

CD11

CD11 CRD READER DIAG AH-8403D-MC
CZCDADO FICHE 1 OF 1

JUN 1980
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IDENTIFICATION

PRODUCT CODE: AC-8402D-MC
PRODUCT NAME: CZCDAD0 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 DOCUMENTATION 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 DOCUMENTATION M 1000 AND M1200 READER TO BE CHECKED. ANOTHER STARTING ADDRESS TESTS SPECIAL DECKS WHICH HAVE ALL COLUMNS AND CARDS CHECKED 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

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!)

147 PRESS 'RESET' ON THE CARD READER.
148 LOAD THE STARTING ADDRESS, THEN SET THE DESIRED SWITCH
149 OPTIONS.
150 PRESS START.

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152 FOLLOW THE INSTRUCTIONS AS THEY ARE PRINTED OUT.
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158 4.3.3 SINGLE SUBTEST LOOP (SA 220)

159 LOAD CARDS (SPARE CARDS OR A TEST DECK) INTO THE INPUT
160 HOPPER.
161 PRESS 'RESET' ON THE CARD READER.
162 LOAD THE STARTING ADDRESS.
163 PRESS START.
164 AT THE 1ST HALT; LOAD THE STARTING ADDRESS OF THE DESIRED
165 TEST (ADDRESS OF THE SCOPE INSTRUCTION AT THE
166 BEGINNING OF THE TEST.)
167 PRESS CONTINUE.
168 AT THE 2ND HALT SET THE SWITCH REGISTER OPTIONS (BIT 11
169 MUST=0).
170 PRESS CONTINUE.
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174 4.3.4 SINGLE DATA PATTERN TEST (SA 240)

175 A SPECIAL DECK (1 OR MORE CARDS) MUST BE PUNCHED TO RUN THIS
176 TEST. ANY DATA PATTERN MAY BE USED, BUT IT MUST BE
177 IDENTICAL IN ALL 80 COLUMNS OF ALL THE CARDS (I.E.
178 ONLY ONE PIECE OF DATA).
179 LOAD THIS PREPARED DECK INTO THE INPUT HOPPER.
180 PRESS CARD READER 'RESET'.
181 LOAD SA 240.
182 PRESS START.
183 AT THE INITIAL HALT SET THE CARD IMAGE OF THE DATA PATTERN
184 USED IN SW11-SW00.
185 PRESS CONTINUE.
186 ON THE SECOND HALT LOAD THE DESIRED SWITCH SETTINGS.
187 PRESS CONTINUE.
188 WHEN THE CARD READER RUNS OUT OF CARDS IT WILL RING THE
189 BELL.
190 RELOADING THE DECK AND PRESSING 'RESET' ON THE CARD READER
191 WILL CONTINUE THE TEST.
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195 5.0 OPERATING PROCEDURE

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197 5.1 OPERATIONAL SWITCH SETTINGS

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199 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

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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

DOCUMENTATION 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.

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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 'CDSi', '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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.TITLE CZCDADO CD11 CARD READER DIAG
:DIAGNOSTIC FOR THE CD11 CARD READER
:COPYRIGHT 1973, 1979 BY DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
:PROGRAMMER: KEN CHAPMAN
:SUB MALLICK (CHANGED FROM REV A TO REV B)
:LEN LORANGER (CHANGED FROM REV C TO REV D)
:

:STARTING ADDRESSES ARE:
:200=INSTRUCTION AND DATA TEST FOR THE CD11
:210=ERROR FUNCTION TEST OF CD11 (M-1000)
:220=SINGLE TEST LOOP
:240=READ SINGLE DATA PATTERN TEST
:250=ERROR FUNCTION TEST FOR CD11 (M-1200)
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:SWITCH REGISTER SETTINGS FOR THE INSTRUCTION AND DATA TEST ARE:
:SW02=1 RUN IN DATA IMAGE MODE ONLY
:SW03=1 RUN IN DATA PACKING MODE ONLY (IGNORED IF SW02=1)
:SW04=1 FOR THE BINARY TEST DECK
:SW05=1 TO HALT AT THE END OF A STANDARD 80 CARD
:TEST DECK.(HITTING CONTINUE WILL START TESTING
:OF THE NEXT DECK IN ACCORDANCE WITH CURRENT
:SWR SETTINGS).
:-0 TO CONTINUE FROM ONE DECK TO THE NEXT.
:AFTER THE LAST DECK IN THE HOPPER IS
:RUN, THE PROGRAM WAITS FOR THE CARD READER
:TO COME BACK ON-LINE,AND RUNS THRU
:A SERIES OF CHECKS OF OFF-LINE AND
:COMING ON-LINE OPERATIONS OF THE READER.
:WHEN THE READER IS BACK ON-LINE AND THE
:CHECKS ARE COMPLETE, THE DATA TEST IS RESUMED.
:SW06=1 TO RUN THE COMBINED INSTRUCTION AND DATA TEST
:WHEN CONTINUING FROM ONE DECK TO THE NEXT
:=0 TO RUN ONLY THE DATA TEST ON EVERY DECK AFTER THE FIRST
:SW07=1 TO RUN ONLY THE INSTRUCTION TEST CONTINUALLY.
:SETTING SW06 AND SW07 AT THE END OF A DECK WILL
:CAUSE THE INSTRUCTION TEST TO BE RUN CONTINUOUSLY FROM THEN ON
:(NOTE THAT IF SW7 IS SET, THE PROGRAM MAY HANG WHEN THE
:CARD READER RUNS OUT OF CARDS)
:SW11=1 TO INHIBIT SUBPROGRAM ITERATION
:(NOTE THAT IF PROGRAM FLOW IS ALLOWED TO ENTER THE
:DATA SUBTEST WHEN SW11 IS SET, DATA ERRORS WILL
:OCCUR SINCE THE CARD COUNT WILL BE INCORRECT.)
:SW12=1 TO INHIBIT TRACE TRAPPING
:SW13=1 TO INHIBIT PRINTOUT
:SW14=1 FOR SCOPE LOOP
:SW15=1 TO HALT ON ERROR
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:OPERATING PROCEDURE FOR THE INSTRUCTION AND DATA TEST:
:1. LOAD TEST DECK IN CARD READER AND PRESS 'START' ON THE CARD
:READER. IF THE DECK BEING USED IS NOT A STANDARD TEST
:DECK, ONLY THE INSTRUCTION PORTION OF THE TEST CAN BE RUN.
:(SW7 MUST BE SET TO ONE TO INDICATE THIS).
:2. LOAD SA 200, THEN SET THE SWITCH REGISTER SWITCHES TO THE DESIRED
:

COMBINATION

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 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.

