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IDENTIFICATION

PRODUCT CODE: AC-8402D-MC

PRODUCT NAME: CZCDADO CD11 CARD READER DIAG

PRODUCT DATE: MAR 1980

MAINTAINER: DIAGNOSTIC ENGINEERING

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                        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  A   RESS TESTS SPECIAL DECKS WHICH HAVE ALL COLUMNS
                                AND CARDS     CHED 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




                                        (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!)
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                                PRESS 'RESET'' ON THE CARD READER.
                                LOAD THE STARTING ADDRESS, THEN SET THE DESIRED SWITCH
                                      OPTIONS.
                                PRESS START.



                                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)
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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 INSTRUCTION SECTION. IT RECORDS THE STARTING ADDRESS OF EACH SUB-TEST AS IT IS BEING ENTERED. IF A SCOPE LOOP IS 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 80 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 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 EPROR 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.

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                        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  ''CDSR'',  ''CDCC'',  AND
                                ''CDBA''  THE  ADDRESSES  OF  THESE REGISTERS OF A CARD READER
                                ASSIGNED NON-STANDARD

                        8.5       ECO HISTORY
                              CHGD1 - MODIFIED ALPCD AND BINCD TABLES FOR CORRECT CARD
                                      COMPARISON PURPOSES.

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540
541                             .TITLE  CZCDADO CD11 CARD READER DIAG
542                             ;DIAGNOSTIC FOR THE CD11 CARD READER
543                             ;COPYRIGHT 1973, 1979 BY DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
544                             ;PROGRAMMER:  KEN CHAPMAN
545                             ;             SUB MALLICK  (CHANGED FROM REV A TO REV B )
546                             ;             LEN LORANGER (CHANGED FROM REV C TO REV D)
547
548
549                             ;STARTING ADDRESSES ARE:
550                             ;       200=INSTRUCTION AND DATA TEST FOR THE CD11
551                             ;       210=ERROR FUNCTION TEST OF CD11 (M-1000)
552                             ;       220=SINGLE TEST LOOP
553                             ;       240=READ SINGLE DATA PATTERN TEST
554                             ;       250=ERROR FUNCTION TEST FOR CD11 (M-1200)
555
556                             ;SWITCH REGISTER SETTINGS FOR THE INSTRUCTION AND DATA TEST ARE:
557                             ;       SW02=1 RUN IN DATA IMAGE MODE ONLY
558                             ;       SW03=1 RUN IN DATA PACKING MODE ONLY (IGNORED IF SW02=1)
559                             ;       SW04=1 FOR THE BINARY TEST DECK
560                             ;       SW05=1 TO HALT AT THE END OF A STANDARD 80 CARD
561                             ;              TEST DECK.(HITTING CONTINUE WILL START TESTING
562                             ;              OF THE NEXT DECK IN ACCORDANCE WITH CURRENT
563                             ;              SWR SETTINGS).
564                             ;       -0 TO CONTINUE FROM ONE DECK TO THE NEXT.
565                             ;              AFTER THE LAST DECK IN THE HOPPER IS
566                             ;              RUN, THE PROGRAM WAITS FOR THE CARD READER
567                             ;              TO COME BACK ON-LINE,AND RUNS THRU
568                             ;              A SERIES OF CHECKS OF OFF-LINE AND
569                             ;              COMING ON-LINE OPERATIONS OF THE READER.
570                             ;              WHEN THE READER IS BACK ON-LINE AND THE
571                             ;              CHECKS ARE COMPLETE, THE DATA TEST IS RESUMED.
572                             ;       SW06=1 TO RUN THE COMBINED INSTRUCTION AND DATA TEST
573                             ;              WHEN CONTINUING FROM ONE DECK TO THE NEXT
574                             ;           =0 TO RUN ONLY THE DATA TEST ON EVERY DECK AFTER THE FIRST
575                             ;       SW07=1 TO RUN ONLY THE INSTRUCTION TEST CONTINUALLY.
576                             ;              SETTING SW06 AND SW07 AT THE END OF A DECK WILL
577                             ;              CAUSE THE INSTRUCTION TEST TO BE RUN CONTINUOUSLY FROM THEN ON
578                             ;              (NOTE THAT IF SW7 IS SET, THE PROGRAM MAY HANG WHEN THE
579                             ;              CARD READER RUNS OUT OF CARDS)
580                             ;       SW11=1 TO INHIBIT SUBPROGRAM ITERATION
581                             ;              (NOTE THAT IF PROGRAM FLOW IS ALLOWED TO ENTER THE
582                             ;              DATA SUBTEST WHEN SW11 IS SET, DATA ERRORS WILL
583                             ;              OCCUR SINCE THE CARD COUNT WILL BE INCORRECT.)
584                             ;       SW12=1 TO INHIBIT TRACE TRAPPING
585                             ;       SW13=1 TO INHIBIT PRINTOUT
586                             ;       SW14=1 FOR SCOPE LOOP
587                             ;       SW15=1 TO HALT ON ERROR
588
589                             ;OPERATING PROCEDURE FOR THE INSTRUCTION AND DATA TEST:
590                             ;       1.  LOAD TEST DECK IN CARD READER AND PRESS "START" ON THE CARD
591                             ;           READER.  IF THE DECK BEING USED IS NOT A STANDARD TEST
592                             ;           DECK, ONLY THE INSTRUCTION PORTION OF THE TEST CAN BE RUN.
593                             ;           (SW7 MUST BE SET TO ONE TO INDICATE THIS).
594                             ;       2.  LOAD SA 200, THEN SET THE SWITCH REGISTER SWITCHES TO THE DESIRED
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                        ;           COMBINATION
                        ;       3.  PRESS "START" ON THE CONSOLE
                        ;       4.  NOTE THAT RUNNING THE COMPLETE INSTRUCTION TEST
                        ;           REQUIRES THAT THE INPUT HOPPER MUST RUN OUT OF CARDS
                        ;           AT THE END OF A TEST DECK AT LEAST ONCE.  WHEN THIS
                        ;           OCCURS, THE PROCESSOR SHOULD CONTINUE TO RUN.  LOADING
                        ;           A DECK INTO THE INPUT HOPPER AND PRESSING "START" ON THE CARD
                        ;           READER SHOULD CAUSE THE BELL TO RING AND THE CARD
                        ;           READER TO RESUME READING CARDS.  IF THIS DOES NOT OCCUR,
                        ;           IT IS A FAULT AND SHOULD BE FIXED.
                        ;
                        ;
                        ;SPECIAL SWITCH REGISTER SETTINGS FOR THE ERROR FUNCTION TEST:
                        ;       SW14=1 TO LOOP THRU THE CURRENT SUBTEST
                        ;       SW15=1 TO HALT ON ERROR
                        ;
                        ;OPERATING PROCEDURE FOR THE ERROR FUNCTION TEST:
                        ;       1.  LOAD A FEW SPARE CARDS INTO THE INPUT HOPPER.
                        ;       2.  PRESS "START" ON THE CARD READER.
                        ;       3.  LOAD THE SA, THEN SET THE DESIRED SWITCH OPTIONS.
                        ;       4.  PRESS "START" ON THE CONSOLE.
                        ;       5.  FOLLOW THE INSTRUCTIONS AS THEY ARE PRINTED OUT.
                        ;
                        ;SINGLE TEST LOOP (SA 220) HALTS TWICE!
                        ;       1ST HALT - LOAD STARTING ADDRESS OF DESIRED TEST (TEST1 TO TEST 24)
                        ;       2ND HALT - SET SWR OPTIONS (BIT 11 MUST = 0)
                        ;       THIS TEST USES TRACE TRAPPING WHERE APPLICABLE IF SW12 IS NOT SET
                        ;
                        ;DESCRIPTION OF SINGLE DATA PATTERN TEST
                        ;       THIS TEST IS DESIGNED TO AID IN THE LOCATION OF DIFFICULT DATA ERROR
                        ;       PROBLEMS AND PERHAPS HELP IN SOME CARD READER ADJUSTMENTS.  IT
                        ;       CONTINUOUSLY READS CARDS WHICH HAVE ALL COLUMNS PUNCHED OR MARKED
                        ;       IDENTICALLY, CHECKING THE DATA AGINST 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.
                        ;
                        ;OPERATING PROCEDURE FOR SINGLE DATA PATTERN TEST:
                        ;       1.  LOAD TEST DECK OF IDENTICAL CARDS IN THE INPUT HOPPER, AND PUT
                        ;           THE CARD READER ON-LINE.
                        ;       2.  LOAD SA 240, THEN PRESS "START" ON THE CONSOLE.
                        ;       3.  AT THE INITIAL HALT SET THE CORRECT CARD-IMAGE
                        ;           DATA PATTERN IN SW11-SW00, THEN PRESS CONTINUE.
                        ;       4.  WHEN THE READER RUNS OUT OF CARDS IT WILL RING THE
                        ;           BELL.  RELOADING THE DECK AND PRESSING "START" ON THE CARD
                        ;           READFR WILL CONTINUE THE TEST.
                        ;
                        ;
                        ;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
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                                ;       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  012452                      $TYPE
000022  000340                      340
            000024              .=24
000024  015756                      POWR
000026  000340                      340
            000030              .=30
000030  012230                      PRINT
000032  000340                      340
            000034              .=34
000034  012354                      SCOPEC
000036  000340                      340

                                ;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  006326                JMP     ERCD11          ;STARTING ADDRESS FOR CD11 (M1000) ERROR FUNCTION TEST
            000220              .-220
000220  012706  000500                MOV     #STACK, SP
```

```
                                        JMP     TESTX           ;STARTING ADDRESS FOR LOOP WHICH CONTINUALLY RUNS
                                                                ;ANY SINGLE SUBTEST

                        000240          .=240
000240  012706  000500                  MOV     #STACK, SP      ;
000244  000167  011112                  JMP     CKSAME          ;STARTING ADDRESS OF TEST TO READ A SINGLE DATA
                                                                ;PATTERN CONTINUOUSLY


                        000250          .=250
000250  012706  000500                  MOV     #STACK, SP
000254  000167  006256                  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 FLO
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  011664  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


                        001000          .=1000


001000  012767  001000  011432  BEGIN:  MOV     #BEGIN,RETURN   ;SAVE RETURN FOR POWER FAIL
001006  004767  177530          JSR     %7,     SETUP   ;INITIALIZE POINTERS AND FLAGS
```

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  763  001012  000004  015715                    TYPE,   MSG27           ;TYPE OUT DIAGNOSTIC IDENTIFICATION
  764  001016  000416                            BR      TEST            ;GO TO INSTRUCTION TESTS
  765  001020  005767  177502          RESTRT:   TST     TRFLG           ;CHECK FOR TRACE TRAPPING
  766  001024  001004                            BNE     TRAPX           ;IF SET, TRACE TRAP
  767  001026  012767  000340  176742  NOTRP:    MOV     #340,   PS      ;IF ZERO, CLEAR TRACE BIT
  768  001034  000407                            BR      TEST            ;GO TO INSTRUCTION TESTS
  769  001036  032767  010000  176524  TRAPX:    BIT     #10000, SWR     ;CHECK SW12
  770  001044  001370                            BNE     NOTRP           ;BRANCH IF SET TO CLEAR TRACE BIT
  771  001046  012767  000360  176722            MOV     #360,   PS      ;SET TRACE BIT
  772
  773                                     ;TEST FOR CORRECT INITIALIZATION OF ALL CARD READER REGISTERS
  774  001054  012767  001064  011356  TEST:    MOV     #TEST1A,RETURN  ;SETUP SCOPE LOOP RETURN ADDRESS
  775  001062  104400                    TEST1:  SCOPE                   ;SO ALL TESTS START WITH SCOPE
  776  001064  004767  011114          TEST1A:  JSR     %7,     CKOFFL  ;CHECK FOR OFF-LINE SET
  777  001070  000005                            RESET                   ;SEND OUT INIT
  778  001072  022713  000200                    CMP     #200,   @CDS    ;CHECK FOR STATUS REGISTER BIT 7 SET
  779  001076  001401                            BEQ     .+4             ;BRANCH IF OK
  780  001100  104000                            HLT                     ;STATUS REGISTER NOT CORRECTLY INITIALIZED
  781
  782  001102  005714                            TST     @CDC            ;CHECK FOR COLUMN COUNT CLEARED
  783  001104  001401                            BEQ     .+4             ;BR IF OK
  784  001106  104000                            HLT                     ;COLUMN COUNT NOT CLEARED BY INIT
  785
  786  001110  005715                            TST     @CDA            ;CHECK FOR BUS ADDRESS CLEARED
  787  001112  001401                            BEQ     .+4             ;BR IF OK
  788  001114  104000                            HLT                     ;BUS ADDRESS NOT CLEARED BY INIT
  789
  790  001116  104400                    TEST2:  SCOPE
  791                                     ;TEST THAT ONLY THE PROPER BITS OF THE STATUS REGISTER ARE READ/WRITE
  792                                             ;ONLY BITS 1,4,5, AND 6 OF THE STATUS REGISTER SHOULD BE
  793                                             ;ABLE TO BE SET TO ONE AND READ BACK AS ONE
  794  001120  052713  177376                    BIS     #177376,@CDS    ;SET ALL BITS BUT 0 AND 8
  795  001124  022713  000362                    CMP     #362,   @CDS    ;ONLY BITS 1,4,5,6, AND 7 SHOULD BE SET
  796  001130  001402                            BEQ     .+6             ;BRANCH IF OK
  797  001132  104000                            HLT                     ;STATUS REGISTER DIDN'T CONTAIN 362
  798  001134  000413                            BR      TEST3           ;BRANCH AFTER FAILURE
  799
  800                                             ;CLEARING STATUS REGISTER SHOULD CLEAR BITS 1,4,5, AND 6
  801  001136  005013                            CLR     @CDS            ;CLEAR BITS 1,4,5, AND 6
  802  001140  022713  000200                    CMP     #200,   @CDS    ;CHECK FOR ALL BITS CLEAR BUT 7
  803  001144  001401                            BEQ     .+4             ;BRANCH IF OK
  804  001146  104000                            HLT                     ;STATUS REGISTER DIDN'T CONTAIN 200
  805
  806                                             ;SETTING ALL BITS SHOULD DO A POWER CLEAR
  807  001150  012713  177777                    MOV     #177777,@CDS    ;SET ALL BITS OF THE STATUS REGISTER
  808  001154  022713  000200                    CMP     #200,   @CDS    ;CHECK FOR ALL BITS CLEAR BUT 7
  809  001160  001401                            BEQ     .+4             ;BRANCH IF OK
  810  001162  104000                            HLT                     ;STATUS REGISTER DIDN'T CONTAIN 200
  811
  812  001164  104400                    TEST3:  SCOPE
  813                                     ;TEST THE COLUMN COUNT REGISTER FOR READ/WRITE-ABILITY
  814  001166  012714  177777                    MOV     #177777,@CDC    ;LOAD ALL BITS
  815  001172  022714  177777                    CMP     #177777,@CDC    ;TEST TO SEE IF IT CAN BE READ
  816  001176  001401                            BEQ     .+4             ;BRANCH IF OK
  817  001200  104000                            HLT                     ;CDCC FAILED TO READ/WRITE
  818
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 819  001202  022713  000200                CMP     #200,   @CDS    ;CHECK STATUS REG
 820  001206  001401                      BEQ     .+4             ;BRANCH IF OK
 821  001210  104000                      HLT                     ;STATUS REG CHANGED
 822
 823  001212  052713  000400              BIS     #400,   @CDS    ;DO A POWER CLEAR
 824  001216  005714                      TST     @CDC            ;CHECK FOR COLUMN COUNT CLEARED
 825  001220  001401                      BEQ     .+4             ;BRANCH IF OK
 826  001222  104000                      HLT                     ;COLUMN COUNT NOT CLEARED BY POWER CLEAR
 827
 828  001224  022713  000200              CMP     #200,   @CDS    ;CHECK STATUS REG
 829  001230  001401                      BEQ     .+4             ;BRANCH IF OK
 830  001232  104000                      HLT                     ;STATUS REG CHANGED
 831
 832  001234  104400              TEST4:  SCOPE
 833                              ;TEST THE BUS ADDRESS REGISTER FOR READ/WRITE-ABILITY
 834  001236  012715  177777              MOV     #177777,@CDA    ;LOAD ALL BITS
 835  001242  022715  177777              CMP     #177777,@CDA    ;TEST TO SEE IF IT CAN BE READ
 836  001246  001401                      BEQ     .+4             ;BRANCH IF OK
 837  001250  104000                      HLT                     ;CDBA FAILED TO READ/WRITE
 838
 839  001252  022713  000200              CMP     #200,   @CDS    ;CHECK STATUS REG
 840  001256  001401                      BEQ     .+4             ;BRANCH IF OK
 841  001260  104000                      HLT                     ;STATUS REG CHANGED
 842
 843  001262  052713  000400              BIS     #400,   @CDS    ;DO A POWER CLEAR
 844  001266  005715                      TST     @CDA            ;CHECK FOR BUS ADDRESS CLEARED
 845  001270  001401                      BEQ     .+4             ;BRANCH IF OK
 846  001272  104000                      HLT                     ;BUS ADDRESS NOT CLEARED BY POWER CLEAR
 847
 848  001274  022713  000200              CMP     #200,   @CDS    ;CHECK STATUS REG
 849  001300  001401                      BEQ     .+4             ;BRANCH IF OK
 850  001302  104000                      HLT                     ;STATUS REG CHANGED
 851
 852  001304  104400              TEST5:  SCOPE
 853                              ;START SHOULD CAUSE CONTROLLER READY WITHIN ABOUT 1 SECOND
 854                              ;BIT 0 SHOULD ALWAYS READ AS BEING EQUAL TO ZERO
 855  001306  004767  010672              JSR     %7,     CKOFFL  ;CHECK FOR OFF-LINE SET
 856  001312  012714  177777              MOV     #-1,    @CDC    ;SET UP COLUMN COUNT TO READ 1 COLUMN
 857  001316  012715  016044              MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
 858  001322  016767  176450  177200      MOV     PS,     PROC    ;STORE CURRENT PROCESSOR STATUS
 859  001330  005067  176442              CLR     PS              ;CLEAR TRACE BIT
 860  001334  005067  177162              CLR     COUNT           ;INITIALIZE COUNTER
 861  001340  005213                      INC     @CDS            ;START READING A CARD
 862  001342  105713                      TSTB    @CDS            ;CHECK FOR CONTROLLER READY CLEARED
 863  001344  100001                      BPL     .+4             ;BRANCH IF OK
 864  001346  104000                      HLT                     ;CONTROLLER READY DIDN'T CLEAR
 865
 866  001350  032713  000001      LOOP5:  BIT     #1,     @CDS    ;CHECK BIT 0
 867  001354  001402                      BEQ     .+6             ;BRANCH IF NOT SET
 868  001356  104000                      HLT                     ;BIT 0 READ AS A ONE
 869  001360  000421                      BR      TEST6           ;BRANCH AFTER FAILURE
 870  001362  005267  177134              INC     COUNT           ;WAIT ABOUT
 871  001366  001370                      BNE     LOOP5
 872  001370  016767  177134  176400      MOV     PROC,   PS      ;RESTORE PROCESSOR STATUS
 873  001376  105713                      TSTB    @CDS            ;CHECK CONTROLLER READY
 874  001400  100401                      BMI     .+4             ;CONTINUE IF  SET
```

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                                        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

                                TEST6:  SCOPE
                                ; (BIT 2) SHOULD NOT BE SET BY READING A CARD
                                ;IT SHOULD REMAIN NOT SET
                                ;THIS SHOULD HAPPEN WITHIN ABOUT 1 SECOND
                                        JSR     %7,CKOFFL       ;CHECK FOR OFF-LINE SET
                                        CLR     @CDS            ;INITIALIZE STATUS REGISTER
                                        MOV     #-20.,  @CDC    ;SET UP COLUMN COUNT TO READ 20 COLUMNS
                                        MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
                                        INC     @CDS            ;READ A CARD
                                        BIT     #4,@CDS         ;CHECK BUSY
                                        BEQ     .+4             ;
                                        HLT                     ;BUSY SET
                                        CLR     COUNT           ;SET UP WAIT COUNTER
                                        MOV     PS,     PROC    ;SAVE PROCESSOR STATUS
                                        CLR     PS              ;CLR THE T BIT
                                LOOP6A: TSTB    @CDS            ;CHECK READY
                                        BMI     LOOP6B          ;BRANCH IF READY
                                        DEC     COUNT           ;WAIT ABOUT 1 SEC.
                                        BNE     LOOP6A
                                        HLT                     ;READING A CARD DIDN'T SET READY
                                        BR      TEST7
                                LOOP6B: MOV     PROC,PS         ;RESTORE THE STATUS
                                LOOP6:  TSTB    @CDS            ;CHECK CONTROLLER READY
                                        BMI     DONE6           ;BRANCH IF SET
                                        HLT                     ;RESTORING STATUS RESET READY

                                DONE6:  TST     @CDS            ;CHECK ERROR BIT 15
                                        BPL     .+4             ;BRANCH IF OK
                                        HLT                     ;ERROR BIT 15 WAS SET

