          ;BRANCH IF NOT
 1718  006402  005713                            TST     @CDS            ;CHECK FOR ERROR (BIT 15)
 1719  006404  100401                            BMI     .+4             ;BRANCH IF SET OK
 1720  005406  104000                            HLT                     ;ERROR BIT 15 NOT SET
 1721
 1722  006410  032713  040000                    BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
 1723  006414  001001                            BNE     .+4             ;BRANCH IF SET OK
 1724  006416  104000                            HLT                     ;OFF-LINE NOT DUE TO CARD READER ERROR
 1725
 1726  006420  032713  023471                    BIT     #023471,@CDS    ;CHECK FOR EXTRA BITS SET
 1727  006424  001401                            BEQ     .+4             ;BRANCH IF Ok
 1728  006426  104000                            HLT                     ;EXTRA ERROR BITS SET
 1729
 1730  006430  012712  006440                    MOV     #ONINT, @#DINT  ;SET UP INTERUPT VECTOR
 1731  006434  000001                            WAIT                    ;WAIT FOR AN INTERUPT
 1732  006436  000776                            BR      .-2             ;WAIT ON TRACE TRAPS
 1733
 1734  006440  032713  000010            ONINT:  BIT     #10,    @CDS    ;CHECK FOR TRANSITION TO ON LINE
 1735  006444  001001                            BNE     .+4             ;BRANCH IF SET OK
 1736  006446  104000                            HLT                     ;INTERUPT BY OTHER THAN BIT 3 SETTING
 1737
 1738  006450  022626                            CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
 1739                            ;WHEN CONTINUING FROM ONE DECK TO ANOTHER, CHECK SW6 FOR TYPE
 1740                            ;OF TESTING TO BE PERFORMED
 1741  006452  005167  172050    DECKCK: COM     TRFLG           ;TOGGLE TRACE FLAG
 1742  006456  032767  000100  171104    BIT     #100,SWR                ;CHECK SW6
 1743  006464  001402                            BEQ     .+6             ;BRANCH IF NOT SET
 1744  006466  000167  172322                    JMP     RESTRT          ;RERUN COMBINED INSTRUCTION AND DATA TEST
 1745  006472  000167  175564                    JMP     DATST
 1746
 1747  006476  022626                    DATRST: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
 1748  006500  000167  175556                    JMP     DATST           ;RESTART DATA TEST
 1749
 1750  006504  177660                    SIZE:   -120
 1751  006506  177660                    OFFSET: -120
```

```
1752  006510  000000          BUFEND: 0
1753  006512  000000          TEMP1:  0
1754  006514  000000          TEMP2:  0
1755  006516  000000          TSTART: 0       ;STARTING ADDRESS OF DATA TABLE
1756  006520  000000          TEND:   0       ;END ADDRESS OF DATA TABLE
1757  006522  000000          CDCNT:  0       ;NUMBER OF CARD BEING READ
1758  006524  000000          CLCNT:  0       ;NUMBER OF COLUMN BEING CHECKED
1759  006526  000000          PTOFF:  0       ;OFFSET TO POINTER FOR DATA PRINTOUT
1760  006530  000000          DERCNT: 0       ;DATA ERROR COLUMN COUNT
```

```
1761
1762                                        ;SETUP FOR ERROR FUNCTION TEST
1763  006532  005067  172002          ER1200: CLR     CD1000          ;CARD READER IS M-1200
1764  006536  000167  000006                  JMP     ER12CD
1765  006542  012767  177777  171770  ERCD11: MOV     #177777, CD1000 ;CARD READER IS M1000
1766  006550  004767  171766          ER12CD: JSR     %7,SETUP        ;INITIALIZE REGISTERS
1767  006554  012767  006570  003652          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS
1768  006562  005067  003642                  CLR     ITMAX           ;RUN EACH ERROR TEST ONCE ONLY
1769
1770
1771                                        ;HALT SHOULD CAUSE DATA LATE ERROR (BIT 10)
1772                                        ;SHOULD SET ERROR (BIT 15)
1773  006566  104400                  TESTA:  SCOPE
1774  006570  004767  003340                  JSR     %7,     INIT    ;INITIALIZE STATUS REGISTER
1775  006574  000004  013717                  TYPE,   CRLF
1776  006600  000004  015417                  TYPE,   MSG22           ;"WHEN PRINTING STOPS PUT HALT AND
1777  006604  000004  015462                  TYPE,   MSG23           ;SINGLE BUS CYCLE DOWN, AND HIT 'CONTINUE' ON THE
1778  006610  000004  015545                  TYPE,   MSG24           ;CONSOLE UNTIL ONE CARD IS READ
1779  006614  000004  015606                  TYPE,   MSG25           ;THEN PUT UP THE TWO SWITCHES AND HIT
1780  006620  000004  015655                  TYPE,   MSG26           ;'CONTINUE' ON THE CONSOLE
1781  006624  000004  013714                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1782  006630  012714  177701                  MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
1783  006634  012715  016000                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1784  006640  000000                          HALT                    ;
1785  006642  005213                          INC     @CDS            ;START READING
1786  006644  105713                          TSTB    @CDS            ;CHECK FOR CONTROLLER READY
1787  006646  001001                          BNE     .+4             ;BRANCH IF SET OK
1788  006650  104000                          HLT                     ;CONTROLLER READY FAILED TO SET
1789
1790  006652  005713                          TST     @CDS            ;CHECK FOR ERROR ( BIT 15)
1791  006654  001001                          BNE     .+4             ;BRANCH IF SET OK
1792  006656  104000                          HLT                     ;ERROR BIT 15 NOT SET
1793
1794  006660  032713  002000                  BIT     #2000.  @CDS    ;CHECK FOR DATA LATE ERROR (BIT 10)
1795  006664  001001                          BNE     .+4             ;BRANCH IF SET OK
1796  006666  104000                          HLT                     ;DATA LATE BIT 10 NOT SET
1797
1798  006670  032713  075577                  BIT     #075577,@CDS    ;CHECK FOR ANY OTHER BITS
1799  006674  001401                          BEQ     .+4             ;BRANCH IF OK
1800  006676  104000                          HLT                     ;EXTRA BITS SET IN STATUS WORD
1801
1802                                        ;THE CARD READER GOING OFF-LINE SHOULD SET ERROR (BIT 15)
1803                                        ;AND OFF-LINE (BIT 12)
1804                                        ;GOING BACK ON LINE SHOULD SET "TRANSITION TO ON-LINE" (BIT 3)
1805  006700  104400                  TESTB:  SCOPE
1806  006702  004767  003226                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1807  006706  000004  014023                  TYPE,   MSG3            ;"PRESS CARD READER 'STOP'"
1808  006712  000004  013756                  TYPE,   MSG2            ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1809  006716  000004  013714                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1810  006722  000000                          HALT
1811  006724  032713  010000                  BIT     #10000,@CDS     ;CHECK BIT 12
1812  006730  001001                          BNE     .+4             ;BRANCH IF SET
1813  006732  104000                          HLT                     ;OFF-LINE (BIT 12) WASN'T SET
1814
1815  006734  005713                          TST     @CDS            ;CHECK BIT 15
1816  006736  100401                          BMI     .+4             ;BRANCH IF SET
```