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 READER 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 INTERRUPT ENABLE

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651      :      BIT 7  CONTROLLER READY
652      :      BIT 8  POWER CLEAR
653      :      BIT 9  NON-EXISTENT MEMORY
654      :      BIT 10 DATA LATE
655      :      BIT 11 DATA ERROR
656      :      BIT 12 OFF LINE
657      :      BIT 13 END OF FILE (M1200 ONLY)
658      :      BIT 14 CARD READER ERROR
659      :      BIT 15 ERROR
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661      177570      SWR= 177570
662      177776      PS= 177776
663      000240      NOP= 240
664      104000      HLT= EMT
665      104400      SCOPE= TRAP
666      000004      TYPE= IOT
667      000000      DUMMY= 0
668      000000      R0= %0      ;SCRATCH
669      000001      R1= %1      ;SCRATCH
670      000002      ADINT= %2    ;CONTAINS ADDRESS OF INTERRUPT VECTOR
671      000003      CDS= %3     ;CONTAINS ADDRESS OF CARD READER STATUS REGISTER
672      000004      CDC= %4     ;CONTAINS ADDRESS OF CARD READER COLUMN COUNT
673      000005      CDA= %5     ;CONTAINS ADDRESS OF CARD READER BUS ADDRESS REG.
674      000005      TTY= %5
675      000006      SP= %6      ;STACK POINTER
676      000007      PC= %7      ;PROGRAM COUNTER
677
678      .ABS
679      000000      .=0          ;TRAP CATCHER IS LOADED INTO LOCATIONS 0 THRU 377
680
681      ;LOAD TRAP VECTORS FOR HLT AND SCOPE ROUTINES
682      000014      .=14
683      000014      000514      TRTRAP
684      000016      000340      340
685      000020      .=20
686      000020      012452      $TYPE
687      000022      000340      340
688      000024      .=24
689      000024      015756      POWR
690      000026      000340      340
691      000030      .=30
692      000030      012230      PRINT
693      000032      000340      340
694      000034      .=34
695      000034      012354      SCOPEC
696      000036      000340      340
697
698      ;LOAD STARTING ADDRESS AREA
699      000200      .=200
700      000200      012706      000500      MOV #STACK, SP
701      000204      000167      000570      JMP BEGIN      ;NORMAL STARTING ADDRESS FOR CD11 READER
702
703      000210      .=210
704      000214      000167      006326      MOV #STACK, SP
705      000220      000220      000500      JMP ERCD11      ;STARTING ADDRESS FOR CD11 (M1000) ERROR FUNCTION TEST
706      000220      012706      000500      MOV #STACK, SP
```

```

707 000224 000167 011022      JMP      TESTX      ;STARTING ADDRESS FOR LOOP WHICH CONTINUALLY RUNS
708                                ;ANY SINGLE SUBTEST
709                                ;.=240
710 000240 012706 000500      MOV      #STACK, SP      ;
711 000244 000167 011112      JMP      CKSAME      ;STARTING ADDRESS OF TEST TO READ A SINGLE DATA
712                                ;PATTERN CONTINUOUSLY
713
714
715                                ;.=250
716 000250 012706 000500      MOV      #STACK, SP      ;
717 000254 000167 006256      JMP      ER1200      ;STARTING ADDRESS FOR M-1200 ERROR FUNCTION TEST
718
719
720
721                                ;LOAD POINTERS AND GENERAL STORAGE
722                                ;.=500
723 000500 000000      STACK: 0      ;STACK POINTER INITIALIZED TO POINT HERE
724 000502 177160      CDST: 177160      ;ADDRESS OF CARD READER STATUS REGISTER
725 000504 177162      CDCC: 177162      ;ADDRESS OF CARD READER COLUMN COUNT
726 000506 177164      CDBA: 177164      ;ADDRESS OF CARD READER BUS ADDRESS
727 000510 177564      TPS: 177564      ;ADDRESS OF TELETYPE STATUS REGISTER
728 000512 177566      TPB: 177566      ;ADDRESS OF TELETYPE DATA BUFFER
729 000514 000002      TRTRAP: RTI      ;RETURN FROM TRACE LOOP
730 000516 000230      INTVC: 230      ;ADDRESS OF CARD READER INTERRUPT VECTOR
731 000520 000232      ;
732 000522 000000      COUNT: 0      ;USED FOR TIMING, ETC.
733 000524 000000      INTFLG: 0      ;CONTAINS LEVEL THAT INTERRUPT IS FOUND AT
734 000526 000000      TRFLG: 0      ;TOGGLED TO SWITCH BETWEEN TRACE TRAPPING AND NORMAL FLO
735 000530 000000      PROC: 0      ;STORES PROCESSOR STATUS WHEN TRACE TRAP MUST BE CLEARED
736                                ;IN A SUBTEST
737 000532 000000      ERFLG: 0      ;SET TO ZERO TO OUTPUT DATA ERROR HEADING
738 000534 000000      CKRF: 0      ;FLAG FOR CHECKERBOARD DECK
739 000536 000000      COUNTG: 0      ;USED AS COUNTER IN TESTG
740 000540 000000      CD1000: 0      ;M-1200 OR M-1000 CARD READER DETECTOR
741
742                                ;INITIALIZE CSR AND DBR POINTERS
743 000542 012767 000001 011664  SETUP: MOV      #1, ITMAX      ;SET ITERATION MAXIMUM TO 1 ITERATION
744 000550 016703 177726      MOV      CDST, CDS      ;SET UP STATUS REGISTER POINTER
745 000554 016704 177724      MOV      CDCC, CDC      ;SET UP COLUMN COUNT REGISTER POINTER
746 000560 016705 177722      MOV      CDBA, CDA      ;SET UP BUS ADDRESS REGISTER POINTER
747 000564 016702 177726      MOV      INTVC, ADINT      ;LOAD ADDRESS OF INTERRUPT VECTOR
748 000570 016712 177724      MOV      INTVC+2, (ADINT)      ;SET UP CD11 TRAP VECTOR
749 000574 005077 177720      CLR      @INTVC+2      ; TO HALT
750 000600 005067 177720      CLR      INTFLG      ;INITIALIZE INTERRUPT FLAG
751 000604 005067 177716      CLR      TRFLG      ;INITIALIZE TRACE FLAG
752 000610 012767 000340 177160      MOV      #340, PS      ;SETUP PROCESSOR STATUS
753 000616 000207      RTS      X7      ;RETURN
754
755
756                                ;.=1000
757
758
759
760
761 001000 012767 001000 011432  BEGIN: MOV      #BEGIN, RETURN      ;SAVE RETURN FOR POWER FAIL
762 001006 004767 177530      JSR      X7, 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
309 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
```