                                TEST7:  SCOPE
                                ;CONTROLLER READY SHOULD CAUSE AN INTERRUPT
                                        JSR     %7,     INIT    ;INITIALIZE
                                        MOV     #TINT7,@ADINT   ;LOAD RETURN POINTER
                                        BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
                                        MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
                                        BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
                                        MOV     #-31.,  @CDC    ;SET UP COLUMN COUNT TO READ 31 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
                                        BIC     #100,   @CDS    ;CLEAR INTERRUPT ENABLE
                                        HLT                     ;NO INTERRUPT OCCURRED
                                        BR      CONT7
                                TINT7:  TSTB    @CDS            ;CHECK CONTROLLER READY
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 931  001630  100401                        BMI     .+4             ;BRANCH IF SET
 932  001632  104000                        HLT                     ;CONTROLLER READY NOT SET
 933  001634  022626                        CMP     (SP)+, (SP)+    ;RESTORE STACK POINTER
 934  001636  005713                        TST     @CDS            ;MAKE SURE NO ERROR OCCURRED
 935  001640  100001                        BPL     .+4
 936  001642  104000                        HLT                     ;BIT 15 WAS SET
 937  001644  005013                        CLR     @CDS            ;DISABLE INTERRUPTS
 938  001646  012712  000232       CONT7:  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
 939  001652  005037  000232               CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 940
 941  001656  104400               TEST10: SCOPE
 942                                ;CONTROLLER READY SHOULDN'T CAUSE AN INTERRUPT IF THE PROCESSOR IS
 943                                ;AT LEVEL 7 PRIORITY
 944  001660  004767  010254               JSR     %7,     INIT    ;INITIALIZE
 945  001664  012712  001726               MOV     #TINT10,@ADINT  ;SETUP RETURN
 946  001670  052767  000340  176100       BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7 PRIORITY
 947  001676  016762  176074  000002       MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
 948  001704  012714  177703               MOV     #-61.,  @CDC    ;SET UP COLUMN COUNT TO READ 61 COLUMNS
 949  001710  012715  016044               MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
 950  001714  012713  000101               MOV     #101,   @CDS    ;SET INTERRUPT ENABLE AND READ
 951  001720  105713                       TSTB    @CDS            ;WAIT FOR CONTROLLER READY
 952  001722  100376                       BPL     .-2
 953  001724  000402                       BR      .+6             ;CONTINUE IF NO INTERRUPT OCCURRED
 954  001726  104000               TINT10: HLT                     ;AN INTERRUPT OCCURPED
 955  001730  022626                       CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
 956  001732  005013                       CLR     @CDS            ;CLEAR INTERRUPT ENABLE
 957  001734  012712  000232               MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
 958  001740  005037  000232               CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 959
 960                                ;FIND THE LEVEL AT WHICH AN INTERRUPT OCCURS
 961                                ;PRINT OUT A MESSAGE STATING THIS LEVEL IF IT IS OTHER THAN THE STANDARD
 962                                ;(LEVEL 6) MAKE CERTAIN THAT IT ALWAYS OCCURS AT THIS LEVEL
 963                                ;THE MESSAGE STATING THE LEVEL IS PRINTED ONLY ONCE, AND THE PROGRAM MUST
 964                                ;BE STARTED OVER AT LOCATION 200 FOR IT TO BE PRINTED AGAIN
 965
 966                                ;TEST FOR AN INTERRUPT ON LEVEL 7
 967  001744  104400               TEST11: SCOPE
 968  001746  004767  010166               JSR     %7,     INIT    ;INITIALIZE
 969  001752  012712  002070               MOV     #TINT11,@ADINT  ;SETUP RETURN ADDRESS
 970  001756  052767  000340  176012       BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
 971  001764  016762  176006  000002       MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
 972  001772  042767  000340  175776       BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
 973  002000  052767  000300  175770       BIS     #300,   PS      ;SET PROCESSOR TO LEVEL 6 PRIORITY
 974  002006  012714  177660               MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
 975  002012  012715  016044               MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
 976  002016  012713  000101               MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
 977  002022  105713                       TSTB    @CDS            ;WAIT FOR CONTROLLER READY
 978  002024  100376                       BPL     .-2
 979  002026  016267  000002  175742       MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
 980  002034  005013                       CLR     @CDS            ;DISABLE INTERRUPTS
 981  002036  012712  000232               MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
 982  002042  005037  000232               CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 983  002046  005767  176452               TST     INTFLG          ;TEST FOR A PREVIOUS INTERUPT
 984  002052  001442                       BEQ     TEST12          ;BRANCH IF NONE
 985  002054  026727  176444  100007       CMP     INTFLG, #100007 ;CHECK PREVIOUS LEVEL
 986  002062  100436                       BMI     TEST12          ;BRANCH IF LOWER
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  987  002064  104000                        HLT                         ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 7 OR HIGHER
  988  002066  000434                        BR      TEST12
  989  002070  105713              TINT11:   TSTB    @CDS                ;MAKE SURE CONTROLLER READY IS SET
  990  002072  100401                        BMI     .+4                 ;BRANCH IF SET
  991  002074  104000                        HLT                         ;CONTROLLER READY WASN'T SET
  992  002076  005013                        CLR     @CDS                ;DISABLE FURTHER INTERRUPTS
  993  002100  012712  000232               MOV     #232,   @ADINT      ;CHANGE INTERRUPT RETURN ADDRESS
  994  002104  005037  000232               CLR     @#232               ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
  995  002110  022626                        CMP     (SP)+,  (SP)+       ;RESTORE STACK POINTER
  996  002112  005767  176406               TST     INTFLG              ;CHECK FOR PREVIOUS FLAG
  997  002116  100413                        BMI     SET7    ;BRANCH IF FLAG SET
  998  002120  012767  100007  176376        MOV     #100007,INTFLG ;SET FLAG AND LEVEL
  999  002126  000004  014062               TYPE,   MSG4                ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS'
 1000  002132  012767  000007  010420        MOV     #7,PRINT1           ;TYPE #7 IN OCTAL
 1001  002140  004767  010460               JSR     %7,PRINTS           ;AND SUPRESS LEADING ZERO'S
 1002  002144  000405                        BR      TEST12
 1003  002146  026727  176352  100007  SET7: CMP     INTFLG, #100007 ;CHECK PREVIOUS LEVEL
 1004  002154  100001                        BPL     TEST12
 1005  002156  104000                        HLT                         ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
 1006                              ;TEST FOR AN INTERRUPT ON LEVEL 6
 1007  002160  104400              TEST12:   SCOPE
 1008  002162  004767  007752               JSR     %7,     INIT        ;INITIALIZE
 1009  002166  012712  002304               MOV     #TINT12,@ADINT      ;SETUP RETURN ADDRESS
 1010  002172  052767  000340  175576        BIS     #340,   PS          ;SET PROCESSOR PRIORITY TO 7
 1011  002200  016762  175572  000002        MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
 1012  002206  042767  000340  175562        BIC     #340,   PS          ;SET PROCESSOR PRIORITY TO 0
 1013  002214  052767  000240  175554        BIS     #240,   PS          ;SET PROCESSOR TO LEVEL 5 PRIORITY
 1014  002222  012714  177660               MOV     #-80.,  @CDC        ;SET UP COLUMN COUNT TO READ 80 COLUMNS
 1015  002226  012715  016044               MOV     #BUFBEG,@CDA        ;SET UP BUS ADDRESS
 1016  002232  012713  000101               MOV     #101,   @CDS        ;SET INTERUPT ENABLE AND READ
 1017  002236  105713                        TSTB    @CDS                ;WAIT FOR CONTROLLER READY
 1018  002240  100376                        BPL     .-2
 1019  002242  016267  000002  175526        MOV     2(ADINT),PS         ;RESTORE PROCESSOR TO HIGHEST PRIORITY
 1020  002250  005013                        CLR     @CDS                ;DISABLE INTERRUPTS
 1021  002252  012712  000232               MOV     #232,   @ADINT      ;CHANGE INTERRUPT RETURN ADDRESS
 1022  002256  005037  000232               CLR     @#232               ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 1023  002262  005767  176236               TST     INTFLG              ;TEST FOR A PREVIOUS INTERUPT
 1024  002266  001442                        BEQ     TEST13              ;BRANCH IF NONE
 1025  002270  026727  176230  100006        CMP     INTFLG, #100006 ;CHECK PREVIOUS LEVEL
 1026  002276  100436                        BMI     TEST13              ;BRANCH IF LOWER
 1027  002300  104000                        HLT                         ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 6 OR HIGHER
 1028  002302  000434                        BR      TEST13
 1029  002304  105713              TINT12:   TSTB    @CDS                ;MAKE SURE CONTROLLER READY IS SET
 1030  002306  100401                        BMI     .+4                 ;BRANCH IF SET
 1031  002310  104000                        HLT                         ;CONTROLLER READY WASN'T SET
 1032  002312  005013                        CLR     @CDS                ;DISABLE FURTHER INTERRUPTS
 1033  002314  012712  000232               MOV     #232,   @ADINT      ;CHANGE INTERRUPT RETURN ADDRESS
 1034  002320  005037  000232               CLR     @#232               ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 1035  002324  022626                        CMP     (SP)+,  (SP)+       ;RESTORE STACK POINTER
 1036  002326  005767  176172               TST     INTFLG              ;CHECK FOR PREVIOUS FLAG
 1037  002332  100413                        BMI     SET6    ;BRANCH IF FLAG SET
 1038  002334  012767  100006  176162        MOV     #100006,INTFLG ;SET FLAG AND LEVEL
 1039  002342  000004  014062               TYPE,   MSG4                ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS'
 1040  002346  012767  000006  010204        MOV     #6,PRINT1           ;TYPE #6 IN OCTAL
 1041  002354  004767  010244               JSR     %7,PRINTS           ;AND SUPRESS LEADING ZERO'S
 1042  002360  000405                        BR      TEST13
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1043  002362  026727  176136  100006  SET6: CMP     INTFLG, #100006 ;CHECK PREVIOUS LEVEL
1044  002370  100001                        BPL     TEST13
1045  002372  104000                        HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1046                                  ;TEST FOR AN INTERRUPT ON LEVEL 5
1047  002374  104400                  TEST13: SCOPE
1048  002376  004767  007536                  JSR     %7,     INIT    ;INITIALIZE
1049  002402  012712  002520                  MOV     #TINT13,@ADINT  ;SETUP RETURN ADDRESS
1050  002406  052767  000340  175362          BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
1051  002414  016762  175356  000002          MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
1052  002422  042767  000340  175346          BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
1053  002430  052767  000200  175340          BIS     #200,   PS      ;SET PROCESSOR TO LEVEL 4 PRIORITY
1054  002436  012714  177660                  MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1055  002442  012715  016044                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1056  002446  012713  000101                  MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
1057  002452  105713                          TSTB    @CDS            ;WAIT FOR CONTROLLER READY
1058  002454  100376                          BPL     .-2
1059  002456  016267  000002  175312          MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1060  002464  005013                          CLR     @CDS            ;DISABLE INTERRUPTS
1061  002466  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1062  002472  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1063  002476  005767  176022                  TST     INTFLG          ;TEST FOR A PREVIOUS INTERUPT
1064  002502  001442                          BEQ     TEST14          ;BRANCH IF NONE
1065  002504  026727  176014  100005          CMP     INTFLG, #100005 ;CHECK PREVIOUS LEVEL
1066  002512  100436                          BMI     TEST14          ;BRANCH IF LOWER
1067  002514  104000                          HLT                     ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 5 OR HIGHER
1068  002516  000434                          BR      TEST14
1069  002520  105713                  TINT13: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
1070  002522  100401                          BMI     .+4             ;BRANCH IF SET
1071  002524  104000                          HLT                     ;CONTROLLER READY WASN'T SET
1072  002526  005013                          CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
1073  002530  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1074  002534  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1075  002540  022626                          CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
1076  002542  005767  175756                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1077  002546  100413                          BMI     SET5    ;BRANCH IF FLAG SET
1078  002550  012767  100005  175746          MOV     #100005,INTFLG ;SET FLAG AND LEVEL
1079  002556  000004  0140                    TYPE,   MSG4            ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS'
1080  002562  012767  00000   007770          MOV     #5,PRINT1       ;TYPE #5 IN OCTAL
1081  002570  004767  010030                  JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
1082  002574  000405                          BR      TEST14
1083  002576  026727  175722  100005  SET5: CMP     INTFLG, #100005 ;CHECK PREVIOUS LEVEL
1084  002604  100001                          BPL     TEST14
1085  002606  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1086                                  ;TEST FOR AN INTERRUPT ON LEVEL 4
1087  002610  104400                  TEST14: SCOPE
1088  002612  004767  007322                  JSR     %7,     INIT    ;INITIALIZE
1089  002616  012712  002734                  MOV     #TINT14,@ADINT  ;SETUP RETURN ADDRESS
1090  002622  052767  000340  175146          BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
1091  002630  016762  175142  000002          MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
1092  002636  042767  000340  175132          BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
1093  002644  052767  000140  175124          BIS     #140,   PS      ;SET PROCESSOR TO LEVEL 3 PRIORITY
1094  002652  012714  177660                  MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1095  002656  012715  016044                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1096  002662  012713  000101                  MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
1097  002666  105713                          TSTB    @CDS            ;WAIT FOR CONTROLLER READY
1098  002670  100376                          BPL     .-2
```

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1099  002672  016267  000002  175076          MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1100  002700  005013                          CLR     @CDS            ;DISABLE INTERRUPTS
1101  002702  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1102  002706  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1103  002712  005767  175606                  TST     INTFLG          ;TEST FOR A PREVIOUS INTERUPT
1104  002716  001433                          BEQ     TEST15          ;BRANCH IF NONE
1105  002720  026727  175600  100004          CMP     INTFLG, #100004 ;CHECK PREVIOUS LEVEL
1106  002726  100427                          BMI     TEST15          ;BRANCH IF LOWER
1107  002730  104000                          HLT                     ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 4 OR HIGHER
1108  002732  000425                          BR      TEST15
1109  002734  105713                  TINT14: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
1110  002736  100401                          BMI     .+4             ;BRANCH IF SET
1111  002740  104000                          HLT                     ;CONTROLLER READY WASN'T SET
1112  002742  005013                          CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
1113  002744  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1114  002750  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1115  002754  022626                          CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
1116  002756  005767  175542                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1117  002762  100404                          BMI     SET4    ;BRANCH IF FLAG SET
1118  002764  012767  100004  175532          MOV     #100004,INTFLG ;SET FLAG AND LEVEL
1119  002772  000405                          BR      TEST15
1120  002774  026727  175524  100004  SET4: CMP     INTFLG, #100004 ;CHECK PREVIOUS LEVEL
1121  003002  100001                          BPL     TEST15
1122  003004  1040C0                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1123                                  ;TEST FOR AN INTERRUPT ON LEVEL 3
1124  003006  104400                  TEST15: SCOPE
1125  003010  004767  007124                  JSR     %7,     INIT    ;INITIALIZE
1126  003014  012712  003132                  MOV     #TINT15,@ADINT  ;SETUP RETURN ADDRESS
1127  003020  052767  000340  174750          BIS     #340,   PS      ;SET PROCESSOR PRIORITY TO 7
1128  003026  016762  174744  000002          MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
1129  003034  042767  000340  174734          BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
1130  003042  052767  000100  174726          BIS     #100,   PS      ;SET PROCESSOR TO LEVEL 2 PRIORITY
1131  003050  012714  177660                  MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1132  003054  012715  016044                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1133  003060  012713  000101                  MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
1134  003064  105713                          TSTB    @CDS            ;WAIT FOR CONTROLLER READY
1135  003066  100376                          BPL     .-2
1136  003070  016267  000002  174700          MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1137  003076  005013                          CLR     @CDS            ;DISABLE INTERRUPTS
1138  003100  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1139  003104  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1140  003110  005767  175410                  TST     INTFLG          ;TEST FOR A PREVIOUS INTERUPT
1141  003114  001442                          BEQ     TEST16          ;BRANCH IF NONE
1142  003116  026727  175402  100003          CMP     INTFLG, #100003 ;CHECK PREVIOUS LEVEL
1143  003124  100436                          BMI     TEST16          ;BRANCH IF LOWER
1144  003126  104000                          HLT                     ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 3 OR HIGHER
1145  003130  000434                          BR      TEST16
1146  003132  105713                  TINT15: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
1147  003134  100401                          BMI     .+4             ;BRANCH IF SET
1148  003136  104000                          HLT                     ;CONTROLLER READY WASN'T SET
1149  003140  005013                          CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
1150  003142  012712  000232                  MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1151  003146  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1152  003152  022626                          CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
1153  003154  005767  175344                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1154  003160  100413                          BMI     SET3    ;BRANCH IF FLAG SET
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1155  003162  012767  100003  175334          MOV     #100003,INTFLG ;SET FLAG AND LEVEL
1156  003170  000004  014062                  TYPE,   MSG4           ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS''
1157  003174  012767  000003  007356          MOV     #3,PRINT1      ;TYPE #3 IN OCTAL
1158  003202  004767  007416                  JSR     %7,PRINTS      ;AND SUPRESS LEADING ZERO'S
1159  003206  000405                          BR      TEST16
1160  003210  026727  175310  100003  SET3: CMP     INTFLG, #100003 ;CHECK PREVIOUS LEVEL
1161  003216  100001                          BPL     TEST16
1162  003220  104000                          HLT                    ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1163                                  ;TEST FOR AN INTERRUPT ON LEVEL 2
1164  003222  104400                  TEST16: SCOPE
1165  003224  004767  006710                  JSR     %7,     INIT   ;INITIALIZE
1166  003230  012712  003346                  MOV     #TINT16,@ADINT ;SETUP RETURN ADDRESS
1167  003234  052767  000340  174534          BIS     #340,   PS     ;SET PROCESSOR PRIORITY TO 7
1168  003242  016762  174530  000002          MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
1169  003250  042767  000340  174520          BIC     #340,   PS     ;SET PROCESSOR PRIORITY TO 0
1170  003256  052767  000040  174512          BIS     #040,   PS     ;SET PROCESSOR TO LEVEL 1 PRIORITY
1171  003264  012714  177660                  MOV     #-80.,  @CDC   ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1172  003270  012715  016044                  MOV     #BUFBEG,@CDA   ;SET UP BUS ADDRESS
1173  003274  012713  000101                  MOV     #101,   @CDS   ;SET INTERUPT ENABLE AND READ
1174  003300  105713                          TSTB    @CDS           ;WAIT FOR CONTROLLER READY
1175  003302  100376                          BPL     .-2
1176  003304  016267  000002  174464          MOV     2(ADINT),PS    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1177  003312  005013                          CLR     @CDS           ;DISABLE INTERRUPTS
1178  003314  012712  000232                  MOV     #232,   @ADINT ;CHANGE INTERRUPT RETURN ADDRESS
1179  003320  005037  000232                  CLR     @#232          ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1180  003324  005767  175174                  TST     INTFLG         ;TEST FOR A PREVIOUS INTERUPT
1181  003330  001442                          BEQ     TEST17         ;BRANCH IF NONE
1182  003332  026727  175166  100002          CMP     INTFLG, #100002 ;CHECK PREVIOUS LEVEL
1183  003340  100436                          BMI     TEST17         ;BRANCH IF LOWER
1184  003342  104000                          HLT                    ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 2 OR HIGHER
1185  003344  000434                          BR      TEST17
1186  003346  105713                  TINT16: TSTB    @CDS           ;MAKE SURE CONTROLLER READY IS SET
1187  003350  100401                          BMI     .+4            ;BRANCH IF SET
1188  003352  104000                          HLT                    ;CONTROLLER READY WASN'T SET
1189  003354  005013                          CLR     @CDS           ;DISABLE FURTHER INTERRUPTS
1190  003356  012712  000232                  MOV     #232,   @ADINT ;CHANGE INTERRUPT RETURN ADDRESS
1191  003362  005037  000232                  CLR     @#232          ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1192  003366  022626                          CMP     (SP)+,  (SP)+  ;RESTORE STACK POINTER
1193  003370  005767  175130                  TST     INTFLG         ;CHECK FOR PREVIOUS FLAG
1194  003374  100413                          BMI     SET2    ;BRANCH IF FLAG SET
1195  003376  012767  100002  175120          MOV     #100002,INTFLG ;SET FLAG AND LEVEL
1196  003404  000004  014062                  TYPE,   MSG4           ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS''
1197  003410  012767  000002  007142          MOV     #2,PRINT1      ;TYPE #2 IN OCTAL
1198  003416  004767  007202                  JSR     %7,PRINTS      ;AND SUPRESS LEADING ZERO'S
1199  003422  000405                          BR      TEST17
1200  003424  026727  175074  100002  SET2: CMP     INTFLG, #100002 ;CHECK PREVIOUS LEVEL
1201  003432  100001                          BPL     TEST17
1202  003434  104000                          HLT                    ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1203                                  ;TEST FOR AN INTERRUPT ON LEVEL 1
1204  003436  104400                  TEST17: SCOPE
1205  003440  004767  006474                  JSR     %7,     INIT   ;INITIALIZE
1206  003444  012712  003544                  MOV     #TINT17,@ADINT ;SETUP RETURN ADDRESS
1207  003450  052767  000340  174320          BIS     #340,   PS     ;SET PROCESSOR PRIORITY TO 7
1208  003456  016762  174314  000002          MOV     PS,     2(ADINT) ;SETUP RETURN PROCESSOR STATUS
1209  003464  042767  000340  174304          BIC     #340,   PS     ;SET PROCESSOR PRIORITY TO 0
1210  003472  052767  000000  174276          BIS     #000,   PS     ;SET PROCESSOR TO LEVEL 0 PRIORITY
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1211  003500  012714  177660            MOV     #-80.,  @CDC    ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1212  003504  012715  016044            MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1213  003510  012713  000101            MOV     #101,   @CDS    ;SET INTERUPT ENABLE AND READ
1214  003514  105713                    TSTB    @CDS            ;WAIT FOR CONTROLLER READY
1215  003516  100376                    BPL     .-2
1216  003520  016267  000002  174250    MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1217  003526  005013                    CLR     @CDS            ;DISABLE INTERRUPTS
1218  003530  012712  000232            MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1219  003534  005037  000232            CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1220  003540  104000                    HLT                     ;INTERUPT DIDN'T OCCURE WITH PROCESSOR AT LEVEL 0
1221  003542  000434                    BR      TEST20
1222  003544  105713            TINT17: TSTB    @CDS            ;MAKE SURE CONTROLLER READY IS SET
1223  003546  100401                    BMI     .+4             ;BRANCH IF SET
1224  003550  104000                    HLT                     ;CONTROLLER READY WASN'T SET
1225  003552  005013                    CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
1226  003554  012712  000232            MOV     #232,   @ADINT  ;CHANGE INTERRUPT RETURN ADDRESS
1227  003560  005037  000232            CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1228  003564  022626                    CMP     (SP)+,  (SP)+   ;RESTORE STACK POINTER
1229  003566  005767  174732            TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1230  003572  100413                    BMI     SET1    ;BRANCH IF FLAG SET
1231  003574  012767  100001  174722    MOV     #100001,INTFLG ;SET FLAG AND LEVEL
1232  003602  000004  014062            TYPE,   MSG4            ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS''
1233  003606  012767  000001  006744    MOV     #1,PRINT1       ;TYPE #1 IN OCTAL
1234  003614  004767  007004            JSR     %7,PRINTS       ;AND SUPRESS LEADING ZERO'S
1235  003620  000405                    BR      TEST20
1236  003622  026727  174676  100001  SET1: CMP       INTFLG, #100001 ;CHECK PREVIOUS LEVEL
1237  003630  100001                    BPL     TEST20
1238  003632  104000                    HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1239
1240  003634  104400            TEST20: SCOPE
1241                            ;TEST FOR NO INTERRUPT OCCURING WITH INTERRUPT ENABLE SET AND REST CLEARED
1242  003636  004767  006276            JSR     %7,     INIT    ;INITIALIZE CSR TO ZERO
1243  003642  012712  003726            MOV     #TINT20,        @ADINT  ;SETUP RETURN ADDRESS
1244  003646  052767  000340  174122    BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1245  003654  016762  174116  000002    MOV     PS,     2(ADINT) ;STORE PROCESSOR STATUS
1246  003662  005067  174110            CLR     PS              ;SET PROCESSOR TO LEVEL 0
1247  003666  012714  177777            MOV     #-1,    @CDC    ;SET UP COLUMN COUNT TO READ 1 COLUMN
1248  003672  012715  016044            MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1249  003676  012713  000100            MOV     #100,   @CDS    ;ENABLE INTERRUPTS
1250  003702  005067  174614            CLR     COUNT           ;INITIALIZE COUNTER
1251  003706  005267  174610            INC     COUNT           ;WAIT AWHILE
1252  003712  001375                    BNE     .-4
1253  003714  016267  000002  174054    MOV     2(ADINT),PS     ;RESTORE PROCESSOR TO LEVEL 7
1254  003722  005013                    CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
1255  003724  000403                    BR      CONT20
1256  003726  104000            TINT20: HLT                     ;AN INTERRUPT OCCURRED
1257  003730  022626                    CMP     (SP)+,  (SP)+   ;RESTORE STACK
1258  003732  005013                    CLR     @CDS            ;DISABLE FURTHER INTERRUPTS
1259  003734  005037  000232    CONT20: CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
1260  003740  012712  000232            MOV     #232,   @ADINT  ;CAUSE A HALT IF AN INTERRUPT OCCURS
1261
1262  003744  104400            TEST21: SCOPE
1263                            ;CHECK FOR SIMULTANEOUS INTERRUPTS ON MORE THAN ONE LEVEL
1264  003746  004767  006166            JSR     %7,     INIT    ;INITIALIZE CSR TO ZERO
1265  003752  012712  004016            MOV     #TINT21,        @ADINT  ;SETUP RETURN ADDRESS
1266  003756  052767  000340  174012    BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
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 1267  003764  016762  174006  000002          MOV     PS,     2(ADINT) ;STORE PROCESSOR STATUS
 1268  003772  042767  000340  173776          BIC     #340,   PS       ;SET PROCESSOR TO LEVEL 0
 1269  004000  012714  177777                  MOV     #-1,    @CDC     ;SET UP COLUMN COUNT TO READ 1 COLUMN
 1270  004004  012715  016044                  MOV     #BUFBEG,@CDA     ;SET UP BUS ADDRESS
 1271  004010  012713  000101                  MOV     #101,   @CDS     ;SET INTERUPT ENABLE AND READ
 1272  004014  000777                          BR      .                ;WAIT FOR INTERRUPT
 1273  004016  022626                  TINT21: CMP     (SP)+,  (SP)+    ;RESTORE STACK POINTER
 1274  004020  012712  004042                  MOV     #TINA21,@ADINT   ;CHANGE RETRUN ADDRESS
 1275  004024  005067  173746                  CLR     PS               ;SET PROCESSOR TO LEVEL 0
 1276  004030  000240                          NOP                      ;WAIT
 1277  004032  016267  000002  173736          MOV     2(ADINT),PS      ;RESTORE PROCESSOR TO LEVEL 7
 1278  004040  000402                          BR      CONT21
 1279  004042  022626                  TINA21: CMP     (SP)+,  (SP)+    ;RESTORE STACK
 1280  004044  104000                          HLT                      ;THE INTERRUPT OCCURRED AT 2 LEVELS
 1281  004046  005013                  CONT21: CLR     @CDS             ;DISABLE INTERRUPTS
 1282  004050  005037  000232                  CLR     @#232            ;CHANGE INTERRUPT RETURN ADDRESS TO
 1283  004054  012712  000232                  MOV     #232,   @ADINT   ;CAUSE A HALT IF AN INTERRUPT OCCURS
 1284
 1285  004060  104400                  TEST22: SCOPE
 1286                                  ;CHECK THAT NON-EXISTANT MEMORY IS DETECTED PROPERLY
 1287  004062  004767  006052                  JSR     %7,     INIT     ;INITIALIZE CSR TO ZERO
 1288  004066  012712  004132                  MOV     #TINT22,@ADINT   ;SETUP RETURN ADDRESS
 1289  004072  052767  000340  173676          BIS     #340,   PS       ;SET PROCESSOR TO LEVEL 7
 1290  004100  016762  173672  000002          MOV     PS,     2(ADINT) ;STORE PROCESSOR STATUS
 1291  004106  042767  000340  173662          BIC     #340,   PS       ;SET PROCESSOR TO LEVEL 0
 1292  004114  012714  177773                  MOV     #-5,    @CDC     ;SET UP COLUMN COUNT TO READ 1 COLUMN
 1293  004120  012715  160000                  MOV     #160000,@CDA     ;SET UP BUS ADDRESS TO NON-EXISTANT MEMORY
 1294  004124  012713  000161                  MOV     #161,   @CDS     ;SET INTERUPT ENABLE AND READ, X MEM BITS SET
 1295  004130  000777                          BR      .                ;WAIT FOR INTERRUPT
 1296  004132  022626                  TINT22: CMP     (SP)+,  (SP)+    ;RESTORE STACK
 1297  004134  005037  000232                  CLR     @#232            ;CHANGE INTERRUPT RETURN ADDRESS TO
 1298  004140  012712  000232                  MOV     #232,   @ADINT   ;CAUSE A HALT IF AN INTERRUPT OCCURS
 1299  004144  105713                          TSTB    @CDS             ;CHECK FOR CONTROLLER READY
 1300  004146  100401                          BMI     .+4              ;BRANCH IF SET OK
 1301  004150  104000                          HLT                      ;CONTROLLER READY DIDN'T SET
 1302
 1303  004152  005713                          TST     @CDS             ;CHECK FOR ERROR (BIT 15)
 1304  004154  100401                          BMI     .+4              ;BRANCH IF SET OK
 1305  004156  104000                          HLT                      ;ERROR BIT 15 NOT SET
 1306
 1307  004160  032713  001000                  BIT     #1000,  @CDS     ;CHECK FOR NON-EXISTANT MEMOPY (BIT 9)
 1308  004164  001001                          BNE     .+4              ;BRANCH IF SET OK
 1309  004166  104000                          HLT                      ;BIT 9 NOT SET
 1310
 1311  004170  032713  000040                  BIT     #40,    @CDS     ;CHECK FOR EXTENDED MEMORY BIT 17 SET
 1312  004174  001001                          BNE     .+4              ;BRANCH IF SET OK
 1313  004176  104000                          HLT                      ;EX-MEM BIT 17 GOT CLEARED
 1314
 1315  004200  032713  000020                  BIT     #20,    @CDS     ;CHECK FOR EX-MEM (BIT 4)
 1316  004204  001001                          BNE     .+4              ;BRANCH IF SET OK
 1317  004206  104000                          HLT                      ;EX-MEM (BIT 4) GOT CLEARED
 1318
 1319  004210  032713  076417                  BIT     #076417,@CDS     ;CHECK FOR ANY OTHER BITS
 1320  004214  001401                          BEQ     .+4              ;BRANCH IF OK
 1321  004216  104000                          HLT                      ;EXTRA ERROR BITS SET
 1322
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 1323  004220  022715  160002            CMP     #160002,@CDA    ;CHECK ADDRESS BUFFER
 1324  004224  001401                     BEQ     .+4             ;BRANCH IF OK
 1325  004226  104000                     HLT                     ;BUS ADDRESS REG CHANGED
 1326
 1327  004230  022714  177774            CMP     #-4,    @CDC    ;CHECK COLUMN COUNT REG
 1328  004234  001401                     BEQ     .+4             ;BRANCH IF OK
 1329  004236  104000                     HLT                     ;COLUMN COUNT REG CHANGED
 1330
 1331                                  ;CHECK SW7 AND RETURN TO TEST1 IF SET, AFTER RINGING BELL
 1332                                  ;OTHERWISE GO INTO THE DATA TEST
 1333  004240  104400                  ENDCK:  SCOPE
 1334  004242  032767  000200  173320          BIT     #200,SWR
 1335  004250  001406                         BEQ     DATST
 1336  004252  004767  005710                 JSR     %7,BELL
 1337  004256  005167  174244                 COM     TRFLG           ;TOGGLE TRACE FLAG
 1338  004262  000167  174532                 JMP     RESTRT
 1339
 1340
 1341
 1342
 1343
 1344
 1345
 1346                                  ;*************************************************************************
 1347                                  ;DATA RELIABILITY TEST FOR CD11
 1348                                  ;*************************************************************************
 1349
 1350                                  ;CHECK SWR FOR TYPE OF DECK BEING TESTED, AND INITIALIZE POINTERS
 1351  004266  005067  002236          DATST:  CLR     CLCNT           ;MAKE SURE COLUMN COUNT IS ZERO
 1352  004272  005067  002230                  CLR     CDCNT           ;SETUP CARD COUNT TO ENTER DATA TABLE AT BEGINNING
 1353  004276  005067  174230                  CLR     ERFLG           ;FLAG SET PREVENTS PRINTING OUT ERROR HEADING
 1354  004302  032767  000020  173260          BIT     #20,    SWR     ;CHECK BIT 4 OF SWR FOR TYPE OF DECK
 1355  004310  001412                         BEQ     ALP1            ;BRANCH IF NOT SET TO LOAD ALPHANUMERIC POINTERS
 1356  004312  012767  013330  002202          MOV     #BINCD, TSTART  ;BIT 2 SET, LOAD BINARY TABLE POINTERS
 1357  004320  012767  013570  002176          MOV     #BINEND+2,TEND
 1358  004326  012767  015133  001632          MOV     #MSG15, DECK
 1359  004334  000411                         BR      CONTD           ;BRANCH AROUND ALPHANUMERIC POINTERS
 1360  004336  012767  012750  002156  ALP1:   MOV     #ALPCD, TSTART  ;LOAD ALPHANUMERIC TABLE POINTERS
 1361  004344  012767  013210  002152          MOV     #ALPEND+2,TEND
 1362  004352  012767  015122  001606          MOV     #MSG14, DECK
 1363  004360  005767  174142  CONTD:  TST     TRFLG           ;CHECK TRACE TRAP FLAG
 1364  004364  001004                         BNE     TRP1            ;BRANCH IF FLAG WAS SET
 1365  004366  012767  000340  173402  NOTRP1: MOV     #340,   PS      ;CLEAR TRACE BIT
 1366  004374  000407                         BR      DCNT1
 1367  004376  032767  010000  173164  TRP1:   BIT     #10000, SWR     ;CHECK SW12 TO INHIBIT TRACE TRAPPING
 1368  004404  001370                         BNE     NOTRP1          ;BRANCH IF SET
 1369  004406  012767  000360  173362          MOV     #360,   PS      ;SET TRACE BIT
 1370  004414  004767  005520  DCNT1:  JSR     %7,     INIT    ;INITIALIZE CARD READER STATUS REGISTER
 1371
 1372                                  ;SET UP INTERRUPT SERVICING, AND START READING
 1373  004420  012712  004552          MOV     #SRVC,  @ADINT  ;SETUP RETURN POINTER
 1374  004424  042767  000340  173344  BIC     #340,   PS      ;SET PROCESSOR TO LEVEL 0
 1375  004432  016762  173340  000002  MOV     PS,     2(ADINT) ;STORE CURRENT STATUS
 1376  004440  016701  002056          MOV     TSTART, R1      ;SET UP TABLE POINTER
 1377  004444  012700  016044          MOV     #BUFBEG,R0      ;SET UP BUFFER POINTER
 1378  004450  012767  177660  002032  MOV     #-120,  SIZE    ;SET UP "SIZE"
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1379  004456  012767  177660  002026          MOV     #-120.,  OFFSET
1380  004464  016714  002020                  MOV     SIZE.,   @CDC     ;SET UP COLUMN COUNT
1381  004470  010015                          MOV     R0,      @CDA     ;SET UP ADDRESS REG
1382  004472  012713  000100                  MOV     #100,    @CDS     ;ENABLE INTERUPTS
1383  004476  032767  000010  173064          BIT     #10,     SWR      ;CHECK FOR PACK MODE ONLY
1384  004504  001406                          BEQ     CDREAD            ;BRANCH IF NOT SET
1385  004506  032737  000004  177570          BIT     #4,      @#SWR    ;CHECK FOR IMAGE MODE ONLY
1386  004514  001002                          BNE     CDREAD            ;BRANCH IF SET
1387  004516  004767  001372                  JSR     %7,      PAKSET   ;SET UP FOR PACKING MODE
1388  004522  005213                  CDREAD: INC     @CDS              ;READ
1389  004524  032713  004000          BKGND:  BIT     #4000,   @CDS     ;CHECK FOR DATA ERROR
1390  004530  001775                          BEQ     BKGND
1391  004532  011467  001776                  MOV     @CDC,    DERCNT   ;SAVE THE COLUMN COUNT
1392  004536  032713  004000          BKGND1: BIT     #4000,   @CDS     ;CHECK FOR DATA ERROR
1393  004542  001375                          BNE     BKGND1            ;BRANCH IF SET
1394  004544  005067  001764                  CLR     DERCNT            ;CLR COLUMN COUNT SAVER
1395  004550  000765                          BR      BKGND
1396
1397                                  ;INTERRUPT SERVICE ROUTINE WHICH RUNS DATA RELIABILITY TES
1398  004552  105713                  SRVC:   TSTB    @CDS              ;CHECK CONTROLLER READY
1399  004554  100401                          BMI     .+4               ;BRANCH IF SET
1400  004556  104000                          HLT                       ;CONTROLLER READY NOT SET
1401  004560  032713  000002                  BIT     #2,      @CDS     ;CHECK FOR DATA PACK MODE
1402  004564  001402                          BEQ     ISR               ;BRANCH IF IMAGE MODE
1403  004566  000167  000470                  JMP     PSR               ;JUMP TO PACK MODE ROUTINE
1404
1405  004572  032713  177477          ISR:    BIT     #177477,@CDS     ;CHECK ALL BITS EXCEPT 6 AND 7
1406  004576  001157                          BNE     ISRER             ;BRANCH TO ERROR ROUTINE
1407  004600  005714                          TST     @CDC              ;CHECK COLUMN COUNT
1408  004602  001401                          BEQ     .+4               ;BRANCH IF OK
1409  004604  104000                          HLT                       ;COLUMN COUNT REGISTER NOT 0
1410
1411  004606  010067  001702                  MOV     R0,      BUFEND
1412  004612  166767  001672  001674          SUB     SIZE,    BUFEND
1413  004620  166767  001664  001666          SUB     SIZE,    BUFEND
1414  004626  026715  001662                  CMP     BUFEND,  @CDA
1415  004632  001401                          BEQ     .+4
1416  004634  104000                          HLT
1417
1418  004636  016767  001646  173656  ISRNC:  MOV     SIZE,    COUNT    ;SET UP COLUMN COUNTER
1419  004644  022021                  ISRLP:  CMP     (R0)+,   (R1)+    ;TEST THE DATA
1420  004646  001035                          BNE     ISRDE             ;BRANCH IF DATA ERROR
1421  004650  020167  001650          ISRRT:  CMP     R1,      TEND     ;CHECK FOR END OF TABLE
1422  004654  100402                          BMI     .+6               ;BRANCH IF NOT
1423  004656  016701  001640                  MOV     TSTART,  R1       ;MOVE POINTER TO TOP OF TABLE
1424  004662  005267  173634                  INC     COUNT             ;CHECK FOR END OF BUFFER
1425  004666  001412                          BEQ     ISRBE             ;BRANCH IF BUFFER END
1426  004670  005267  001634                  INC     CLCNT             ;KEEP TRACK OF COLUMNS
1427  004674  026727  001630  000120          CMP     CLCNT,   #120     ;CHECK FOR END OF CARD
1428  004702  001360                          BNE     ISRLP             ;BRANCH IF NOT END OF CARD
1429  004704  004767  001402                  JSR     %7,      NXCRD    ;INC TO NEXT CARD
1430  004710  005721                          TST     (R1)+             ;UPDATE TABLE POINTER FOR NEXT CARD
1431  004712  000754                          BR      ISRLP
1432
1433  004714  004767  001372          ISRBE:  JSR     %7,      NXCRD    ;GO TO NEXT CARD
1434  004720  005721                  ISRNX:  TST     (R1)+
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1435  004722  032767  000004  172640          BIT     #4,     SWR     ;CHECK FOR IMAGE MODE ONLY
1436  004730  001002                          BNE     ISRNX1          ;BRANCH IF SET
1437  004732  004767  001156                  JSR     %7,     PAKSET  ;SET UP FOR PACKING MODE
1438  004736  000167  001066          ISRNX1: JMP     SRETRN          ;CALCULATE 'SIZE' AND RETURN
1439
1440                                  ;DATA ERROR WAS DETECTED, OUTPUT ERROR PRINTOUT
1441  004742  005767  001560          ISRDE:  TST     CDCNT           ;CHECK FOR FIRST CARD
1442  004746  001045                          BNE     ISRD2           ;BRANCH IF NOT
1443  004750  005740                  ISRD1:  TST     -(R0)           ;SUB 2 FROM POINTER
1444  004752  005267  001550                  INC     CDCNT
1445  004756  022021                          CMP     (R0)+,  (R1)+   ;TEST THE DATA
1446  004760  001031                          BNE     1$              ;BRANCH IF NOT THE SAME
1447  004762  062701  000042                  ADD     #42.    R1      ;ADD THE MAGIC NUMBER
1448  004766  020167  001532                  CMP     R1,     TEND    ;CHECK FOR RAP AROUND
1449  004772  003402                          BLE     2$              ;BRANCH IF NOT
1450  004774  162701  000240                  SUB     #240,   R1      ;RAP AROUND
1451  005000  026011  000042          2$:     CMP     42(R0), (R1)    ;CHECK FOR DOUBLE MATCH
1452  005004  001010                          BNE     3$              ;BRANCH IF NOT
1453  005006  162701  000042                  SUB     #42.    R1      ;SUBTRACT THE MAGIC NUMBER
1454  005012  020167  001504                  CMP     R1,     TSTART  ;CHECK FOR RAP AROUND
1455  005016  003314                          BGT     ISRRT           ;BRANCH IF NOT
1456  005020  062701  000240                  ADD     #240,   R1      ;RAP AROUND
1457  005024  000711                          BR      ISRRT           ;GO CHECK REST OF DATA
1458
1459  005026  162701  000042          3$:     SUB     #42,    R1      ;SUBTRACT MAGIC NUMBER
1460  005032  020167  001464                  CMP     R1,     TSTART  ;CHECK FOR RAP AROUND
1461  005036  003002                          BGT     1$              ;BRANCH IF NOT
1462  005040  062701  000240                  ADD     #240,   R1      ;RAP AROUND
1463  005044  020167  001454          1$:     CMP     R1,     TEND
1464  005050  001337                          BNE     ISRD1
1465  005052  016701  001444                  MOV     TSTART, R1
1466  005056  005067  001444                  CLR     CDCNT           ;RESET CARD COUNTER
1467  005062  032767  020000  172500  ISRD2:  BIT     #20000,SWR      ;CK SW13 FOR INHIBIT PRINTOUT
1468  005070  001015                          BNE     ISRDE4          ;BRANCH IF SET
1469  005072  004767  001050                  JSR     %7,     TYHEAD  ;TYPE HEADING, DECK, CDCNT, CLCNT
1470  005076  014167  005456                  MOV     -(R1),PRINT1    ;TYPE -(R1) IN OCTAL
1471  005102  004767  005506                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
1472  005106  000004  013715                  TYPE,   SPACE
1473  005112  014067  005442                  MOV     -(R0),PRINT1    ;TYPE -(R0) IN OCTAL
1474  005116  004767  005472                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
1475  005122  022021                          CMP     (R0)+,  (R1)+   ;RESET POINTERS
1476  005124  005767  172440          ISRDE4: TST     SWR             ;CHECK FOR HALT ON ERROR
1477  005130  100001                          BPL     .+4             ;BRANCH IF HALT ON ERROR NOT SET
1478  005132  000000                          HALT                    ;HALT ON ERROR SET
1479  005134  000645                          BR      ISRRT
1480
1481                                  ;INTERUPT DUE TO SOME KIND OF ERROR
1482                                  ;THESE ERRORS ARE DESASTEROUS, THEREFORE THE DATA TEST IS RESTARTED
1483  005136  100402          ISRER:  BMI     ISRE1           ;BRANCH ON ERROR BIT 15
1484  005140  104000                  HLT                     ;ERROR BIT 15 NOT SET
1485  005142  000445                  BR      ISRST
1486
1487  005144  032713  010000          ISRE1:  BIT     #10000, @CDS    ;CHECK FOR OFF-LINE
1488  005150  001412                          BEQ     ISRE2
1489  005152  032713  040000                  BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
1490  005156  001002                          BNE     .+6             ;BRANCH IF SET
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1491  005160  104000                        HLT                         ;OFF-LINE BUT NOT CARD READER ERROR
1492  005162  000411                        BR      ISRE3
1493
1494  005164  004767  001062                JSR     %7,     LASTCD      ;CHECK FOR LAST CARD
1495  005170  002222                        BGE     ISRNC               ;BRANCH IF 80TH CARD
1496  005172  104000                        HLT                         ;CARD READER ERROR BUT NOT 80TH CARD
1497  005174  000430                        BR      ISRST
1498
1499  005176  032713  040000      ISRE2:    BIT     #40000, @CDS        ;CHECK FOR CARD READER ERROR
1500  005202  001401                        BEQ     .+4                 ;BRANCH IF NOT
1501  005204  104000                        HLT                         ;CARD READER ERROR BUT NOT OFF LINE
1502
1503  005206  032713  020000      ISRE3:    BIT     #20000, @CDS
1504  005212  001401                        BEQ     .+4
1505  005214  104000                        HLT                         ;END OF FILE ERROR (M1200 ONLY)
1506
1507  005216  032713  004000                BIT     #4000,  @CDS
1508  005222  001401                        BEQ     .+4
1509  005224  104000                        HLT                         ;DATA ERROR
1510
1511  005226  032713  002000                BIT     #2000,  @CDS
1512  005232  001401                        BEQ     .+4
1513  005234  104000                        HLT                         ;DATA LATE ERROR
1514
1515  005236  032713  001000                BIT     #1000,  @CDS
1516  005242  001401                        BEQ     .+4
1517  005244  104000                        HLT                         ;NON-EXISTANT MEMORY ERROR
1518  005246  032713  077000                BIT     #077000,@CDS        ;CHECK ALL ERROR BITS
1519  005252  001001                        BNE     .+4                 ;BRANCH IF AT LEAST ONE
1520  005254  104000                        HLT                         ;NONE OF THE ERROR BITS SET
1521  005256  000167  001220      ISRST:    JMP     DATRST              ;RESTART THE ENTIRE DATA TEST
1522
1523  005262  032713  177475      PSR:      BIT     #177475,@CDS        ;CHECK ALL BITS EXCEPT 1,6 AND 7
1524  005266  001170                        BNE     PSRER               ;BRANCH TO ERROR ROUTINE
1525  005270  005714                        TST     @CDC                ;CHECK COLUMN COUNT REG.
1526  005272  001401                        BEQ     .+4                 ;BRANCH IF OK
1527  005274  104000                        HLT                         ;
1528  005276  010067  001212                MOV     R0,     BUFEND
1529  005302  166767  001202  001204        SUB     SIZE,   BUFEND
1530  005310  026715  001200                CMP     BUFEND, @CDA
1531  005314  001401                        BEQ     .+4
1532  005316  104000                        HLT
1533  005320  016767  001164  173174  PSRNC:  MOV     SIZE,   COUNT       ;SET UP COLUMN COUNTER
1534  005326  122021                PSRLP:  CMPB    (R0)+,  (R1)+       ;TEST THE DATA
1535  005330  001047                        BNE     PSRDE               ;BRANCH IF DATA ERROR
1536  005332  020167  001166        PSRRT:  CMP     R1,     TEND        ;CHECK FOR END OF TABLE
1537  005336  100402                        BMI     .+6                 ;BRANCH IF NOT
1538  005340  016701  001156                MOV     TSTART, R1          ;MOVE POINTER TO TOP OF TABLE
1539  005344  005267  173152                INC     COUNT               ;CHECK FOR END OF BUFFER
1540  005350  001412                        BEQ     PSRBE               ;BRANCH IF BUFFER END
1541  005352  005267  001152                INC     CLCNT               ;KEEP TRACK OF COLUMNS
1542  005356  026727  001146  000120        CMP     CLCNT,  #120        ;CHECK FOR END OF CARD
1543  005364  001360                        BNE     PSRLP               ;BRANCH IF NOT END OF CARD
1544  005366  004767  000720                JSR     %7,     NXCRD       ;GO TO NEXT CARD
1545  005372  105721                        TSTB    (R1)+               ;UPDATE TABLE POINTER FOR NEXT CARD
1546  005374  000754                        BR      PSRLP
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1547
1548  005376  004767  000710          PSRBE:  JSR     %7,     NXCRD   ;GO TO NEXT CARD
1549  005402  105721                  PSRNX:  TSTB    (R1)+
1550  005404  032767  000010  172156          BIT     #10,    SWR
1551  005412  001014                          BNE     PSRNX1
1552  005414  162767  000240  001100          SUB     #160.,  TSTART  ;MOVE TABLE POINTER TO IMAGE TABLE
1553  005422  162767  000120  001074          SUB     #80.,   TEND
1554  005430  162701  000240                  SUB     #160.,  R1      ;UPDATE TABLE POINTER
1555  005434  066701  001066                  ADD     CDCNT,  R1      ;COMPENSATE FOR BYTES
1556  005440  042713  000002                  BIC     #2,     @CDS    ;CLR PACKING MODE BIT
1557  005444  000167  000360          PSRNX1: JMP     SRETRN          ;CALCULATE 'SIZE' AND READ MORE CARDS
1558
1559                                  ;DATA ERROR WAS DETECTED, OUTPUT ERROR PRINTOUT
1560  005450  005767  001052          PSRDE:  TST     CDCNT
1561  005454  001045                          BNE     PSRD2
1562  005456  105740                  PSRD1:  TSTB    -(R0)           ;SUB 1 FROM POINTER
1563  005460  005267  001042                  INC     CDCNT
1564  005464  122021                          CMPB    (R0)+,  (R1)+   ;TEST THE DATA
1565  005466  001031                          BNE     1$              ;BRANCH IF NOT THE SAME
1566  005470  062701  000021                  ADD     #21,    R1      ;ADD THE MAGIC NUMBER
1567  005474  020167  001024                  CMP     R1,     TEND    ;CHECK FOR RAP AROUND
1568  005500  003402                          BLE     2$              ;BRANCH IF NOT
1569  005502  162701  000120                  SUB     #120,   R1      ;RAP AROUND
1570  005506  126011  000021          2$:     CMPB    21(R0), (R1)    ;CHECK FOR DOUBLE MATCH
1571  005512  001010                          BNE     3$              ;BRANCH IF NOT
1572  005514  162701  000021                  SUB     #21,    R1      ;SUBTRACT THE MAGIC NUMBER
1573  005520  020167  000776                  CMP     R1,     TSTART  ;CHECK FOR RAP AROUND
1574  005524  003302                          BGT     PSRRT           ;BRANCH IF NOT
1575  005526  062701  000120                  ADD     #120,   R1      ;RAP AROUND
1576  005532  000677                          BR      PSRRT           ;GO CHECK REST OF DATA
1577
1578  005534  162701  000021          3$:     SUB     #21,    R1      ;SUBTRACT MAGIC NUMBER
1579  005540  020167  000756                  CMP     R1,     TSTART  ;CHECK FOR RAP AROUND
1580  005544  003002                          BGT     1$              ;BRANCH IF NOT
1581  005546  062701  000120                  ADD     #120,   R1      ;RAP AROUND
1582  005552  020167  000746          1$:     CMP     R1,     TEND
1583  005556  001337                          BNE     PSRD1
1584  005560  016701  000736                  MOV     TSTART, R1
1585  005564  005067  000736                  CLR     CDCNT           ;RESET CARD COUNTER
1586  005570  032767  020000  171772  PSRD2:  BIT     #20000,SWR      ;CK SW13 FOR INHIBIT PRINTOUT
1587  005576  001017                          BNE     PSRDE3          ;BRANCH IF SET
1588  005600  004767  000342                  JSR     %7,     TYHEAD  ;TYPE HEADING, DECK, CDCNT, CLCNT
1589  005604  000004  013715                  TYPE,   SPACE
1590  005610  114167  004745                  MOVB    -(R1),  PRINT1+1 ;MOVE BYTE INTO PRINT BUFFER
1591  005614  004767  004754                  JSR     %7,     PRINTB  ; AND PRINT IT
1592  005620  000004  013712                  TYPE,   SPACE-3
1593  005624  114067  004731                  MOVB    -(R0),  PRINT1+1 ;MOVE BYTE INTO PRINT BUFFER
1594  005630  004767  004740                  JSR     %7,     PRINTB  ; AND PRINT IT
1595  005634  122021                          CMPB    (R0)+,  (R1)+   ;RESET POINTERS
1596  005636  005767  171726          PSRDE3: TST     SWR             ;CHECK FOR HALT ON ERROR
1597  005642  100001                          BPL     .+4             ;BRANCH IF HALT ON ERROR NOT SET
1598  005644  000000                          HALT                    ;HALT ON ERROR SET
1599  005646  000631                          BR      PSRRT
1600
1601                                  ;INTERUPT DUE TO SOME KIND OF ERROR
1602  005650  100402                  PSRER:  BMI     PSRE1           ;BRANCH ON ERROR BIT 15
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1603  005652  104000                        HLT                         ;ERROR BIT 15 NOT SET
1604  005654  000463                        BR      PSRST
1605
1606  005656  032713  004000        PSRE1:  BIT     #4000,  @CDS
1607  005662  001414                        BEQ     PSRE2               ;BRANCH IF NOT
1608  005664  032713  000002                BIT     #2,     @CDS
1609  005670  001001                        BNE     .+4
1610  005672  104000                        HLT
1611  005674  032767  000020  171666        BIT     #20,    SWP
1612  005702  001001                        BNE     .+4                 ;BRANCH IF BINARY DECK
1613  005704  104000                        HLT
1614  005706  012767  177660  172606        MOV     #-120,  COUNT       ;ONLY READ ONE CARD
1615  005714  032713  010000        PSRE2:  BIT     #10000, @CDS        ;CHECK FOR OFF-LINE
1616  005720  001415                        BEQ     PSRE3
1617  005722  032713  040000                BIT     #40000, @CDS        ;CHECK FOR CARD READER ERROR
1618  005726  001002                        BNE     .+6                 ;BRANCH IF SET
1619  005730  104000                        HLT                         ;OFF-LINE BUT NOT CARD READER ERROR
1620  005732  000414                        BR      PSRE4
1621
1622  005734  004767  000312                JSR     %7,     LASTCD      ;CHECK FOR LAST CARD
1623  005740  002402                        BLT     1$                  ;BRANCH IF NOT
1624  005742  000167  177352                JMP     PSRNC               ;BRANCH IF 80TH CARD
1625  005746  104000        1$:     HLT                                 ;CARD READER ERROR BUT NOT 80TH CARD
1626  005750  000167  000526                JMP     DATRST              ;RESTART THE ENTIRE TEST
1627
1628  005754  032713  040000        PSRE3:  BIT     #40000, @CDS        ;CHECK FOR CARD READER ERROR
1629  005760  001401                        BEQ     .+4                 ;BRANCH IF NOT
1630  005762  104000                        HLT                         ;CARD READER ERROR BUT NOT OFF LINE
1631
1632  005764  032713  020000        PSRE4:  BIT     #20000, @CDS
1633  005770  001401                        BEQ     .+4
1634  005772  104000                        HLT                         ;END OF FILE ERROR (M1200 ONLY)
1635
1636  005774  032713  002000                BIT     #2000,  @CDS
1637  006000  001401                        BEQ     .+4
1638  006002  104000                        HLT                         ;DATA LATE ERROR
1639
1640  006004  032713  001000                BIT     #1000,  @CDS
1641  006010  001401                        BEQ     .+4
1642  006012  104000                        HLT                         ;NON-EXISTANT MEMORY ERROR
1643  006014  032713  077000                BIT     #077000,@CDS        ;CHECK ALL ERROR BITS
1644  006020  001001                        BNE     .+4                 ;BRANCH IF AT LEAST ONE
1645  006022  104000                        HLT                         ;NONE OF THE ERROR BITS SET
1646  006024  000167  177276        PSRST:  JMP     PSRLP               ;GO CHECK THE DATA
1647
1648                                ;RETURN PORTION OF INTERUPT SERVICE ROUTINE
1649                                ;CALCULATES A NEW "SIZE" (NUMBER OF COLUMNS TO BE READ)
1650                                ;SETS UP THE CARD READER BUFFERS, AND ISUES THE READ COMMAND
1651                                ;THEN DOES AN RTI TO THE BACKGROUND ROUTINE
1652  006030  066767  000456  000452 SRETRN: ADD     OFFSET, SIZE
1653  006036  100404                        BMI     SRETR1
1654  006040  012767  177660  000444        MOV     #-120,  OFFSET
1655  006046  000770                        BR      SRETRN
1656  006050  032767  001000  000432 SRETR1: BIT     #001000,SIZE
1657  006056  001004                        BNE     SRETR4
1658  006060  012767  000120  000424 SRETR3: MOV     #120,   OFFSET
```

```
1659  006066  000760                        BR      SRETRN
1660  006070  004767  000156          SRETR4: JSR     %7,     LASTCD  ;CHECK FOR MORE THAN 80 CARDS
1661  006074  003371                        BGT     SRETR3          ;BRANCH IF GREATER
1662  006076  016714  000406                MOV     SIZE,   @CDC    ;SET UP COLMN COUNT
1663  006102  012700  016044                MOV     #BUFBEG,R0      ;RESET TABLE POINTER
1664  006106  010015                        MOV     R0,     @CDA    ;SET UP ADDRESS REG
1665  006110  005213                        INC     @CDS            ;READ
1666  006112  000002                        RTI
1667
1668
1669                                  ;SUBROUTINE TO SET PACKING MODE AND MOVE THE POINTERS FOR THE DATA.
1670  006114  062767  000240  000400  PAKSET: ADD     #160.,  TSTART  ;MOVE TABLE POINTER TO PACKED TABLE
1671  006122  062767  000120  000374          ADD     #80.,   TEND
1672  006130  062701  000240                ADD     #160    R1      ;UPDATE TABLE POINTER
1673  006134  166701  000366                SUB     CDCNT   R1      ;COMPENSATE FOR BYTES
1674  006140  052713  000002                BIS     #2,     @CDS    ;SET PACKING MODE BIT
1675  006144  000207                        RTS     %7
1676
1677                                  ;SUBROUTINE TO TYPE HEADING, TYPE OF DECK, CARD COUNT, AND COLUMN COUNT
1678  006146  005767  172360          TYHEAD: TST     ERFLG           ;CHECK FOR FIRST ERROR
1679  006152  001004                        BNE     NOHEAD          ;BRANCH IF NOT
1680  006154  005267  172352                INC     ERFLG           ;SET FLAG
1681  006160  000004  015053                TYPE,   MSG13           ;TYPE HEADING FOR DATA ERRORS
1682  006164  000004                  NOHEAD: TYPE                    ;OUTPUT TYPE OF DECK
1683  006166  000000                  DECK:   DUMMY                   ;POINTER TO DECK TITLE
1684  006170  000004  013715                TYPE,   SPACE
1685  006174  005267  000326                INC     CDCNT           ;ADJUST CADR COUNT
1686  006200  016767  000322  004352        MOV     CDCNT,PRINT1    ;TYPE CDCNT IN OCTAL
1687  006206  004767  004402                JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
1688  006212  005367  000310                DEC     CDCNT           ;READJUST CADR COUNT
1689  006216  000004  013715                TYPE,   SPACE
1690  006222  005267  000302                INC     CLCNT           ;ADJUST COLUMN COUNT
1691  006226  016767  000276  004324        MOV     CLCNT,PRINT1    ;TYPE CLCNT IN OCTAL
1692  006234  004767  004354                JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
1693  006240  005367  000264                DEC     CLCNT           ;READJUST COLUMN COUNT
1694  006244  000004  013715                TYPE,   SPACE
1695  006250  000207                        RTS     %7
1696
1697                                  ;SUBROUTINE TO CHECK FOR LAST CARD
1698  006252  016767  000232  000236  LASTCD: MOV     SIZE,   TEMP1
1699  006260  016767  000242  000232          MOV     CDCNT,  TEMP2
1700  006266  005267  000226          LSTCD1: INC     TEMP2
1701  006272  062767  000120  000216          ADD     #120,   TEMP1
1702  006300  100772                        BMI     LSTCD1
1703  006302  026727  000212  000120        CMP     TEMP2,  #80.
1704  006310  000207                        RTS     %7
1705
1706                                  ;SUBROUTINE TO KEEP TRACK OF CARDS
1707  006312  005067  000212          NXCRD:  CLR     CLCNT           ;RESET COLUMN COUNT
1708  006316  005267  000204                INC     CDCNT           ;KEEP TRACK OF CARDS
1709  006322  026727  000200  000120        CMP     CDCNT,  #120    ;CHECK FOR 80TH CARD
1710  006330  002001                        BGE     ALLDON
1711  006332  000207                        RTS     %7              ;RETURN
1712
1713  006334  005726                  ALLDON: TST     (6)+            ;CORRECT STACK POINTER TO REPLACE RTS
1714  006336  022626                        CMP     (6)+,   (6)+    ;CORRECT STACK POINTER TO REPLACE RTI
```

```
1715  006340  004767  003622              JSR     %7,BELL         ;RING BELL
 716  006344  013700  000042              MOV     @#42,   %0      ;LOAD CONTENTS OF SOFT VECTOR 42
1717  006350  001405                      BEQ     HOOK1           ;BRANCK IF NO HOOK
1718  006352  000005                      RESET                   ;CLEAR ALL I/O
1719  006354  004710                      JSR     %7,     (R0)    ;RETURN TO MONITOR
1720  006356  000240                      NOP
1721  006360  000240                      NOP
1722  006362  000240                      NOP
1723  006364  032767  000040  171176  HOOK1: BIT     #40,SWR         ;CHECK SWR FOR HALT AT END OF DECK
1724  006372  001402                      BEQ     ONLINE          ;CONTINUE IF NOT SET
1725  006374  000000                      HALT                    ;END OF DECK,SW5 SET
1726  006376  000427                      BR      DECKCK
1727
1728  006400  032713  010000          ONLINE: BIT     #10000, @CDS    ;CHECK FOR OFF-LINE
1729  006404  001424                      BEQ     DECKCK          ;BRANCH IF NOT
1730  006406  005713                      TST     @CDS            ;CHECK FOR ERROR (BIT 15)
1731  006410  100401                      BMI     .+4             ;BRANCH IF SET OK
1732  006412  104000                      HLT                     ;ERROR BIT 15 NOT SET
1733
1734  006414  032713  040000              BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
1735  006420  001001                      BNE     .+4             ;BRANCH IF SET OK
1736  006422  104000                      HLT                     ;OFF-LINE NOT DUE TO CARD READER ERROR
1737
1738  006424  032713  023471              BIT     #023471,@CDS    ;CHECK FOR EXTRA BITS SET
1739  006430  001401                      BEQ     .+4             ;BRANCH IF OK
1740  006432  104000                      HLT                     ;EXTRA ERROR BITS SET
1741
1742  006434  012712  006444              MOV     #ONINT, @ADINT  ;SET UP INTERUPT VECTOR
1743  006440  000001                      WAIT                    ;WAIT FOR AN INTERUPT
1744  006442  000776                      BR      .-2             ;WAIT ON TRACE TRAPS
1745
1746  006444  032713  000010          ONINT:  BIT     #10,    @CDS    ;CHECK FOR TRANSITION TO ON LINE
1747  006450  001001                      BNE     .+4             ;BRANCH IF SET OK
1748  006452  104000                      HLT                     ;INTERUPT BY OTHER THAN BIT 3 SETTING
1749
1750  006454  022626                      CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
1751                                ;WHEN CONTINUING FROM ONE DECK TO ANOTHER, CHECK SW6 FOR TYPE
1752                                ;OF TESTING TO BE PERFORMED
1753  006456  005167  172044          DECKCK: COM     TRFLG           ;TOGGLE TRACE FLAG
1754  006462  032767  000100  171100        BIT     #100,SWR                ;CHECK SW6
1755  006470  001402                      BEQ     .+6             ;BRANCH IF NOT SET
1756  006472  000167  172322              JMP     RESTRT          ;RERUN COMBINED INSTRUCTION AND DATA TEST
1757  006476  000167  175564              JMP     DATST
1758
1759  006502  022626                  DATRST: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
1760  006504  000167  175556              JMP     DATST           ;RESTART DATA TEST
1761
1762  006510  177660                  SIZE:   -120
1763  006512  177660                  OFFSET: -120
1764  006514  000000                  BUFEND: 0
1765  006516  000000                  TEMP1:  0
1766  006520  000000                  TEMP2:  0
1767  006522  000000                  TSTART: 0                       ;STARTING ADDRESS OF DATA TABLE
1768  006524  000000                  TEND:   0                       ;END ADDRESS OF DATA TABLE
1769  006526  000000                  CDCNT:  0                       ;NUMBER OF CARD BEING READ
1770  006530  000000                  CLCNT:  0                       ;NUMBER OF COLUMN BEING CHECKED
```

```
1771  006532  000000                PTOFF:  0                       ;OFFSET TO POINTER FOR DATA PRINTOUT
1772  006534  000000                DERCNT: 0                       ;DATA ERROR COLUMN COUNT
1773
1774
1775                                ;SETUP FOR ERROR FUNCTION TEST
1776  006536  005067  171776        ER1200: CLR     CD1000          ;CARD READER IS M-1200
1777  006542  000167  000006                JMP     ER12CD
1778  006546  012767  177777  171764 ERCD11: MOV     #177777, CD1000 ;CARD READER IS M1000
1779  006554  004767  171762        ER12CD: JSR     %7,SETUP        ;INITIALIZE REGISTERS
1780  006560  012767  006574  003652        MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS
1781  006566  005067  003642                CLR     ITMAX           ;RUN EACH ERROR TEST ONCE ONLY
1782
1783
1784                                ;HALT SHOULD CAUSE DATA LATE ERROR (BIT 10)
1785                                ;SHOULD SET ERROR (BIT 15)
1786  006572  104400                TESTA:  SCOPE
1787  006574  004767  003340                JSR     %7,     INIT    ;INITIALIZE STATUS REGISTER
1788  006600  000004  013723                TYPE,   CRLF
1789  006604  000004  015423                TYPE,   MSG22           ;'WHEN PRINTING STOPS PUT HALT AND
1790  006610  000004  015466                TYPE,   MSG23           ;SINGLE BUS CYCLE DOWN, AND HIT 'CONTINUE' ON THE
1791  006614  000004  015551                TYPE,   MSG24           ;CONSOLE UNTIL ONE CARD IS READ
1792  006620  000004  015612                TYPE,   MSG25           ;THEN PUT UP THE TWO SWITCHES AND HIT
1793  006624  000004  015661                TYPE,   MSG26           ;'CONTINUE' ON THE CONSOLE
1794  006630  000004  013720                TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1795  006634  012714  177701                MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
1796  006640  012715  016044                MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
1797  006644  000000                        HALT                    ;
1798  006646  005213                        INC     @CDS            ;START READING
1799  006650  105713                        TSTB    @CDS            ;CHECK FOR CONTROLLER READY
1800  006652  001001                        BNE     .+4             ;BRANCH IF SET OK
1801  006654  104000                        HLT                     ;CONTROLLER READY FAILED TO SET
1802
1803  006656  005713                        TST     @CDS            ;CHECK FOR ERROR ( BIT 15)
1804  006660  001001                        BNE     .+4             ;BRANCH IF SET OK
1805  006662  104000                        HLT                     ;ERROR BIT 15 NOT SET
1806
1807  006664  032713  002000                BIT     #2000,  @CDS    ;CHECK FOR DATA LATE ERROR (BIT 10)
1808  006670  001001                        BNE     .+4             ;BRANCH IF SET OK
1809  006672  104000                        HLT                     ;DATA LATE BIT 10 NOT SET
1810
1811  006674  032713  075577                BIT     #075577,@CDS    ;CHECK FOR ANY OTHER BITS
1812  006700  001401                        BEQ     .+4             ;BRANCH IF OK
1813  006702  104000                        HLT                     ;EXTRA BITS SET IN STATUS WORD
1814
1815                                ;THE CARD READER GOING OFF-LINE SHOULD SET ERROR (BIT 15)
1816                                ;AND OFF-LINE (BIT 12)
1817                                ;GOING BACK ON LINE SHOULD SET 'TRANSITION TO ON-LINE'' (BIT 3)
1818  006704  104400                TESTB:  SCOPE
1819  006706  004767  003226                JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1820  006712  000004  014027                TYPE,   MSG3            ;'PRESS CARD READER 'STOP'''
1821  006716  000004  013762                TYPE,   MSG2            ;'THEN HIT 'CONTINUE' ON THE CONSOLE''
1822  006722  000004  013720                TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1823  006726  000000                        HALT
1824  006730  032713  010000                BIT     #10000,@CDS     ;CHECK BIT 12
1825  006734  001001                        BNE     .+4             ;BRANCH IF SET
1826  006736  104000                        HLT                     ;OFF-LINE (BIT 12) WASN'T SET
```

```
1827
1828  006740  005713                    TST     @CDS            ;CHECK BIT 15
1829  006742  100401                    BMI     .+4             ;BRANCH IF SET
1830  006744  104000                    HLT                     ;ERROR (BIT 15) WASN'T SET
1831
1832  006746  031327  067577            BIT     @CDS,#067577    ;CHECK FOR EXTRA BITS
1833  006752  001401                    BEQ     .+4             ;BRANCH IF OK
1834  006754  104000                    HLT                     ;STATUS WORD ERROR
1835
1836  006756  000004  013726            TYPE,   MSG1            ;'PRESS CARD READER 'RESET'';
1837  006762  000004  013762            TYPE,   MSG2            ;'THEN HIT 'CONTINUE' ON THE CONSOLE''
1838  006766  000004  013720            TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1839  006772  000000                    HALT
1840
1841  006774  032713  000010            BIT     #10,    @CDS    ;CHECK FOR TRANSIION TO ON-LINE(BIT 3)
1842  007000  001001                    BNE     .+4             ;BRANCH IF SET OK
1843  007002  104000                    HLT                     ;TRANSITION TO ON-LINE FAILED TO SET
1844
1845  007004  032713  010000            BIT     #10000, @CDS    ;CHECK FOR OFF-LINE
1846  007010  001401                    BEQ     .+4             ;BRANCH IF OK
1847  007012  104000                    HLT                     ;OFF-LINE STILL SET
1848
1849  007014  005713                    TST     @CDS            ;CHECK ERROR (BIT 15)
1850  007016  100401                    BMI     .+4             ;BRANCH IF STILL SET
1851  007020  104000                    HLT                     ;ERROR BIT 15 CLEARED
1852
1853  007022  032713  077567            BIT     #077567,@CDS    ;CHECK FOR EXTRA BITS
1854  007026  001401                    BEQ     .+4             ;BRANCH IF OK
1855  007030  104000                    HLT                     ;EXTRA STATUS BITS SET
1856
1857                          ;TRYING TO READ WHEN CARD READER IS OFF-LINE SHOULD CAUSE AN INTERUPT
1858                          ;CHECK THAT AN INTERRUPT OCCURS WHEN THE CARD READER COMES ON LINE
1859  007032  104400          TESTC:  SCOPE
1860  007034  004767  003100            JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1861  007040  012712  007112            MOV     #TINTC, @ADINT  ;LOAD RETURN POINTER
1862  007044  052767  000340  170724    BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1863  007052  016762  170720  000002    MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
1864  007060  042767  000340  170710    BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
1865  007066  012713  000100            MOV     #100,   @CDS    ;SET INTERUPT ENABLE
1866  007072  000004  014027            TYPE,   MSG3            ;'PRESS CARD READER 'STOP'''
1867  007076  000004  013720            TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1868  007102  032713  010000  TLOPC:   BIT     #10000, @CDS    ;WAIT FOR OFF-LINE TO SET
1869  007106  001775                    BEQ     TLOPC
1870  007110  000402                    BR      CONTC           ;SKIP INTERUPT HANDLER
1871
1872  007112  104000          TINTC:  HLT                     ;'STOP' SHOULDN'T CAUSE AN INTERUPT
1873  007114  000002                    RTI                     ;RETURN FROM THE INTERUPT
1874
1875  007116  105713          CONTC:  TSTB    @CDS            ;CHECK CONTROLLER READY BIT 7
1876  007120  100401                    BMI     .+4             ;BRANCH IF OK
1877  007122  104000                    HLT                     ;CU READY DIDN'T SET YET
1878
1879  007124  005713                    TST     @CDS            ;CHECK ERROR BIT
1880  007126  100401                    BMI     .+4             ;BRANCH IF SET
1881  007130  104000                    HLT                     ;ERROR (BIT 15) NOT SET
1882
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1883  007132  032713  067477              BIT     #067477,@CDS    ;CHECK FOR EXTRA BITS
1884  007136  001401                      BEQ     .+4             ;BRANCH IF OK
1885  007140  104000                      HLT                     ;STATUS WORD ERROR
1886
1887  007142  012712  007174              MOV     #TINTCA,@ADINT  ;LOAD RETURN POINTER
1888  007146  052767  000340  170622      BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1889  007154  016762  170616  000002      MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
1890  007162  042767  000340  170606      BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
1891  007170  005213                      INC     @CDS            ;TRY TO READ A CARD
1892  007172  000777                      BR      .               ;WAIT FOR THE INTERUPT
1893
1894  007174  022626          TINTCA: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
1895  007176  105713                  TSTB    @CDS            ;CHECK CONTROLLER READY BIT 7
1896  007200  100401                  BMI     .+4             ;BRANCH IF OK
1897  007202  104000                  HLT                     ;CU READY DIDN'T SET YET
1898
1899  007204  032713  010000          BIT     #10000, @CDS    ;CHECK FOR OFF-LINE BIT 12
1900  007210  001001                  BNE     .+4             ;BRANCH IF OK
1901  007212  104000                  HLT                     ;OFF-LINE BIT 12 NOT SET
1902
1903  007214  005713                  TST     @CDS            ;CHECK ERROR BIT
1904  007216  100401                  BMI     .+4             ;BRANCH IF SET
1905  007220  104000                  HLT                     ;ERROR (BIT 15) NOT SET
1906
1907  007222  032713  067477          BIT     #067477,@CDS    ;CHECK FOR EXTRA BITS
1908  007226  001401                  BEQ     .+4             ;BRANCH IF OK
1909  007230  104000                  HLT                     ;STATUS WORD ERROR
1910
1911  007232  012712  007272          MOV     #TINTCB,@ADINT  ;LOAD RETURN POINTER
1912  007236  052767  000340  170532  BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
1913  007244  016762  170526  000002  MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
1914  007252  042767  000340  170516  BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
1915  007260  000004  013726          TYPE,   MSG1            ;'PRESS CARD READER 'RESET'''
1916  007264  000004  013720          TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
1917  007270  000777                  BR      .               ;WAIT FOR THE INTERUPT
1918
1919  007272  022626          TINTCB: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
1920  007274  032713  000010          BIT     #10,    @CDS    ;CHECK FOR TRANSITION TO ON-LINE(BIT 3)
1921  007300  001001                  BNE     .+4             ;BRANCH IF SET OK
1922  007302  104000                  HLT                     ;TRANSITION TO ON-LINE FAILED TO SET
1923
1924  007304  032713  010000          BIT     #10000, @CDS    ;CHECK FOR OFF-LINE
1925  007310  001401                  BEQ     .+4             ;BRANCH IF OK
1926  007312  104000                  HLT                     ;OFF-LINE STILL SET
1927
1928  007314  005713                  TST     @CDS            ;CHECK ERROR (BIT 15)
1929  007316  100401                  BMI     .+4             ;BRANCH IF STILL SET
1930  007320  104000                  HLT                     ;ERROR BIT 15 CLEARED
1931
1932  007322  032713  077467          BIT     #077467,@CDS    ;CHECK FOR EXTRA BITS
1933  007326  001401                  BEQ     .+4             ;BRANCH IF OK
1934  007330  104000                  HLT                     ;EXTRA STATUS BITS SET
1935
1936                          ;INPUT HOPPER EMPTY SHOULD SET SPECIAL CONDITION
1937                          ;CHECK THAT INTERRUPTS OCCUR WHEN THE CARD READER COMES ON LINE
1938  007332  104400          TESTD:  SCOPE
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 1939  007334  004767  002600                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 1940  007340  000004  014115                  TYPE,   MSG5            ;'REMOVE ALL CARDS FROM THE INPUT HOPPER''
 1941  007344  000004  013762                  TYPE,   MSG2            ;'THEN HIT 'CONTINUE' ON THE CONSOLE''
 1942  007350  000004  013720                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
 1943  007354  000000                          HALT
 1944  007356  032713  010000                  BIT     #10000,@CDS     ;CHECK BIT12
 1945  007362  001001                          BNE     .+4             ;BRANCH IF SET
 1946  007364  104000                          HLT                     ;OFF-LINE (BIT 12) WASN'T SET
 1947
 1948  007366  005713                          TST     @CDS            ;CHECK ERROR BIT
 1949  007370  100401                          BMI     .+4             ;BRANCH IF SET
 1950  007372  104000                          HLT                     ;ERROR (BIT 15) NOT SET
 1951
 1952  007374  032713  040000                  BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
 1953  007400  001001                          BNE     .+4             ;BRANCH IF SET
 1954  007402  104000                          HLT                     ;CARD REAER ERROR BIT 14 NOT SET
 1955
 1956  007404  032713  027573                  BIT     #027573,@CDS    ;CHECK FOR EXTRA BITS
 1957  007410  001401                          BEQ     .+4             ;BRANCH IF OK
 1958  007412  104000                          HLT                     ;STATUS WORD ERROR
 1959
 1960  007414  012712  007464                  MOV     #TINTD, @ADINT  ;LOAD RETURN POINTER
 1961  007420  052767  000340  170350          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
 1962  007426  016762  170344  000002          MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
 1963  007434  042767  000340  170334          BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
 1964  007442  012713  000100                  MOV     #100,   @CDS    ;SET INTERUPT ENABLE
 1965  007446  000004  014166                  TYPE,   MSG6            ;'RESTORE CARDS TO THE INPUT HOPPER''
 1966  007452  000004  013726                  TYPE,   MSG1            ;'PRESS CARD READER 'RESET'''
 1967  007456  000004  013720                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
 1968  007462  000777                          BR      .               ;WAIT FOR THE INTERUPT
 1969
 1970  007464  022626                  TINTD:  CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
 1971  007466  012712  007530                  MOV     #TINTDA,@ADINT  ;LOAD RETURN POINTER
 1972  007472  052767  000340  170276          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
 1973  007500  016762  170272  000002          MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
 1974  007506  042767  000340  170262          BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
 1975  007514  012714  177701                  MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
 1976  007520  012715  016044                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
 1977  007524  005213                          INC     @CDS            ;START READING
 1978  007526  000777                          BR      .               ;WAIT FOR AN INTERUPT
 1979
 1980  007530  022626                  TINTDA: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
 1981  007532  022713  000300                  CMP     #000300,@CDS    ;CHECH THE CARD READER STATUS
 1982  007536  001401                          BEQ     .+4             ;BRANCH IF OK
 1983  007540  104000                          HLT                     ;CARD READER STATUS ERROR
 1984
 1985                                  ;OUTPUT STACKER FULL SHOULD SET BITS 15, 14, 12, '
 1986  007542  104400                  TESTE:  SCOPE
 1987  007544  004767  002370                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 1988  007550  000004  014232                  TYPE,   MSG7            ;'PULL OUTPUT STACKER PRESSURE ARM
 1989                                                                  ;ALL THE WAY DOWN''
 1990  007554  000004  013762                  TYPE,   MSG2            ;'THEN HIT 'CONTINUE' ON THE CONSOLE''
 1991  007560  000004  013720                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
 1992  007564  000000                          HALT
 1993  007566  032713  010000                  BIT     #10000,@CDS     ;CHECK OFF-LINE BIT12
 1994  007572  001001                          BNE     .+4             ;BRANCH IF SET
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1995  007574  104000                          HLT                     ;OFF-LINE (BIT 12) WASN'T SET
1996
1997  007576  005713                          TST     @CDS            ;CHECK ERROR BIT 15
1998  007600  100401                          BMI     .+4             ;BRANCH IF SET
1999  007602  104000                          HLT                     ;ERROR BIT 15 NOT SET
2000
2001  007604  032713  040000                  BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
2002  007610  001001                          BNE     .+4             ;BRANCH IF SET
2003  007612  104000                          HLT                     ;CARD READER ERROR BIT 14 NOT SET
2004
2005  007614  032713  027577                  BIT     #027577,@CDS    ;CHECK FOR EXTRA BITS
2006  007620  001401                          BEQ     .+4             ;BRANCH IF OK
2007  007622  104000                          HLT                     ;STATUS WORD ERROR
2008
2009  007624  012712  007670                  MOV     #TINTE, @ADINT  ;LOAD RETURN POINTER
2010  007630  052767  000340  170140          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2011  007636  016762  170134  000002          MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2012  007644  042767  000340  170124          BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2013  007652  012713  000100                  MOV     #100,   @CDS    ;SET INTERUPT ENABLE
2014  007656  000004  013726                  TYPE,   MSG1            ;'PRESS CARD READER 'RESET'''
2015  007662  000004  013720                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2016  007666  000777                          BR      .               ;WAIT FOR THE INTERUPT
2017
2018  007670  022626                  TINTE:  CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2019  007672  012712  007734                  MOV     #TINTEA,@ADINT  ;LOAD RETURN POINTER
2020  007676  052767  000340  170072          BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2021  007704  016762  170066  000002          MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2022  007712  042767  000340  170056          BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2023  007720  012714  177701                  MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2024  007724  012715  016044                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2025  007730  005213                          INC     @CDS            ;START READING
2026  007732  000777                          BR      .               ;WAIT FOR AN INTERUPT
2027
2028  007734  022626                  TINTEA: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2029  007736  022713  000300                  CMP     #000300,@CDS    ;CHECH THE CARD READER STATUS
2030  007742  001401                          BEQ     .+4             ;BRANCH IF OK
2031  007744  104000                          HLT                     ;CARD READER STATUS ERROR
2032
2033                                  ;A PICK CHECK ERROR SHOULD SET BIT 15, BIT 14, AND BIT 12
2034                                  ;THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO
2035                                  ;THE READ STATION WITHIN 400 MS.
2036  007746  104400                  TESTF:  SCOPE
2037  007750  004767  002164                  JSR     %7,INIT
2038  007754  000004  014115                  TYPE,   MSG5            ;'REMOVE ALL CARDS FROM THE INPUT HOPPER''
2039  007760  000004  013762                  TYPE,   MSG2            ;'THEN HIT 'CONTINUE' ON THE CONSOLE''
2040  007764  000004  014334                  TYPE,   MSG8            ;'HOLD DOWN THE SWITCH UNDER THE CAP
2041                                                                  ;OF THE INPUT HOPPER''
2042  007770  000004  013726                  TYPE,   MSG1            ;'PRESS CARD READER 'RESET'''
2043  007774  000004  013720                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2044  010000  000000                          HALT
2045  010002  032713  010000                  BIT     #10000, @CDS    ;CHECK FOR OFF-LINE
2046  010006  001001                          BNE     .+4             ;BRANCH IF SET
2047  010010  104000                          HLT                     ;OFF LINE NOT SET AFTER ''CONTINUE''
2048
2049  010012  032713  000010                  BIT     #10,    @CDS    ;CHECK FOR ''TRANSITION TO ON LINE''
2050  010016  001775                          BEQ     .-4             ;WAIT FOR IT
```

```
2051  010020  022713  140210            CMP     #140210,@CDS    ;CHECK FOR CORRECT STATUS BITS
2052  010024  001401                    BEQ     .+4             ;BRANCH IF OK
2053  010026  104000                    HLT                     ;STATUS NOT EQUAL TO 140210
2054
2055  010030  012714  177701            MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2056  010034  012715  016044            MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2057  010040  005213                    INC     @CDS            ;READ
2058  010042  105713                    TSTB    @CDS            ;CHECK CONTROLLER READY
2059  010044  100376                    BPL     .-2             ;WAIT FOR CONTROLLER READY
2060  010046  032713  010000            BIT     #10000,@CDS     ;CHECK BIT12
2061  010052  001001                    BNE     .+4             ;BRANCH IF SET
2062  010054  104000                    HLT                     ;OFF-LINE (BIT 12) WASN'T SET
2063
2064  010056  005713                    TST     @CDS            ;CHECK SPECIAL CONDITION BIT
2065  010060  100401                    BMI     .+4             ;BRANCH IF SET
2066  010062  104000                    HLT                     ;SPECIAL CONDITION NOT SET
2067
2068  010064  032713  040000            BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
2069  010070  001001                    BNE     .+4             ;BRANCH IF SET
2070  010072  104000                    HLT                     ;CARD REAER ERROR BIT 14 NOT SET
2071
2072  010074  031327  027577            BIT     @CDS,#027577    ;CHECK FOR EXTRA BITS
2073  010100  001401                    BEQ     .+4             ;BRANCH IF OK
2074  010102  104000                    HLT                     ;STATUS WORD ERROR
2075
2076  010104  012712  010154            MOV     #TINTF, @ADINT  ;LOAD RETURN POINTER
2077  010110  052767  000340  167660    BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2078  010116  016762  167654  000002    MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2079  010124  042767  000340  167644    BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2080  010132  012713  000100            MOV     #100,   @CDS    ;SET INTERUPT ENABLE
2081  010136  000004  014166            TYPE,   MSG6            ;'RESTORE CARDS TO THE INPUT HOPPER''
2082  010142  000004  013726            TYPE,   MSG1            ;'PRESS CARD READER 'RESET'''
2083  010146  000004  013720            TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2084  010152  000777                    BR      .               ;WAIT FOR THE INTERUPT
2085
2086  010154  022626            TINTF:  CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2087  010156  012712  010220            MOV     #TINTFA,@ADINT  ;LOAD RETURN POINTER
2088  010162  052767  000340  167606    BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2089  010170  016762  167602  000002    MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2090  010176  042767  000340  167572    BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2091  010204  012714  177701            MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2092  010210  012715  016044            MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2093  010214  005213                    INC     @CDS            ;START READING
2094  010216  000777                    BR      .               ;WAIT FOR AN INTERUPT
2095
2096  010220  022626            TINTFA: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2097  010222  022713  000300            CMP     #000300,@CDS    ;CHECH THE CARD READER STATUS
2098  010226  001401                    BEQ     .+4             ;BRANCH IF OK
2099  010230  104000                    HLT                     ;CARD READER STATUS ERROR
2100
2101                              ;A STACK CHECK ERROR SHOULD SET BIT 15, BIT 14, AND BIT 12
2102                              ;THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO
2103                              ;THE READ STATION
2104  010232  104400            TESTG:  SCOPE
2105  010234  004767  001700            JSR     %7,INIT
2106  010240  000004  014027            TYPE,   MSG3            ;'PRESS CARD READER 'STOP'''
```

```
2107  010244  000004  014425                TYPE,   MSG9            ;'SLIDE A CARD FROM THE OUTPUT HOPPER ABOUT
2108                                                                   ;HALF AN INCH BACK INTO THE READ HEAD
2109                                                                   ;BLOCKING THE PHOTO CELL
2110  010250  000004  013726                TYPE,   MSG1             ;'PRESS CARD READER 'RESET'''
2111  010254  000004  013720                TYPE,   CRLF-3           ;MOVE MESSAGE UP ON TTY
2112  010260  032713  010000        TLOPG:  BIT     #10000, @CDS     ;CHECK FOR OF LINE
2113  010264  001775                BEQ     TLOPG                    ;WAIT FOR OFF-LINE
2114  010266  032713  000010        TLOPGA: BIT     #10,    @CDS     ;CHECK FOR ''TRANSITION TO ON LINE''
2115  010272  001775                BEQ     TLOPGA                   ;WAIT FOR IT
2116  010274  022713  100210                CMP     #100210,@CDS     ;CHECK FOR CORRECT STATUS BITS
2117  010300  001401                BEQ     .+4                      ;BRANCH IF OK
2118  010302  104000                HLT                              ;STATUS NOT EQUAL TO 100210
2119
2120  010304  012714  177701                MOV     #-77,   @CDC     ;SET UP COLUMN COUNT
2121  010310  012715  016044                MOV     #BUFBEG,@CDA     ;SET UP BUS ADDRESS
2122  010314  005213                INC     @CDS                     ;READ
2123  010316  105713        TLOPGB: TSTB    @CDS                     ;CHECK CONTROLLER READY
2124  010320  100376                BPL     TLOPGB                   ;WAIT FOR CONTROLLER READY
2125  010322  032713  010000                BIT     #10000,@CDS      ;CHECK BIT12
2126  010326  001001                BNE     .+4                      ;BRANCH IF SET
2127  010330  104000                HLT                              ;OFF-LINE (BIT 12) WASN'T SET
2128
2129  010332  005713                TST     @CDS                     ;CHECK SPECIAL CONDITION BIT
2130  010334  100401                BMI     .+4                      ;BRANCH IF SET
2131  010336  104000                HLT                              ;SPECIAL CONDITION NOT SET
2132
2133  010340  032713  040000                BIT     #40000, @CDS     ;CHECK FOR CARD READER ERROR
2134  010344  001001                BNE     .+4                      ;BRANCH IF SET
2135  010346  104000                HLT                              ;CARD REAER ERROR BIT 14 NOT SET
2136
2137  010350  032713  027577                BIT     #027577,@CDS     ;CHECK FOR EXTRA BITS
2138  010354  001401                BEQ     .+4                      ;BRANCH IF OK
2139  010356  104000                HLT                              ;STATUS WORD ERROR
2140
2141  010360  012712  010430                MOV     #TINTG, @ADINT   ;LOAD RETURN POINTER
2142  010364  052767  000340  167404        BIS     #340,   PS       ;SET PROCESSOR TO LEVEL 7
2143  010372  016762  167400  000002        MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2144  010400  042767  000340  167370        BIC     #340,   PS       ;SET PROSSOR PRIORITY TO 0
2145  010406  012713  000100                MOV     #100,   @CDS     ;SET INTERUPT ENABLE
2146  010412  000004  014603                TYPE,   MSG10            ;'REMOVE JAMMED CARDS''
2147  010416  000004  013726                TYPE,   MSG1             ;'PRESS CARD READER 'RESET'''
2148  010422  000004  013720                TYPE,   CRLF-3           ;MOVE MESSAGE UP ON TTY
2149  010426  000777                BR      .                        ;WAIT FOR THE INTERUPT
2150
2151  010430  022626                TINTG:  CMP     (SP)+,  (SP)+    ;RESTORE THE STACK
2152  010432  012712  010474                MOV     #TINTGA,@ADINT   ;LOAD RETURN POINTER
2153  010436  052767  000340  167332        BIS     #340,   PS       ;SET PROCESSOR TO LEVEL 7
2154  010444  016762  167326  000002        MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2155  010452  042767  000340  167316        BIC     #340,   PS       ;SET PROSSOR PRIORITY TO 0
2156  010460  012714  177701                MOV     #-77,   @CDC     ;SET UP COLUMN COUNT
2157  010464  012715  016044                MOV     #BUFBEG,@CDA     ;SET UP BUS ADDRESS
2158  010470  005213                INC     @CDS                     ;START READING
2159  010472  000777                BR      .                        ;WAIT FOR AN INTERUPT
2160
2161  010474  022626                TINTGA: CMP     (SP)+,  (SP)+    ;RESTORE THE STACK
2162  010476  022713  000300                CMP     #000300,@CDS     ;CHECH THE CARD READER STATUS
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2163  010502  001401                        BEQ     .+4             ;BRANCH IF OK
2164  010504  104000                        HLT                     ;CARD READER STATUS ERROR
2165
2166                                        ;END OF FILE BUTTON AND HOPPER CHECK TEST
2167                                ;ON M-1000 BIT 13 IS ALWAYS CLEARED
2168                                ;ON M-1200 IF END OF FILE BUTTON IS PRESSED WITH INPUT
2169                                ;HOPPER LOADED THEN WHEN INPUT HOPPER BECOMES EMPTY
2170                                ;HOPPER CHECK INDICATOR LIGHT COMES ON AND BITS
2171                                ;13  14 AND  15 ARE SET
2172
2173
2174  010506  005767  170026                TST     CD1000          ;IS READER M-1000?
2175  010512  001402                        BEQ     TEST1           ;BRANCH IF READER IS M-1200
2176  010514  000167  000322                JMP     TESTH           ;OUT OF THIS TEST IF M-1000
2177
2178  010520  104400                TEST1:  SCOPE
2179  010522  004767  001412                JSR     %7,     INIT
2180  010526  000004  015324                TYPE,   MSG20           ;'PUT ANY TWO CARDS IN INPUT HOPPER'
2181  010532  000004  013726                TYPE,   MSG1            ;'PRESS CARD READER 'RESET'''
2182  010536  000004  013762                TYPE,   MSG2            ;'THEN HIT 'CONTINUE' ON THE CONSOLE''
2183  010542  000004  013720                TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2184  010546  000000                        HALT
2185
2186  010550  032713  000010                BIT     #10,    @CDS    ;CHECK FOR TRANSITION TO ON LINE
2187  010554  001775                        BEQ     .-4             ;WAIT FOR IT
2188  010556  000004  015370                TYPE,   MSG21           ;'PRESS END OF FILE BUTTON'
2189  010562  000004  013762                TYPE,   MSG2            ;'THEN HIT 'CONTINUE' ON THE CONSOLE''
2190  010566  000004  013720                TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2191  010572  004767  001342                JSR     %7,     INIT
2192  010576  000000                        HALT
2193
2194
2195  010600  032713  020000                BIT     #20000, @CDS    ;CHECK BIT 13
2196  010604  001401                        BEQ     .+4             ;BRANCH IF NOT SET
2197  010606  104000                        HLT                     ;EOF SET FROM BEGINING
2198
2199
2200  010610  032713  040000                BIT     #40000, @CDS    ;CHECK BIT 14
2201  010614  001401                        BEQ     .+4             ;BRANCH IF NOT SET
2202  010616  104000                        HLT                     ;READER CHECK ERROR SET FROM BEGINNING
2203
2204
2205  010620  032713  000004                BIT     #4,     @CDS    ;CHECK BIT 2
2206  010624  001401                        BEQ     .+4             ;BRANCH IF NOT SET
2207  010626  104000                        HLT                     ;HOPPER CHECK SET FROM BEGINING
2208
2209  010630  005713                        TST     @CDS            ;CHECK ERROR BIT
2210  010632  100001                        BPL     .+4             ;BRANCH IF NOT SET
2211  010634  104000                        HLT                     ;ERROR SET FROM BEGINING
2212
2213
2214
2215
2216  010636  012712  010704                MOV     #TINT1, @ADINT  ;LOAD RETURN POINTER
2217  010642  052767  000340  167126 SECN:  BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2218  010650  016762  167122  000002        MOV     PS,     2(ADINT);LOAD RETURN PROCESSOR STATUS
```

```
 2219  010656  042767  000340  167112          BIC     #340,   PS      ;SET PROCESSOR PRIORITY TO 0
 2220  010664  012713  000100                  MOV     #100,   @CDS    ;SET INTERRUPT ENABLE
 2221  010670  012714  177701                  MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
 2222  010674  012715  016044                  MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
 2223  010700  005213                          INC     @CDS            ;START READER
 2224  010702  000777                          BR      .               ;WAIT FOR AN INTERPUPT
 2225
 2226
 2227  010704  022626                  TINTI:  CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
 2228
 2229  010706  032713  020000                  BIT     #20000, @CDS    ;CHECK BIT 13
 2230  010712  001401                          BEQ     .+4             ;BRANCH IF NOT SET
 2231  010714  104000                          HLT                     ;EOF SET AT END OF ONE CARD
 2232
 2233  010716  032713  040000                  BIT     #40000, @CDS    ;CHECK BIT 14
 2234  010722  001401                          BEQ     .+4             ;BRANCH IF NOT SET
 2235  010724  104000                          HLT                     ;READER CHECK ERROR SET AT END OF ONE CARD
 2236
 2237  010726  005713                          TST     @CDS            ;CHECK ERROR BIT
 2238  010730  100001                          BPL     .+4             ;BRANCH IF NOT SET
 2239  010732  104000                          HLT                     ;ERROR SET AT END OF ONE CARD
 2240
 2241  010734  012712  010742                  MOV     #TINTIA,@ADINT  ;LOAD RETURN POINTER
 2242  010740  000740                          BR      SECN            ;READ SECOND CARD
 2243  010742  022626                  TINTIA: CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
 2244
 2245  010744  032713  020000                  BIT     #20000, @CDS    ;CHECK BIT 13
 2246  010750  001001                          BNE     .+4             ;BRANCH IF SET
 2247  010752  104000                          HLT                     ;EOF NOT SET AT END OF FILE
 2248
 2249  010754  032713  040000                  BIT     #40000, @CDS    ;CHECK BIT 14
 2250  010760  001001                          BNE     .+4             ;BRANCH IF SET
 2251  010762  104000                          HLT                     ;READER CHECK NOT SET AT END OF FILE
 2252
 2253  010764  032713  000004                  BIT     #4,     @CDS    ;CHECK BIT 2
 2254  010770  001001                          BNE     .+4             ;BRANCH IF SET
 2255  010772  104000                          HLT                     ;HOPPER CHECK NOT SET WHEN HOPPER EMPTY
 2256
 2257
 2258  010774  005713                          TST     @CDS            ;CHECK ERROR BIT
 2259  010776  100401                          BMI     .+4             ;BRANCH IF SET
 2260  011000  104000                          HLT                     ;ERROR BIT NOT SET AT END OF FILE
 2261
 2262  011002  000004  014166                  TYPE,   MSG6            ;'RESTORE CARDS TO THE INPUT HOPPER''
 2263  011006  000004  013726                  TYPE,   MSG1            ;'PRESS CARD READER 'RESET''
 2264  011012  000004  013762                  TYPE,   MSG2            ;''THEN HIT CONTINUE ON THE CONSOLE''
 2265  011016  000004  013720                  TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
 2266  011022  000000                          HALT
 2267
 2268  011024  032713  000010                  BIT     #10,    @CDS    ;CHECK TRANSITION TO ON LINE
 2269  011030  001775                          BEQ     .-4             ;WAIT FOR IT
 2270
 2271
 2272  011032  032713  020000                  BIT     #20000, @CDS    ;CHECK BIT 13
 2273  011036  001401                          BEQ     .+4             ;BRANCH IF NOT SET
 2274  011040  104000                          HLT                     ;EOF DIDN'T CLEAR BY TRANSITION TO ON LINE
```

```
2275                                    ;
2276                                    ;
2277                                    ;A READ CHECK ERROR SHOULD SET BIT 15, BIT 14, AND BIT 12
2278                                    ;THIS ERROR OCCURS WHEN THE READ ELECTRONICS IN THE CARD
2279                                    ;READER DISAGREES WITH THE NORMAL UNPUNCHED AREA OF THE CARD
2280  011042  104400                   TESTH:  SCOPE
2281  011044  004767  001070                   JSR     %7,INIT
2282  011050  000004  014702                   TYPE,   MSG12           ;'PLACE SPECIAL DARK LIGHT CHECK CARD ONLY
2283                                                                    ;AT THE FRONT OF THE INPUT STACK''
2284  011054  000004  013726                   TYPE,   MSG1            ;'PRESS CARD READER 'RESET'''
2285  011060  000004  013720                   TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2286  011064  032713  010000           TLOPH:  BIT     #10000, @CDS    ;CHECK FOR OF LINE
2287  011070  001775                           BEQ     TLOPH           ;WAIT FOR OFF-LINE
2288  011072  032713  000010           TLOPHA: BIT     #10,    @CDS    ;CHECK FOR 'TRANSITION TO ON LINE''
2289  011076  001775                           BEQ     TLOPHA          ;WAIT FOR IT
2290  011100  022713  140210                   CMP     #140210,@CDS    ;CHECK FOR CORRECT STATUS BITS
2291  011104  001401                           BEQ     .+4             ;BRANCH IF OK
2292  011106  104000                           HLT                     ;STATUS NOT EQUAL TO 140210
2293
2294  011110  012714  177701                   MOV     #-77,   @CDC    ;SET UP COLUMN COUNT
2295  011114  012715  016044                   MOV     #BUFBEG,@CDA    ;SET UP BUS ADDRESS
2296  011120  005213                           INC     @CDS            ;READ
2297  011122  105713           TLOPHB: TSTB    @CDS            ;CHECK CONTROLLER READY
2298  011124  100376                           BPL     TLOPHB          ;WAIT FOR CONTROLLER READY
2299  011126  032713  010000                   BIT     #10000,@CDS     ;CHECK BIT12
2300  011132  001001                           BNE     .+4             ;BRANCH IF SET
2301  011134  104000                           HLT                     ;OFF-LINE (BIT 12) WASN'T SET
2302
2303  011136  005713                           TST     @CDS            ;CHECK SPECIAL CONDITION BIT
2304  011140  100401                           BMI     .+4             ;BRANCH IF SET
2305  011142  104000                           HLT                     ;SPECIAL CONDITION NOT SET
2306
2307  011144  032713  040000                   BIT     #40000, @CDS    ;CHECK FOR CARD READER ERROR
2308  011150  001001                           BNE     .+4             ;BRANCH IF SET
2309  011152  104000                           HLT                     ;CARD REAER ERROR BIT 14 NOT SET
2310
2311  011154  032713  027577                   BIT     #027577,@CDS    ;CHECK FOR EXTRA BITS
2312  011160  001401                           BEQ     .+4             ;BRANCH IF OK
2313  011162  104000                           HLT                     ;STATUS WORD ERROR
2314
2315  011164  012712  011236                   MOV     #TINTH, @ADINT  ;LOAD RETURN POINTER
2316  011170  052767  000340  166600           BIS     #340,   PS      ;SET PROCESSOR TO LEVEL 7
2317  011176  016762  166574  000002           MOV     PS,     2(ADINT) ;LOAD RETURN PROCESSOR STATUS
2318  011204  042767  000340  166564           BIC     #340,   PS      ;SET PROSSOR PRIORITY TO 0
2319  011212  012713  000100                   MOV     #100,   @CDS    ;SET INTERUPT ENABLE
2320  011216  000004  014166                   TYPE,   MSG6            ;'RESTORE CARDS TO THE INPUT HOPPER''
2321  011222  000004  013726                   TYPE,   MSG1            ;'PRESS CARD READER 'RESET''
2322  011226  000004  013720                   TYPE,   CRLF-3          ;MOVE MESSAGE UP ON TTY
2323  011232  000777                           BR      .               ;WAIT FOR AN INTERUPT
2324  011234  000000                           HALT
2325  011236  022626           TINTH:  CMP     (SP)+,  (SP)+   ;RESTORE THE STACK
2326  011240  104400                           SCOPE
2327  011242  004767  000720                   JSR     %7,     BELL    ;RING THE BELL
2328  011246  000167  175302                   JMP     ER12CD          ;LOOP BACK TO THE PcGINNING
2329
2330
```

```
2331
2332                                    ;*************************************************************************
2333                                    ;ROUTINE TO LOOP THRU A SINGLE INSTRUCTION TEST OR ERROR FUNCTION TEST
2334                                    ;NOTE THAT SW11 MUST BE DOWN AFTER 2ND HALT
2335                                    ;*************************************************************************
2336  011252  004767  167264           TESTX:  JSR     %7,SETUP                ;SETUP POINTERS AND FLAGS
2337  011256  000000                           HALT                            ;WAIT FOR STARTING ADDRESS
2338  011260  016767  166304  000072           MOV     SWR,RETRNX              ;STORE STARTING ADDRESS
2339  011266  062767  000002  000064           ADD     #2,RETRNX               ;CHANGE TO FIRST ADDRESS AFTER SCOPE INSTRUCTION
2340  011274  000000                           HALT                            ;SET SWR OPTIONS (BIT 11 MUST = 0)
2341  011276  032767  010000  166264           BIT     #10000,SWR              ;CHECK SW12
2342  011304  001404                           BEQ     .+12                    ;BRANCH IF NOT SET
2343  011306  042767  000020  166462           BIC     #20,PS                  ;CLEAR TRACE BIT
2344  011314  000403                           BR      .+10                    ;SKIP NEXT INSTRUCTION
2345  011316  052767  000020  166452           BIS     #20,PS                  ;SET TRACE BIT
2346  011324  005067  001106                   CLR     ITCNT                   ;CLEAR ITERATION COUNTER
2347  011330  012767  004000  001076           MOV     #4000,ITMAX
2348  011336  012767  011350  001074           MOV     #XLOOP,RETURN           ;LOAD RETURN ADDRESS
2349  011344  000177  000010                   JMP     @RETRNX                 ;JUMP TO TEST
2350  011350  005067  001062           XLOOP:  CLR     ITCNT                   ;KEEP ITERATION COUNTER AT ZERO
2351  011354  000177  000000                   JMP     @RETRNX                 ;JUMP TO TEST
2352  011360  000000                   RETRNX: 0
2353
2354
2355
2356                                    ;*************************************************************************
2357                                    ;ROUTINE TO CHECK CARDS WHICH HAVE ALL COLUMNS IDENTICALLY PUNCHED.
2358                                    ;THIS ROUTINE ALLOWS SPECIFIC TYPES OF DATA FAILURES TO BE STUDIED
2359                                    ;EASILY.  THE ROUTINE HALTS ONCE AT THE START.  SET THE CORRECT CARD
2360                                    ;IMAGE PATTERN IN SW11-SW00, THEN HIT CONTINUE (AFTER THE DECK IS
2361                                    ;LOADED AND CARD READER IS ON-LINE).  THE PATTERN IS STORED, AND THEN
2362                                    ;EACH COLUMN OF EACH CARD IS READ TWICE AND COMPARED WITH IT.  IF A
2363                                    ;DISCREPANCY OCCURS, THE ERROR IS PRINTED OUT ALONG WITH THE TOTAL
2364                                    ;NUMBER OF CARDS READ AND THE TOTAL NUMBER OF DATA ERRORS DISCOVERED
2365                                    ;UP TO THAT POINT (ALL PRINTOUTS ARE IN OCTAL).  WHEN THE INPUT HOPPER
2366                                    ;IS EMPTY, THE ROUTINE RINGS THE BELL AND WAITS FOR MORE CARDS TO BE
2367                                    ;LOADED AND THE CARD READER TO BE PUT BACK ON-LINE.
2368                                    ;SW15=1 CAUSES A HALT AFTER AN ERROR, AND SW13=1 INHIBITS ERROR PRINTOUTS.
2369                                    ;*************************************************************************
2370
2371  011362  012767  011362  001050   CKSAME: MOV     #CKSAME,RETURN
2372  011370  004767  167146                   JSR     %7,SETUP        ;INITIALIZE POINTERS
2373  011374  000000                           HALT                    ;WAIT FOR CARD IMAGE PATTERN
2374  011376  016767  166166  000526           MOV     SWR,CARDIM      ;STORE PATTERN
2375  011404  042767  170000  000520           BIC     #170000,CARDIM  ;CLEAR UPPER BITS OF PATTERN
2376  011412  016767  000514  000514           MOV     CARDIM, CDPK0
2377  011420  005067  000512                   CLR     DERFLG
2378  011424  006067  000504                   ROR     CDPK0
2379  011430  106167  000501                   ROLB    CDPK1
2380  011434  106067  000474                   RORB    CDPK0
2381  011440  106167  000471                   ROLB    CDPK1
2382  011444  106167  000465                   ROLB    CDPK1
2383  011450  106167  000461                   ROLB    CDPK1
2384  011454  106167  000455                   ROLB    CDPK1
2385  011460  012701  000007                   MOV     #7,     R1
2386  011464  006067  000444           CKLOP1: ROR     CDPK0
```