```
1817  006740  104000                          HLT                     ;ERROR (BIT 15) WASN'T SET
1818
1819  006742  031327  067577                  BIT     @CDS,#067577    ;CHECK FOR EXTRA BITS
1820  006746  001401                          BEQ     .+4             ;BRANCH IF OK
1821  006750  104000                          HLT                     ;STATUS WORD ERROR
1822
1823  006752  000004  013722                  TYPE,   MSG1            ;"PRESS CARD READER 'RESET'";
1824  006756  000004  013756                  TYPE,   MSG2            ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1825  006762  000004  013714                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1826  006766  000000                          HALT
1827
1828  006770  032713  000010                  BIT     #10,    @CDS    ;CHECK FOR TRANSIION TO ON-LINE'BIT 3)
1829  006774  001001                          BNE     .+4             ;BRANCH IF SET OK
1830  006776  104000                          HLT                     ;TRANSITION TO ON-LINE FAILED TO SET
1831
1832  007000  032713  010000                  BIT     #10000, @CDS    ;CHECK FOR OFF-LINE
1833  007004  001401                          BEQ     .+4             ;BRANCH IF OK
1834  007006  104000                          HLT                     ;OFF-LINE STILL SET
1835
1836  007010  005713                          TST     @CDS            ;CHECK ERROR (BIT 15)
1837  007012  100401                          BMI     .+4             ;BRANCH IF STILL SET
1838  007014  104000                          HLT                     ;ERROR BIT 15 CLEARED
1839
1840  007016  032713  077567                  BIT     #077567,@CDS    ;CHECK FOR EXTRA BITS
1841  007022  001401                          BEQ     .+4             ;BRANCH IF OK
1842  007024  104000                          HLT                     ;EXTRA STATUS BITS SET
1843
1844                                  ;TRYING TO READ WHEN CARD READER IS OFF-LINE SHOULD CAUSE AN INTERUPT
1845                                  ;CHECK THAT AN INTERRUPT OCCURS WHEN THE CARD READER COMES ON LINE
1846  007026  104400                  TESTC:  SCOPE
1847  007030  004767  003100                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1848  007034  012712  007106                  MOV     #TINTC, @ADINT  ;LOAD RETURN POINTER
1849  007040  052767  000340  170730          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1850  007046  016762  170724  000002          MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
1851  007054  042767  000340  170714          BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
1852  007062  012713  000100                  MOV     #100,   @CDS    ;SET INTERUPT ENABLE
1853  007066  000004  014023                  TYPE,   MSG3            ;"PRESS CARD READER 'STOP'"
1854  007072  000004  013714                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1855  007076  032713  010000          TLOPC:  BIT     #10000, @CDS    ;WAIT FOR OFF-LINE TO SET
1856  007102  001775                          BEQ     TLOPC
1857  007104  000402                          BR      CONTC           ;SKIP INTERUPT HANDLER
1858
1859  007106  104000                  TINTC:  HLT                     ;'STOP' SHOULDN'T CAUSE AN INTERUPT
1860  007110  000002                          RTI                     ;RETURN FROM THE INTERUPT
1861
1862  007112  105713                  CONTC:  TSTB    @CDS            ;CHECK CONTROLLER READY BIT 7
1863  007114  100401                          BMI     .+4             ;BRANCH IF OK
1864  007116  104000                          HLT                     ;CU READY DIDN'T SET YET
1865
1866  007120  005713                          TST     @CDS            ;CHECK ERROR BIT
1867  007122  100401                          BMI     .+4             ;BRANCH IF SET
1868  007124  104000                          HLT                     ;ERROR (BIT 15) NOT SET
1869
1870  007126  032713  067477                  BIT     #067477,@CDS    ;CHECK FOR EXTRA BITS
1871  007132  001401                          BEQ     .+4             ;BRANCH IF OK
1872  007134  104000                          HLT                     ;STATUS WORD ERROR
```

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1873
1874  007136  012712  007170                  MOV     #TINTCA,@#DINT  ;LOAD RETURN POINTER
1875  007142  052767  000340  170626          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1876  007150  016762  170622  000002          MOV     PS,     2(#DINT) ;LOAD RETURN PROCESSOR STATUS
1877  007156  042767  000340  170612          BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
1878  007164  005213                          INC     @#CDS           ;TRY TO READ A CARD
1879  007166  000777                          BR      .               ;WAIT FOR THE INTERUPT
1880
1881  007170  022626                  TINTCA: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
1882  007172  105713                          TSTB    @#CDS           ;CHECK CONTROLLER READY BIT 7
1883  007174  100401                          BMI     .+4             ;BRANCH IF OK
1884  007176  104000                          HLT                     ;CU READY DIDN'T SET YET
1885
1886  007200  032713  010000                  BIT     #10000, @#CDS   ;CHECK FOR OFF-LINE BIT 12
1887  007204  001001                          BNE     .+4             ;BRANCH IF OK
1888  007206  104000                          HLT                     ;OFF-LINE BIT 12 NOT SET
1889
1890  007210  005713                          TST     @#CDS           ;CHECK ERROR BIT
1891  007212  100401                          BMI     .+4             ;BRANCH IF SET
1892  007214  104000                          HLT                     ;ERROR (BIT 15) NOT SET
1893
1894  007216  032713  067477                  BIT     #067477,@#CDS   ;CHECK FOR EXTRA BITS
1895  007222  001401                          BEQ     .+4             ;BRANCH IF OK
1896  007224  104000                          HLT                     ;STATUS WORD ERROR
1897
1898  007226  012712  007266                  MOV     #TINTCB,@#DINT  ;LOAD RETURN POINTER
1899  007232  052767  000340  170536          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1900  007240  016762  170532  000002          MOV     PS,     2(#DINT) ;LOAD RETURN PROCESSOR STATUS
1901  007246  042767  000340  170522          BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
1902  007254  000004  013722                  TYPE,   MSG1            ;"PRESS CARD READER 'RESET'"
1903  007260  000004  013714                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1904  007264  000777                          BR      .               ;WAIT FOR THE INTERUPT
1905
1906  007266  022626                  TINTCB: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
1907  007270  032713  000010                  BIT     #10,    @#CDS   ;CHECK FOR TRANSITION TO ON-LINE(BIT 3)
1908  007274  001001                          BNE     .+4             ;BRANCH IF SET OK
1909  007276  104000                          HLT                     ;TRANSITION TO ON-LINE FAILED TO SET
1910
1911  007300  032713  010000                  BIT     #10000, @#CDS   ;CHECK FOR OFF-LINE
1912  007304  001401                          BEQ     .+4             ;BRANCH IF OK
1913  007306  104000                          HLT                     ;OFF-LINE STILL SET
1914
1915  007310  005713                          TST     @#CDS           ;CHECK ERROR (BIT 15)
1916  007312  100401                          BMI     .+4             ;BRANCH IF STILL SET
1917  007314  104000                          HLT                     ;ERROR BIT IS CLEARED
1918
1919  007316  032713  077467                  BIT     #077467,@#CDS   ;CHECK FOR EXTRA BITS
1920  007322  001401                          BEQ     .+4             ;BRANCH IF OK
1921  007324  104000                          HLT                     ;EXTRA STATUS BITS SET
1922
1923                          ;INPUT HOPPER EMPTY SHOULD SET SPECIAL CONDITION
1924                          ;CHECK THAT INTERRUPTS OCCUR WHEN THE CARD READER COMES ON LINE
1925  007326  104400          TESTD:  SCOPE
1926  007330  004767  002600                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1927  007334  000004  014111                  TYPE,   MSG5            ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
1928  007340  000004  013756                  TYPE,   MSG2            ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
```

```
 1929  007344  000004  013714                    TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
 1930  007350  000000                            HALT
 1931  007352  032713  010000                    BIT     #10000,@CDS     ;CHECK BIT12
 1932  007356  001001                            BNE     .+4             ;BRANCH IF SET
 1933  007360  104000                            HLT                     ;OFF-LINE (BIT 12) WASN'T SET
 1934
 1935  007362  005713                            TST     @CDS            ;CHECK ERROR BIT
 1936  007364  100401                            BMI     .+4             ;BRANCH IF SET
 1937  007366  104000                            HLT                     ;ERROR (BIT 15) NOT SET
 1938
 1939  007370  032713  040000                    BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
 1940  007374  001001                            BNE     .+4             ;BRANCH IF SET
 1941  007376  104000                            HLT                     ;CARD REAER ERROR BIT 14 NOT SET
 1942
 1943  007400  032713  027573                    BIT     #027573,@CDS    ;CHECK FOR EXTRA BITS
 1944  007404  001401                            BEQ     .+4             ;BRANCH IF OK
 1945  007406  104000                            HLT                     ;STATUS WORD ERROR
 1946
 1947  007410  012712  007460                    MOV     #TINTD, @ADINT  ;LOAD RETURN POINTER
 1948  007414  052767  000340  170354            BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
 1949  007422  016762  170350  000002            MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
 1950  007430  042767  000340  170340            BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
 1951  007436  012713  000100                    MOV     #100,   @CDS    ;SET INTERUPT ENABLE
 1952  007442  000004  014162                    TYPE,   MSG6            ;"RESTORE CARDS TO THE INPUT HOPPER"
 1953  007446  000004  013722                    TYPE,   MSG1            ;"PRESS CARD READER 'RESET'"
 1954  007452  000004  013714                    TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
 1955  007456  000777                            BR      .               ;WAIT FOR THE INTERUPT
 1956
 1957  007460  022626                TINTD:      CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
 1958  007462  012712  007524                    MOV     #TINTDA,@ADINT  ;LOAD RETURN POINTER
 1959  007466  052767  000340  170302            BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
 1960  007474  016762  170276  000002            MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
 1961  007502  042767  000340  170266            BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
 1962  007510  012714  177701                    MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
 1963  007514  012715  016000                    MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
 1964  007520  005213                            INC     @CDS            ;START READING
 1965  007522  000777                            BR      .               ;WAIT FOR AN INTERUPT
 1966
 1967  007524  022626                TINTDA:     CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
 1968  007526  022713  000300                    CMP     #000300,@CDS    ;CHECH THE CARD READER STATUS
 1969  007532  001401                            BEQ     .+4             ;BRANCH IF OK
 1970  007534  104000                            HLT                     ;CARD READER STATUS ERROR
 1971
 1972                                ;OUTPUT STACKER FULL SHOULD SET BITS 15, 14, 12, 7
 1973  007536  104400                TESTE:      SCOPE
 1974  007540  004767  002370                    JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 1975  007544  000004  014226                    TYPE,   MSG7            ;"PULL OUTPUT STACKER PRESSURE ARM
                                                                          ;ALL THE WAY DOWN"
 1976
 1977  007550  000004  013756                    TYPE,   MSG2            ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 1978  007554  000004  013714                    TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
 1979  007560  000000                            HALT
 1980  007562  032713  010000                    BIT     #10000,@CDS     ;CHECK OFF-LINE BIT12
 1981  007566  001001                            BNE     .+4             ;BRANCH IF SET
 1982  007570  104000                            HLT                     ;OFF-LINE (BIT 12) WASN'T SET
 1983
 1984  007572  005713                            TST     @CDS            ;CHECK ERROR BIT 15
```

```
1985  007574  100401                          BMI     .+4                 ;BRANCH IF SET
1986  007576  104000                          HLT                         ;ERROR BIT IS NOT SET
1987
1988  007600  032713  040000                  BIT     #40000, @CDS        ;CHECK FOR CARD READER ERROR
1989  007604  001001                          BNE     .+4                 ;BRANCH IF SET
1990  007606  104000                          HLT                         ;CARD READER ERROR BIT 14 NOT SET
1991
1992  007610  032713  027577                  BIT     #027577,@CDS        ;CHECK FOR EXTRA BITS
1993  007614  001401                          BEQ     .+4                 ;BRANCH IF OK
1994  007616  104000                          HLT                         ;STATUS WORD ERROR
1995
1996  007620  012712  007664                  MOV     #TINTE, @ADINT      ;LOAD RETURN POINTER
1997  007624  052767  000340  170144          BIS     #340,   PS          ;SET PROCESSOR TO LEVEL 7
1998  007632  016762  170140  000002          MOV     PS,     2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
1999  007640  042767  000340  170130          BIC     #340,   PS          ;SET PROSSOR PRIORITY TO 0
2000  007646  012713  000100                  MOV     #100,   @CDS        ;SET INTERUPT ENABLE
2001  007652  000004  013722                  TYPE,   MSG1                ;"PRESS CARD READER 'RESET'"
2002  007656  000004  013714                  TYPE,   CRLF-3              ;MOVE MESSAGE UP ON TTY
2003  007662  000777                          BR      .                   ;WAIT FOR THE INTERUPT
2004
2005  007664  022626                  TINTE:  CMP     (SP)+,  (SP)+       ;RESTORE THE STACK
2006  007666  012712  007730                  MOV     #TINTEA,@ADINT      ;LOAD RETURN POINTER
2007  007672  052767  000340  170076          BIS     #340,   PS          ;SET PROCESSOR TO LEVEL 7
2008  007700  016762  170072  000002          MOV     PS,     2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
2009  007706  042767  000340  170062          BIC     #340,   PS          ;SET PROSSOR PRIORITY TO 0
2010  007714  012714  177701                  MOV     #-77,   @CDC        ;SET UP COLUMN COUNT
2011  007720  012715  016000                  MOV     #BUFBEG,@CDA        ;SET UP BUS ADDRESS
2012  007724  005213                          INC     @CDS                ;START READING
2013  007726  000777                          BR      .                   ;WAIT FOR AN INTERUPT
2014
2015  007730  022626                  TINTEA: CMP     (SP)+,  (SP)+       ;RESTORE THE STACK
2016  007732  022713  000300                  CMP     #000300,@CDS        ;CHECH THE CARD READER STATUS
2017  007736  001401                          BEQ     .+4                 ;BRANCH IF OK
2018  007740  104000                          HLT                         ;CARD READER STATUS ERROR
2019
2020                                  ;A PICK CHECK ERROR SHOULD SET BIT 15, BIT 14, AND BIT 12
2021                                  ;THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO
2022                                  ;THE READ STATION WITHIN 400 MS.
2023  007742  104400                  TESTF:  SCOPE
2024  007744  004767  002164                  JSR     %7,INIT
2025  007750  000004  014111                  TYPE,   MSG5                ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
2026  007754  000004  013756                  TYPE,   MSG2                ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2027  007760  000004  014330                  TYPE,   MSG8                ;"HOLD DOWN THE SWITCH UNDER THE CAP
2028                                                                      ;OF THE INPUT HOPPER"
2029  007764  000004  013722                  TYPE,   MSG1                ;"PRESS CARD READER 'RESET'"
2030  007770  000004  013714                  TYPE,   CRLF-3              ;MOVE MESSAGE UP ON TTY
2031  007774  000000                          HALT
2032  007776  032713  010000                  BIT     #10000, @CDS        ;CHECK FOR OFF-LINE
2033  010002  001001                          BNE     .+4                 ;BRANCH IF SET
2034  010004  104000                          HLT                         ;OFF LINE NOT SET AFTER "CONTINUE"
2035
2036  010006  032713  000010                  BIT     #10,    @CDS        ;CHECK FOR "TRANSITION TO ON LINE"
2037  010012  001775                          BEQ     .-4                 ;WAIT FOR IT
2038  010014  022713  140210                  CMP     #140210,@CDS        ;CHECK FOR CORRECT STATUS BITS
2039  010020  001401                          BEQ     .+4                 ;BRANCH IF OK
2040  010022  104000                          HLT                         ;STATUS NOT EQUAL TO 140210
```

```
2041
2042  010024  012714  177701                MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2043  010030  012715  016000                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2044  010034  005213                        INC     @CDS            ;READ
2045  010036  105713                        TSTB    @CDS            ;CHECK CONTROLLER READY
2046  010040  100376                        BPL     .-2             ;WAIT FOR CONTROLLER READY
2047  010042  032713  010000                BIT     #10000,@CDS     ;CHECK BIT12
2048  010046  001001                        BNE     .+4             ;BRANCH IF SET
2049  010050  104000                        HLT                     ;OFF-LINE (BIT 12) WASN'T SET
2050
2051  010052  005713                        TST     @CDS            ;CHECK SPECIAL CONDITION BIT
2052  010054  100401                        BMI     .+4             ;BRANCH IF SET
2053  010056  104000                        HLT                     ;SPECIAL CONDITION NOT SET
2054
2055  010060  032713  040000                BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
2056  010064  001001                        BNE     .+4             ;BRANCH IF SET
2057  010066  104000                        HLT                     ;CARD READER ERROR BIT 14 NOT SET
2058
2059  010070  031327  027577                BIT     @CDS,#027577    ;CHECK FOR EXTRA BITS
2060  010074  001401                        BEQ     .+4             ;BRANCH IF OK
2061  010076  104000                        HLT                     ;STATUS WORD ERROR
2062
2063  010100  012712  010150                MOV     #TINTF, @ADINT  ;LOAD RETURN POINTER
2064  010104  052767  000340  167664        BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2065  010112  016762  167660  000002        MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2066  010120  042767  000340  167650        BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2067  010126  012713  000100                MOV     #100,   @CDS    ;SET INTERUPT ENABLE
2068  010132  000004  014162                TYPE,   MSG6            ;"RESTORE CARDS TO THE INPUT HOPPER"
2069  010136  000004  013722                TYPE,   MSG1            ;"PRESS CARD READER 'RESET'"
2070  010142  000004  013714                TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2071  010146  000777                        BR      .               ;WAIT FOR THE INTERUPT
2072
2073  010150  022626                TINTF:  CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2074  010152  012712  010214                MOV     #TINTFA,@ADINT  ;LOAD RETURN POINTER
2075  010156  052767  000340  167612        BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2076  010164  016762  167606  000002        MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2077  010172  042767  000340  167576        BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2078  010200  012714  177701                MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2079  010204  012715  016000                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2080  010210  005213                        INC     @CDS            ;START READING
2081  010212  000777                        BR      .               ;WAIT FOR AN INTERUPT
2082
2083  010214  022626                TINTFA: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2084  010216  022713  000300                CMP     #000300,@CDS    ;CHECH THE CARD READER STATUS
2085  010222  001401                        BEQ     .+4             ;BRANCH IF OK
2086  010224  104000                        HLT                     ;CARD READER STATUS ERROR
2087
2088                        ;A STACK CHECK ERROR SHOULD SET BIT 15, BIT 14, AND BIT 12
2089                        ;THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO
2090                        ;THE READ STATION
2091  010226  104400        TESTG:  SCOPE
2092  010230  004767  001700                JSR     %7,INIT
2093  010234  000004  014023                TYPE,   MSG3            ;"PRESS CARD READER 'STOP'"
2094  010240  000004  014421                TYPE,   MSG9            ;"SLIDE A CARD FROM THE OUTPUT HOPPER ABOUT
2095                                                                ;HALF AN INCH BACK INTO THE READ HEAD
2096                                                                ;BLOCKING THE PHOTO CELL
```

```
2097  010244  000004  013722                TYPE,   MSG1           ;"PRESS CARD READER 'RESET'"
2098  010250  000004  013714                TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2099  010254  032713  010000      TLOPG:    BIT     #10000, @CDS    ;CHECK FOR OF LINE
2100  010260  001775                BEQ     TLOPG                   ;WAIT FOR OFF-LINE
2101  010262  032713  000010      TLOPGA:   BIT     #10,    @CDS    ;CHECK FOR "TRANSITION TO ON LINE"
2102  010266  001775                BEQ     TLOPGA                  ;WAIT FOR IT
2103  010270  022713  100210                CMP     #100210,@CDS    ;CHECK FOR CORRECT STATUS BITS
2104  010274  001401                BEQ     .+4                     ;BRANCH IF OK
2105  010276  104000                HLT                             ;STATUS NOT EQUAL TO 100210
2106
2107  010300  012714  177701                MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2108  010304  012715  016000                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2109  010310  005213                INC     @CDS                    ;READ
2110  010312  105713      TLOPGB:   TSTB    @CDS                    ;CHECK CONTROLLER READY
2111  010314  100376                BPL     TLOPGB                  ;WAI  FOR CONTROLLER READY
2112  010316  032713  010000                BIT     #10000,@CDS     ;CHE  . BIT12
2113  010322  001001                BNE     .+4                     ;BRAI.CH IF SET
2114  010324  104000                HLT                             ;OFF-LINE (BIT 12) WASN'T SET
2115
2116  010326  005713                TST     @CDS                    ;CHECK SPECIAL CONDITION BIT
2117  010330  100401                BMI     .+4                     ;BRANCH IF SET
2118  010332  104000                HLT                             ;SPECIAL CONDITION NOT SET
2119
2120  010334  032713  040000                BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
2121  010340  001001                BNE     .+4                     ;BRANCH IF SET
2122  010342  104000                HLT                             ;CARD REAER ERROR BIT 14 NOT SET
2123
2124  010344  032713  027577                BIT     #027577,@CDS    ;CHECK FOR EXTRA BITS
2125  010350  001401                BEQ     .+4                     ;BRANCH IF OK
2126  010352  104000                HLT                             ;STATUS WORD ERROR
2127
2128  010354  012712  010424                MOV     #TINTG, @ADINT  ;LOAD RETURN POINTER
2129  010360  052767  000340  167410        BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2130  010366  016762  167404  000002        MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2131  010374  042767  000340  167374        BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2132  010402  012713  000100                MOV     #100,   @CDS    ;SET INTERUPT ENABLE
2133  010406  000004  014577                TYPE,   MSG10           ;"REMOVE JAMMED CARDS"
2134  010412  000004  013722                TYPE,   MSG1            ;"PRESS CARD READER 'RESET'"
2135  010416  000004  013714                TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2136  010422  000777                BR      .                       ;WAIT FOR THE INTERUPT
2137
2138  010424  022626            TINTG:    CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2139  010426  012712  010470                MOV     #TINTGA,@ADINT  ;LOAD RETURN POINTER
2140  010432  052767  000340  167336        BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2141  010440  016762  167332  000002        MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2142  010446  042767  000340  167322        BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2143  010454  012714  177701                MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2144  010460  012715  016000                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2145  010464  005213                INC     @CDS                    ;START READING
2146  010466  000777                BR      .                       ;WAIT FOR AN INTERUPT
2147
2148  010470  022626            TINTGA:   CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2149  010472  022713  000300                CMP     #000300,@CDS    ;CHECH THE CARD READER STATUS
2150  010476  001401                BEQ     .+4                     ;BRANCH IF OK
2151  010500  104000                HLT                             ;CARD READER STATUS ERROR
2152
```

```
2153                                                    ;END OF FILE BUTTON AND HOPPER CHECK TEST
2154                                            :ON M-1000 BIT 13 IS ALWAYS CLEARED
2155                                            :ON M-1200 IF END OF FILE BUTTON IS PRESSED WITH INPUT
2156                                            :HOPPER LOADED THEN WHEN INPUT HOPPER BECOMES EMPTY
2157                                            ;HOPPER CHECK INDICATOR LIGHT COMES ON AND BITS
2158                                            :13  14 AND  15 ARE SET
2159
2160
2161  010502  005767  170032                       TST     CD1000          ;IS READER M-1000?
2162  010506  001402                               BEQ     TESTI           ;BRANCH IF READER IS M-1200
2163  010510  000167  000322                       JMP     TESTH           ;OUT OF THIS TEST IF M-1000
2164
2165  010514  104400                        TESTI:  SCOPE
2166  010516  004767  001412                       JSR     %7,     INIT
2167  010522  000004  015320                       TYPE,   MSG20           ;"PUT ANY TWO CARDS IN INPUT HOPPER"
2168  010526  000004  013722                       TYPE,   MSG1            ;"PRESS CARD READER 'RESET'"
2169  010532  000004  013756                       TYPE,   MSG2            ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2170  010536  000004  013714                       TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2171  010542  000000                               HALT
2172
2173  010544  032713  000010                       BIT     #10,    @CDS    ;CHECK FOR TRANSITION TO ON LINE
2174  010550  001775                               BEQ     .-4             ;WAIT FOR IT
2175  010552  000004  015364                       TYPE,   MSG21           ;"PRESS END OF FILE BUTTON"
2176  010556  000004  013756                       TYPE,   MSG2            ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2177  010562  000004  013714                       TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2178  010566  004767  001342                       JSR     %7,     INIT
2179  010572  000000                               HALT
2180
2181
2182  010574  032713  020000                       BIT     #20000, @CDS    ;CHECK BIT 13
2183  010600  001401                               BEQ     .+4             ;BRANCH IF NOT SET
2184  010602  104000                               HLT                     ;EOF SET FROM BEGINING
2185
2186
2187  010604  032713  040000                       BIT     #40000, @CDS    ;CHECK BIT 14
2188  010610  001401                               BEQ     .+4             ;BRANCH IF NOT SET
2189  010612  104000                               HLT                     ;READER CHECK ERROR SET FROM BEGINNING
2190
2191
2192  010614  032713  000004                       BIT     #4,     @CDS    ;CHECK BIT 2
2193  010620  001401                               BEQ     .+4             ;BRANCH IF NOT SET
2194  010622  104000                               HLT                     ;HOPPER CHECK SET FROM BEGINING
2195
2196  010624  005713                               TST     @CDS            ;CHECK ERROR BIT
2197  010626  100001                               BPL     .+4             ;BRANCH IF NOT SET
2198  010630  104000                               HLT                     ;ERROR SET FROM BEGINING
2199
2200
2201
2202
2203  010632  012712  010700                       MOV     #TINTI, @ADINT  ;LOAD RETURN POINTER
2204  010636  052767  000340  167132        SECN:  BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2205  010644  016762  167126  000002               MOV     PS,     2(ADINT);LOAD RETURN PROCESSOR STATUS
2206  010652  042767  000340  167116               BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
2207  010660  012713  000100                       MOV     #100,   @CDS    ;SET INTERRUPT ENABLE
2208  010664  012714  177701                       MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
```

```
2209  010670  012715  016000                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2210  010674  005213                        INC     @CDS            ;START READER
2211  010676  000777                        BR      .               ;WAIT FOR AN INTERRUPT
2212
2213
2214  010700  022626              TINTI:    CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2215
2216  010702  032713  020000                BIT     #20000, @CDS    ;CHECK BIT 13
2217  010706  001401                        BEQ     .+4             ;BRANCH IF NOT SET
2218  010710  104000                        HLT                     ;EOF SET AT END OF ONE CARD
2219
2220  010712  032713  040000                BIT     #40000, @CDS    ;CHECK BIT 14
2221  010716  001401                        BEQ     .+4             ;BRANCH IF NOT SET
2222  010720  104000                        HLT                     ;READER CHECK ERROR SET AT END OF ONE CARD
2223
2224  010722  005713                        TST     @CDS            ;CHECK ERROR BIT
2225  010724  100001                        BPL     .+4             ;BRANCH IF NOT SET
2226  010726  104000                        HLT                     ;ERROR SET AT END OF ONE CARD
2227
2228  010730  012712  010736                MOV     #TINTIA,@ADINT  ;LOAD RETURN POINTER
2229  010734  000740                        BR      SECN            ;READ SECOND CARD
2230  010736  022626              TINTIA:   CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2231
2232  010740  032713  020000                BIT     #20000, @CDS    ;CHECK BIT 13
2233  010744  001001                        BNE     .+4             ;BRANCH IF SET
2234  010746  104000                        HLT                     ;EOF NOT SET AT END OF FILE
2235
2236  010750  032713  040000                BIT     #40000, @CDS    ;CHECK BIT 14
2237  010754  001001                        BNE     .+4             ;BRANCH IF SET
2238  010756  104000                        HLT                     ;READER CHECK NOT SET AT END OF FILE
2239
2240  010760  032713  000004                BIT     #4,     @CDS    ;CHECK BIT 2
2241  010764  001001                        BNE     .+4             ;BRANCH IF SET
2242  010766  104000                        HLT                     ;HOPPER CHECK NOT SET WHEN HOPPER EMPTY
2243
2244
2245  010770  005713                        TST     @CDS            ;CHECK ERROR BIT
2246  010772  100401                        BMI     .+4             ;BRANCH IF SET
2247  010774  104000                        HLT                     ;ERROR BIT NOT SET AT END OF FILE
2248
2249  010776  000004  014162                TYPE,   MSG6            ;"RESTORE CARDS TO THE INPUT HOPPER"
2250  011002  000004  013722                TYPE,   MSG1            ;"PRESS CARD READER 'RESET'"
2251  011006  000004  013756                TYPE,   MSG2            ;"THEN HIT CONTINUE ON THE CONSOLE"
2252  011012  000004  013714                TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2253  011016  000000                        HALT
2254
2255  011020  032713  000010                BIT     #10,    @CDS    ;CHECK TRANSITION TO ON LINE
2256  011024  001775                        BEQ     .-4             ;WAIT FOR IT
2257
2258
2259  011026  032713  020000                BIT     #20000, @CDS    ;CHECK BIT 13
2260  011032  001401                        BEQ     .+4             ;BRANCH IF NOT SET
2261  011034  104000                        HLT                     ;EOF DIDN'T CLEAR BY TRANSITION TO ON LINE
2262                                ;
2263                                ;
2264                                ;A READ CHECK ERROR SHOULD SET BIT 15, BIT 14, AND BIT 12
```

```
2265                                    ;THIS ERROR OCCURS WHEN THE READ ELECTRONICS IN THE CARD
2266                                    ;READER DISAGREES WITH THE NORMAL UNPUNCHED AREA OF THE CARD
2267  011036  104400                    TESTH:  SCOPE
2268  011040  004767  001070                    JSR     %7,INIT
2269  011044  000004  014676                    TYPE,   MSG12           ;"PLACE SPECIAL DARK LIGHT CHECK CARD ONLY
2270                                                                    ;AT THE FRONT OF THE INPUT STACK"
2271  011050  000004  013722                    TYPE,   MSG1            ;"PRESS CARD READER 'RESET'"
2272  011054  000004  013714                    TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2273  011060  032713  010000          TLOPH:    BIT     #10000, @CDS    ;CHECK FOR OF LINE
2274  011064  001775                    BEQ     TLOPH                   ;WAIT FOR OFF-LINE
2275  011066  032713  000010          TLOPHA:   BIT     #10,    @CDS    ;CHECK FOR "TRANSITION TO ON LINE"
2276  011072  001775                    BEQ     TLOPHA                  ;WAIT FOR IT
2277  011074  022713  140210                    CMP     #140210,@CDS    ;CHECK FOR CORRECT STATUS BITS
2278  011100  001401                    BEQ     .+4                     ;BRANCH IF OK
2279  011102  104000                    HLT                             ;STATUS NOT EQUAL TO 140210
2280
2281  011104  012714  177701                    MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2282  011110  012715  016000                    MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2283  011114  005213                    INC     @CDS                    ;READ
2284  011116  105713          TLOPHB:   TSTB    @CDS                    ;CHECK CONTROLLER READY
2285  011120  100376                    BPL     TLOPHB                  ;WAIT FOR CONTROLLER READY
2286  011122  032713  010000                    BIT     #10000,@CDS     ;CHECK BIT12
2287  011126  001001                    BNE     .+4                     ;BRANCH IF SET
2288  011130  104000                    HLT                             ;OFF-LINE (BIT 12) WASN'T SET
2289
2290  011132  005713                    TST     @CDS                    ;CHECK SPECIAL CONDITION BIT
2291  011134  100401                    BMI     .+4                     ;BRANCH IF SET
2292  011136  104000                    HLT                             ;SPECIAL CONDITION NOT SET
2293
2294  011140  032713  040000                    BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
2295  011144  001001                    BNE     .+4                     ;BRANCH IF SET
2296  011146  104000                    HLT                             ;CARD REAER ERROR BIT 14 NOT SET
2297
2298  011150  032713  027577                    BIT     #027577,@CDS    ;CHECK FOR EXTRA BITS
2299  011154  001401                    BEQ     .+4                     ;BRANCH IF OK
2300  011156  104000                    HLT                             ;STATUS WORD ERROR
2301
2302  011160  012712  011232                    MOV     #TINTH, @ADINT  ;LOAD RETURN POINTER
2303  011164  052767  000340  166604            BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2304  011172  016762  166600  000002            MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2305  011200  042767  000340  166570            BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2306  011206  012713  000100                    MOV     #100,   @CDS    ;SET INTERUPT ENABLE
2307  011212  000004  014162                    TYPE,   MSG6            ;"RESTORE CARDS TO THE INPUT HOPPER"
2308  011216  000004  013722                    TYPE,   MSG1            ;"PRESS CARD READER 'RESET'"
2309  011222  000004  013714                    TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2310  011226  000777                    BR      .                       ;WAIT FOR AN INTERUPT
2311  011230  000000                    HALT
2312  011232  022626          TINTH:    CMP     (SP)+,  (SP)+           ;RESTORE THE STACK
2313  011234  104400                    SCOPE
2314  011236  004767  000720                    JSR     %7      BELL    ;RING THE BELL
2315  011242  000167  175302                    JMP     ER12CD          ;LOOP BACK TO THE BEGINNING
2316
2317
2318
2319                                    ;*************************************************************************
2320                                    ;ROUTINE TO LOOP THRU A SINGLE INSTRUCTION TEST OR ERROR FUNCTION TEST
```

```
                                        ;NOTE THAT SW11 MUST BE DOWN AFTER 2ND HALT
                                        ;*****************************************************************
011246  004767  167270          TESTX:  JSR     %7,SETUP            ;SETUP POINTERS AND FLAGS
011252  000000                          HALT                        ;WAIT FOR STARTING ADDRESS
011254  016767  166310  000072          MOV     SWR,RETRNX          ;STORE STARTING ADDRESS
011262  062767  000002  000064          ADD     #2,RETRNX           ;CHANGE TO FIRST ADDRESS AFTER SCOPE INSTRUCTION
011270  000000                          HALT                        ;SET SWR OPTIONS (BIT 11 MUST = 0)
011272  032767  010000  166270          BIT     #10000,SWR          ;CHECK SW12
011300  001404                          BEQ     .+12                ;BRANCH IF NOT SET
011302  042767  000020  166466          BIC     #20,PS              ;CLEAR TRACE BIT
011310  000403                          BR      .+10                ;SKIP NEXT INSTRUCTION
011312  052767  000020  166456          BIS     #20,PS              ;SET TRACE BIT
011320  005067  001106                  CLR     ITCNT               ;CLEAR ITERATION COUNTER
011324  012767  004000  001076          MOV     #4000,ITMAX
011332  012767  011344  001074          MOV     #XLOOP,RETURN       ;LOAD RETURN ADDRESS
011340  000177  000010                  JMP     @RETRNX             ;JUMP TO TEST
011344  005067  001062          XLOOP:  CLR     ITCNT               ;KEEP ITERATION COUNTER AT ZERO
011350  000177  000000                  JMP     @RETRNX             ;JUMP TO TEST
011354  000000                  RETRNX: 0
                                        ;*****************************************************************
                                        ;ROUTINE TO CHECK CARDS WHICH HAVE ALL COLUMNS IDENTICALLY PUNCHED.
                                        ;THIS ROUTINE ALLOWS SPECIFIC TYPES OF DATA FAILURES TO BE STUDIED
                                        ;EASILY.  THE ROUTINE HALTS ONCE AT THE START.  SET THE CORRECT CARD
                                        ;IMAGE PATTERN IN SW11-SW00, THEN HIT CONTINUE (AFTER THE DECK IS
                                        ;LOADED AND CARD READER IS ON-LINE).  THE PATTERN IS STORED, AND THEN
                                        ;EACH COLUMN OF EACH CARD IS READ TWICE AND COMPARED WITH IT.  IF A
                                        ;DISCREPANCY OCCURS, THE ERROR IS PRINTED OUT ALONG WITH THE TOTAL
                                        ;NUMBER OF CARDS READ AND THE TOTAL NUMBER OF DATA ERRORS DISCOVERED
                                        ;UP TO THAT POINT (ALL PRINTOUTS ARE IN OCTAL).  WHEN THE INPUT HOPPER
                                        ;IS EMPTY, THE ROUTINE RINGS THE BELL AND WAITS FOR MORE CARDS TO BE
                                        ;LOADED AND THE CARD READER TO BE PUT BACK ON-LINE.
                                        ;SW15=1 CAUSES A HALT AFTER AN ERROR, AND SW13=1 INHIBITS ERROR PRINTOUTS.
                                        ;*****************************************************************
011356  012767  011356  001050  CKSAME: MOV     #CKSAME,RETURN
011364  004767  167152                  JSR     %7,SETUP            ;INITIALIZE POINTERS
011370  000000                          HALT                        ;WAIT FOR CARD IMAGE PATTERN
011372  016767  166172  000526          MOV     SWR,CARDIM          ;STORE PATTERN
011400  042767  170000  000520          BIC     #170000,CARDIM      ;CLEAR UPPER BITS OF PATTERN
011406  016767  000514  000514          MOV     CARDIM, CDPK0
011414  005067  000512                  CLR     DERFLG
011420  006067  000504                  ROR     CDPK0
011424  106167  000501                  ROLB    CDPK1
011430  106067  000474                  RORB    CDPK0
011434  106167  000471                  ROLB    CDPK1
011440  106167  000465                  RCLB    CDPK1
011444  106167  000461                  ROLB    CDPK1
011450  106167  000455                  ROLB    CDPK1
011454  012701  000007                  MOV     #7,     R1
011460  006067  000444          CkLOP1: ROR     CDPK0
011464  103004                          BCC     CKOVR
011466  005267  000440                  INC     DERFLG
011472  150167  000433                  BISB    R1,CDPK1
```

```
 2377  011476  005301                  CKOVR:  DEC     R1
 2378  011500  001367                          BNE     CKLOP1
 2379  011502  000000                          HALT                    ;WAIT FOR SWITCH SETTINGS
 2380  011504  004767  000424          CKSTRT: JSR     %7,INIT
 2381  011510  005067  000410                  CLR     TOTCRD          ;INITIALIZE CARD COUNT
 2382  011514  005067  000402                  CLR     TOTERR          ;INITIALIZE ERROR COUNT
 2383  011520  005067  167006                  CLR     ERFLG           ;CLEAR FLAG FOR PRINTING ERROR HEADING
 2384  011524  105067  000403          CKLOOP: CLRB    DERFLG+1
 2385  011530  032767  000010  166032          BIT     #10,    SWR     ;CHECK FOR PACK MODE ONLY
 2386  011536  001410                          BEQ     CKREAD          ;BRANCH IF NOT SET
 2387  011540  032737  000004  177570          BIT     #4,     @#SWR   ;CHECK FOR IMAGE MODE ONLY
 2388  011546  001004                          BNE     CKREAD          ;BRANCH IF SET
 2389  011550  052713  000002                  BIS     #2,     @CDS    ;SET PACKING MODE
 2390  011554  105167  000353                  COMB    DERFLG+1
 2391  011560  005067  174740          CKREAD: CLR     CLCNT           ;INITIALIZE COLUMN COUNT
 2392  011564  012700  016000                  MOV     #BUFBEG,R0      ;SET UP BUFFER POINTER
 2393  011570  012714  177660                  MOV     #-120,  @CDC    ;SET UP COLUMN COUNTER
 2394  011574  010015                          MOV     R0,     @CDA    ;SET UP BUS ADDRESS
 2395  011576  005213                          INC     @CDS            ;START READING CARD
 2396  011600  005267  000320                  INC     TOTCRD          ;INCREMENT CARD COUNT
 2397  011604  105713          CKLP1:  TSTB    @CDS            ;CHECK CONTROLLER READY
 2398  011606  100376                          BPL     CKLP1           ;LOOP IF NOT SET
 2399  011610  005713                          TST     @CDS            ;CHECK FOR ERROR
 2400  011612  100427                          BMI     CKERR           ;BRANCH IF ERROR SET
 2401  011614  005767  000312                  TST     DERFLG
 2402  011620  100012                          BPL     CKLOP2
 2403  011622  122067  000303          CKLOP3: CMPB    (R0)+,CDPK1     ;CHECK DATA
 2404  011626  001046                          BNE     CKFAIL
 2405  011630  005267  174670                  INC     CLCNT
 2406  011634  026727  174664  000120          CMP     CLCNT,#120
 2407  011642  001367                          BNE     CKLOP3
 2408  011644  000727                          BR      CKLOOP
 2409  011646  022067  000254          CKLOP2: CMP     (R0)+,  CARDIM  ;CHECK THE DATA
 2410  011652  001034                          BNE     CKFAIL          ;BRANCH IF DATA ERROR
 2411  011654  005267  174644                  INC     CLCNT           ;COUNT THE COLUMNS
 2412  011660  026727  174640  000120          CMP     CLCNT,  #120    ;CHECK FOR LAST COLUMN
 2413  011666  001367                          BNE     CKLOP2
 2414  011670  000715                          BR      CKLOOP
 2415
 2416  011672  032713  010000          CKERR:  BIT     #10000,@CDS     ;CHECK FOR OFFLINE
 2417  011676  001406                          BEQ     CKERR1          ;BRANCH IF NOT
 2418  011700  004767  000256                  JSR     %7,     BELL    ;RING THE BELL
 2419  011704  032713  000010          CKERR3: BIT     #10,    @CDS    ;CHECK TRANSITION TO ON-LINE
 2420  011710  001775                          BEQ     CKERR3          ;BRANCH IF OFF-LINE
 2421  011712  000674                          BR      CKSTRT          ;START OVER
 2422
 2423  011714  032713  004000          CKERR1: BIT     #4000,@CDS      ;CHECK FOR DATA ERROR
 2424  011720  001407                          BEQ     CKERR2
 2425  011722  005767  000204                  TST     DERFLG
 2426  011726  100004                          BPL     CKERR2
 2427  011730  122767  000001  000174          CMPB    #1,DERFLG
 2428  011736  003331                          BGT     CKLOP3          ;BRANCH IF LEGIT
 2429  011740  104000          CKERR2: HLT                             ;REAL, LIVE ERROR.
 2430  011742  000670                          BR      CKLOOP
 2431
 2432  011744  005267  000152          CKFAIL: INC     TOTERR          ;COUNT ERRORS
```