```
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      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
```

875	001402	104000		HLT			:CONTROLLER READY DIDN'T SET WITHIN 1 SEC
876	001404	005713		TST	@CDS		
877	001406	100002		BPL	.+6		
878	001410	104000		HLT			:ERROR BIT SET
879	001412	000404		BR	TEST6		
880	001414	032713	177577	BIT	#177577,@CDS		:CHECK FOR ANY OTHER BITS
881	001420	001401		BEQ	.+4		:BRANCH IF OK
882	001422	104000		HLT			:EXTRA BIT(S) SET
883							
884	001424	104400		TEST6:	SCOPE		
885							: (BIT 2) SHOULD NOT BE SET BY READING A CARD
886							:IT SHOULD REMAIN NOT SET
887							:THIS SHOULD HAPPEN WITHIN ABOUT 1 SECOND
888	001426	004767	010552	JSR	%7,CKOFFL		:CHECK FOR OFF-LINE SET
889	001432	005013		CLR	@CDS		:INITIALIZE STATUS REGISTER
890	001434	012714	177754	MOV	#-20,@CDC		:SET UP COLUMN COUNT TO READ 20 COLUMNS
891	001440	012715	016044	MOV	#BUFBEG,@CDA		:SET UP BUS ADDRESS
892	001444	005213		INC	@CDS		:READ A CARD
893	001446	032713	000004	BIT	#4,@CDS		:CHECK BUSY
894	001452	001401		BEQ	.+4		
895	001454	104000		HLT			:BUSY SET
896	001456	005067	177040	CLR	COUNT		:SET UP WAIT COUNTER
897	001462	016767	176310	MOV	PS, PROC		:SAVE PROCESSOR STATUS
898	001470	005067	176302	CLR	PS		:CLR THE T BIT
899	001474	105713		LOOP6A:	TSTB	@CDS	:CHECK READY
900	001476	100405		BMI	LOOP6B		:BRANCH IF READY
901	001500	005367	177016	DEC	COUNT		:WAIT ABOUT 1 SEC.
902	001504	001373		BNE	LOOP6A		
903	001506	104000		HLT			:READING A CARD DIDN'T SET READY
904	001510	000411		BR	TEST7		
905	001512	016767	177012	LOOP6B:	MOV	PROC,PS	:RESTORE THE STATUS
906	001520	105713		LOOP6:	TSTB	@CDS	:CHECK CONTROLLER READY
907	001522	100401		BMI	DONE6		:BRANCH IF SET
908	001524	104000		HLT			:RESTORING STATUS RESET READY
909							
910	001526	005713		DONE6:	TST	@CDS	:CHECK ERROR BIT 15
911	001530	100001		BPL	.+4		:BRANCH IF OK
912	001532	104000		HLT			:ERROR BIT 15 WAS SET
913							
914	001534	104400		TEST7:	SCOPE		
915							:CONTROLLER READY SHOULD CAUSE AN INTERRUPT
916	001536	004767	010376	JSR	%7, INIT		:INITIALIZE
917	001542	012712	001626	MOV	#TINT7,@ADINT		:LOAD RETURN POINTER
918	001546	052767	000340	BIS	#340, PS		:SET PROCESSOR TO LEVEL 7
919	001554	016762	176216	MOV	PS, 2(ADINT)		:LOAD RETURN PROCESSOR STATUS
920	001562	042767	000340	BIC	#340, PS		:SET PROCESSOR PRIORITY TO 0
921	001570	012714	177741	MOV	#-31,@CDC		:SET UP COLUMN COUNT TO READ 31 COLUMNS
922	001574	012715	016044	MOV	#BUFBEG,@CDA		:SET UP BUS ADDRESS
923	001600	012713	000101	MOV	#101,@CDS		:SET INTERRUPT ENABLE AND READ
924	001604	105713		TSTB	@CDS		:WAIT FOR CONTROLLER READY
925	001606	100376		BPL	.-2		
926	001610	016267	000002	MOV	2(ADINT),PS		:RESTORE PROCESSOR TO HIGHEST PRIORITY
927	001616	042713	000100	BIC	#100,@CDS		:CLEAR INTERRUPT ENABLE
928	001622	104000		HLT			:NO INTERRUPT OCCURRED
929	001624	000410		BR	CONT7		
930	001626	105713		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 OCCURRED
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      TEST11: SCOPE
968 001744 104400      JSR      %7, INIT ;INITIALIZE
969 001746 004767 010166      MOV      #TINT11,@ADINT ;SETUP RETURN ADDRESS
970 001752 012712 002070      BIS      #340, PS ;SET PROCESSOR PRIORITY TO 7
971 001756 052767 000340 176012      MOV      PS, 2(ADINT) ;SETUP RETURN PROCESSOR STATUS
972 001764 016762 176006 000002      BIC      #340, PS ;SET PROCESSOR PRIORITY TO 0
973 001772 042767 000340 175776      BIS      #300, PS ;SET PROCESSOR TO LEVEL 6 PRIORITY
974 002000 052767 000300 175770      MOV      #-80, @CDC ;SET UP COLUMN COUNT TO READ 80 COLUMNS
975 002006 012714 177660      MOV      #BUFBEG,@CDA ;SET UP BUS ADDRESS
976 002012 012715 016044      MOV      #101, @CDS ;SET INTERRUPT ENABLE AND READ
977 002016 012713 000101      TSTB      @CDS ;WAIT FOR CONTROLLER READY
978 002022 105713      BPL      .-2
979 002024 100376      MOV      2(ADINT),PS ;RESTORE PROCESSOR TO HIGHEST PRIORITY
980 002026 016267 000002 175742      CLR      @CDS ;DISABLE INTERRUPTS
981 002034 005013      MOV      #232, @ADINT ;CHANGE INTERRUPT RETURN ADDRESS
982 002036 012712 000232      CLR      @#232 ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
983 002042 005037 000232      TST      INTFLG ;TEST FOR A PREVIOUS INTERUPT
984 002046 005767 176452      BEQ      TEST12 ;BRANCH IF NONE
985 002052 001442      CMP      INTFLG, #100007 ;CHECK PREVIOUS LEVEL
986 002054 026727 176444 100007      BMI      TEST12 ;BRANCH IF LOWER
987 002062 100436
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987 002064 104000 HLT ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 7 OR HIGHER
988 002066 000434 BR TINT11: TSTB TEST12 ;MAKE SURE CONTROLLER READY IS SET
989 002070 105713 BMI @CDS ;BRANCH IF SET
990 002072 100401 HLT ;CONTROLLER READY WASN'T SET
991 002074 104000 CLR @CDS ;DISABLE FURTHER INTERRUPTS
992 002076 005013 MOV #232, @ADINT ;CHANGE INTERRUPT RETURN ADDRESS
993 002100 012712 000232 CLR @#232 ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
994 002104 005037 000232 CMP (SP)+, (SP)+ ;RESTORE STACK POINTER
995 002110 022626 TST INTFLG ;CHECK FOR PREVIOUS FLAG
996 002112 005767 176406 BMI SET7 ;BRANCH IF FLAG SET
997 002116 100413 MOV #100007, INTFLG ;SET FLAG AND LEVEL
998 002120 012767 100007 176376 TYPE, MSG4 ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS'
999 002126 000004 014062 MOV #7, PRINT1 ;TYPE #7 IN OCTAL
1000 002132 012767 000007 010420 JSR %7, PRINTS ;AND SUPRESS LEADING ZERO'S
1001 002140 004767 010460 BR TEST12
1002 002144 000405 SET7: CMP INTFLG, #100007 ;CHECK PREVIOUS LEVEL
1003 002146 026727 176352 100007 BPL TEST12
1004 002154 100001 HLT ;INTERUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1005 002156 104000 ;TEST FOR AN INTERRUPT ON LEVEL 6
1006 TEST12: SCOPE
1007 JSR %7, INIT ;INITIALIZE
1008 MOV #TINT12, @ADINT ;SETUP RETURN ADDRESS
1009 BIS #340, PS ;SET PROCESSOR PRIORITY TO 7
1010 MOV PS, 2(ADINT) ;SETUP RETURN PROCESSOR STATUS
1011 BIC #340, PS ;SET PROCESSOR PRIORITY TO 0
1012 BIS #240, PS ;SET PROCESSOR TO LEVEL 5 PRIORITY
1013 MOV #-80, @CDC ;SET UP COLUMN COUNT TO READ 80 COLUMNS
1014 MOV #BUFBEG, @CDA ;SET UP BUS ADDRESS
1015 MOV #101, @CDS ;SET INTERRUPT ENABLE AND READ
1016 TSTB @CDS ;WAIT FOR CONTROLLER READY
1017 BPL -2
1018 MOV 2(ADINT), PS ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1019 CLR @CDS ;DISABLE INTERRUPTS
1020 MOV #232, @ADINT ;CHANGE INTERRUPT RETURN ADDRESS
1021 CLR @#232 ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1022 TST INTFLG ;TEST FOR A PREVIOUS INTERUPT
1023 BEQ TEST13 ;BRANCH IF NONE
1024 CMP INTFLG, #100006 ;CHECK PREVIOUS LEVEL
1025 BMI TEST13 ;BRANCH IF LOWER
1026 HLT ;INTERUPT PREVIOUSLY OCCURRED AT LEVEL 6 OR HIGHER
1027 BR TEST13
1028 TINT12: TSTB @CDS ;MAKE SURE CONTROLLER READY IS SET
1029 BMI .+4 ;BRANCH IF SET
1030 HLT ;CONTROLLER READY WASN'T SET
1031 CLR @CDS ;DISABLE FURTHER INTERRUPTS
1032 MOV #232, @ADINT ;CHANGE INTERRUPT RETURN ADDRESS
1033 CLR @#232 ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1034 CMP (SP)+, (SP)+ ;RESTORE STACK POINTER
1035 TST INTFLG ;CHECK FOR PREVIOUS FLAG
1036 BMI SET6 ;BRANCH IF FLAG SET
1037 MOV #100006, INTFLG ;SET FLAG AND LEVEL
1038 TYPE, MSG4 ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS'