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2387  011470  103004                    BCC     CKOVR
2388  011472  005267  000440            INC     DERFLG
2389  011476  150167  000433            BISB    R1,CDPK1
2390  011502  005301            CKOVR:  DEC     R1
2391  011504  001367                    BNE     CKLOP1
2392  011506  000000                    HALT                    ;WAIT FOR SWITCH SETTINGS
2393  011510  004767  000424    CKSTRT: JSR     %7,INIT
2394  011514  005067  000410            CLR     TOTCRD          ;INITIALIZE CARD COUNT
2395  011520  005067  000402            CLR     TOTERR          ;INITIALIZE ERROR COUNT
2396  011524  005067  167002            CLR     ERFLG           ;CLEAR FLAG FOR PRINTING ERROR HEADING
2397  011530  105067  000403    CKLOOP: CLRB    DERFLG+1
2398  011534  032767  000010  166026    BIT     #10,    SWR     ;CHECK FOR PACK MODE ONLY
2399  011542  001410                    BEQ     CKREAD          ;BRANCH IF NOT SET
2400  011544  032737  000004  177570    BIT     #4,     @#SWR   ;CHECK FOR IMAGE MODE ONLY
2401  011552  001004                    BNE     CKREAD          ;BRANCH IF SET
2402  011554  052713  000002            BIS     #2,     @CDS    ;SET PACKING MODE
2403  011560  105167  000353            COMB    DERFLG+1
2404  011564  005067  174740    CKREAD: CLR     CLCNT           ;INITIALIZE COLUMN COUNT
2405  011570  012700  016044            MOV     #BUFBEG,R0      ;SET UP BUFFER POINTER
2406  011574  012714  177660            MOV     #-120,  @CDC    ;SET UP COLUMN COUNTER
2407  011600  010015                    MOV     R0,     @CDA    ;SET UP BUS ADDRESS
2408  011602  005213                    INC     @CDS            ;START READING CARD
2409  011604  005267  000320            INC     TOTCRD          ;INCREMENT CARD COUNT
2410  011610  105713            CKLP1:  TSTB    @CDS            ;CHECK CONTROLLER READY
2411  011612  100376                    BPL     CKLP1           ;LOOP IF NOT SET
2412  011614  005713                    TST     @CDS            ;CHECK FOR ERROR
2413  011616  100427                    BMI     CKERR           ;BRANCH IF ERROR SET
2414  011620  005767  000312            TST     DERFLG
2415  011624  100012                    BPL     CKLOP2
2416  011626  122067  000303    CKLOP3: CMPB    (R0)+,CDPK1     ;CHECK DATA
2417  011632  001046                    BNE     CKFAIL
2418  011634  005267  174670            INC     CLCNT
2419  011640  026727  174664  000120    CMP     CLCNT,#120
2420  011646  001367                    BNE     CKLOP3
2421  011650  000727                    BR      CKLOOP
2422  011652  022067  000254    CKLOP2: CMP     (R0)+,  CARDIM  ;CHECK THE DATA
2423  011656  001034                    BNE     CKFAIL          ;BRANCH IF DATA ERROR
2424  011660  005267  174644            INC     CLCNT           ;COUNT THE COLUMNS
2425  011664  026727  174640  000120    CMP     CLCNT,  #120    ;CHECK FOR LAST COLUMN
2426  011672  001367                    BNE     CKLOP2
2427  011674  000715                    BR      CKLOOP
2428
2429  011676  032713  010000    CKERR:  BIT     #10000,@CDS     ;CHECK FOR OFFLINE
2430  011702  001406                    BEQ     CKERR1          ;BRANCH IF NOT
2431  011704  004767  000256            JSR     %7,     BELL    ;RING THE BELL
2432  011710  032713  000010    CKERR3: BIT     #10,    @CDS    ;CHECK TRANSITION TO ON-LINE
2433  011714  001775                    BEQ     CKERR3          ;BRANCH IF OFF-LINE
2434  011716  000674                    BR      CKSTRT          ;START OVER
2435
2436  011720  032713  004000    CKERR1: BIT     #4000,@CDS      ;CHECK FOR DATA ERROR
2437  011724  001407                    BEQ     CKERR2
2438  011726  005767  000204            TST     DERFLG
2439  011732  100004                    BPL     CKERR2
2440  011734  122767  000001  000174    CMPB    #1,DERFLG
2441  011742  003331                    BGT     CKLOP3          ;BRANCH IF LEGIT
2442  011744  104000            CKERR2: HLT                     ;REAL, LIVE ERROR.
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2443  011746  000670                        BR      CKLOOP
2444
2445  011750  005267  000152        CKFAIL: INC     TOTERR          ;COUNT ERRORS
2446  011754  032767  020000  165606        BIT     #20000,SWR      ;CHECK FOR INHIBITING PRINTOUT
2447  011762  001054                        BNE     CKHLT           ;BRANCH AROUND PRINTOUT IF SET
2448  011764  005767  166542                TST     ERFLG           ;TEST FLAG TO PRINT HEADING
2449  011770  001004                        BNE     CKNOHD          ;BRANCH IF ALREADY DONE
2450  011772  005267  166534                INC     ERFLG           ;PRINT HEADING ONCE ONLY
2451  011776  000004  015270                TYPE,   MSG19           ;OUTPUT HEADING
2452  012002  000004  013723        CKNOHD: TYPE,   CRLF            ;OUTPUT CARRIAGE RETURN, LINEFEED
2453  012006  016767  174516  000544        MOV     CLCNT,PRINT1    ;TYPE CLCNT IN OCTAL
2454  012014  004767  000574                JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2455  012020  000004  013715                TYPE,   SPACE
2456  012024  005767  000106                TST     DERFLG
2457  012030  100006                        BPL     CKNOPK
2458  012032  114067  000523                MOVB    -(R0),  PRINT1+1 ;MOVE BYTE INTO PRINT BUFFER
2459  012036  004767  000532                JSR     %7,     PRINTB  ; AND PRINT IT
2460  012042  105720                        TSTB    (R0)+
2461  012044  000405                        BR      CKOVR1
2462  012046                        CKNOPK:
2463  012046  014067  000506                MOV     -(R0),PRINT1    ;TYPE -(R0) IN OCTAL
2464  012052  004767  000536                JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2465  012056  005720                        TST     (R0)+
2466  012060  000004  013715        CKOVR1: TYPE,   SPACE
2467  012064  016767  000040  000466        MOV     TOTCRD,PRINT1   ;TYPE TOTCRD IN OCTAL
2468  012072  004767  000516                JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2469  012076  000004  013715                TYPE,   SPACE
2470  012102  016767  000020  000450        MOV     TOTERR,PRINT1   ;TYPE TOTERR IN OCTAL
2471  012110  004767  000500                JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2472  012114  005767  165450        CKHLT:  TST     SWR             ;CHECK SW15 TO HALT ON ERROR
2473  012120  100203                        BPL     CKLOOP          ;BRANCH IF NOT SET
2474  012122  000000                        HALT                    ;HALT ON ERROR
2475  012124  000601                        BR      CKLOOP          ;CONTINUE
2476
2477  012126  000000                TOTERR: 0
2478  012130  000000                TOTCRD: 0
2479  012132  000000                CARDIM: 0
2480  012134     000                CDPK0:  .BYTE   0
2481  012135     000                CDPK1:  .BYTE   0
2482  012136  000000                DERFLG: 0
2483
2484
2485                                ;ISSUE MESSAGE IF CARD READER IS OFF-LINE
2486                                ;WAIT FOR BUSY TO CLEAR IN CASE CARD READER IS STILL READING A CARD
2487                                ;INITIALIZE STATUS REGISTER AND USE ERROR HALT IF IT DOESN'T CLEAR PROPERLY
2488                                ;NOTE THAT PROGRAM WILL HANG HERE IF BUSY REMAINS SET
2489  012140  004767  000040        INIT:   JSR     %7,     CKOFFL  ;SEE IF OFF-LINE BIT IS SET
2490  012144  105713                        TSTB    @CDS            ;WAIT FOR CONTROLLER READY, IN CASE
2491  012146  100376                        BPL     .-2             ;A CARD IS STILL BEING READ
2492  012150  012713  000400                MOV     #400,   @CDS    ;INITIALIZE THE CARD READER
2493  012154  022713  000200                CMP     #200,   @CDS    ;MAKE SURE INITIALIZATION OK
2494  012160  001401                        BEQ     .+4             ;BRANCH IF ALL BITS ZERO
2495  012162  104000                        HLT                     ;NOT ALL BITS OF STATUS REGISTER ARE ZERO
2496  012164  000207                        RTS     %7              ;RETURN
2497
2498                                ;BELL ON PASS COMPLETE
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2499  012166  105777  166316          BELL:   TSTB    @TPS            ;WAIT FOR TTY READY
2500  012172  100375                          BPL     .-4
2501  012174  012777  000207  166310          MOV     #207,@TPB       ;RING BELL
2502  012202  000207                          RTS     %7              ;RETURN
2503
2504                                  ;SUBROUTINE TO CHECK FOR BIT 12 (OFF-LINE) BEING SET IN CARD
2505                                  ;READER CSR, AND PRINT OUT A MESSAGE IF IT IS
2506  012204  032713  010000          CKOFFL: BIT     #10000, @CDS    ;CHECK BIT 12
2507  012210  001001                          BNE     .+4             ;BRANCH IF SET
2508  012212  000207                          RTS     %7              ;RETURN IF NOT SET
2509  012214  000004  015247                  TYPE,   MSG18           ;'BIT 12 WAS SET''
2510  012220  000004  015165                  TYPE,   MSG17           ;'REMEDY THE ERROR CONDITION
2511  012224  000000                          HALT                    ;WAIT FOR CONTINUE
2512  012226  000766                          BR      CKOFFL          ;CHECK AGAIN
2513
2514                                  ;ENTERED WITH SYSTEM TRAP CALL (HLT)
2515                                  ;PRINT OUT THE ERROR PC AND STATUS REGISTER
2516  012230  036727  165334  020000  PRINT:  BIT     SWR,    #20000  ;TEST FOR INHIBIT PRINT OUT
2517  012236  001401                          BEQ     .+4             ;BRANCH TO PRINT
2518  012240  000433                          BR      B.CK            ;INHIBIT, CHECK FOR HALT
2519  012242  012667  000102                  MOV     (6)+,   SAVPC   ;PC OF FAILING ROUTINE
2520  012246  012667  000100                  MOV     (6)+,   SAVPS   ;PS OR ERROR CONDITION
2521  012252  024646                          CMP     -(6),   -(6)    ;RESTORE STACK
2522  012254  000004  013723                  TYPE,   CRLF            ;OUTPUT CARRIAGE RETURN, LINEFEED
2523  012260  016767  000064  000272          MOV     SAVPC,PRINT1    ;TYPE SAVPC IN OCTAL
2524  012266  004767  000322                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2525  012272  000004  013714                  TYPE,   SPACE-1
2526  012276  016767  000050  000254          MOV     SAVPS,PRINT1    ;TYPE SAVPS IN OCTAL
2527  012304  004767  000304                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2528  012310  000004  013714                  TYPE,   SPACE-1
2529  012314  011367  000240                  MOV     @CDS,PRINT1     ;TYPE @CDS IN OCTAL
2530  012320  004767  000270                  JSR     %7,PRINTR       ;TYPE LEADING ZERO'S
2531  012324  000004  013723                  TYPE,   CRLF
2532  012330  005767  165234          B.CK:   TST     SWR             ;CHECK SWR FOR HALT SWITCH
2533  012334  100001                          BPL     .+4             ;BRANCH IF NOT SET
2534  012336  000000                          HALT                    ;HALT ON ERROR UP
2535  012340  000002                          RTI                     ;RETURN TO MAIN LINE
2536  012342  000000                  SAVR2:  0
2537  012344  000000                  SAVR3:  0
2538  012346  000000                  SAVR4:  0
2539  012350  000000                  SAVPC:  0
2540  012352  000000                  SAVPS:  0
2541
2542                                  ;SCOPE AND/OR ITERATION LOOP FOR EACH TEST 2 TIMES
2543  012354  032767  040000  165206  SCOPEC: BIT     #40000, SWR     ;TEST SWR FOR SCOPE
2544  012362  001012                          BNE     D.1             ;YES,SCOPE
2545  012364  032767  004000  165176          BIT     #4000,SWR       ;NO- TEST FOR ITERATION
2546  012372  001013                          BNE     D.2             ;INHIBIT ITERATION
2547  012374  026767  000036  000032          CMP     ITCNT,ITMAX     ;CHECK FOR ITERATIONS COMPLETE
2548  012402  100007                          BPL     D.2             ;EXIT-DONE
2549  012404  005267  000026                  INC     ITCNT           ;INCREMENT COUNT
2550  012410  022606                  D.1:    CMP     (6)+,   %6      ;REPOSITION STACK POINTER
2551  012412  012667  165360                  MOV     (6)+,   PS      ;RESTORE PROCESSOR STATUS
2552  012416  000177  000016                  JMP     @RETURN         ;RETURN TO RERUN TEST
2553  012422  005067  000010          D.2:    CLR     ITCNT           ;CLEAR COUNTER
2554  012426  011667  000006                  MOV     @%6,    RETURN  ;SAVE SCOPE RETURN POINTER
```