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2433  011750  032767  020000  165612          BIT     #20000,SWR      ;CHECK FOR INHIBITING PRINTOUT
2434  011756  001054                          BNE     CKHLT           ;BRANCH AROUND PRINTOUT IF SET
2435  011760  005767  166546                  TST     ERFLG           ;TEST FLAG TO PRINT HEADING
2436  011764  001004                          BNE     CKNOHD          ;BRANCH IF ALREADY DONE
2437  011766  005267  166540                  INC     ERFLG           ;PRINT HEADING ONCE ONLY
2438  011772  000004  015264                  TYPE,   MSG19           ;OUTPUT HEADING
2439  011776  000004  013717          CKNOHD: TYPE,   CRLF            ;OUTPUT CARRIAGE RETURN, LINEFEED
2440  012002  016767  174516  000544          MOV     CLCNT,PRINT1    ;TYPE CLCNT IN OCTAL
2441  012010  004767  000574                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2442  012014  000004  013711                  TYPE,   SPACE
2443  012020  005767  000106                  TST     DERFLG
2444  012024  100006                          BPL     CKNOPK
2445  012026  114067  000523                  MOVB    -(R0),  PRINT1+1 ;MOVE BYTE INTO PRINT BUFFER
2446  012032  004767  000532                  JSR     %7,     PRINTB  ; AND PRINT IT
2447  012036  105720                          TSTB    (R0)+
2448  012040  000405                          BR      CKOVR1
2449  012042                          CKNOPK:
2450  012042  014067  000506                  MOV     -(R0),PRINT1    ;TYPE -(R0) IN OCTAL
2451  012046  004767  000536                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2452  012052  005720                          TST     (R0)+
2453  012054  000004  013711          CKOVR1: TYPE,   SPACE
2454  012060  016767  000040  000466          MOV     TOTCRD,PRINT1   ;TYPE TOTCRD IN OCTAL
2455  012066  004767  000516                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2456  012072  000004  013711                  TYPE,   SPACE
2457  012076  016767  000020  000450          MOV     TOTERR,PRINT1   ;TYPE TOTERR IN OCTAL
2458  012104  004767  000500                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2459  012110  005767  165454          CKHLT:  TST     SWR             ;CHECK SW15 TO HALT ON ERROR
2460  012114  100203                          BPL     CKLOOP          ;BRANCH IF NOT SET
2461  012116  000000                          HALT                    ;HALT ON ERROR
2462  012120  000601                          BR      CKLOOP          ;CONTINUE
2463
2464  012122  000000          TOTERR: 0
2465  012124  000000          TOTCRD: 0
2466  012126  000000          CARDIM: 0
2467  012130     000          CDPK0:  .BYTE   0
2468  012131     000          CDPK1:  .BYTE   0
2469  012132  000000          DERFLG: 0
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```
                                        ;ISSUE MESSAGE IF CARD READER IS OFF-LINE
                                        ;WAIT FOR BUSY TO CLEAR IN CASE CARD READER IS STILL READING A CARD
                                        ;INITIALIZE STATUS REGISTER AND USE ERROR HALT IF IT DOESN'T CLEAR PROPERLY
                                        ;NOTE THAT PROGRAM WILL HANG HERE IF BUSY REMAINS SET
012134  004767  000040          INIT:   JSR     %7,     CKOFFL  ;SEE IF OFF-LINE BIT IS SET
012140  105713                          TSTB    @CDS            ;WAIT FOR CONTROLLER READY, IN CASE
012142  100376                          BPL     .-2             ;A CARD IS STILL BEING READ
012144  012713  000400                  MOV     #400,   @CDS    ;INITIALIZE THE CARD READER
012150  022713  000200                  CMP     #200,   @CDS    ;MAKE SURE INITIALIZATION OK
012154  001401                          BEQ     .+4             ;BRANCH IF ALL BITS ZERO
012156  104000                          HLT                     ;NOT ALL BITS OF STATUS REGISTER ARE ZERO
012160  000207                          RTS     %7              ;RETURN