1039 MOV #6, PRINT1 ;TYPE #6 IN OCTAL
1040 JSR %7, PRINTS ;AND SUPRESS LEADING ZERO'S
1041 BR TEST13
1042
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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 INTERRUPT 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 INTERRUPT
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		;INTERRUPT 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	01406		TYPE,	MSG4	;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS'
1080	002562	012767	000006	007770	MOV	#5, PRINT1	;TYPE #5 IN OCTAL
1081	002570	004767	010030		JSR	%7, PRINTS	;AND SUPPRESS 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 INTERRUPT 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                     ;INTERUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1123                                ;TEST FOR AN INTERRUPT ON LEVEL 3
1124                                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 INTERRUPT 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 SUPPRESS 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
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 INTERRUPT 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 INTERRUPT
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
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
1189 003354 005013      CLR      @CDS      ;CONTROLLER READY WASN'T SET
1190 003356 012712 000232      MOV      #232, @ADINT ;DISABLE FURTHER INTERRUPTS
1191 003362 005037 000232      CLR      @#232        ;CHANGE INTERRUPT RETURN ADDRESS
1192 003366 022626      CMP      (SP)+, (SP)+ ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1193 003370 005767 175130      TST      INTFLG      ;RESTORE STACK POINTER
1194 003374 100413      BMI      SET2      ;CHECK FOR PREVIOUS FLAG
1195 003376 012767 100002 175120      MOV      #100002,INTFLG ;BRANCH IF FLAG SET
1196 003404 000004 014062      TYPE,    MSG4         ;SET FLAG AND LEVEL
1197 003410 012767 000002 007142      MOV      #2,PRINT1    ;PRINT MESSAGE 'THE INTERRUPT LEVEL WAS''
1198 003416 004767 007202      JSR      %7,PRINTS    ;TYPE #2 IN OCTAL
1199 003422 000405      BR      TEST17    ;AND SUPPRESS LEADING ZERO'S
1200 003424 026727 175074 100002 SET2: CMP    INTFLG, #100002 ;CHECK PREVIOUS LEVEL
1201 003432 100001      BPL     TEST17
1202 003434 104000      HLT
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 INTERRUPT 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			:INTERUPT 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

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	#BUFBEQ,	@CDA	:SET UP BUS ADDRESS
1271	004010	012713	000101		MOV	#101,	@CDS	:SET INTERRUPT 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 INTERRUPT 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 MEMORY (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 INTERRUPTS
1383	004476	032767	000010	1/3064	BIT	#10,	SWR	;CHECK FOR PACK MODE ONLY
1384	004504	001406			BEQ	CDREAD		;BRANCH IF NOT SET
1385	004506	032737	000000	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								
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		ISRR1: 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	ISRRLP		;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 ISRDE2 ;BRANCH IF NOT
1443 004750 00574 ) ISRDE1: 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 ISRDE1
1465 005052 016701 001444 MOV TSTART, R1
1466 005056 005067 001444 CLR CDCNT ;RESET CARD COUNTER
1467 005062 032767 020000 172500 ISRDE2: 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 ;CHECK FOR LAST CARD
1495 005170 002222 BGE ;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$: CMP R1, TEND
1583 005556 001337 BNE PSRD1
1584 005560 016701 000736 MOV TSTART, R1
1585 005564 005067 000736 CLR CDCNT ;RESET CARD COUNTER
1586 005570 032767 020000 171772 PSRD2: BIT #20000, SWR ;CK SW13 FOR INHIBIT PRINTOUT
1587 005575 001017 BNE PSRDE3 ;BRANCH IF SET
1588 005600 004767 000342 JSR %7, TYHEAD ;TYPE HEADING, DECK, CDCNT, CLCNT
1589 005604 000004 013715 TYPE, SPACE
1590 005610 114167 004745 MOVB -(R1), PRINT1+1 ;MOVE BYTE INTO PRINT BUFFER
1591 005614 004767 004754 JSR %7, PRINTB ; AND PRINT IT
1592 005620 000004 013712 TYPE, SPACE-3
1593 005624 114067 004731 MOVB -(R0), PRINT1+1 ;MOVE BYTE INTO PRINT BUFFER
1594 005630 004767 004740 JSR %7, PRINTB ; AND PRINT IT
1595 005634 122021 CMPB (R0)+, (R1)+ ;RESET POINTERS
1596 005636 005767 171726 PSRDE3: TST SWR ;CHECK FOR HALT ON ERROR
1597 005642 100001 BPL .+4 ;BRANCH IF HALT ON ERROR NOT SET
1598 005644 000000 HALT ;HALT ON ERROR SET
1599 005646 000631 BR PSRRT
1600
1601 ;INTERUPT DUE TO SOME KIND OF ERROR
1602 005650 100402 PSRER: BMI PSRE1 ;BRANCH ON ERROR BIT 15
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1603 005652 104000 HLT ;ERROR BIT 15 NOT SET
1604 005654 000463 BR PSRST
1605
1606 005656 032713 004000 PSRE1: BIT #4000, @CDS
1607 005662 001414 BEQ PSRE2 ;BRANCH IF NOT
1608 005664 032713 000002 BIT #2, @CDS
1609 005670 001001 BNE .+4
1610 005672 104000 HLT
1611 005674 032767 000020 171666 BIT #20, SWP
1612 005702 001001 BNE .+4 ;BRANCH IF BINARY DECK
1613 005704 104000 HLT
1614 005706 012767 177660 172606 MOV #-120, COUNT ;ONLY READ ONE CARD
1615 005714 032713 010000 PSRE2: BIT #10000, @CDS ;CHECK FOR OFF-LINE
1616 005720 001415 BEQ PSRE3
1617 005722 032713 040000 BIT #40000, @CDS ;CHECK FOR CARD READER ERROR
1618 005726 001002 BNE .+6 ;BRANCH IF SET
1619 005730 104000 HLT ;OFF-LINE BUT NOT CARD READER ERROR
1620 005732 000414 BR PSRE4
1621
1622 005734 004767 000312 JSR %7, LASTCD ;CHECK FOR LAST CARD
1623 005740 002402 BLT 1$ ;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 INTERRUPT SERVICE ROUTINE
1649 ;CALCULATES A NEW 'SIZE' (NUMBER OF COLUMNS TO BE READ)
1650 ;SETS UP THE CARD READER BUFFERS, AND ISSUES 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 000412 SRETR1: BIT #001000, SIZE
1657 006056 001004 BNE SRETR4
1658 006060 012767 000120 000424 SRETR3: MOV #120, OFFSET
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1659 006066 000760
1660 006070 004767 000156
1661 006074 003371
1662 006076 016714 000406
1663 006102 012700 016044
1664 006106 010015
1665 006110 005213
1666 006112 000002
1667
1668
1669
1670 006114 062767 000240 000400
1671 006122 062767 000120 000374
1672 006130 062701 000240
1673 006134 166701 000366
1674 006140 052713 000002
1675 006144 000207
1676
1677
1678 006146 005767 172360
1679 006152 001004
1680 006154 005267 172352
1681 006160 000004 015053
1682 006164 000004
1683 006166 000000
1684 006170 000004 013715
1685 006174 005267 000326
1686 006200 016767 000322 004352
1687 006206 004767 004402
1688 006212 005367 000310
1689 006216 000004 013715
1690 006222 005267 000302
1691 006226 016767 000276 004324
1692 006234 004767 004354
1693 006240 005367 000264
1694 006244 000004 013715
1695 006250 000207
1696
1697
1698 006252 016767 000232 000236
1699 006260 016767 000242 000232
1700 006266 005267 000226
1701 006272 062767 000120 000216
1702 006300 100772
1703 006302 026727 000212 000120
1704 006310 000207
1705
1706
1707 006312 005067 000212
1708 006316 005267 000204
1709 006322 026727 000200 000120
1710 006330 002001
1711 006332 000207
1712
1713 006334 005726
1714 006336 022626
```