```
2555  012432  000002                    RTI                     ;RETURN INLINE-NEXT TEST
2556  012434  000001            ITMAX:  1                       ;MAX NUMBER OF ITERATIONS
2557  012436  000000            ITCNT:  0                       ;COUNT LOCATION FOR ITERATION LOOP
2558  012440  001064            RETURN: TEST1+2                 ;ADDRESS OF LAST TEST
2559
2560
2561                            ;ROUTINE TO TYPE ASCII MESSAGE, MESSAGE MUST TERMINATE WITH A 0 BYTE.
2562                            ;THE ROUTINE WILL INSERT A NUMBER OF NUL' CHARACTERS AFTER A LINE FEED.
2563                            ;NOTE1: $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
2564                            ;NOTE2: $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
2565
2566
2567
2568
2569  012442  177564            $TPS:   177564                  ;TTY PRINTER STATUS REG. ADDRESS
2570  012444  177566            $TPB:   177566                  ;TTY PRINTER BUFFER REG. ADDRESS
2571  012446     000            $NULL:  .BYTE   0               ;CONTAINS NULL CHARACTER FOR FILLS
2572  012447     002            $FILLS: .BYTE   2               ;CONTAINS # OF FILLER CHARACTERS REQUIPED
2573  012450     000            $TPFLG: .BYTE   0               ;''TERMINAL AVAILABLE'' FLAG (0=YES)
2574  012451     000                    .BYTE   0               ;RESERVED
2575
2576  012452  105767  177772    $TYPE:  TSTB    $TPFLG          ;IS THERE A TERMINAL?
2577  012456  001402                    BEQ     6$              ;BR IF YES
2578  012460  000000                    HALT                    ;HALT HERE IF NO TERMINAL
2579  012462  000407                    BR      7$              ;LEAVE
2580  012464  010046            6$:     MOV     R0,-(SP)        ;SAVE R0
2581  012466  017600  000002            MOV     @2(SP),R0       ;GET ADDRESS OF ASCIZ STRING
2582  012472  112046            1$:     MOVB    (R0)+,-(SP)     ;PUSH CHARACTER TO BE TYPED ONTO STACK
2583  012474  001005                    BNE     2$              ;BR IF IT ISN'T THE TERMINATOR
2584  012476  005726                    TST     (SP)+           ;IF TERMINATOR POP IT OFF THE STACK
2585  012500  012600                    MOV     (SP)+,R0        ;RESTORE R0
2586  012502  062716  000002    7$:     ADD     #2,(SP)         ;ADJUST RETURN PC
2587  012506  000002                    RTI                     ;RETURN
2588  012510  004767  000026    2$:     JSR     PC,5$           ;GO TYPE THIS CHARACTER
2589  012514  122726  000012    3$:     CMPB    #12,(SP)+       ;CHECK IF THE CHAR. TYPED WAS A LINE FEED
2590  012520  001364                    BNE     1$              ;GO GET NEXT CHAR, IF NOT LINE FEED
2591  012522  016746  177720            MOV     $NULL,-(SP)     ;GET # OF FILLER CHARS, NEEDED
2592                                                            ;AND THE NULL CHAR.
2593  012526  105366  000001    4$:     DECB    1(SP)           ;DOES A NULL NEED TO BE TYPED?
2594  012532  002770                    BLT     3$              ;BR IF NO--GO POP THE NULL OFF OF STACK
2595  012534  004767  000002            JSR     PC,5$           ;GO TYPE A NULL
2596  012540  000772                    BR      4$              ;LOOP
2597  012542  105777  177674    5$:     TSTB    @$TPS           ;WAIT UNTIL PRINTER IS READY
2598  012546  100375                    BPL     5$
2599  012550  116677  000002  177666    MOVB    2(SP),@$TPB     ;LOAD CHAR TO BE TYPED INTO DATA REG.
2600  012556  000207                    RTS     PC
2601
2602
2603
2604
2605
2606
2607
2608                            ;       OCTAL DUMP OF A WORD
2609
2610  012560  000000            PRINT1: 0
```