                                        ;BELL ON PASS COMPLETE
012162  105777  166322          BELL:   TSTB    @TPS            ;WAIT FOR TTY READY
012166  100375                          BPL     .-4
012170  012777  000207  166314          MOV     #207,@TPB       ;RING BELL
012176  000207                          RTS     %7              ;RETURN

                                        ;SUBROUTINE TO CHECK FOR BIT 12 (OFF-LINE) BEING SET IN CARD
                                        ;READER CSR, AND PRINT OUT A MESSAGE IF IT IS
012200  032713  010000          CKOFFL: BIT     #10000, @CDS    ;CHECK BIT 12
012204  001001                          BNE     .+4             ;BRANCH IF SET
012206  000207                          RTS     %7              ;RETURN IF NOT SET
012210  000004  015243                  TYPE,   MSG18           ;"BIT 12 WAS SET"
012214  000004  015161                  TYPE,   MSG17           ;"REMEDY THE ERROR CONDITION
012220  000000                          HALT                    ;WAIT FOR CONTINUE
012222  000766                          BR      CKOFFL          ;CHECK AGAIN

                                        ;ENTERED WITH SYSTEM TRAP CALL (HLT)
                                        ;PRINT OUT THE ERROR PC AND STATUS REGISTER
012224  036727  165340  020000  PRINT:  BIT     SWR,    #20000  ;TEST FOR INHIBIT PRINT OUT
012232  001401                          BEQ     .+4             ;BRANCH TO PRINT
012234  000433                          BR      B.CK            ;INHIBIT, CHECK FOR HALT
012236  012667  000102                  MOV     (6)+,   SAVPC   ;PC OF FAILING ROUTINE
012242  012667  000100                  MOV     (6)+,   SAVPS   ;PS OR ERROR CONDITION
012246  024646                          CMP     -(6),   -(6)    ;RESTORE STACK
012250  000004  013717                  TYPE,   CRLF            ;OUTPUT CARRIAGE RETURN, LINEFEED
012254  016767  000064  000272          MOV     SAVPC,PRINT1    ;TYPE SAVPC IN OCTAL
012262  004767  000322                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
012266  000004  013710                  TYPE,   SPACE-1
012272  016767  000050  000254          MOV     SAVPS,PRINT1    ;TYPE SAVPS IN OCTAL
012300  004767  000304                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
012304  000004  013710                  TYPE,   SPACE-1
012310  011367  000240                  MOV     @CDS,PRINT1     ;TYPE @CDS IN OCTAL
012314  004767  000270                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
012320  000004  013717                  TYPE,   CRLF
012324  005767  165240          B.CK:   TST     SWR             ;CHECK SWR FOR HALT SWITCH
012330  100001                          BPL     .+4             ;BRANCH IF NOT SET
012332  000000                          HALT                    ;HALT ON ERROR UP
012334  000002                          RTI                     ;RETURN TO MAIN LINE
012336  000000                  SAVR2:  0
012340  000000                  SAVR3:  0
012342  000000                  SAVR4:  0
012344  000000                  SAVPC:  0
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2526  012346  000000                    SAVPS:  0
2527
2528                                    ;SCOPE AND/OR ITERATION LOOP FOR EACH TEST 2 TIMES
2529  012350  032767  040000  165212    SCOPEC: BIT     #40000, SWR     ;TEST SWR FOR SCOPE
2530  012356  001012                            BNE     D.1             ;YES,SCOPE
2531  012360  032767  004000  165202            BIT     #4000,SWR       ;NO- TEST FOR ITERATION
2532  012366  001013                            BNE     D.2             ;INHIBIT ITERATION
2533  012370  026767  000036  000032            CMP     ITCNT,ITMAX     ;CHECK FOR ITERATIONS COMPLETE
2534  012376  100007                            BPL     D.2             ;EXIT-DONE
2535  012400  005267  000026                    INC     ITCNT           ;INCREMENT COUNT
2536  012404  022606                    D.1:    CMP     (6)+,   %6      ;REPOSITION STACK POINTER
2537  012406  012667  165364                    MOV     (6)+,   PS      ;RESTORE PROCESSOR STATUS
2538  012412  000177  000016                    JMP     @RETURN         ;RETURN TO RERUN TEST
2539  012416  005067  000010            D.2:    CLR     ITCNT           ;CLEAR COUNTER
2540  012422  011667  000006                    MOV     @%6,    RETURN  ;SAVE SCOPE RETURN POINTER
2541  012426  000002                            RTI                     ;RETURN INLINE-NEXT TEST
2542  012430  000001                    ITMAX:  1                       ;MAX NUMBER OF ITERATIONS
2543  012432  000000                    ITCNT:  0                       ;COUNT LOCATION FOR ITERATION LOOP
2544  012434  001060                    RETURN: TEST1+2                 ;ADDRESS OF LAST TEST
2545
2546
2547                                    ;ROUTINE TO TYPE ASCII MESSAGE, MESSAGE MUST TERMINATE WITH A 0 BYTE.
2548                                    ;THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
2549                                    ;NOTE1: $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
2550                                    ;NOTE2: $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
2551
2552
2553
2554
2555  012436  177564                    $TPS:   177564                  ;TTY PRINTER STATUS REG. ADDRESS
2556  012440  177566                    $TPB:   177566                  ;TTY PRINTER BUFFER REG. ADDRESS
2557  012442     000                    $NULL:  .BYTE   0               ;CONTAINS NULL CHARACTER FOR FILLS
2558  012443     002                    $FILLS: .BYTE   2               ;CONTAINS # OF FILLER CHARACTERS REQUIPED
2559  012444     000                    $TPFLG: .BYTE   0               ;"TERMINAL AVAILABLE" FLAG (0=YES)
2560  012445     000                            .BYTE   0               ;RESERVED
2561
2562  012446  105767  177772            $TYPE:  TSTB    $TPFLG          ;IS THERE A TERMINAL?
2563  012452  001402                            BEQ     6$              ;BR IF YES
2564  012454  000000                            HALT                    ;HALT HERE IF NO TERMINAL
2565  012456  000407                            BR      7$              ;LEAVE
2566  012460  010046                    6$:     MOV     R0,-(SP)        ;SAVE R0
2567  012462  017600  000002                    MOV     @2(SP),R0       ;GET ADDRESS OF ASCIZ STRING
2568  012466  112046                    1$:     MOVB    (R0)+,-(SP)     ;PUSH CHARACTER TO BE TYPED ONTO STACK
2569  012470  001005                            BNE     2$              ;BR IF IT ISN'T THE TERMINATOR
2570  012472  005726                            TST     (SP)+           ;IF TERMINATOR POP IT OFF THE STACK
2571  012474  012600                            MOV     (SP)+,R0        ;RESTORE R0
2572  012476  062716  000002            7$:     ADD     #2,(SP)         ;ADJUST RETURN PC
2573  012502  000002                            RTI                     ;RETURN
2574  012504  004767  000026            2$:     JSR     PC,5$           ;GO TYPE THIS CHARACTER
2575  012510  122726  000012            3$:     CMPB    #12,(SP)+       ;CHECK IF THE CHAR, TYPED WAS A LINE FEED
2576  012514  001364                            BNE     1$              ;GO GET NEXT CHAR, IF NOT LINE FEED
2577  012516  016746  177720                    MOV     $NULL,-(SP)     ;GET # OF FILLER CHARS, NEEDED
2578                                            ;AND THE NULL CHAR.
2579  012522  105366  000001            4$:     DECB    1(SP)           ;DOES A NULL NEED TO BE TYPED?
2580  012526  002770                            BLT     3$              ;BR IF NO--GO POP THE NULL OFF OF STACK
2581  012530  004767  000002                    JSR     PC,5$           ;GO TYPE A NULL
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2582  012534  000772                        BR      4$              ;LOOP
2583  012536  105777  177674          5$:   TSTB    @$TPS           ;WAIT UNTIL PRINTER IS READY
2584  012542  100375                        BPL     5$
2585  012544  116677  000002  177666        MOVB    2(SP),@$TPB     ;LOAD CHAR TO BE TYPED INTO DATA REG.
2586  012552  000207                        RTS     PC
2587
2588
2589
2590
2591
2592
2593
2594                          ;       OCTAL DUMP OF A WORD
2595
2596  012554  000000          PRINT1: 0
2597  012556  000000  000000  PRINT2: .WORD   0,0,0,0
2598  012564  000000
2599  012566     000     000  PRINT3: .BYTE   0,0
2600
2601  012570  012767  176401  177770  PRINTB: MOV     #176401,PRINT3  ;.BYTE  -1,3
2602  012576  010546                          MOV     %5,     -(6)    ;SAVE R5
2603  012600  012705  012556                  MOV     #PRINT2,%5      ;SET POINTER TO 1ST ASCII CHAR.
2604  012604  105015                          CLRB    (5)             ;CLR 1ST BYTE
2605  012606  000422                          BR      PRINTT          ;PRINT 2 BITS
2606
2607  012610  112767  000001  177750  PRINTR: MOVB    #1,PRINT3       ;SET ZERO FILL SWITCH
2608  012616  000402                          BR      .+6
2609  012620  005067  177742          PRINTS: CLR     PRINT3          ;SUPRESS LEADING ZERO'S
2610  012624  112767  177772  177735          MOVB    #-6,PRINT3+1    ;SET COUNT
2611  012632  010546                          MOV     %5,-(6)         ;SAVE R5
2612  012634  012705  012556                  MOV     #PRINT2,%5      ;SET POINTER TO FIRST ASCII CHAR.
2613  012640  105015                          CLRB    (5)             ;CLEAR FIRST BYTE
2614  012642  000407                          BR      PRINTF          ;ROTATE FIRST BIT
2615  012644  105015          PRINTL: CLRB    (5)             ;CLEAR BYTE OF CHARACTER
2616  012646  006167  177702                  ROL     PRINT1          ;ROTATE BIT INTO C
2617  012652  106115                          ROLB    (5)             ;PACK IT
2618  012654  006167  177674          PRINTT: ROL     PRINT1          ;ROTATE BIT INTO C
2619  012660  106115                          ROLB    (5)             ;PACK IT
2620  012662  006167  177666          PRINTF: ROL     PRINT1          ;ROTATE BIT INTO C
2621  012666  106115                          ROLB    (5)             ;PACK IT
2622  012670  105715                          TSTB    (5)
2623  012672  001402                          BEQ     .+6
2624  012674  105267  177666                  INCB    PRINT3
2625  012700  105767  177662                  TSTB    PRINT3          ;CHECK FILL SWITCH
2626  012704  001402                          BEQ     .+6
2627  012706  152725  000060                  BISB    #'0,(5)+        ;MAKE INTO ASCII CHAR
2628  012712  105267  177651                  INCB    PRINT3+1
2629  012716  001352                          BNE     PRINTL          ;REPEAT
2630  012720  022705  012556                  CMP     #PRINT2,%5
2631  012724  001002                          BNE     .+6
2632  012726  112725  000060                  MOVB    #'0,(5)+
2633  012732  105015                          CLRB    (5)
2634  012734  000004  012556                  TYPE,   PRINT2          ;TYPE IT
2635  012740  012605                          MOV     (6)+,%5         ;RESTORE R5
2636  012742  000207                          RTS     %7
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                                        ;DATA TABLES FOR DATA RELIABILITY TESTS