BR SRETRN
SRETR4: JSR %7, LASTCD ;CHECK FOR MORE THAN 80 CARDS
BGT SRETR3 ;BRANCH IF GREATER
MOV SIZE, @CDC ;SET UP COLUMN COUNT
MOV #80, @CDC ;RESET TABLE POINTER
MOV R0, @CDA ;SET UP ADDRESS REG
INC @CDS ;READ
RTI

;SUBROUTINE TO SET PACKING MODE AND MOVE THE POINTERS FOR THE DATA.
PAKSET: ADD #160., TSTART ;MOVE TABLE POINTER TO PACKED TABLE
ADD #80., TEND
ADD #160, P1 ;UPDATE TABLE POINTER
SUB CDCN, 1 ;COMPENSATE FOR BYTES
BIS #2, @CDS ;SET PACKING MODE BIT
RTS %7

;SUBROUTINE TO TYPE HEADING, TYPE OF DECK, CARD COUNT, AND COLUMN COUNT
TYHEAD: TST ERFLG ;CHECK FOR FIRST ERROR
BNE NOHEAD ;BRANCH IF NOT
INC ERFLG ;SET FLAG
TYPE, MSG13 ;TYPE HEADING FOR DATA ERRORS
NOHEAD: TYPE ;OUTPUT TYPE OF DECK
DECK: DUMMY ;POINTER TO DECK TITLE
TYPE, SPACE
INC CDCNT ;ADJUST CADR COUNT
MOV CDCNT, PRINT1 ;TYPE CDCNT IN OCTAL
JSR %7, PRINTR ;TYPE LEADING ZERO'S
DEC CDCNT ;READJUST CADR COUNT
TYPE, SPACE
INC CLCNT ;ADJUST COLUMN COUNT
MOV CLCNT, PRINT1 ;TYPE CLCNT IN OCTAL
JSR %7, PRINTR ;TYPE LEADING ZERO'S
DEC CLCNT ;READJUST COLUMN COUNT
TYPE, SPACE
RTS %7

;SUBROUTINE TO CHECK FOR LAST CARD
LASTCD: MOV SIZE, TEMP1
MOV CDCNT, TEMP2
LSTCD1: INC TEMP2
ADD #120, TEMP1
BMI LSTCD1
CMP TEMP2, #80.
RTS %7