```
2611  012562  000000  000000  000000  PRINT2: .WORD   0,0,0,0
2612  012570  000000
2613  012572     000     000          PRINT3: .BYTE   0,0
2614
2615  012574  012767  176401  177770  PRINTB: MOV     #176401,PRINT3  ;.BYTE  -1,3
2616  012602  010546                          MOV     %5,     -(6)    ;SAVE R5
2617  012604  012705  012562                  MOV     #PRINT2,%5      ;SET POINTER TO 1ST ASCII CHAR.
2618  012610  105015                          CLRB    (5)             ;CLR 1ST BYTE
2619  012612  000422                          BR      PRINTT          ;PRINT 2 BITS
2620
2621  012614  112767  000001  177750  PRINTR: MOVB    #1,PRINT3       ;SET ZERO FILL SWITCH
2622  012622  000402                          BR      .+6
2623  012624  005067  177742          PRINTS: CLR     PRINT3          ;SUPRESS LEADING ZERO'S
2624  012630  112767  177772  177735          MOVB    #-6,PRINT3+1    ;SET COUNT
2625  012636  010546                          MOV     %5,-(6)         ;SAVE R5
2626  012640  012705  012562                  MOV     #PRINT2,%5      ;SET POINTER TO FIRST ASCII CHAR.
2627  012644  105015                          CLRB    (5)             ;CLEAR FIRST BYTE
2628  012646  000407                          BR      PRINTF          ;ROTATE FIRST BIT
2629  012650  105015          PRINTL: CLRB    (5)             ;CLEAR BYTE OF CHARACTER
2630  012652  006167  177702                  ROL     PRINT1          ;ROTATE BIT INTO C
2631  012656  106115                          ROLB    (5)             ;PACK IT
2632  012660  006167  177674          PRINTT: ROL     PRINT1          ;ROTATE BIT INTO C
2633  012664  106115                          ROLB    (5)             ;PACK IT
2634  012666  006167  177666          PRINTF: ROL     PRINT1          ;ROTATE BIT INTO C
2635  012672  106115                          ROLB    (5)             ;PACK IT
2636  012674  105715                          TSTB    (5)
2637  012676  001402                          BEQ     .+6
2638  012700  105267  177666                  INCB    PRINT3
2639  012704  105767  177662                  TSTB    PRINT3          ;CHECK FILL SWITCH
2640  012710  001402                          BEQ     .+6
2641  012712  152725  000060                  BISB    #'0,(5)+        ;MAKE INTO ASCII CHAR
2642  012716  105267  177651                  INCB    PRINT3+1
2643  012722  001352                          BNE     PRINTL          ;REPEAT
2644  012724  022705  012562                  CMP     #PRINT2,%5
2645  012730  001002                          BNE     .+6
2646  012732  112725  000060                  MOVB    #'0,(5)+
2647  012736  105015                          CLRB    (5)
2648  012740  000004  012562                  TYPE,   PRINT2          ;TYPE IT
2649  012744  012605                          MOV     (6)+,%5         ;RESTORE R5
2650  012746  000207                          RTS     %7
2651
2652
2653                                  ;DATA TABLES FOR DATA RELIABILITY TESTS
2654
2655                                  ;ALPHANUMERIC DECK DATA TABLE
2656                                  ;CARD IMAGE FORM
2657                                  ;                                       COLUMN  ASCII   PUNCH
2658  012750                          CHGD1:
2659  012750  004000                  ALPCD:  4000                    ;1      &       12
2660  012752  014400                          14400                   ;2      A       12 1
2661  012754  024200                          24200                   ;3      B       12 2
2662  012756  034100                          34100                   ;4      C       12 3
2663  012760  044040                          44040                   ;5      D       12 4
2664  012762  054020                          54020                   ;6      E       12 5
2665  012764  064010                          64010                   ;7      F       12 6
2666  012766  074004                          74004                   ;8      G       12 7
```