                                        ;ALPHANUMERIC DECK DATA TABLE
                                        ;CARD IMAGE FORM
                                        ;                                       COLUMN  ASCII   PUNCH
012744  004000                          ALPCD:  4000                            ;1      &       12
012746  004400                                  4400                            ;2      A       12 1
012750  004200                                  4200                            ;3      B       12 2
012752  004100                                  4100                            ;4      C       12 3
012754  004040                                  4040                            ;5      D       12 4
012756  004020                                  4020                            ;6      E       12 5
012760  004010                                  4010                            ;7      F       12 6
012762  004004                                  4004                            ;8      G       12 7
012764  004002                                  4002                            ;9      H       12 8
012766  004001                                  4001                            ;10     I       12 9
012770  004202                                  4202                            ;11     [       12 8 2
012772  004102                                  4102                            ;12     .       12 8 3
012774  004042                                  4042                            ;13     <       12 8 4
012776  004022                                  4022                            ;14     (       12 8 5
013000  004012                                  4012                            ;15     +       12 8 6
013002  004006                                  4006                            ;16     !       12 8 7
013004  002000                                  2000                            ;17     -       11
013006  002400                                  2400                            ;18     J       11 1
013010  002200                                  2200                            ;19     K       11 2
013012  002100                                  2100                            ;20     L       11 3
013014  002040                                  2040                            ;21     M       11 4
013016  002020                                  2020                            ;22     N       11 5
013020  002010                                  2010                            ;23     O       11 6
013022  002004                                  2004                            ;24     P       11 7
013024  002002                                  2002                            ;25     Q       11 8
013026  002001                                  2001                            ;26     R       11 9
013030  002202                                  2202                            ;27     ]       11 8 2
013032  002102                                  2102                            ;28     $       11 8 3
013034  002042                                  2042                            ;29     *       11 8 4
013036  002022                                  2022                            ;30     )       11 8 5
013040  002012                                  2012                            ;31     ;       11 8 6
013042  002006                                  2006                            ;32     ^       11 8 7
013044  001000                                  1000                            ;33     0       0
013046  001400                                  1400                            ;34     /       0 1
013050  001200                                  1200                            ;35     S       0 2
013052  001100                                  1100                            ;36     T       0 3
013054  001040                                  1040                            ;37     U       0 4
013056  001020                                  1020                            ;38     V       0 5
013060  001010                                  1010                            ;39     W       0 6
013062  001004                                  1004                            ;40     X       0 7
013064  001002                                  1002                            ;41     Y       0 8
013066  001001                                  1001                            ;42     Z       0 9
013070  001202                                  1202                            ;43     \       0 8 2
013072  001102                                  1102                            ;44     ,       0 8 3
013074  001042                                  1042                            ;45     %       0 8 4
013076  001022                                  1022                            ;46     =       0 8 5
013100  001012                                  1012                            ;47     >       0 8 6
013102  001006                                  1006                            ;48     ?       0 8 7
013104  000000                                  0000                            ;49     SPACE   BLANK
013106  000400                                  0400                            ;50     1       1
```

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 2693  013110  000200                    0200                    ;51    2        2
 2694  013112  000100                    0100                    ;52    3        3
 2695  013114  000040                    0040                    ;53    4        4
 2696  013116  000020                    0020                    ;54    5        5
 2697  013120  000010                    0010                    ;55    6        6
 2698  013122  000004                    0004                    ;56    7        7
 2699  013124  000002                    0002                    ;57    8        8
 2700  013126  000001                    0001                    ;58    9        9
 2701  013130  000202                    0202                    ;59    :        8 2
 2702  013132  000102                    0102                    ;60    ;        8 3
 2703  013134  000042                    0042                    ;61    <        8 4
 2704  013136  000022                    0022                    ;62    =        8 5
 2705  013140  000012                    0012                    ;63    >        8 6
 2706  013142  000006                    0006                    ;64    ?        8 7
 2707  013144  004000                    4000                    ;65    @       12
 2708  013146  004400                    4400                    ;66    A       12 1
 2709  013150  004200                    4200                    ;67    B       12 2
 2710  013152  004100                    4100                    ;68    C       12 3
 2711  013154  004040                    4040                    ;69    D       12 4
 2712  013156  004020                    4020                    ;70    E       12 5
 2713  013160  004010                    4010                    ;71    F       12 6
 2714  013162  004004                    4004                    ;72    G       12 7
 2715  013164  004002                    4002                    ;73    H       12 8
 2716  013166  004001                    4001                    ;74    I       12 9
 2717  013170  004202                    4202                    ;75    [       12 8 2
 2718  013172  004102                    4102                    ;76    .       12 8 3
 2719  013174  004042                    4042                    ;77    <       12 8 4
 2720  013176  004022                    4022                    ;78    (       12 8 5
 2721  013200  004012                    4012                    ;79    +       12 8 6
 2722  013202  004006                    4006            ALPEND: ;80    !       12 8 7
 2723
 2724
 2725
 2726                                                            ;               COLUMN  ASCII   PUNCH
 2727  013204      200                   200             ALPCDP: .BYTE   200     ;1      &       12
 2728  013205      201                   201                     .BYTE   201     ;2      A       12 1
 2729  013206      202                   202                     .BYTE   202     ;3      B       12 2
 2730  013207      203                   203                     .BYTE   203     ;4      C       12 3
 2731  013210      204                   204                     .BYTE   204     ;5      D       12 4
 2732  013211      205                   205                     .BYTE   205     ;6      E       12 5
 2733  013212      206                   206                     .BYTE   206     ;7      F       12 6
 2734  013213      207                   207                     .BYTE   207     ;8      G       12 7
 2735  013214      210                   210                     .BYTE   210     ;9      H       12 8
 2736  013215      220                   220                     .BYTE   220     ;10     I       12 9
 2737  013216      211                   211                     .BYTE   211     ;11     [       12 8 2
 2738  013217      213                   213                     .BYTE   213     ;12     .       12 8 3
 2739  013220      214                   214                     .BYTE   214     ;13     <       12 8 4
 2740  013221      215                   215                     .BYTE   215     ;14     (       12 8 5
 2741  013222      216                   216                     .BYTE   216     ;15     +       12 8 6
 2742  013223      217                   217                     .BYTE   217     ;16     !       12 8 7
 2743  013224      100                   100                     .BYTE   100     ;17     -       11
 2744  013225      101                   101                     .BYTE   101     ;18     J       11 1
 2745  013226      102                   102                     .BYTE   102     ;19     K       11 2
 2746  013227      103                   103                     .BYTE   103     ;20     L       11 3
 2747  013230      104                   104                     .BYTE   104     ;21     M       11 4
 2748  013231      105                   105                     .BYTE   105     ;22     N       11 5
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 2749  013232  106                .BYTE   106             ;23   O       11 6
 2750  013233  107                .BYTE   107             ;24   P       11 7
 2751  013234  110                .BYTE   110             ;25   Q       11 8
 2752  013235  120                .BYTE   120             ;26   R       11 9
 2753  013236  112                .BYTE   112             ;27   J       11 8 2
 2754  013237  113                .BYTE   113             ;28   $       11 8 3
 2755  013240  114                .BYTE   114             ;29   *       11 8 4
 2756  013241  115                .BYTE   115             ;30   )       11 8 5
 2757  013242  116                .BYTE   116             ;31   ;       11 8 6
 2758  013243  117                .BYTE   117             ;32   ¬       11 8 7
 2759  013244  040                .BYTE   40              ;33   0       0
 2760  013245  041                .BYTE   41              ;34   /       0 1
 2761  013246  042                .BYTE   42              ;35   S       0 2
 2762  013247  043                .BYTE   43              ;36   T       0 3
 2763  013250  044                .BYTE   44              ;37   U       0 4
 2764  013251  045                .BYTE   45              ;38   V       0 5
 2765  013252  046                .BYTE   46              ;39   W       0 6
 2766  013253  047                .BYTE   47              ;40   X       0 7
 2767  013254  050                .BYTE   50              ;41   Y       0 8
 2768  013255  060                .BYTE   60              ;42   Z       0 9
 2769  013256  052                .BYTE   52              ;43   ^       0 8 2
 2770  013257  053                .BYTE   53              ;44           0 8 3
 2771  013260  054                .BYTE   54              ;45   %       0 8 4
 2772  013261  055                .BYTE   55              ;46   _       0 8 5
 2773  013262  056                .BYTE   56              ;47   >       0 8 6
 2774  013263  057                .BYTE   57              ;48   ?       0 8 7
 2775  013264  000                .BYTE   0               ;49   SPACE   BLANK
 2776  013265  001                .BYTE   1               ;50           1
 2777  013266  002                .BYTE   2               ;51           2
 2778  013267  003                .BYTE   3               ;52           3
 2779  013270  004                .BYTE   4               ;53           4
 2780  013271  005                .BYTE   5               ;54           5
 2781  013272  006                .BYTE   6               ;55           6
 2782  013273  007                .BYTE   7               ;56           7
 2783  013274  010                .BYTE   10              ;57           8
 2784  013275  020                .BYTE   20              ;58           9
 2785  013276  012                .BYTE   12              ;59           8 2
 2786  013277  013                .BYTE   13              ;60           8 3
 2787  013300  014                .BYTE   14              ;61           8 4
 2788  013301  015                .BYTE   15              ;62           8 5
 2789  013302  016                .BYTE   16              ;63           8 6
 2790  013303  017                .BYTE   17              ;64           8 7
 2791  013304  200                .BYTE   200             ;65           12
 2792  013305  201                .BYTE   201             ;66           12 1
 2793  013306  202                .BYTE   202             ;67           12 2
 2794  013307  203                .BYTE   203             ;68           12 3
 2795  013310  204                .BYTE   204             ;69           12 4
 2796  013311  205                .BYTE   205             ;70           12 5
 2797  013312  206                .BYTE   206             ;71           12 6
 2798  013313  207                .BYTE   207             ;72           12 7
 2799  013314  210                .BYTE   210             ;73           12 8
 2800  013315  220                .BYTE   220             ;74           12 9
 2801  013316  212                .BYTE   212             ;75           12 8 2
 2802  013317  213                .BYTE   213             ;76           12 8 3
 2803  013320  214                .BYTE   214             ;77           12 8 4
 2804  013321  215                .BYTE   215             ;78           12 8 5
```