;SUBROUTINE TO KEEP TRACK OF CARDS
NXCRD: CLR CLCNT ;RESET COLUMN COUNT
INC CDCNT ;KEEP TRACK OF CARDS
CMP CDCNT, #120 ;CHECK FOR 80TH CARD
BGE ALLDON
RTS %7 ;RETURN
ALLDON: TST (6)+
CMP (6)+, (6)+ ;CORRECT STACK POINTER TO REPLACE RTS
;CORRECT STACK POINTER TO REPLACE RTI

```
1715 006340 004767 003622 JSR %7,BELL ;RING BELL
1716 006344 013700 000042 MOV @#42,%0 ;LOAD CONTENTS OF SOFT VECTOR 42
1717 006350 001405 BEQ HOOK1 ;BRANCH IF NO HOOK
1718 006352 000005 RESET ;CLEAR ALL I/O
1719 006354 004710 JSR %7,(RC) ;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 INTERRUPT VECTOR
1743 006440 000001 WAIT ;WAIT FOR AN INTERRUPT
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 RESTR ;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 000J06      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 TRANSITION 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 INTERRUPT
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 BIS      #340,    PS      ;SET PROCESSOR TO LEVEL 7
1863 007052 016762 170720 MOV      PS,      2(ADINT) ;LOAD RETURN PROCESSOR STATUS
1864 007060 042767 000340 BIC      #340,    PS      ;SET PROSSOR PRIORITY TO 0
1865 007066 012713 000100 MOV      #100,    @CDS  ;SET INTERRUPT 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 INTERRUPT HANDLER
1871
1872 007112 104000      TINTC: HLT                ;'STOP' SHOULDN'T CAUSE AN INTERRUPT
1873 007114 000002      RTI                ;RETURN FROM THE INTERRUPT
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
```

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 READER 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	BIS	#340, PS	:SET PROCESSOR TO LEVEL 7
1962	007426	016762	170344	MOV	PS, 2(ADINT)	:LOAD RETURN PROCESSOR STATUS
1963	007434	042767	000340	BIC	#340, PS	:SET PROSSOR PRIORITY TO 0
1964	007442	012713	000100	MOV	#100, @CDS	:SET INTERRUPT 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 INTERRUPT
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	BIS	#340, PS	:SET PROCESSOR TO LEVEL 7
1973	007500	016762	170272	MOV	PS, 2(ADINT)	:LOAD RETURN PROCESSOR STATUS
1974	007506	042767	000340	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 INTERRUPT
1979						
1980	007530	022626		TINTDA: CMP	(SP)+, (SP)+	:RESTORE THE STACK
1981	007532	022713	000300	CMP	#000300, @CDS	:CHECK 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 INTERRUPT 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 INTERRUPT
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 INTERRUPT
2027
2028 007734 022626 TINTEA: CMP (SP)+, (SP)+ ;RESTORE THE STACK
2029 007736 022713 000300 CMP #000300, @CDS ;CHECK 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
2037 007746 104400 TESTF: SCOPE
2038 007750 004767 JSR %7, INIT
2039 007754 000004 TYPE, MSG5 ;'REMOVE ALL CARDS FROM THE INPUT HOPPER'
2040 007760 000004 TYPE, MSG2 ;'THEN HIT 'CONTINUE' ON THE CONSOLE'
2041 007764 000004 TYPE, MSG8 ;'HOLD DOWN THE SWITCH, UNDER THE CAP
2042 007770 000004 013726 TYPE, MSG1 ;OF THE INPUT HOPPER'
2043 007774 000004 013720 TYPE, CRLF-3 ;'PRESS CARD READER 'RESET''
2044 010000 000000 HALT ;MOVE MESSAGE UP ON TTY
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 READER 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 INTERRUPT 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 INTERRUPT
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 INTERRUPT
2095							
2096	010220	022626			TINTFA: CMP	(SP)+, (SP)+	:RESTORE THE STACK
2097	010222	022713	000300		CMP	#000300, @CDS	:CHECK THE CARD READER STATUS
2098	010226	001401			BEQ	+.4	:BRANCH IF OK
2099	010230	104000			HLT		:CARD READER STATUS ERROR
2100							
2101							
2102							
2103							
2104	010232	104400			:A STACK CHECK ERROR SHOULD SET BIT 15, BIT 14, AND BIT 12		
2105	010234	004767	001700		:THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO		
2106	010240	000004	014027		:THE READ STATION		
					TESTG: SCOPE		
					JSR	%7, INIT	
					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	;	CHECK FOR OF LINE
2113	010264	001775			BEQ	TLOPG	;	WAIT FOR OFF-LINE
2114	010266	032713	000010		TLOPGA:	BIT	;	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	;	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 READER 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 INTERRUPT 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 INTERRUPT
2150								
2151	010430	022626			TINTG:	CMP	;	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 INTERRUPT
2160								
2161	010474	022626			TINTGA:	CMP	;	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
2181 010532 000004 013726      TYPE,    MSG1
2182 010536 000004 013762      TYPE,    MSG2
2183 010542 000004 013720      TYPE,    CRLF-3
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
2189 010562 000004 013762      TYPE,    MSG2
2190 010566 000004 013720      TYPE,    CRLF-3
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      #TINTI, @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

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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	#BUFBEQ,	@CDA	:SET UP BUS ADDRESS
2223	010700	005213			INC	@CDS		:START READER
2224	010702	000777			BR	.		:WAIT FOR AN INTERRUPT
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		:WHEN 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