```
012770  004002          4002            ;9      H       12 8
012772  004001          4001            ;10     I       12 9
012774  024202          24202           ;11     [       12 8 2
012776  034102          34102           ;12     .       12 8 3
013000  044042          44042           ;13     <       12 8 4
013002  054022          54022           ;14     (       12 8 5
013004  064012          64012           ;15     +       12 8 6
013006  074006          74006           ;16     !       12 8 7
013010  002000          2000            ;17     -       11
013012  012400          12400           ;18     J       11 1
013014  022200          22200           ;19     K       11 2
013016  032100          32100           ;20     L       11 3
013020  042040          42040           ;21     M       11 4
013022  052020          52020           ;22     N       11 5
013024  062010          62010           ;23     O       11 6
013026  072004          72004           ;24     P       11 7
013030  002002          2002            ;25     Q       11 8
013032  002001          2001            ;26     R       11 9
013034  022202          22202           ;27     ]       11 8 2
013036  032102          32102           ;28     $       11 8 3
013040  042042          42042           ;29     *       11 8 4
013042  052022          52022           ;30     )       11 8 5
013044  062012          62012           ;31     ;       11 8 6
013046  072006          72006           ;32     ^       11 8 7
013050  001000          1000            ;33     0       0
013052  011400          11400           ;34     /       0 1
013054  021200          21200           ;35     S       0 2
013056  031100          31100           ;36     T       0 3
013060  041040          41040           ;37     U       0 4
013062  051020          51020           ;38     V       0 5
013064  061010          61010           ;39     W       0 6
013066  071004          71004           ;40     X       0 7
013070  001002          1002            ;41     Y       0 8
013072  001001          1001            ;42     Z       0 9
013074  021202          21202           ;43     \       0 8 2
013076  031102          31102           ;44     ,       0 8 3
013100  041042          41042           ;45     %       0 8 4
013102  051022          51022           ;46             0 8 5
013104  061012          61012           ;47     >       0 8 6
013106  071006          71006           ;48     ?       0 8 7
013110  000000          0000            ;49     SPACE   BLANK
013112  010400          10400           ;50     1       1
013114  020200          20200           ;51     2       2
013116  030100          30100           ;52     3       3
013120  040040          40040           ;53     4       4
013122  050020          50020           ;54     5       5
013124  060010          60010           ;55     6       6
013126  070004          70004           ;56     7       7
013130  000002          0002            ;57     8       8
013132  000001          0001            ;58     9       9
013134  020202          20202           ;59     :       8 2
013136  030102          30102           ;60     #       8 3
013140  040042          40042           ;61     @       8 4
013142  050022          50022           ;62     '       8 5
013144  060012          60012           ;63     -       8 6
013146  070006          70006           ;64     "       8 7
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2723  013150  004000                        4000                    ;65   &       12
2724  013152  014400                        14400                   ;66   A       12 1
2725  013154  024200                        24200                   ;67   B       12 2
2726  013156  034100                        34100                   ;68   C       12 3
2727  013160  044040                        44040                   ;69   D       12 4
2728  013162  054020                        54020                   ;70   E       12 5
2729  013164  064010                        64010                   ;71   F       12 6
2730  013166  074004                        74004                   ;72   G       12 7
2731  013170  004002                        4002                    ;73   H       12 8
2732  013172  004001                        4001                    ;74   I       12 9
2733  013174  024202                        24202                   ;75   [       12 8 2
2734  013176  034102                        34102                   ;76   .       12 8 3
2735  013200  044042                        44042                   ;77   <       12 8 4
2736  013202  054022                        54022                   ;78   (       12 8 5
2737  013204  064012                        64012                   ;79   +       12 8 6
2738  013206  074006              ALPEND:   74006                   ;80   !       12 8 7
2739
2740                               ;ALPHANUMERIC DECK DATA TABLE
2741                               ;THE VALUE IS THE ENCODED FORM OF THE DATA
2742                               ;                                 COLUMN  ASCII   PUNCH
2743  013210       200             ALPCDP:  .BYTE   200               ;1    &       12
2744  013211       201                      .BYTE   201               ;2    A       12 1
2745  013212       202                      .BYTE   202               ;3    B       12 2
2746  013213       203                      .BYTE   203               ;4    C       12 3
2747  013214       204                      .BYTE   204               ;5    D       12 4
2748  013215       205                      .BYTE   205               ;6    E       12 5
2749  013216       206                      .BYTE   206               ;7    F       12 6
2750  013217       207                      .BYTE   207               ;8    G       12 7
2751  013220       210                      .BYTE   210               ;9    H       12 8
2752  013221       220                      .BYTE   220               ;10   I       12 9
2753  013222       212                      .BYTE   212               ;11   [       12 8 2
2754  013223       213                      .BYTE   213               ;12   .       12 8 3
2755  013224       214                      .BYTE   214               ;13   <       12 8 4
2756  013225       215                      .BYTE   215               ;14   (       12 8 5
2757  013226       216                      .BYTE   216               ;15   +       12 8 6
2758  013227       217                      .BYTE   217               ;16   !       12 8 7
2759  013230       100                      .BYTE   100               ;17   -       11
2760  013231       101                      .BYTE   101               ;18   J       11 1
2761  013232       102                      .BYTE   102               ;19   K       11 2
2762  013233       103                      .BYTE   103               ;20   L       11 3
2763  013234       104                      .BYTE   104               ;21   M       11 4
2764  013235       105                      .BYTE   105               ;22   N       11 5
2765  013236       106                      .BYTE   106               ;23   O       11 6
2766  013237       107                      .BYTE   107               ;24   P       11 7
2767  013240       110                      .BYTE   110               ;25   Q       11 8
2768  013241       120                      .BYTE   120               ;26   R       11 9
2769  013242       112                      .BYTE   112               ;27   ]       11 8 2
2770  013243       113                      .BYTE   113               ;28   $       11 8 3
2771  013244       114                      .BYTE   114               ;29   *       11 8 4
2772  013245       115                      .BYTE   115               ;30   )       11 8 5
2773  013246       116                      .BYTE   116               ;31   ;       11 8 6
2774  013247       117                      .BYTE   117               ;32   ^       11 8 7
2775  013250       040                      .BYTE   40                ;33   0       0
2776  013251       041                      .BYTE   41                ;34   /       0 1
2777  013252       042                      .BYTE   42                ;35   S       0 2
2778  013253       043                      .BYTE   43                ;36   T       0 3
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 2779  013254  044                    .BYTE   44              ;37     U       0 4
 2780  013255  045                    .BYTE   45              ;38     V       0 5
 2781  013256  046                    .BYTE   46              ;39     W       0 6
 2782  013257  047                    .BYTE   47              ;40     X       0 7
 2783  013260  050                    .BYTE   50              ;41     Y       0 8
 2784  013261  060                    .BYTE   60              ;42     Z       0 9
 2785  013262  052                    .BYTE   52              ;43     \       0 8 2
 2786  013263  053                    .BYTE   53              ;44     ^       0 8 3
 2787  013264  054                    .BYTE   54              ;45     _       0 8 4
 2788  013265  055                    .BYTE   55              ;46     `       0 8 5
 2789  013266  056                    .BYTE   56              ;47     |       0 8 6
 2790  013267  057                    .BYTE   57              ;48     ~       0 8 7
 2791  013270  000                    .BYTE   0               ;49     SPACE   BLANK
 2792  013271  001                    .BYTE   1               ;50     1       1
 2793  013272  002                    .BYTE   2               ;51     2       2
 2794  013273  003                    .BYTE   3               ;52     3       3
 2795  013274  004                    .BYTE   4               ;53     4       4
 2796  013275  005                    .BYTE   5               ;54     5       5
 2797  013276  006                    .BYTE   6               ;55     6       6
 2798  013277  007                    .BYTE   7               ;56     7       7
 2799  013300  010                    .BYTE   10              ;57     8       8
 2800  013301  020                    .BYTE   20              ;58     9       9
 2801  013302  012                    .BYTE   12              ;59     :       8 2
 2802  013303  013                    .BYTE   13              ;60     #       8 3
 2803  013304  014                    .BYTE   14              ;61     @       8 4
 2804  013305  015                    .BYTE   15              ;62     '       8 5
 2805  013306  016                    .BYTE   16              ;63     =       8 6
 2806  013307  017                    .BYTE   17              ;64     "       8 7
 2807  013310  200                    .BYTE   200             ;65     &       12
 2808  013311  201                    .BYTE   201             ;66     A       12 1
 2809  013312  202                    .BYTE   202             ;67     B       12 2
 2810  013313  203                    .BYTE   203             ;68     C       12 3
 2811  013314  204                    .BYTE   204             ;69     D       12 4
 2812  013315  205                    .BYTE   205             ;70     E       12 5
 2813  013316  206                    .BYTE   206             ;71     F       12 6
 2814  013317  207                    .BYTE   207             ;72     G       12 7
 2815  013320  210                    .BYTE   210             ;73     H       12 8
 2816  013321  220                    .BYTE   220             ;74     I       12 9
 2817  013322  212                    .BYTE   212             ;75     [       12 8 2
 2818  013323  213                    .BYTE   213             ;76     .       12 8 3
 2819  013324  214                    .BYTE   214             ;77     <       12 8 4
 2820  013325  215                    .BYTE   215             ;78     (       12 8 5
 2821  013326  216                    .BYTE   216             ;79     +       12 8 6
 2822  013327  217          ALPENP:   .BYTE   217             ;80     !       12 8 7
 2823
 2824                       ;BINARY DECK DATA TABLE
 2825                       ;                               COLUMN  PUNCH
 2826  013330  000000       BINCD:    0                     ;1      BLANK
 2827  013332  000001                 1                     ;2
 2828  013334  000002                 2                     ;3
 2829  013336  070004                 70004                 ;4
 2830  013340  060010                 60010                 ;5
 2831  013342  050020                 50020                 ;6
 2832  013344  040040                 40040                 ;7
 2833  013346  030100                 30100                 ;8
 2834  013350  020200                 20200                 ;9
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2835  013352  010400                  10400                ;10
2836  013354  001000                  1000                 ;11
2837  013356  002000                  2000                 ;12
2838  013360  004000                  4000                 ;13
2839  013362  171111                  171111               ;14
2840  013364  172222                  172222               ;15
2841  013366  173333                  173333               ;16
2842  013370  174444                  174444               ;17
2843  013372  175555                  175555               ;18
2844  013374  176666                  176666               ;19
2845  013376  177777                  177777               ;20
2846  013400  061010                  61010                ;21
2847  013402  161212                  161212               ;22
2848  013404  171313                  171313               ;23
2849  013406  171414                  171414               ;24
2850  013410  171515                  171515               ;25
2851  013412  171616                  171616               ;26
2852  013414  171717                  171717               ;27
2853  013416  052020                  52020                ;28
2854  013420  172121                  172121               ;29
2855  013422  172323                  172323               ;30
2856  013424  172424                  172424               ;31
2857  013426  172525                  172525               ;32
2858  013430  172626                  172626               ;33
2859  013432  172727                  172727               ;34
2860  013434  173030                  173030               ;35
2861  013436  173131                  173131               ;36
2862  013440  173232                  173232               ;37
2863  013442  173434                  173434               ;38
2864  013444  173535                  173535               ;39
2865  013446  173636                  173636               ;40
2866  013450  173737                  173737               ;41
2867  013452  044040                  44040                ;42
2868  013454  174141                  174141               ;43
2869  013456  164242                  164242               ;44
2870  013460  174343                  174343               ;45
2871  013462  174545                  174545               ;46
2872  013464  174646                  174646               ;47
2873  013466  174747                  174747               ;48
2874  013470  165050                  165050               ;49
2875  013472  175151                  175151               ;50
2876  013474  165252                  165252               ;51
2877  013476  175353                  175353               ;52
2878  013500  175454                  175454               ;53
2879  013502  175656                  175656               ;54
2880  013504  175757                  175757               ;55
2881  013506  156060                  156060               ;56
2882  013510  176161                  176161               ;57
2883  013512  176262                  176262               ;58
2884  013514  176363                  176363               ;59
2885  013516  176464                  176464               ;60
2886  013520  176565                  176565               ;61
2887  013522  176767                  176767               ;62
2888  013524  177070                  177070               ;63
2889  013526  177171                  177171               ;64
2890  013530  177272                  177272               ;65
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 2891  013532  177373                    177373                  ;66
 2892  013534  177474                    177474                  ;67
 2893  013536  177575                    177575                  ;68
 2894  013540  177676                    177676                  ;69
 2895  013542  030101                    30101                   ;70
 2896  013544  020202                    20202                   ;71
 2897  013546  130303                    130303                  ;72
 2898  013550  170404                    170404                  ;73
 2899  013552  170505                    170505                  ;74
 2900  013554  170606                    170606                  ;75
 2901  013556  170707                    170707                  ;76
 2902  013560  163210                    163210                  ;77
 2903  013562  170123                    170123                  ;78
 2904  013564  177654                    177654                  ;79
 2905  013566  174567            BINEND: 174567                  ;80
 2906
 2907                                    ;BINARY DECK DATA TABLE
 2908                                    ;THE VALUE IS THE ENCODED VALUE, WHICH ORS THE OCTAL REPRESENTATION OF
 2909                                    ;ROWS ONE THRU SEVEN
 2910                                    ;                                COLUMN  ASCII   PUNCH
 2911  013570      000           BINCDP: .BYTE   0                       ;1      SPACE   BLANK
 2912  013571      020                   .BYTE   20                      ;2      9       9
 2913  013572      010                   .BYTE   10                      ;3      8       8
 2914  013573      007                   .BYTE   7                       ;4      7       7
 2915  013574      006                   .BYTE   6                       ;5      6       6
 2916  013575      005                   .BYTE   5                       ;6      5       5
 2917  013576      004                   .BYTE   4                       ;7      4       4
 2918  013577      003                   .BYTE   3                       ;8      3       3
 2919  013600      002                   .BYTE   2                       ;9      2       2
 2920  013601      001                   .BYTE   1                       ;10     1       1
 2921  013602      040                   .BYTE   40                      ;11     0       0
 2922  013603      100                   .BYTE   100                     ;12     -       11
 2923  013604      200                   .BYTE   200                     ;13     &       12
 2924  013605      067                   .BYTE   67                      ;14
 2925  013606      117                   .BYTE   117                     ;15
 2926  013607      177                   .BYTE   177                     ;16
 2927  013610      207                   .BYTE   207                     ;17
 2928  013611      267                   .BYTE   267                     ;18
 2929  013612      317                   .BYTE   317                     ;19
 2930  013613      377                   .BYTE   377                     ;20
 2931  013614      046                   .BYTE   46                      ;21
 2932  013615      056                   .BYTE   56                      ;22
 2933  013616      077                   .BYTE   77                      ;23
 2934  013617      047                   .BYTE   47                      ;24
 2935  013620      067                   .BYTE   67                      ;25
 2936  013621      057                   .BYTE   57                      ;26
 2937  013622      077                   .BYTE   77                      ;27
 2938  013623      105                   .BYTE   105                     ;28
 2939  013624      127                   .BYTE   127                     ;29
 2940  013625      137                   .BYTE   137                     ;30
 2941  013626      107                   .BYTE   107                     ;31
 2942  013627      127                   .BYTE   127                     ;32
 2943  013630      117                   .BYTE   117                     ;33
 2944  013631      137                   .BYTE   137                     ;34
 2945  013632      147                   .BYTE   147                     ;35
 2946  013633      167                   .BYTE   167                     ;36
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013634     157                                  .BYTE   157             ;37
013635     147                                  .BYTE   147             ;38
013636     167                                  .BYTE   167             ;39
013637     157                                  .BYTE   157             ;40
013640     177                                  .BYTE   177             ;41
013641     204                                  .BYTE   204             ;42
013642     227                                  .BYTE   227             ;43
013643     216                                  .BYTE   216             ;44
013644     237                                  .BYTE   237             ;45
013645     227                                  .BYTE   227             ;46
013646     217                                  .BYTE   217             ;47
013647     237                                  .BYTE   237             ;48
013650     246                                  .BYTE   246             ;49
013651     267                                  .BYTE   267             ;50
013652     256                                  .BYTE   256             ;51
013653     277                                  .BYTE   277             ;52
013654     247                                  .BYTE   247             ;53
013655     257                                  .BYTE   257             ;54
013656     277                                  .BYTE   277             ;55
013657     305                                  .BYTE   305             ;56
013660     327                                  .BYTE   327             ;57
013661     317                                  .BYTE   317             ;58
013662     337                                  .BYTE   337             ;59
013663     307                                  .BYTE   307             ;60
013664     327                                  .BYTE   327             ;61
013665     337                                  .BYTE   337             ;62
013666     347                                  .BYTE   347             ;63
013667     367                                  .BYTE   367             ;64
013670     357                                  .BYTE   357             ;65
013671     377                                  .BYTE   377             ;66
013672     347                                  .BYTE   347             ;67
013673     367                                  .BYTE   367             ;68
013674     357                                  .BYTE   357             ;69
013675     023                                  .BYTE   23              ;70
013676     012                                  .BYTE   12              ;71
013677     033                                  .BYTE   33              ;72
013700     007                                  .BYTE   7               ;73
013701     027                                  .BYTE   27              ;74
013702     017                                  .BYTE   17              ;75
013703     037                                  .BYTE   37              ;76
013704     146                                  .BYTE   146             ;77
013705     037                                  .BYTE   37              ;78
013706     347                                  .BYTE   347             ;79
013707     237                         BINENP:  .BYTE   237             ;80