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2805  013322  216                     .BYTE   216             ;79     +       12 8 6
2806  013323  217             ALPENP: .BYTE   217             ;80     !       12 8 7
2807
2808                                    :BINARY DECK DATA TABLE
2809                                    ;                               COLUMN  PUNCH
2810  013324  000000            BINCD:  0                       ;1      BLANK
2811  013326  000001                    1                       ;2
2812  013330  000002                    2                       ;3
2813  013332  000004                    4                       ;4
2814  013334  000010                    10                      ;5
2815  013336  000020                    20                      ;6
2816  013340  000040                    40                      ;7
2817  013342  000100                    100                     ;8
2818  013344  000200                    200                     ;9
2819  013346  000400                    400                     ;10
2820  013350  001000                    1000                    ;11
2821  013352  002000                    2000                    ;12
2822  013354  004000                    4000                    ;13
2823  013356  001111                    1111                    ;14
2824  013360  002222                    2222                    ;15
2825  013362  003333                    3333                    ;16
2826  013364  004444                    4444                    ;17
2827  013366  005555                    5555                    ;18
2828  013370  006666                    6666                    ;19
2829  013372  007777                    7777                    ;20
2830  013374  001010                    1010                    ;21
2831  013376  001212                    1212                    ;22
2832  013400  001313                    1313                    ;23
2833  013402  001414                    1414                    ;24
2834  013404  001515                    1515                    ;25
2835  013406  001616                    1616                    ;26
2836  013410  001717                    1717                    ;27
2837  013412  002020                    2020                    ;28
2838  013414  002121                    2121                    ;29
2839  013416  002323                    2323                    ;30
2840  013420  002424                    2424                    ;31
2841  013422  002525                    2525                    ;32
2842  013424  002626                    2626                    ;33
2843  013426  002727                    2727                    ;34
2844  013430  003030                    3030                    ;35
2845  013432  003131                    3131                    ;36
2846  013434  003232                    3232                    ;37
2847  013436  003434                    3434                    ;38
2848  013440  003535                    3535                    ;39
2849  013442  003636                    3636                    ;40
2850  013444  003737                    3737                    ;41
2851  013446  004040                    4040                    ;42
2852  013450  004141                    4141                    ;43
2853  013452  004242                    4242                    ;44
2854  013454  004343                    4343                    ;45
2855  013456  004545                    4545                    ;46
2856  013460  004646                    4646                    ;47
2857  013462  004747                    4747                    ;48
2858  013464  005050                    5050                    ;49
2859  013466  005151                    5151                    ;50
2860  013470  005252                    5252                    ;51
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 2861  013472  005353                          5353                    ;52
 2862  013474  005454                          5454                    ;53
 2863  013476  005656                          5656                    ;54
 2864  013500  005757                          5757                    ;55
 2865  013502  006060                          6060                    ;56
 2866  013504  006161                          6161                    ;57
 2867  013506  006262                          6262                    ;58
 2868  013510  006363                          6363                    ;59
 2869  013512  006464                          6464                    ;60
 2870  013514  006565                          6565                    ;61
 2871  013516  006767                          6767                    ;62
 2872  013520  007070                          7070                    ;63
 2873  013522  007171                          7171                    ;64
 2874  013524  007272                          7272                    ;65
 2875  013526  007373                          7373                    ;66
 2876  013530  007474                          7474                    ;67
 2877  013532  007575                          7575                    ;68
 2878  013534  007676                          7676                    ;69
 2879  013536  000101                          0101                    ;70
 2880  013540  000202                          0202                    ;71
 2881  013542  000303                          0303                    ;72
 2882  013544  000404                          0404                    ;73
 2883  013546  000505                          0505                    ;74
 2884  013550  000606                          0606                    ;75
 2885  013552  000707                          0707                    ;76
 2886  013554  003210                          3210                    ;77
 2887  013556  000123                          0123                    ;78
 2888  013560  007654                          7654                    ;79
 2889  013562  004567              BINEND:     4567                    ;80
 2890
 2891                                          ;BINARY DECK DATA TABLE
 2892                                          ;THE VALUE IS THE ENCODED VALUE, WHICH ORS THE OCTAL REPRESENTATION OF
 2893                                          ;ROWS ONE THRU SEVEN
 2894                                          .                       COLUMN  ASCII   PUNCH
 2895  013564       000             BINCDP:    .BYTE   0               ;1      SPACE   BLANK
 2896  013565       020                        .BYTE   20              ;2      9       9
 2897  013566       010                        .BYTE   10              ;3      8       8
 2898  013567       007                        .BYTE   7               ;4      7       7
 2899  013570       006                        .BYTE   6               ;5      6       6
 2900  013571       005                        .BYTE   5               ;6      5       5
 2901  013572       004                        .BYTE   4               ;7      4       4
 2902  013573       003                        .BYTE   3               ;8      3       3
 2903  013574       002                        .BYTE   2               ;9      2       2
 2904  013575       001                        .BYTE   1               ;10     1       1
 2905  013576       040                        .BYTE   40              ;11     0       0
 2906  013577       100                        .BYTE   100             ;12     -       11
 2907  013600       200                        .BYTE   200             ;13     &       12
 2908  013601       067                        .BYTE   67              ;14
 2909  013602       117                        .BYTE   117             ;15
 2910  013603       177                        .BYTE   177             ;16
 2911  013604       207                        .BYTE   207             ;17
 2912  013605       267                        .BYTE   267             ;18
 2913  013606       317                        .BYTE   317             ;19
 2914  013607       377                        .BYTE   377             ;20
 2915  013610       046                        .BYTE   46              ;21
 2916  013611       056                        .BYTE   56              ;22
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2917  013612  077                     .BYTE   77              ;23
2918  013613  047                     .BYTE   47              ;24
2919  013614  067                     .BYTE   67              ;25
2920  013615  057                     .BYTE   57              ;26
2921  013616  077                     .BYTE   77              ;27
2922  013617  105                     .BYTE   105             ;28
2923  013620  127                     .BYTE   127             ;29
2924  013621  137                     .BYTE   137             ;30
2925  013622  107                     .BYTE   107             ;31
2926  013623  127                     .BYTE   127             ;32
2927  013624  117                     .BYTE   117             ;33
2928  013625  137                     .BYTE   137             ;34
2929  013626  147                     .BYTE   147             ;35
2930  013627  167                     .BYTE   167             ;36
2931  013630  157                     .BYTE   157             ;37
2932  013631  147                     .BYTE   147             ;38
2933  013632  167                     .BYTE   167             ;39
2934  013633  157                     .BYTE   157             ;40
2935  013634  177                     .BYTE   177             ;41
2936  013635  204                     .BYTE   204             ;42
2937  013636  227                     .BYTE   227             ;43
2938  013637  216                     .BYTE   216             ;44
2939  013640  237                     .BYTE   237             ;45
2940  013641  227                     .BYTE   227             ;46
2941  013642  217                     .BYTE   217             ;47
2942  013643  237                     .BYTE   237             ;48
2943  013644  246                     .BYTE   246             ;49
2944  013645  267                     .BYTE   267             ;50
2945  013646  256                     .BYTE   256             ;51
2946  013647  277                     .BYTE   277             ;52
2947  013650  247                     .BYTE   247             ;53
2948  013651  257                     .BYTE   257             ;54
2949  013652  277                     .BYTE   277             ;55
2950  013653  305                     .BYTE   305             ;56
2951  013654  327                     .BYTE   327             ;57
2952  013655  317                     .BYTE   317             ;58
2953  013656  337                     .BYTE   337             ;59
2954  013657  307                     .BYTE   307             ;60
2955  013660  327                     .BYTE   327             ;61
2956  013661  337                     .BYTE   337             ;62
2957  013662  347                     .BYTE   347             ;63
2958  013663  367                     .BYTE   367             ;64
2959  013664  357                     .BYTE   357             ;65
2960  013665  377                     .BYTE   377             ;66
2961  013666  347                     .BYTE   347             ;67
2962  013667  367                     .BYTE   367             ;68
2963  013670  357                     .BYTE   357             ;69
2964  013671  023                     .BYTE   23              ;70
2965  013672  012                     .BYTE   12              ;71
2966  013673  033                     .BYTE   33              ;72
2967  013674  007                     .BYTE   7               ;73
2968  013675  027                     .BYTE   27              ;74
2969  013676  017                     .BYTE   17              ;75
2970  013677  037                     .BYTE   37              ;76
2971  013700  146                     .BYTE   146             ;77
2972  013701  037                     .BYTE   37              ;78
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2973  013702  000347                          BINENP: .BYTE   347             ;79
2974  013703  000237                                  .BYTE   237             ;80
2975
2976  013704  020040  020040  000040                  .ASCII  /     /
2977  013711  000040  000040                  SPACE:  .ASCIZ  /  /
2978  013714  005012  000012                          .ASCII  <12><12><12>
2979  013717  000015  000012                  CRLF:   .ASCIZ  <15><12>
2980
2981  013722  005015  051120  051505  051505  MSG1:   .ASCIZ  <15><12>/PRESS CARD READER 'RESET'/
2982  013730  020123  040503  042122
2983  013736  051040  040505  042504
2984  013744  020122  051047  051505
2985  013752  052105  000047
2986  013756  005015  044124  047105  MSG2:   .ASCIZ  <15><12>/THEN HIT 'CONTINUE' ON THE CONSOLE/
2987  013764  044040  052111  023440
2988  013772  047503  052116  047111
2989  014000  042525  020047  047117
2990  014006  052040  042510  041440
2991  014014  047117  047523  042514
2992  014022  000000
2993  014023  000015  050012  042522  MSG3:   .ASCIZ  <15><12>/PRESS CARD READER 'STOP'/
2994  014030  051523  041440  051101
2995  014036  020104  042522  042101
2996  014044  051105  023440  052123
2997  014052  050117  000047
2998  014056  005015  044124  020105  MSG4:   .ASCIZ  <15><12>/THE INTERRUPT LEVEL WAS /
2999  014064  047111  042524  051122
3000  014072  050125  020124  042514
3001  014100  042526  020114  040527
3002  014106  020123  000000
3003  014111  000015  051012  046505  MSG5:   .ASCIZ  <15><12>/REMOVE ALL CARDS FROM THE INPUT HOPPER/
3004  014116  053117  020105  046101
3005  014124  020114  040503  042122
3006  014132  020123  051106  046517
3007  014140  052040  042510  044440
3008  014146  050116  052125  044040
3009  014154  050117  042520  000122
3010  014162  005015  042522  052123  MSG6:   .ASCIZ  <15><12>/RESTORE CARDS TO THE INPUT HOPPER/
3011  014170  051117  020105  040503
3012  014176  042122  020123  047524
3013  014204  052040  042510  044440
3014  014212  050116  052125  044040
3015  014220  050117  042520  000122
3016  014226  005015  052520  046114  MSG7:   .ASCII  <15><12>/PULL OUTPUT STACKER PRESSURE ARM DOWN /
3017  014234  047440  052125  052520
3018  014242  020124  052123  041501
3019  014250  042513  020122  051120
3020  014256  051505  052523  042522
3021  014264  040440  046522  042040
3022  014272  053517  020116
3023  014276  047125  044524  020114          .ASCIZ  /UNTIL HOPPER CHECK LIGHTS/
3024  014304  047510  050120  051105
3025  014312  041440  042510  045503
3026  014320  046040  043511  052110
3027  014326  000123
3028  014330  005015  047510  042114  MSG8:   .ASCII  <15><12>/HOLD DOWN THE SWITCH UNDER THE CAP OF THE INPUT /
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  3029  014336  042040  053517  020116
  3030  014344  044124  020105  053523
  3031  014352  052111  044103  052440
  3032  014360  042116  051105  052040
  3033  014366  042510  041440  050101
  3034  014374  047440  020106  044124
  3035  014402  020105  047111  052520
  3036  014410  020124
  3037  014412  047510  050120  051105          .ASCIZ  /HOPPER/
  3038  014420     000
  3039  014421     015  051412  044514  MSG9:   .ASCII  <15><12>/SLIDE A CARD FROM THE OUTPUT HOPPER ABOUT HALF AN INCH /
  3040  014426  042504  040440  041440
  3041  014434  051101  020104  051106
  3042  014442  046517  052040  042510
  3043  014450  047440  052125  052520
  3044  014456  020124  047510  050120
  3045  014464  051105  040440  047502
  3046  014472  052125  044040  046101
  3047  014500  020106  047101  044440
  3048  014506  041516  020110
  3049  014512  005015  020040  040502          .ASCIZ  <15><12>/  BACK INTO THE READ HEAD, BLOCKING THE PHOTO CELL/
  3050  014520  045503  044440  052116
  3051  014526  020117  044124  020105
  3052  014534  042522  042101  044040
  3053  014542  040505  026104  041040
  3054  014550  047514  045503  047111
  3055  014556  020107  044124  020105
  3056  014564  044120  052117  020117
  3057  014572  042503  046114     000
  3058  014577     015  051012  046505  MSG10:  .ASCIZ  <15><12>/REMOVE JAMMED CARD/
  3059  014604  053117  020105  040512
  3060  014612  046515  042105  041440
  3061  014620  051101  000104
  3062  014624  005015  047510  042114  MSG11:  .ASCIZ  <15><12>/HOLD THE OUTPUT STACKER GATE OPEN. THEN/
  3063  014632  052040  042510  047440
  3064  014640  052125  052520  020124
  3065  014646  052123  041501  042513
  3066  014654  020122  040507  042524
  3067  014662  047440  042520  027116
  3068  014670  052040  042510  000116
  3069  014676  005015  046120  041501  MSG12:  .ASCII  <15><12>/PLACE SPECIAL DARK-LIGHT CHECK CARD ONLY (SEE 7.2.2 OF /
  3070  014704  020105  050123  041505
  3071  014712  040511  020114  040504
  3072  014720  045522  046055  043511
  3073  014726  052110  041440  042510
  3074  014734  045503  041440  051101
  3075  014742  020104  047117  054514
  3076  014750  024040  042523  020105
  3077  014756  027067  027062  020062
  3078  014764  043117     040
  3079  014767     124  042510  053440          .ASCII  /THE WRITE-UP)/
  3080  014774  044522  042524  052455
  3081  015002  024520
  3082  015004  005015  052101  052040          .ASCIZ  <15><12>   /AT THE BOTTOM OF THE INPUT STACK/
  3083  015012  042510  041040  052117
  3084  015020  047524  020115  043117
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3085  015026  052040  042510  044440
3086  015034  050116  052125  051440
3087  015042  040524  045503     000
3088  015047     015  042012  041505  MSG13:  .ASCIZ  <15><12>/DECK    CARD    COLUMN  PATTERN READ/
3089  015054  020113  020040  041440
3090  015062  051101  020104  020040
3091  015070  041440  046117  046525
3092  015076  020116  050040  052101
3093  015104  042524  047122  051040
3094  015112  040505  000104
3095  015116  005015  046101  044120  MSG14:  .ASCIZ  <15><12>/ALPHA /
3096  015124  020101     000
3097  015127     015  041012  047111  MSG15:  .ASCIZ  <15><12>/BINARY/
3098  015134  051101  000131
3099  015140  005015  044502  020124  MSG16:  .ASCIZ  <15><12>/BIT 15 WAS SET/
3100  015146  032461  053440  051501
3101  015154  051440  052105     000
3102  015161     015  051012  046505  MSG17:  .ASCIZ  <15><12>/REMEDY THE ERROR CONDITION AND PRESS 'CONTINUE'/
3103  015166  042105  020131  044124
3104  015174  020105  051105  047522
3105  015202  020122  047503  042116
3106  015210  052111  047511  020116
3107  015216  047101  020104  051120
3108  015224  051505  020123  041447
3109  015232  047117  044524  052516
3110  015240  023505     000
3111  015243     015  041012  052111  MSG18:  .ASCIZ  <15><12>/BIT 12 WAS SET/
3112  015250  030440  020062  040527
3113  015256  020123  042523  000124
3114  015264  005015  047503  052514  MSG19:  .ASCIZ  <15><12>/COLUMN READ  CARDS ERRORS/
3115  015272  047115  051040  040505
3116  015300  020104  041440  051101
3117  015306  051504  042440  051122
3118  015314  051117  000123
3119  015320  005015  052520  020124  MSG20:  .ASCIZ  <15><12>/PUT ANY TWO CARDS IN INPUT HOPPER/
3120  015326  047101  020131  053524
3121  015334  020117  040503  042122
3122  015342  020123  047111  044440
3123  015350  050116  052125  044040
3124  015356  050117  042520  000122
3125  015364  005015  051120  051505  MSG21:  .ASCIZ  <15><12>/PRESS END OF FILE BUTTON/
3126  015372  020123  047105  020104
3127  015400  043117  043040  046111
3128  015406  020105  052502  052124
3129  015414  047117     000
3130  015417     015  053412  042510  MSG22:  .ASCIZ  <15><12>/WHEN PRINTING STOPS PUT HALT AND/
3131  015424  020116  051120  047111
3132  015432  044524  043516  051440
3133  015440  047524  051520  050040
3134  015446  052125  044040  046101
3135  015454  020124  047101  000104
3136  015462  005015  044523  043516  MSG23:  .ASCIZ  <15><12>/SINGLE BUS CYCLE DOWN, AND HIT 'CONTINUE' ON THE/
3137  015470  042514  041040  051525
3138  015476  041440  041531  042514
3139  015504  042040  053517  026116
3140  015512  040440  042116  044040
```