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2275
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2280 011042 104400
2281 011044 004767 001070
2282 011050 000004 014702
2283
2284 011054 000004 013726
2285 011060 000004 013720
2286 011064 032713 010000
2287 011070 001775
2288 011072 032713 000010
2289 011076 001775
2290 011100 022713 140210
2291 011104 001401
2292 011106 104000
2293
2294 011110 012714 177701
2295 011114 012715 016044
2296 011120 005213
2297 011122 105713
2298 011124 100376
2299 011126 032713 010000
2300 011132 001001
2301 011134 104000
2302
2303 011136 005713
2304 011140 100401
2305 011142 104000
2306
2307 011144 032713 040000
2308 011150 001001
2309 011152 104000
2310
2311 011154 032713 027577
2312 011160 001401
2313 011162 104000
2314
2315 011164 012712 011236
2316 011170 052767 000340 166600
2317 011176 016762 166574 000002
2318 011204 042767 000340 166564
2319 011212 012713 000100
2320 011216 000004 014166
2321 011222 000004 013726
2322 011226 000004 013720
2323 011232 000777
2324 011234 000670
2325 011236 022626
2326 011240 104400
2327 011242 004767 000720
2328 011246 000167 175302
2329
2330
```

...
: A READ CHECK ERROR SHOULD SET BIT 15, BIT 14, AND BIT 12
: THIS ERROR OCCURS WHEN THE READ ELECTRONICS IN THE CARD
: READER DISAGREES WITH THE NORMAL UNPUNCHED AREA OF THE CARD
TESTH: SCOPE
JSR X7,INIT
TYPE, MSG12
: 'PLACE SPECIAL DARK LIGHT CHECK CARD ONLY
: AT THE FRONT OF THE INPUT STACK'
: 'PRESS CARD READER 'RESET''
: MOVE MESSAGE UP ON TTY
TLOPH: TYPE, MSG1
TYPE, CRLF-3
BIT #10000, @CDS
BEQ TLOPH
: CHECK FOR OF LINE
: WAIT FOR OFF-LINE
TLOPHA: BIT #10, @CDS
BEQ TLOPHA
: CHECK FOR 'TRANSITION TO ON LINE'
: WAIT FOR IT
CMP #140210, @CDS
BEQ .+4
: CHECK FOR CORRECT STATUS BITS
: BRANCH IF OK
HLT
: STATUS NOT EQUAL TO 140210
MOV #-77, @CDC
MOV #BUFBEG, @CDA
INC @CDS
TLOPHB: TSTB @CDS
BPL TLOPHB
BIT #10000, @CDS
BNE .+4
: SET UP COLUMN COUNT
: SET UP BUS ADDRESS
: READ
: CHECK CONTROLLER READY
: WAIT FOR CONTROLLER READY
: CHECK BIT12
: BRANCH IF SET
HLT
: OFF-LINE (BIT 12) WASN'T SET
TST @CDS
BMI .+4
: CHECK SPECIAL CONDITION BIT
: BRANCH IF SET
HLT
: SPECIAL CONDITION NOT SET
BIT #40000, @CDS
BNE .+4
: CHECK FOR CARD READER ERROR
: BRANCH IF SET
HLT
: CARD READER ERROR BIT 14 NOT SET
BIT #027577, @CDS
BEQ .+4
: CHECK FOR EXTRA BITS
: BRANCH IF OK
HLT
: STATUS WORD ERROR
MOV #TINTH, @ADINT
BIS #340, PS
MOV PS, 2(ADINT)
BIC #340, PS
MOV #100, @CDS
TYPE, MSG6
TYPE, MSG1
TYPE, CRLF-3
BR .
: LOAD RETURN POINTER
: SET PROCESSOR TO LEVEL 7
: LOAD RETURN PROCESSOR STATUS
: SET PROSSOR PRIORITY TO 0
: SET INTERRUPT ENABLE
: 'RESTORE CARDS TO THE INPUT, HOPPER'
: 'PRESS CARD READER 'RESET''
: MOVE MESSAGE UP ON TTY
: WAIT FOR AN INTERRUPT
TINTH: CMP (SP)+, (SP)+
SCOPE
JSR X7, BELL
JMP ER12CD
: RESTORE THE STACK
: RING THE BELL
: LOOP BACK TO THE P2GINNING

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2336 011252 004767 167264
2337 011256 000000
2338 011260 016767 166304 000072
2339 011266 062767 000002 000064
2340 011274 000000
2341 011276 032767 010000 166264
2342 011304 001404
2343 011306 042767 000020 166462
2344 011314 000403
2345 011316 052767 000020 166452
2346 011324 005067 001106
2347 011330 012767 004000 001076
2348 011336 012767 011350 001074
2349 011344 000177 000010
2350 011350 005067 001062
2351 011354 000177 000000
2352 011360 000000
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2371 011362 012767 011362 001050
2372 011370 004767 167146
2373 011374 000000
2374 011376 016767 166166 000526
2375 011404 042767 170000 000520
2376 011412 016767 000514 000514
2377 011420 005067 000512
2378 011424 006067 000504
2379 011430 106167 000501
2380 011434 106067 000474
2381 011440 106167 000471
2382 011444 106167 000465
2383 011450 106167 000461
2384 011454 106167 000455
2385 011460 012701 000007
2386 011464 006067 000444

*****
:ROUTINE TO LOOP THRU A SINGLE INSTRUCTION TEST OR ERROR FUNCTION TEST
:NOTE THAT SW11 MUST BE DOWN AFTER 2ND HALT
*****
TESTX: JSR      X7,SETUP          ;SETUP POINTERS AND FLAGS
        HALT          ;WAIT FOR STARTING ADDRESS
        MOV      SWR,RETRNX      ;STORE STARTING ADDRESS
        ADD      #2,RETRNX      ;CHANGE TO FIRST ADDRESS AFTER SCOPE INSTRUCTION
        HALT          ;SET SWR OPTIONS (BIT 11 MUST = 0)
        BIT      #10000,SWR      ;CHECK SW12
        BEQ      .+12           ;BRANCH IF NOT SET
        BIC      #20,PS         ;CLEAR TRACE BIT
        BR       .+10           ;SKIP NEXT INSTRUCTION
        BIS      #20,PS         ;SET TRACE BIT
        CLR      ITCNT          ;CLEAR ITERATION COUNTER
        MOV      #4000,ITMAX
        MOV      #XLOOP,RETURN  ;LOAD RETURN ADDRESS
        JMP      @RETRNX        ;JUMP TO TEST
XLOOP:  CLR      ITCNT          ;KEEP ITERATION COUNTER AT ZERO
        JMP      @RETRNX        ;JUMP TO TEST
RETRNX: 0

*****
:ROUTINE TO CHECK CARDS WHICH HAVE ALL COLUMNS IDENTICALLY PUNCHED.
:THIS ROUTINE ALLOWS SPECIFIC TYPES OF DATA FAILURES TO BE STUDIED
:EASILY. THE ROUTINE HALTS ONCE AT THE START. SET THE CORRECT CARD
:IMAGE PATTERN IN SW11-SW00, THEN HIT CONTINUE (AFTER THE DECK IS
:LOADED AND CARD READER IS ON-LINE). THE PATTERN IS STORED, AND THEN
: EACH COLUMN OF EACH CARD IS READ TWICE AND COMPARED WITH IT. IF A
:DISCREPANCY OCCURS, THE ERROR IS PRINTED OUT ALONG WITH THE TOTAL
:NUMBER OF CARDS READ AND THE TOTAL NUMBER OF DATA ERRORS DISCOVERED
:UP TO THAT POINT (ALL PRINTOUTS ARE IN OCTAL). WHEN THE INPUT HOPPER
:IS EMPTY, THE ROUTINE RINGS THE BELL AND WAITS FOR MORE CARDS TO BE
:LOADED AND THE CARD READER TO BE PUT BACK ON-LINE.
:SW15=1 CAUSES A HALT AFTER AN ERROR, AND SW13=1 INHIBITS ERROR PRINTOUTS.
*****
CKSAME: MOV      #CKSAME,RETURN ;INITIALIZE POINTERS
        JSR      X7,SETUP      ;WAIT FOR CARD IMAGE PATTERN
        HALT          ;STORE PATTERN
        MOV      SWR,CARDIM     ;CLEAR UPPER BITS OF PATTERN
        BIC      #170000,CARDIM
        MOV      CARDIM,CDPK0
        CLR      DERFLG
        ROR      CDPK0
        ROLB     CDPK1
        RORB     CDPK0
        ROLB     CDPK1
        ROLB     CDPK1
        ROLB     CDPK1
        ROLB     CDPK1
        MOV      #7, R1
        CKLOP1: ROR      CDPK0
```