013710  020040  020040     040                  .ASCII  /     /
013715     040  000040             SPACE:       .ASCIZ  / /
013720  005012     012                          .ASCII  <12><12><12>
013723     015  000012             CRLF:        .ASCIZ  <15><12>

013726  005015  051120  051505     MSG1:        .ASCIZ  <15><12>/PRESS CARD READER 'RESET'/
013734  020123  040503  042122
013742  051040  040505  042504
013750  020122  051047  051505
013756  052105  000047
013762  005015  044124  047105     MSG2:        .ASCIZ  <15><12>/THEN HIT 'CONTINUE' ON THE CONSOLE/
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3003  013770  044040  052111  023440
3004  013776  047503  052116  047111
3005  014004  042525  020047  047117
3006  014012  052040  042510  041440
3007  014020  047117  047523  042514
3008  014026     000
3009  014027     015  050012  042522  MSG3:   .ASCIZ  <15><12>/PRESS CARD READER 'STOP'/
3010  014034  051523  041440  051101
3011  014042  020104  042522  042101
3012  014050  051105  023440  052123
3013  014056  050117  000047
3014  014062  005015  044124  020105  MSG4:   .ASCIZ  <15><12>/THE INTERRUPT LEVEL WAS /
3015  014070  047111  042524  051122
3016  014076  050125  020124  042514
3017  014104  042526  020114  040527
3018  014112  020123     000
3019  014115     015  051012  046505  MSG5:   .ASCIZ  <15><12>/REMOVE ALL CARDS FROM THE INPUT HOPPER/
3020  014122  053117  020105  046101
3021  014130  020114  040503  042122
3022  014136  020123  051106  046517
3023  014144  052040  042510  044440
3024  014152  050116  052125  044040
3025  014160  050117  042520  000122
3026  014166  005015  042522  052123  MSG6:   .ASCIZ  <15><12>/RESTORE CARDS TO THE INPUT HOPPER/
3027  014174  051117  020105  040503
3028  014202  042122  020123  047524
3029  014210  052040  042510  044440
3030  014216  050116  052125  044040
3031  014224  050117  042520  000122
3032  014232  005015  052520  046114  MSG7:   .ASCII  <15><12>/PULL OUTPUT STACKER PRESSURE ARM DOWN /
3033  014240  047440  052125  052520
3034  014246  020124  052123  041501
3035  014254  042513  020122  051120
3036  014262  051505  052523  042522
3037  014270  040440  046522  042040
3038  014276  053517  020116
3039  014302  047125  044524  020114          .ASCIZ  /UNTIL HOPPER CHECK LIGHTS/
3040  014310  047510  050120  051105
3041  014316  041440  042510  045503
3042  014324  046040  043511  052110
3043  014332  000123
3044  014334  005015  047510  042114  MSG8:   .ASCII  <15><12>/HOLD DOWN THE SWITCH UNDER THE CAP OF THE INPUT /
3045  014342  042040  053517  020116
3046  014350  044124  020105  053523
3047  014356  052111  044103  052440
3048  014364  042116  051105  052040
3049  014372  042510  041440  050101
3050  014400  047440  020106  044124
3051  014406  020105  047111  052520
3052  014414  020124
3053  014416  047510  050120  051105          .ASCIZ  /HOPPER/
3054  014424     000
3055  014425     015  051412  044514  MSG9:   .ASCII  <15><12>/SLIDE A CARD FROM THE OUTPUT HOPPER ABOUT HALF AN INCH /
3056  014432  042504  040440  041440
3057  014440  051101  020104  051106
3058  014446  046517  052040  042510
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3059  014454  047440  052125  052520
3060  014462  020124  047510  050120
3061  014470  051105  040440  047502
3062  014476  052125  044040  046101
3063  014504  020106  047101  044440
3064  014512  041516  020110
3065  014516  005015  020040  040502          .ASCIZ  <15><12>/  BACK INTO THE READ HEAD, BLOCKING THE PHOTO CELL/
3066  014524  045503  044440  052116
3067  014532  020117  044124  020105
3068  014540  042522  042101  044040
3069  014546  040505  026104  041040
3070  014554  047514  045503  047111
3071  014562  020107  044124  020105
3072  014570  044120  052117  020117
3073  014576  042503  046114     000
3074  014603     015  051012  046505  MSG10:  .ASCIZ  <15><12>/REMOVE JAMMED CARD/
3075  014610  053117  020105  040512
3076  014616  046515  042105  041440
3077  014624  051101  000104
3078  014630  005015  047510  042114  MSG11:  .ASCIZ  <15><12>/HOLD THE OUTPUT STACKER GATE OPEN. THEN/
3079  014636  052040  042510  047440
3080  014644  052125  052520  020124
3081  014652  052123  041501  042513
3082  014660  020122  040507  042524
3083  014666  047440  042520  027116
3084  014674  052040  042510  000116
3085  014702  005015  046120  041501  MSG12:  .ASCII  <15><12>/PLACE SPECIAL DARK-LIGHT CHECK CARD ONLY (SEE 7.2.2 OF /
3086  014710  020105  050123  041505
3087  014716  040511  020114  040504
3088  014724  045522  046055  043511
3089  014732  052110  041440  042510
3090  014740  045503  041440  051101
3091  014746  020104  047117  054514
3092  014754  024040  042523  020105
3093  014762  027067  027062  020062
3094  014770  043117     040
3095  014773     124  042510  053440          .ASCII  /THE WRITE-UP)/
3096  015000  044522  042524  052455
3097  015006  024520
3098  015010  005015  052101  052040          .ASCIZ  <15><12>   /AT THE BOTTOM OF THE INPUT STACK/
3099  015016  042510  041040  052117
3100  015024  047524  020115  043117
3101  015032  052040  042510  044440
3102  015040  050116  052125  051440
3103  015046  040524  045503     000
3104  015053     015  042012  041505  MSG13:  .ASCIZ  <15><12>/DECK    CARD    COLUMN  PATTERN READ/
3105  015060  020113  020040  041440
3106  015066  051101  020104  020040
3107  015074  041440  046117  046525
3108  015102  020116  050040  052101
3109  015110  042524  047122  051040
3110  015116  040505  000104
3111  015122  005015  046101  044120  MSG14:  .ASCIZ  <15><12>/ALPHA /
3112  015130  020101     000
3113  015133     015  041012  047111  MSG15:  .ASCIZ  <15><12>/BINARY/
3114  015140  051101  000131
```

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3115  015144  005015  044502  020124  MSG16:  .ASCIZ  <15><12>/BIT 15 WAS SET/
3116  015152  032461  053440  051501
3117  015160  051440  052105  000
3118  015165  015  051012  046505  MSG17:  .ASCIZ  <15><12>/REMEDY THE ERROR CONDITION AND PRESS 'CONTINUE'/
3119  015172  042105  020131  044124
3120  015200  020105  051105  047522
3121  015206  020122  047503  042116
3122  015214  052111  047511  020116
3123  015222  047101  020104  051120
3124  015230  051505  020123  041447
3125  015236  047117  044524  052516
3126  015244  023505  000
3127  015247  015  041012  052111  MSG18:  .ASCIZ  <15><12>/BIT 12 WAS SET/
3128  015254  030440  020062  040527
3129  015262  020123  042523  000124
3130  015270  005015  047503  052514  MSG19:  .ASCIZ  <15><12>/COLUMN READ  CARDS ERRORS/
3131  015276  047115  051040  040505
3132  015304  020104  041440  051101
3133  015312  051504  042440  051122
3134  015320  051117  000123
3135  015324  005015  052520  020124  MSG20:  .ASCIZ  <15><12>/PUT ANY TWO CARDS IN INPUT HOPPER/
3136  015332  047101  020131  053524
3137  015340  020117  040503  042122
3138  015346  020123  047111  044440
3139  015354  050116  052125  044040
3140  015362  050117  042520  000122
3141  015370  005015  051120  051505  MSG21:  .ASCIZ  <15><12>/PRESS END OF FILE BUTTON/
3142  015376  020123  047105  020104
3143  015404  043117  043040  046111
3144  015412  020105  052502  052124
3145  015420  047117  000
3146  015423  015  053412  042510  MSG22:  .ASCIZ  <15><12>/WHEN PRINTING STOPS PUT HALT AND/
3147  015430  020116  051120  047111
3148  015436  044524  043516  051440
3149  015444  047524  051520  050040
3150  015452  052125  044040  046101
3151  015460  020124  047101  000104
3152  015466  005015  044523  043516  MSG23:  .ASCIZ  <15><12>/SINGLE BUS CYCLE DOWN, AND HIT 'CONTINUE' ON THE/
3153  015474  042514  041040  051525
3154  015502  041440  041531  042514
3155  015510  042040  053517  026116
3156  015516  040440  042116  044040
3157  015524  052111  023440  047503
3158  015532  052116  047111  042525
3159  015540  020047  047117  052040
3160  015546  042510  000
3161  015551  015  041412  047117  MSG24:  .ASCIZ  <15><12>/CONSOLE UNTIL ONE CARD IS READ/
3162  015556  047523  042514  052440
3163  015564  052116  046111  047440
3164  015572  042516  041440  051101
3165  015600  020104  051511  051040
3166  015606  040505  000104
3167  015612  005015  044124  047105  MSG25:  .ASCIZ  <15><12>/THEN PUT UP THE TWO SWITCHES AND HIT/
3168  015620  050040  052125  052440
3169  015626  020120  044124  020105
3170  015634  053524  020117  053523
```