```
  3141  015520  052111  023440  047503
  3142  015526  052115  047111  042525
  3143  015534  020047  047117  052040
  3144  015542  042510     000
  3145  015545     015  041412  047117  MSG24:  .ASCIZ  <15><12>/CONSOLE UNTIL ONE CARD IS READ/
  3146  015552  047523  042514  052440
  3147  015560  052116  046111  047440
  3148  015566  042516  041440  051101
  3149  015574  020104  051511  051040
  3150  015602  040505  000104
  3151  015606  005015  044124  047105  MSG25:  .ASCIZ  <15><12>/THEN PUT UP THE TWO SWITCHES AND HIT/
  3152  015614  050040  052125  052440
  3153  015622  020120  044124  020105
  3154  015630  053524  020117  053523
  3155  015636  052111  044103  051505
  3156  015644  040440  042116  044040
  3157  015652  052111     000
  3158  015655     015  023412  047503  MSG26:  .ASCIZ  <15><12>/'CONTINUE' ON THE CONSOLE/
  3159  015662  052116  047111  042525
  3160  015670  020047  047117  052040
  3161  015676  042510  041440  047117
  3162  015704  047523  042514     000
  3163          015712                  .EVEN
```

```
3164
3165  015712  012767  015742  162104  POWR:   MOV     #RESTOR,24
3166  015720  010046                          MOV     %0,-(6)
3167  015722  010146                          MOV     %1,-(6)
3168  015724  010246                          MOV     %2,-(6)
3169  015726  010346                          MOV     %3,-(6)
3170  015730  010446                          MOV     %4,-(6)
3171  015732  010546                          MOV     %5,-(6)
3172  015734  010667  000036                  MOV     %6,SAV6
3173  015740  000000                          HALT
3174
3175
3176  015742  012767  015712  162054  RESTOR: MOV     #POWR,24
3177  015750  016706  000022                  MOV     SAV6,%6
3178  015754  012605                          MOV     (6)+,%5
3179  015756  012604                          MOV     (6)+,%4
3180  015760  012603                          MOV     (6)+,%3
3181  015762  012602                          MOV     (6)+,%2
3182  015764  012601                          MOV     (6)+,%1
3183  015766  012600                          MOV     (6)+,%0
3184  015770  016716  174440                  MOV     RETURN,(6)      ;START TEST OVER
3185  015774  000002                          RTI
3186
3187  015776  000000                  SAV6:   0
3188
3189  016000  000000                  BUFBEG: 0
3190          000001                          .END
```

DZCDAC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
CDST    002502          714#    734
CD1000  000540          730#   1763*  1765*  2161
CKERR   011672         2400    2416#
CKERR1  011714         2417    2423#
CKERR2  011740         2424    2426   2429#
CKERR3  011704         2419#   2420
CKFAIL  011744         2404    2410   2432#
CKHLT   012110         2434    2459#
CKLOOP  011524         2384#   2408   2414   2430   2460   2462
CKLOP1  011460         2373#   2378
CKLOP2  011646         2402    2409#  2413
CKLOP3  011622         2403#   2407   2428
CKLP1   011604         2397#   2398
CKNOHO  011776         2436    2439#
CKNOPK  012042         2444    2449#
CKOFFL  012200          764     843    876   2475   2492#  2499
CKOVR   011476         2374    2377#
CKOVR1  012054         2448    2453#
CKREAD  011560         2386    2388   2391#
CKSF    000534          728#
CKSAME  011356          701    2358#
CKSTRT  011504         2380#   2421
CLCNT   006524         1339#   1414*  1415   1529*  1530   1678#  1679   1681#  1695#  1758#  2391#  2405#  2406
                       2411#   2412   2440
CONTC   007112         1857    1862#
CONTD   004354         1347    1351#
CONT20  003730         1243    1247#
CONT21  004042         1266    1269#
CONT7   001642          917     926#
COUNT   000522          722#    848#   858#   884#   889#  1238#  1239#  1406#  1412#  1521#  1527#  1602#
COUNTG  000536          729#
CRLF    013717         1775    1781   1809   1825   1854   1903   1929   1954   1978   2002   2030   2070   2098
                       2135    2170   2177   2252   2272   2309   2439   2508   2517   2979#
DATRST  006476         1509    1614   1747#
DATST   004262         1323    1339#  1745   1748
DCNT1   004410         1354    1358#
DECK    006162         1346#   1350#  1671#
DECKCK  006452         1714    1717   1741#
DERCNT  006530         1379#   1382#  1760#
DERFLG  012132         2364#   2375#  2384#  2390#  2401   2425   2427   2443   2469#
DONEB   001522          895     898#
DUMMY = 000000          657#   1671
D.1     012404         2530    2536#
D.2     012416         2532    2534   2539#
ENDCK   004234         1321#
ERCD11  006542          694    1765#
ERFLG   000532          727#   1341#  1666   1668#  2383#  2435   2437#
ERR200  006550         1764    1766#  2315
ERR250  006532          707    1763#
HLT   = 104000          654#    768    772    776    785    792    798    805    809    814    818    825    829
                        834     838    852    856    863    866    870    883    891    896    900    916    920
                        924     942    975    979    993   1015   1019   1033   1055   1059   1073   1095   1099
                       1110    1132   1136   1150   1172   1176   1190   1208   1212   1226   1244   1268   1289
                       1293    1297   1301   1305   1309   1313   1317   1388   1397   1404   1472   1479   1484
                       1489    1493   1497   1501   1505   1508   1515   1520   1591   1598   1601   1607   1613
                       1618    1622   1626   1630   1633   1720   1724   1728   1736   1788   1792   1796   1800
```

DZCDAC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
                    1813    1817    1821    1830    1834    1836    1842    1859    1864    1868    1872    1884    1888
                    1892    1896    1909    1913    1917    1921    1933    1937    1941    1345    1970    1982    1986
                    1990    1994    2018    2034    2040    2049    2053    2057    2061    2086    2105    2114    2118
                    2122    2126    2151    2184    2189    2194    2198    2218    2222    2226    2234    2238    2242
                    2247    2261    2279    2288    2292    2296    2300    2429    2481
HOOK1   006360      1705    1711#
INIT    012134       904     932     956     996    1036    1076    1113    1153    1193    1230    1252    1275    1358
                    1774    1806    1847    1926    1974    2024    2092    2166    2178    2268    2380    2475#
INTFLG  000524       723#    740*    971     973     974     986*    991    1011    1013    1024    1026*   1031    1051
                    1053    1064    1066*   1071    1081    1093    1104    1106*   1108    1128    1130    1141    1143*
                    1148    1168    1170    1181    1183*   1188    1217    1219*   1224
INTVC   000516       720#    737     738     739*
ISR     004566      1390    1393#
ISRBE   004710      1413    1421#
ISRDE   004736      1408    1429#
ISRDE4  005120      1456    1464#
ISRD1   004744      1431#   1452
ISRD2   005056      1430    1455#
ISRER   005132      1394    1471#
ISRE1   005140      1471    1475#
ISRE2   005172      1476    1487#
ISRE3   005202      1480    1491#
ISRLP   004640      1407#   1416    1419
ISRNC   004632      1406#   1483
ISRNX   004714      1422#
ISRNX1  004732      1424    1426#
ISRRT   004644      1409#   1443    1445    1467
ISRST   005252      1473    1485    1509#
ITCNT   012432      2333*   2337*   2533    2535*   2539*   2543#
ITMAX   012430       733*   1768*   2334*   2533    2542#
LASTCD  006246      1482    1610    1648    1686#
LOOP5   001344       854#    859
LOOP6   001514       894#
LOOP6A  001470       887#    890
LOOP6B  001506       888     893#
LSTCD1  006262      1688#   1690
MSG1    013722      1823    1902    1953    2001    2029    2069    2097    2134    2168    2250    2271    2308    2981#
MSG10   014577      2133    3058#
MSG11   014624      3062#
MSG12   014676      2269    3069#
MSG13   015047      1669    3088#
MSG14   015116      1350    3095#
MSG15   015127      1346    3097#
MSG16   015140      3099#
MSG17   015161      2496    3102#
MSG18   015243      2495    3111#
MSG19   015264      2438    3114#
MSG2    013756      1808    1824    1928    1977    2026    2169    2176    2251    2986#
MSG20   015320      2167    3119#
MSG21   015364      2175    3125#
MSG22   015417      1776    3130#
MSG23   015462      1777    3136#
MSG24   015545      1778    3145#
MSG25   015606      1779    3151#
MSG26   015655      1780    3158#
MSG3    014023      1807    1853    2093    2993#
```

```
MSG4    014056            987    1027    1067    1144    1184    1220    2998#
MSG5    014111           1927    2025    3003#
MSG6    014162           1952    2068    2249    2307    3010#
MSG7    014226           1975    3016#
MSG8    014230           2027    3028#
MSG9    014421           2094    3039#
NOHEAD  006160           1667    1670#
NOP   = 000240            653#
NOTRP   001022            755#    758
NOTRP1  004362           1353#   1356
NXCRD   006306           1417    1421    1532    1536    1695#
OFFSET  006506           1367*   1640    1642*   1646*   1751#
ONINT   006440           1730    1734#
ONLINE  006374           1712    1716#
PAKSET  006110           1375    1425    1658#
PC    = 000007            666#   2574*   2581*   2586*
POWR    015712            679    3165#   3176
PRINT   012224            682    2502#
PRINTB  012570           1579    1582    2446    2601#
PRINTF  012662           2614    2620#
PRINTL  012644           2615#   2629
PRINTR  012610           1459    1462    1675    1680    2441    2451    2455    2458    2510    2513    2516    2607#
PRINTS  012620            989    1029    1069    1146    1186    1222    2609#
PRINTT  012654           2605    2618#
PRINT1  012554            988*   1028*   1068*   1145*   1185*   1221*   1458*   1461*   1578*   1581*   1674*   1679*   2440*
                         2445*   2450*   2454*   2457*   2509*   2512*   2515*   2596#   2616*   2618*   2620*
PRINT2  012556           2597#   2603    2612    2630    2634
PRINT3  012566           2599#   2601*   2607*   2609*   2610*   2624*   2625    2628*
PROC    000530            725#    846*    860     885*    893
PS    = 177776            652#    742*    755*    759*    846     847*    860*    885     886*    893*    906*    907     908*
                          914*    934*    935     958*    959     960*    961*    967*    998*    999     1000*   1001*   1007*
                         1038*   1039    1040*   1041*   1047*   1078*   1079    1080*   1081*   1087*   1115*   1116    1117*
                         1118*   1124*   1155*   1156    1157*   1158*   1164*   1195*   1196    1197*   1198*   1204*   1232*
                         1233    1234*   1241*   1254*   1255    1256*   1263*   1265*   1277*   1278    1279*   1353*   1357*
                         1362*   1363    1849*   1850    1851*   1875*   1876    1877*   1899*   1900    1901*   1948*   1949
                         1950*   1959*   1960    1961*   1997*   1998    1999*   2007*   2008    2009*   2064*   2065    2066*
                         2075*   2076    2077*   2129*   2130    2131*   2140*   2141    2142*   2204*   2205    2206*   2303*
                         2304    2305*   2330*   2332*   2537*
PSR     005256           1391    1511#
PSRBE   005372           1528    1536#
PSRDE   005444           1523    1548#
PSRDE3  005632           1575    1584#
PSRD1   005452           1550#   1571
PSRD2   005564           1549    1574#
PSRER   005644           1512    1590#
PSRE1   005652           1590    1594#
PSRE2   005710           1595    1603#
PSRE3   005750           1604    1616#
PSRE4   005760           1608    1620#
PSRLP   005322           1522#   1531    1534    1634
PSRNC   005314           1521#   1612
PSRNX   005376           1537#
PSRNX1  005440           1539    1545#
PSRRT   005326           1524#   1562    1564    1587
PSRST   006020           1592    1634#
PTOFF   006526           1759#
```

D2CDAC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
RESTOR  015742          3165    3176#
RESTRT  001014           753#   1326    1744
RETRNX  011354          2325*   2326*   2336    2338    2339#
RETURN  012434           750*    762*   1767*   2335*   2358*   2538    2540*   2544#   3184
R0     =%000000          658#   1365*   1369    1399    1407    1431    1433    1439    1461    1463    1516    1522    1550
                        1552    1558    1581    1583    1651*   1652    1707    2392*   2394    2403    2409    2445    2447
                        2450    2452    2566    2567*   2568    2571*
R1     =%000001          659#   1364*   1407    1409    1411*   1418    1422    1423    1435*   1436    1438*   1439    1441*
                        1442    1444*   1447*   1448    1450*   1451    1453*   1458    1463    1522    1524    1526*   1533
                        1537    1542*   1543*   1552    1554*   1555    1557*   1558    1560*   1561    1563*   1566*   1567
                        1569*   1570    1572*   1578    1583    1660*   1661*   2372*   2376    2377*
SAVPC   012344          2505*   2509    2525#
SAVPS   012346          2506*   2512    2526#
SAVR2   012336          2522#
SAVR3   012340          2523#
SAVR4   012342          2524#
SAV6    015776          3172*   3177    3187#
SCOPE  = 104400           655#    763     778     800     820     840     872     902     929     955     995    1035    1075
                        1112    1152    1192    1228    1250    1273    1321    1773    1805    1846    1925    1973    2023
                        2091    2165    2267    2313
SCOPEC  012350           685    2529#
SECN    010636          2204#   2229
SETUP   000542           733#    751    1766    2323    2359
SET1    003616          1218    1224#
SET2    003420          1182    1188#
SET3    003204          1142    1148#
SET4    002770          1105    1108#
SET5    002572          1065    1071#
SET6    002356          1025    1031#
SET7    002142           985     991#
SIZE    006504          1366*   1368    1400    1401    1406    1517    1521    1640*   1644    1650    1686    1750#
SP     =%000006          665#    690*    693*    696*    700*    706*    921     943     983    1023    1063    1103    1140
                        1180    1216    1245    1261    1267    1284    1738    1747    1881    1906    1957    1967    2005
                        2015    2073    2083    2138    2148    2214    2230    2312    2566*   2567    2568*   2570    2571
                        2572*   2575    2577*   2579*   2585
SPACE   013711          1460    1577    1580    1672    1677    1682    2442    2453    2456    2511    2514    2977#
SRETRN  006024          1426    1545    1640#   1643    1647
SRETR1  006044          1641    1644#
SRETR3  006054          1646#   1649
SRETR4  006064          1645    1648#
SRVC    004546          1361    1386#
STACK   000500           690     693     696     700     706     713#
SWR    = 177570          651#    757    1322    1342    1355    1371    1373    1423    1455    1464    1538    1574    1584
                        1539    1711    1742    2325    2328    2361    2385    2387    2433    2459    2502    2518    2529
                        2531
TEMP1   006512          1686*   1689*   1753#
TEMP2   006514          1687*   1688*   1691    1754#
TEND    006520          1345*   1349*   1409    1436    1451    1524    1541*   1555    1570    1659*   1756#
TEST    001050           752     756     762#
TESTA   006566          1767    1773#
TESTB   006700          1805#
TESTC   007026          1846#
TESTD   007326          1925#
TESTE   007536          1973#
TESTF   007742          2023#
TESTG   010226          2091#
```

DZCDAC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
TESTH   011036          2163    2267#
TESTI   010514          2162    2165#
TESTX   011246           697    2323#
TEST1   001056           763#   2544
TEST1A  001060           762     764#
TEST10  001652           929#
TEST11  001740           955#
TEST12  002154           972     974     976     990     992     995#
TEST13  002370          1012    1014    1016    1030    1032    1035#
TEST14  002604          1052    1054    1056    1070    1072    1075#
TEST15  003002          1092    1094    1096    1107    1109    1112#
TEST16  003216          1129    1131    1133    1147    1149    1152#
TEST17  003432          1169    1171    1173    1187    1189    1192#
TEST2   001112           778#
TEST20  003630          1209    1223    1225    1228#
TEST21  003740          1250#
TEST22  004054          1273#
TEST3   001160           786     800#
TEST4   001230           820#
TEST5   001300           840#
TEST6   001420           857     867     872#
TEST7   001530           892     902#
TINA21  004036          1262    1267#
TINTC   007106          1848    1859#
TINTCA  007170          1874    1881#
TINTCB  007266          1898    1906#
TINTD   007460          1947    1957#
TINTDA  007524          1958    1967#
TINTE   007664          1996    2005#
TINTEA  007730          2006    2015#
TINTF   010150          2063    2073#
TINTFA  010214          2074    2083#
TINTG   010424          2128    2138#
TINTGA  010470          2139    2148#
TINTH   011232          2302    2312#
TINTI   010700          2203    2214#
TINTIA  010736          2228    2230#
TINT10  001722           933     942#
TINT11  002064           957     977#
TINT12  002300           997    1017#
TINT13  002514          1037    1057#
TINT14  002730          1077    1097#
TINT15  003126          1114    1134#
TINT16  003342          1154    1174#
TINT17  003540          1194    1210#
TINT20  003722          1231    1244#
TINT21  004012          1253    1261#
TINT22  004126          1276    1284#
TINT7   001622           905     918#
TLOPC   007076          1855#   1856
TLOPG   010254          2099#   2100
TLOPGA  010262          2101#   2102
TLOPGB  010312          2110#   2111
TLOPH   011060          2273#   2274
TLOPHA  011066          2275#   2276
TLOPHB  011116          2284#   2285
```

DZCDAC.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

```
TOTCRD  012124          2381* 2396* 2454  2465*
TOTERR  012122          2382* 2432* 2457  2464*
TPB     000512           718* 2487*
TPS     000510           717* 2485
TRAPX   001032           754   757*
TRFLG   000526           724*  741*  753  1325* 1351  1741*
TRP1    004372          1352   1355*
TRTRAP  000514           673   719*
TSTART  006516          1344* 1348* 1364  1411  1442  1448  1453  1526  1540* 1561  1567  1572  1658*
                        1755*
TTY    =%000005          664*
TYHEAD  006142          1457   1576  1666*
TYPE   = 000004          656*   987  1027  1067  1144  1184  1220  1460  1577  1580  1669  1670  1672
                        1677   1682  1775  1776  1777  1778  1779  1780  1781  1807  1808  1809  1823
                        1824   1825  1853  1854  1902  1903  1927  1928  1929  1952  1953  1954  1975
                        1977   1978  2001  2002  2025  2026  2027  2029  2030  2068  2069  2070  2093
                        2094   2097  2098  2133  2134  2135  2167  2168  2169  2170  2175  2176  2177
                        2249   2250  2251  2252  2269  2271  2272  2307  2308  2309  2438  2439  2442
                        2453   2456  2495  2496  2508  2511  2514  2517  2634
XLOOP   011344          2335   2337*
$FILLS  012443          2558*
$NULL   012442          2557*  2577
$TPB    012440          2556*  2585*
$TPFLG  012444          2559*  2562
$TPS    012436          2555*  2583
$TYPE   012446           676   2562*
.      = 016002          669*   670   672*  675*  678*  681*  684*  689*  692*  695*  699*  705*  712*
                         745*   767   771   775   784   791   797   804   808   813   817   824   828
                         833    837   851   855   862   865   869   882   899   913   919   923   940
                         941    966   978  1006  1018  1046  1058  1086  1098  1123  1135  1163  1175
                        1203   1211  1240  1260  1283  1288  1292  1296  1300  1304  1308  1312  1316
                        1387   1396  1403  1410  1465  1478  1488  1492  1496  1500  1504  1507  1514
                        1519   1525  1585  1597  1600  1606  1617  1621  1625  1629  1632  1719  1723
                        1727   1732  1735  1743  1787  1791  1795  1799  1812  1816  1820  1829  1833
                        1837   1841  1863  1867  1871  1879  1883  1887  1891  1895  1904  1908  1912
                        1916   1920  1932  1936  1940  1944  1955  1965  1969  1981  1985  1989  1993
                        2003   2013  2017  2033  2037  2039  2046  2048  2052  2056  2060  2071  2081
                        2085   2104  2113  2117  2121  2125  2136  2146  2150  2174  2183  2188  2193
                        2197   2211  2217  2221  2225  2233  2237  2241  2246  2256  2260  2278  2287
                        2291   2295  2299  2310  2329  2331  2477  2480  2486  2493  2503  2519  2608
                        2623   2626  2631  3163*
```

BDUMP	688#	1578	1581	2445							
COMMEN	1#										
DUMP	688#	1458	1461	1674	1679	2440	2449	2454	2457	2509	2512	2515
ENDCOM	1#										
ESCAPE	1#										
GETPRI	1#										
GETSWR	1#										
INT	954#	994	1034	1074	1111	1151	1191				
MULT	1#										
NEWTST	1#										
POP	1#										
PUSH	1#										
REPORT	1#										
SDUMP	688#	988	1028	1068	1145	1185	1221				
SETPRI	1#										
SETUP	1#										
SKIP	1#										
SLASH	1#										
STARS	1#										
SWRSU	1#										
TYPBIN	1#										
TYPDEC	1#										
TYPEM	687#										
TYPNAM	1#										
TYPNUM	1#										
TYPOCS	1#										
TYPOCT	1#										
TYPTXT	1#										
$$ESCA	1#										
$$NEWT	1#										
$$SKIP	1#										
.EQUAT	1#										
.HEADE	1#										
.KT11	1#										
.SETUP	1#										
.SWRHI	1#										
.$ACT1	1#										
.$APTB	1#										
.$APTH	1#										
.$APTY	1#										
.$ASTA	1#										
.$CATC	1#										
.$CMTA	1#										
.$DB2D	1#										
.$DB2O	1#										
.$DIV	1#										
.$EOP	1#										
.$ERRO	1#										
.$ERRT	1#										
.$MULT	1#										
.$POWE	1#										
.$RAND	1#										
.$RDDE	1#										
.$RDOC	1#										
.$READ	1#										
.$R2AZ	1#										

```
.$SAVE      1#
.$SB2D      1#
.$SB2O      1#
.$SCOP      1#
.$SIZE      1#
.$SUPR      1#
.$TRAP      1#
.$TYPB      1#
.$TYPD      1#
.$TYPE      1#
.$TYPO      1#
.$40CA      1#
.1170       1#
```

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ADD     1435  1444  1450  1543  1554  1563  1569  1640  1658  1659  1660  1689  2326  2572
BCC     2374
BEQ      767   771   775   784   791   797   804   808   813   817   824   828   833   837   855
         869   882   972  1012  1052  1092  1129  1169  1308  1312  1316  1323  1343  1372  1378
        1390  1396  1403  1413  1476  1488  1492  1496  1500  1504  1514  1519  1528  1595  1604
        1617  1621  1625  1629  1705  1712  1717  1727  1743  1799  1820  1833  1841  1856  1871
        1895  1912  1920  1944  1969  1993  2017  2037  2039  2060  2085  2100  2102  2104  2125
        2150  2162  2174  2183  2188  2193  2217  2221  2256  2260  2274  2276  2278  2299  2329
        2386  2417  2420  2424  2480  2503  2563  2623  2626
BGE     1483  1698
BGT     1443  1449  1562  1568  1649  2428
BIC      908   915   960  1000  1040  1080  1117  1157  1197  1256  1279  1362  1544  1851  1877
        1901  1950  1961  1999  2009  2066  2077  2131  2142  2206  2305  2330  2362
BIS      782   811   831   906   934   958   961   998  1001  1038  1041  1078  1081  1115  1118
        1155  1158  1195  1198  1232  1254  1277  1662  1849  1875  1899  1948  1959  1997  2007
        2064  2075  2129  2140  2204  2303  2332  2389
BISB    2376  2627
BIT      757   854   868   881  1295  1299  1303  1307  1322  1342  1355  1371  1373  1377  1380
        1389  1393  1423  1455  1475  1477  1487  1491  1495  1499  1503  1506  1511  1538  1574
        1594  1596  1599  1603  1605  1616  1620  1624  1628  1631  1644  1711  1716  1722  1726
        1734  1742  1794  1798  1811  1819  1828  1832  1840  1855  1870  1886  1894  1907  1911
        1919  1931  1939  1943  1980  1988  1992  2032  2036  2047  2055  2059  2099  2101  2112
        2120  2124  2173  2182  2187  2192  2216  2220  2232  2236  2240  2255  2259  2273  2275
        2286  2294  2298  2328  2385  2387  2416  2419  2423  2433  2492  2502  2529  2531
BLE     1437  1556
BLT     1611  2580
BMI      862   888   895   919   974   978   985  1014  1018  1025  1054  1058  1065  1094  1098
        1105  1131  1135  1142  1171  1175  1182  1211  1218  1288  1292  1387  1410  1471  1525
        1590  1641  1690  1719  1816  1937  1863  1867  1883  1891  1916  1936  1985  2052  2117
        2246  2291  2400
BNE      754   758   859   890  1240  1296  1300  1304  1352  1356  1374  1381  1394  1408  1416
        1424  1430  1434  1440  1452  1456  1478  1507  1512  1523  1531  1539  1549  1553  1559
        1571  1575  1597  1600  1606  1632  1645  1667  1723  1735  1787  1791  1795  1812  1829
        1887  1908  1932  1940  1981  1989  2033  2048  2056  2113  2121  2233  2237  2241  2287
        2295  2378  2388  2404  2407  2410  2413  2434  2436  2493  2530  2532  2569  2576  2629
        2631
BPL      851   865   899   913   923   940   966   992  1006  1032  1046  1072  1086  1109  1123
        1149  1163  1189  1203  1225  1465  1585  2046  2111  2197  2225  2285  2398  2402  2426
        2444  2460  2477  2486  2519  2534  2584
BR       752   756   786   857   867   892   917   941   976   990  1016  1030  1056  1070  1096
        1107  1133  1147  1173  1187  1209  1223  1243  1260  1266  1283  1347  1354  1383  1419
        1445  1467  1473  1480  1485  1534  1564  1587  1592  1608  1643  1647  1714  1732  1857
        1879  1904  1955  1965  2003  2013  2071  2081  2136  2146  2211  2229  2310  2331  2408
        2414  2421  2430  2448  2462  2498  2504  2565  2582  2605  2608  2614
CLR      739   740   741   789   847   848   877   884   886   925   927   944   946   968   970
         980   982  1008  1010  1020  1022  1048  1050  1060  1062  1088  1090  1100  1102  1125
        1127  1137  1139  1165  1167  1177  1179  1205  1207  1213  1215  1234  1238  1242  1246
        1247  1263  1269  1270  1285  1339  1340  1341  1382  1454  1573  1695  1763  1768  2333
        2337  2364  2381  2382  2383  2391  2539  2609
CLRB    2384  2604  2613  2615  2633
CMP      766   783   790   796   803   807   816   823   827   836   921   943   973   983   991
        1013  1023  1031  1053  1063  1071  1093  1103  1108  1130  1140  1148  1170  1180  1188
        1215  1224  1245  1261  1267  1284  1311  1315  1402  1407  1409  1415  1433  1436  1439
        1442  1448  1451  1463  1518  1524  1530  1555  1561  1567  1570  1691  1697  1702  1738
        1747  1881  1906  1957  1967  1968  2005  2015  2016  2038  2073  2083  2084  2103  2138
        2148  2149  2214  2230  2277  2312  2406  2409  2412  2479  2507  2533  2536  2630
```

DZCDAC.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

DZCDAC.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

```
        2110    2284    2397    2447    2476    2485    2562    2583    2622    2625
WAIT    1731
.ABS     668
.ASCII  2976    2978    3016    3028    3039    3069    3079
.ASCIZ  2977    2979    2981    2986    2993    2998    3003    3010    3023    3037    3049    3058    3062    3082    3088
        3095    3097    3099    3102    3111    3114    3119    3125    3130    3136    3145    3151    3158
.BYTE   2467    2468    2557    2558    2559    2560    2599    2727    2728    2729    2730    2731    2732    2733    2734
        2735    2736    2737    2738    2739    2740    2741    2742    2743    2744    2745    2746    2747    2748    2749
        2750    2751    2752    2753    2754    2755    2756    2757    2758    2759    2760    2761    2762    2763    2764
        2765    2766    2767    2768    2769    2770    2771    2772    2773    2774    2775    2776    2777    2778    2779
        2780    2781    2782    2783    2784    2785    2786    2787    2788    2789    2790    2791    2792    2793    2794
        2795    2796    2797    2798    2799    2800    2801    2802    2803    2804    2805    2806    2895    2896    2897
        2898    2899    2900    2901    2902    2903    2904    2905    2906    2907    2908    2909    2910    2911    2912
        2913    2914    2915    2916    2917    2918    2919    2920    2921    2922    2923    2924    2925    2926    2927
        2928    2929    2930    2931    2932    2933    2934    2935    2936    2937    2938    2939    2940    2941    2942
        2943    2944    2945    2946    2947    2948    2949    2950    2951    2952    2953    2954    2955    2956    2957
        2958    2959    2960    2961    2962    2963    2964    2965    2966    2967    2968    2969    2970    2971    2972
        2973    2974
.E:ABL     1
.END    3190
.ENDC    976     990    1016    1030    1056    1070    1096    1107    1133    1147    1173    1187    1208    1209    1223
.EVEN   3163
.IFEQ    976    1016    1056    1096    1133    1173    1208
.IFNE    971     987    1011    1027    1051    1067    1091    1107    1128    1144    1168    1184    1208    1220
.LIST      1     532     632     670     731     744    1333    1761    2317    2342    2470    2637    3164
.MACR    687     688     954
.MACRO     1
.NLIST     1     532     632     670     731     744    1333    1761    2317    2342    2470    2637    3164
.REM       1
.REPT    670
.SBTTL   532     632     731     744    1333    1761    2317    2342    2470    2637    3164
.TITLE   533
.WORD   2597
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ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

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*,DZCDAC.SEQ/SOL/CRF/PAGNUM/NL:TOC=SYSMAC.CD,DZCDAC.P11
RUN-TIME: 29 40 4 SECONDS
RUN-TIME RATIO: 126/74=1.6
CORE USED:  33K  (65 PAGES)
```

M06

Spooler runtime 11 Seconds, 50 KCS, 324 disk reads, 4 disk writes, 76 pages