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 3171  015642  052111  044103  051505
 3172  015650  040440  042116  044040
 3173  015656  052111     000
 3174  015661     015  023412  047503  MSG26:  .ASCIZ  <15><12>/'CONTINUE' ON THE CONSOLE/
 3175  015666  052116  047111  042525
 3176  015674  020047  047117  052040
 3177  015702  042510  041440  047117
 3178  015710  047523  042514     000
 3179  015715     015  041412  041532  MSG27:  .ASCIZ  <15><12>/CZCDADO CD11 CARD READER DIAG/
 3180  015722  040504  030104  041440
 3181  015730  030504  020061  040503
 3182  015736  042122  051040  040505
 3183  015744  042504  020122  044504
 3184  015752  043501     000
 3185          015756                  .EVEN
 3186
 3187
 3188  015756  012767  016006  162040  POWR:   MOV     #RESTOR,24
 3189  015764  010046                  MOV     %0,-(6)
 3190  015766  010146                  MOV     %1,-(6)
 3191  015770  010246                  MOV     %2,-(6)
 3192  015772  010346                  MOV     %3,-(6)
 3193  015774  010446                  MOV     %4,-(6)
 3194  015776  010546                  MOV     %5,-(6)
 3195  016000  010667  000036          MOV     %6,SAV6
 3196  016004  000000                  HALT
 3197
 3198
 3199  016006  012767  015756  162010  RESTOR: MOV     #POWR,24
 3200  016014  016706  000022          MOV     SAV6,%6
 3201  016020  012605                  MOV     (6)+,%5
 3202  016022  012604                  MOV     (6)+,%4
 3203  016024  012603                  MOV     (6)+,%3
 3204  016026  012602                  MOV     (6)+,%2
 3205  016030  012601                  MOV     (6)+,%1
 3206  016032  012600                  MOV     (6)+,%0
 3207  016034  016716  174400          MOV     RETURN,(6)      ;START TEST OVER
 3208  016040  000002                  RTI
 3209
 3210  016042  000000          SAV6:   0
 3211
 3212  016044  000000          BUFBEG: 0
 3213          000001                  .END
```

ALLDON	006334	1710	1713#											
ALPCD	012750	1360	2659#											
ALPCDP	013210	2743#												
ALPEND	013206	1361	2738#											
ALPENP	013327	2822#												
ALP1	004336	1355	1360#											
BEGIN	001000	701	761#											
BELL	012166	1336	1715	2327	2431	2499#								
BINCD	013330	1356	2826#											
BINCDP	013570	2911#												
BINEND	013566	1357	2905#											
BINENP	013707	2990#												
BKGND	004524	1389#	1390	1395										
BKGND1	004536	1392#	1393											
BUFBEG	016044	857	891	922	949	975	1015	1055	1095	1132	1172	1212	1248	1270
		1377	1663	1796	1976	2024	2056	2092	2121	2157	2222	2295	2405	3212#
BUFEND	006514	1411*	1412*	1413*	1414	1528*	1529*	1530	1764#					
B.CK	012330	2518	2532#											
CARDIM	012132	2374*	2375*	2376	2422	2479#								
CDBA	000506	726#	746											
CDCC	000504	725#	745											
CDCNT	006526	1352*	1441	1444*	1466*	1555	1560	1563*	1585*	1673	1685*	1686	1688*	1699
		1708*	1709	1769#										
CDPK0	012134	2376*	2378*	2380*	2386*	2480#								
CDPK1	012135	2379*	2381*	2382*	2383*	2384*	2389*	2416	2481#					
CDREAD	004522	1384	1386	1388#										
CDST	000502	724#	744											
CD1000	000540	740#	1776*	1778*	2174									
CHGD1	012750	2658#												
CKERR	011676	2413	2429#											
CKERR1	011720	2430	2436#											
CKERR2	011744	2437	2439	2442#										
CKERR3	011710	2432#	2433											
CKFAIL	011750	2417	2423	2445#										
CKHLT	012114	2447	2472#											
CKLOOP	011530	2397#	2421	2427	2443	2473	2475							
CKLOP1	011464	2386#	2391											
CKLOP2	011652	2415	2422#	2426										
CKLOP3	011626	2416#	2420	2441										
CKLP1	011610	2410#	2411											
CKNOHD	012002	2449	2452#											
CKNOPK	012046	2457	2462#											
CKOFFL	012204	776	855	888	2489	2506#	2512							
CKOVR	011502	2387	2390#											
CKOVR1	012060	2461	2466#											
CKREAD	011564	2399	2401	2404#										
CKRF	000534	738#												
CKSAME	011362	711	2371#											
CKSTRT	011510	2393#	2434											
CLCNT	006530	1351*	1426*	1427	1541*	1542	1690*	1691	1693*	1707*	1770#	2404*	2418*	2419
		2424*	2425	2453										
CONTC	007116	1870	1875#											
CONTD	004360	1359	1363#											
CONT20	003734	1255	1259#											
CONT21	004046	1278	1281#											
CONT.	001646	929	938#											

```
COUNT   000522   732# 860* 870* 896* 901* 1250* 1251* 1418* 1424* 1533* 1539* 1614*
COUNTG  000536   739#
CRLF    013723  1788 1794 1822 1838 1867 1916 1942 1967 1991 2015 2043 2083 2111
                2148 2183 2190 2265 2285 2322 2452 2522 2531 2995#
DATRST  006502  1521 1626 1759#
DATST   004266  1335 1351# 1757 1760
DCNT1   004414  1366 1370#
DECK    006166  1358* 1362* 1683#
DECKCK  006456  1726 1729 1753#
DERCNT  006534  1391* 1394* 1772#
DERFLG  012136  2377* 2388* 2397* 2403* 2414 2438 2440 2456 2482#
DONE6   001526   907  910#
DUMMY = 000000   667# 1683
D.1     012410  2544 2550#
D.2     012422  2546 2548 2553#
ENDCK   004240  1333#
ERCD11  006546   704 1778#
ERFLG   000532   727# 1353* 1678 1680* 2396* 2448 2450*
ER12CD  006554  1777 1779# 2328
ER1200  006536   717 1776#
HLT   = 104000   664# 780 784 788 797 804 810 817 821 826 830 837 841
                 846 850 864 868 875 878 882 895 903 908 912 928 932
                 936 954 987 991 1005 1027 1031 1045 1067 1071 1085 1107 1111
                1122 1144 1148 1162 1184 1188 1202 1220 1224 1238 1256 1280 1301
                1305 1309 1313 1317 1321 1325 1329 1400 1409 1416 1484 1491 1496
                1501 1505 1509 1513 1517 1520 1527 1532 1603 1610 1613 1619 1625
                1630 1634 1638 1642 1645 1732 1736 1740 1748 1801 1805 1809 1813
                1826 1830 1834 1843 1847 1851 1855 1872 1877 1881 1885 1897 1901
                1905 1909 1922 1926 1930 1934 1946 1950 1954 1958 1983 1995 1999
                2003 2007 2031 2047 2053 2062 2066 2070 2074 2099 2118 2127 2131
                2135 2139 2164 2197 2202 2207 2211 2231 2235 2239 2247 2251 2255
                2260 2274 2292 2301 2305 2309 2313 2442 2495
HOOK1   006364  1717 1723#
INIT    012140   916  944  968 1008 1048 1088 1125 1165 1205 1242 1264 1287 1370
                1787 1819 1860 1939 1987 2037 2105 2179 2191 2281 2393 2489#
INTFLG  000524   733# 750* 983 985 996 998* 1003 1023 1025 1036 1038* 1043 1063
                1065 1076 1078* 1083 1103 1105 1116 1118* 1120 1140 1142 1153 1155*
                1160 1180 1182 1193 1195* 1200 1229 1231* 1236
INTVC   000516   730# 747 748 749*
ISR     004572  1402 1405#
ISRBE   004714  1425 1433#
ISRDE   004742  1420 1441#
ISRDE4  005124  1468 1476#
ISRD1   004750  1443# 1464
ISRD2   005062  1442 1467#
ISRER   005136  1406 1483#
ISRE1   005144  1483 1487#
ISRE2   005176  1488 1499#
ISRE3   005206  1492 1503#
ISRLP   004644  1419# 1428 1431
ISRNC   004636  1418# 1495
ISRNX   004720  1434#
ISRNX1  004736  1436 1438#
ISRRT   004650  1421# 1455 1457 1479
ISRST   005256  1485 1497 1521#
ITCNT   012436  2346* 2350* 2547 2549* 2553* 2557#
```

```
ITMAX   012434            743*  1781*  2347*  2547   2556#
LASTCD  006252           1494   1622   1660   1698#
LOOP5   001350            866#   871
LOOP6   001520            906#
LOOP6A  001474            899#   902
LOOP6B  001512            900    905#
LSTCD1  006266           1700#  1702
MSG1    013726           1836   1915   1966   2014   2042   2082   2110   2147   2181   2263   2284   2321   2997#
MSG10   014603           2146   3074#
MSG11   014630           3078#
MSG12   014702           2282   3085#
MSG13   015053           1681   3104#
MSG14   015122           1362   3111#
MSG15   015133           1358   3113#
MSG16   015144           3115#
MSG17   015165           2510   3118#
MSG18   015247           2509   3127#
MSG19   015270           2451   3130#
MSG2    013762           1821   1837   1941   1990   2039   2182   2189   2264   3002#
MSG20   015324           2180   3135#
MSG21   015370           2188   3141#
MSG22   015423           1789   3146#
MSG23   015466           1790   3152#
MSG24   015551           1791   3161#
MSG25   015612           1792   3167#
MSG26   015661           1793   3174#
MSG27   015715            763   3179#
MSG3    014027           1820   1866   2106   3009#
MSG4    014062            999   1039   1079   1156   1196   1232   3014#
MSG5    014115           1940   2038   3019#
MSG6    014166           1965   2081   2262   2320   3026#
MSG7    014232           1988   3032#
MSG8    014334           2040   3044#
MSG9    014425           2107   3055#
NOHEAD  006164           1679   1682#
NOP   = 000240            663#
NOTRP   001026            767#   770
NOTRP1  004366           1365#  1368
NXCRD   006312           1429   1433   1544   1548   1707#
OFFSET  006512           1379*  1652   1654*  1658*  1763#
ONINT   006444           1742   1746#
ONLINE  006400           1724   1728#
PAKSET  006114           1387   1437   1670#
POWR    015756            689   3188#  3199
PRINT   012230            692   2516#
PRINTB  012574           1591   1594   2459   2615#
PRINTF  012666           2628   2634#
PRINTL  012650           2629#  2643
PRINTR  012614           1471   1474   1687   1692   2454   2464   2468   2471   2524   2527   2530   2621#
PRINTS  012624           1001   1041   1081   1158   1198   1234   2623#
PRINTT  012660           2619   2632#
PRINT1  012560           1000*  1040*  1080*  1157*  1197*  1233*  1470*  1473*  1590*  1593*  1686*  1691*  2453*
                         2458*  2463*  2467*  2470*  2523*  2526*  2529*  2610#  2630*  2632*  2634*
PRINT2  012562           2611#  2617   2626   2644   2648
PRINT3  012572           2613#  2615*  2621*  2623*  2624*  2638*  2639   2642*
PROC    000530            735#   858*   872    897*   905
```

PS = 177776 662# 752* 767* 771* 858 859* 872* 897 898* 905* 918* 919 920*
926* 946* 947 970* 971 972* 973* 979* 1010* 1011 1012* 1013* 1019*
1050* 1051 1052* 1053* 1059* 1090* 1091 1092* 1093* 1099* 1127* 1128 1129*
1130* 1136* 1167* 1168 1169* 1170* 1176* 1207* 1208 1209* 1210* 1216* 1244*
1245 1246* 1253* 1266* 1267 1268* 1275* 1277* 1289* 1290 1291* 1365* 1369*
1374* 1375 1862* 1863 1864* 1888* 1889 1890* 1912* 1913 1914* 1961* 1962
1963* 1972* 1973 1974* 2010* 2011 2012* 2020* 2021 2022* 2077* 2078 2079*
2088* 2089 2090* 2142* 2143 2144* ..53* 2154 2155* 2217* 2218 2219* 2316*
2317 2318* 2343* 2345* 2551*

PSR 005262 1403 1523#
PSRBE 005376 1540 1548#
PSRDE 005450 1535 1560#
PSRDE3 005636 1587 1596#
PSRD1 005456 1562# 1583
PSRD2 005570 1561 1586#
PSRER 005650 1524 1602#
PSRE1 005656 1602 1606#
PSRE2 005714 1607 1615#
PSRE3 005754 1616 1628#
PSRE4 005764 1620 1632#
PSRLP 005326 1534# 1543 1546 1646
PSRNC 005320 1533# 1624
PSRNX 005402 1549#
PSRNX1 005444 1551 1557#
PSRRT 005332 1536# 1574 1576 1599
PSRST 006024 1604 1646#
PTOFF 006532 1771#
RESTOR 016006 3188 3199#
RESTRT 001020 765# 1338 1756
RETRNX 011360 2338* 2339* 2349 2351 2352#
RETURN 012440 761* 774* 1780* 2348* 2371* 2552 2554* 2558# 3207
SAVPC 012350 2519* 2523 2539#
SAVPS 012352 2520* 2526 2540#
SAVR2 012342 2536#
SAVR3 012344 2537#
SAVR4 012346 2538#
SAV6 016042 3195* 3200 3210#
SCOPE = 104400 665# 775 790 812 832 852 884 914 941 967 1007 1047 1087
1124 1164 1204 1240 1262 1285 1333 1786 1818 1859 1938 1986 2036
2104 2178 2280 2326
SCOPEC 012354 695 2543#
SECN 010642 2217# 2242
SETUP 000542 743# 762 1779 2336 2372
SET1 003622 1230 1236#
SET2 003424 1194 1200#
SET3 003210 1154 1160#
SET4 002774 1117 1120#
SET5 002576 1077 1083#
SET6 002362 1037 1043#
SET7 002146 997 1003#
SIZE 006510 1378* 1380 1412 1413 1418 1529 1533 1652* 1656 1662 1698 1762#
SPACE 013715 1472 1589 1592 1684 1689 1694 2455 2466 2469 2525 2528 2993#
SRETRN 006030 1438 1557 1652# 1655 1659
SRETR1 006050 1653 1656#
SRETR3 006060 1658# 1661
SRETR4 006070 1657 1660#

```
SRVC    004552  1373  1398#
STACK   000500   700   703   706   710   716   723#
$WR   = 177570   661#  769  1334  1354  1367  1383  1385  1435  1467  1476  1550  1586  1596
                1611  1723  1754  2338  2341  2374  2398  2400  2446  2472  2516  2532  2543
                2545
TEMP1   006516  1698* 1701* 1765#
TEMP2   006520  1699* 1700* 1703  1766#
TEND    006524  1357* 1361* 1421  1448  1463  1536  1553* 1567  1582  1671* 1768#
TEST    001054   764   768   774#
TESTA   006572  1780  1786#
TESTB   006704  1818#
TESTC   007032  1859#
TESTD   007332  1938#
TESTE   007542  1986#
TESTF   007746  2036#
TESTG   010232  2104#
TESTH   011042  2176  2280#
TESTI   010520  2175  2178#
TESTX   011252   707  2336#
TEST1   001062   775#  2558
TEST1A  001064   774   776#
TEST10  001656   941#
TEST11  001744   967#
TEST12  002160   984   986   988  1002  1004  1007#
TEST13  002374  1024  1026  1028  1042  1044  1047#
TEST14  002610  1064  1066  1068  1082  1084  1087#
TEST15  003006  1104  1106  1108  1119  1121  1124#
TEST16  003222  1141  1143  1145  1159  1161  1164#
TEST17  003436  1181  1183  1185  1199  1201  1204#
TEST2   001116   790#
TEST20  003634  1221  1235  1237  1240#
TEST21  003744  1262#
TEST22  004060  1285#
TEST3   001164   798   812#
TEST4   001234   832#
TEST5   001304   852#
TEST6   001424   869   879   884#
TEST7   001534   904   914#
TINA21  004042  1274  1279#
TINTC   007112  1861  1872#
TINTCA  007174  1887  1894#
TINTCB  007272  1911  1919#
TINTD   007464  1960  1970#
TINTDA  007530  1971  1980#
TINTE   007670  2009  2018#
TINTEA  007734  2019  2028#
TINTF   010154  2076  2086#
TINTFA  010220  2087  2096#
TINTG   010430  2141  2151#
TINTGA  010474  2152  2161#
TINTH   011236  2315  2325#
TINTI   010704  2216  2227#
TINTIA  010742  2241  2243#
TINT10  001726   945   954#
TINT11  002070   969   989#
TINT12  002304  1009  1029#
```

```
TINT13  002520  1049  1069#
TINT14  002734  1089  1109#
TINT15  003132  1126  1146#
TINT16  003346  1166  1186#
TINT17  003544  1206  1222#
TINT20  003726  1243  1256#
TINT21  004016  1265  1273#
TINT22  004132  1288  1296#
TINT7   001626   917   930#
TLOPC   007102  1868#  1869
TLOPG   010260  2112#  2113
TLOPGA  010266  2114#  2115
TLOPGB  010316  2123#  2124
TLOPH   011064  2286#  2287
TLOPHA  011072  2288#  2289
TLOPHB  011122  2297#  2298
TOTCRD  012130  2394*  2409*  2467  2478#
TOTERR  012126  2395*  2445*  2470  2477#
TPB     000512   728#  2501*
TPS     000510   727#  2499
TRAPX   001036   766   769#
TRFLG   000526   734#   751*  765  1337*  1363  1753*
TRP1    004376  1364  1367#
TRTRAP  000514   683   729#
TSTART  006522  1356*  1360*  1376  1423  1454  1460  1465  1538  1552*  1573  1579  1584  1670*
                1767#
TYHEAD  006146  1469  1588  1678#
TYPE  = 000004   666#   763   999  1039  1079  1156  1196  1232  1472  1589  1592  1681  1682
                1684  1689  1694  1788  1789  1790  1791  1792  1793  1794  1820  1821  1822
                1836  1837  1838  1866  1867  1915  1916  1940  1941  1942  1965  1966  1967
                1988  1990  1991  2014  2015  2038  2039  2040  2042  2043  2081  2082  2083
                2106  2107  2110  2111  2146  2147  2148  2180  2181  2182  2183  2188  2189
                2190  2262  2263  2264  2265  2282  2284  2285  2320  2321  2322  2451  2452
                2455  2466  2469  2509  2510  2522  2525  2528  2531  2648
XLOOP   011350  2348  2350#
$FILLS  012447  2572#
$NULL   012446  2571#  2591
$TPB    012444  2570#  2599*
$TPFLG  012450  2573#  2576
$TPS    012442  2569#  2597
$TYPE   012452   686  2576#
.     = 016046   679#   680   682#  685#  688#  691#  694#  699#  702#  705#  709#  715#  722#
                756#   779   783   787   796   803   809   816   820   825   829   836   840
                845   849   863   867   874   877   881   894   911   925   931   935   952
                953   978   990  1018  1030  1058  1070  1098  1110  1135  1147  1175  1187
               1215  1223  1252  1272  1295  1300  1304  1308  1312  1316  1320  1324  1328
               1399  1408  1415  1422  1477  1490  1500  1504  1508  1512  1516  1519  1526
               1531  1537  1597  1609  1612  1618  1629  1633  1637  1641  1644  1731  1735
               1739  1744  1747  1755  1800  1804  1808  1812  1825  1829  1833  1842  1846
               1850  1854  1876  1880  1884  1892  1896  1900  1904  1908  1917  1921  1925
               1929  1933  1945  1949  1953  1957  1968  1978  1982  1994  1998  2002  2006
               2016  2026  2030  2046  2050  2052  2059  2061  2065  2069  2073  2084  2094
               2098  2117  2126  2130  2134  2138  2149  2159  2163  2187  2196  2201  2206
               2210  2224  2230  2234  2238  2246  2250  2254  2259  2269  2273  2291  2300
               2304  2308  2312  2323  2342  2344  2491  2494  2500  2507  2517  2533  2622
               2637  2640  2645  3185#
```

BDUMP	698#	1590	1593	2458								
DUMP	698#	1470	1473	1686	1691	2453	2462	2467	2470	2523	2526	2529
INT	966#	1006	1046	1086	1123	1163	1203					
SDUMP	698#	1000	1040	1080	1157	1197	1233					
TYPEM	697#											

. ABS. 016046 000

ERRORS DETECTED: 0

CZCDAD.BIN,CZCDAD.LST/CRF/SOL/NL:TOC=CZCDAD.P11
RUN-TIME: 10 22 2 SECONDS
RUN-TIME RATIO: 81/35=2.2
CORE USED: 8K (15 PAGES)