2387	011470	103004			BCC	CKOVR	
2388	011472	005267	000440		INC	DERFLG	
2389	011476	150167	000433		BISB	R1,CDPK1	
2390	011502	005301			DEC	R1	
2391	011504	001367			BNE	CKLOP1	
2392	011506	000000			HALT		:WAIT FOR SWITCH SETTINGS
2393	011510	004767	000424		CKSTRT: JSR	X7,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,RO	:SET UP BUFFER POINTER
2406	011574	012714	177660		MOV	#-120, @CDC	:SET UP COLUMN COUNTER
2407	011600	010015			MOV	RO, @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	(RO)+,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	(RO)+, 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	X7, 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.

```
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 ;TYPE TOTCRD IN OCTAL
2467 012064 016767 000040 000466 MOV TOTCRD,PRINT1 ;TYPE LEADING ZERO'S
2468 012072 004767 000516 JSR %7,PRINTR
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
```

```
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
2556 012434 000001
2557 012436 000000
2558 012440 001064
2559
2560
2561
2562
2563
2564
2565
2566
2567
2568

RTI
ITMAX: 1
ITCNT: 0
RETURN: TEST1+2

;RETURN INLINE-NEXT TEST
;MAX NUMBER OF ITERATIONS
;COUNT LOCATION FOR ITERATION LOOP
;ADDRESS OF LAST TEST

;ROUTINE TO TYPE ASCII MESSAGE, MESSAGE MUST TERMINATE WITH A 0 BYTE.
;THE ROUTINE WILL INSERT A NUMBER OF NUL' CHARACTERS AFTER A LINE FEED.
;NOTE1: \$NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
;NOTE2: \$FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.

2569 012442 177564
2570 012444 177566
2571 012446 000
2572 012447 002
2573 012450 000
2574 012451 000
2575

\$TPS: 177564
\$TPB: 177566
\$NULL: .BYTE 0
\$FILLS: .BYTE 2
\$TPFLG: .BYTE 0
 .BYTE 0

;TTY PRINTER STATUS REG. ADDRESS
;TTY PRINTER BUFFER REG. ADDRESS
;CONTAINS NULL CHARACTER FOR FILLS
;CONTAINS # OF FILLER CHARACTERS REQUIRED
;'TERMINAL AVAILABLE' FLAG (0=YES)
;RESERVED

2576 012452 105767 177772
2577 012456 001402
2578 012460 000000
2579 012462 000407
2580 012464 010046
2581 012466 017600 000002
2582 012472 112046
2583 012474 001005
2584 012476 005726
2585 012500 012600
2586 012502 062716 000002
2587 012506 000002
2588 012510 004767 000026
2589 012514 122726 000012
2590 012520 001364
2591 012522 016746 177720
2592

\$TYPE: TSTB \$TPFLG
 BEQ 6\$
 HALT
 BR 7\$
6\$: MOV R0, -(SP)
 MOV @2(SP), R0
1\$: MOV B (R0)+, -(SP)
 BNE 2\$
 TST (SP)+
 MOV (SP)+, R0
7\$: ADD #2, (SP)
 RTI
2\$: JSR PC, 5\$
3\$: CMPB #12, (SP)+
 BNE 1\$
 MOV \$NULL, -(SP)
4\$: DECB 1(SP)
 BLT 3\$
 JSR PC, 5\$
 BR 4\$
5\$: TSTB @2\$TPS
 BPL 5\$
 MOVB 2(SP), @2\$TPB
 RTS PC

;IS THERE A TERMINAL?
;BR IF YES
;HALT HERE IF NO TERMINAL
;LEAVE
;SAVE R0
;GET ADDRESS OF ASCII STRING
;PUSH CHARACTER TO BE TYPED ONTO STACK
;BR IF IT ISN'T THE TERMINATOR
;IF TERMINATOR POP IT OFF THE STACK
;RESTORE R0
;ADJUST RETURN PC
;RETURN
;GO TYPE THIS CHARACTER
;CHECK IF THE CHAR. TYPED WAS A LINE FEED
;GO GET NEXT CHAR. IF NOT LINE FEED
;GET # OF FILLER CHARS. NEEDED
;AND THE NULL CHAR.
;DOES A NULL NEED TO BE TYPED?
;BR IF NO--GO POP THE NULL OFF OF STACK
;GO TYPE A NULL
;LOOP
;WAIT UNTIL PRINTER IS READY
;LOAD CHAR TO BE TYPED INTO DATA REG.

2600 012556 000207
2601
2602
2603
2604
2605
2606
2607
2608
2609
2610 012560 000000

; OCTAL DUMP OF A WORD

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 ;SUPPRESS 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

```

;DATA TABLES FOR DATA RELIABILITY TESTS

;ALPHANUMERIC DECK DATA TABLE ;CARD IMAGE FORM

COLUMN	ASCII	PUNCH
:1	B	12
:2	A	12 1
:3	B	12 2
:4	C	12 3
:5	D	12 4
:6	E	12 5
:7	F	12 6
:8	G	12 7

```

CHGD1:
ALPCD: 4000
      14400
      24200
      34100
      44040
      54020
      64010
      74004

```

```

2651
2652
2653
2654
2655
2656
2657
2658 012750
2659 012750 004000
2660 012752 014400
2661 012754 024200
2662 012756 034100
2663 012760 044040
2664 012762 054020
2665 012764 064010
2666 012766 074004

```

:9
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 :61
 :62
 :63
 :64

H I J K L M N O P Q R S T U V W X Y Z [\] ^ _ ` a b c d e f g h i j k l m n o p q r s t u v w x y z { | } ~

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12	9	
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12	8	5
12	8	6
12	8	7
11		
11	1	
11	2	
11	3	
11	4	
11	5	
11	6	
11	7	
11	8	
11	9	
11	8	2
11	8	3
11	8	4
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11	8	6
11	8	7
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BLANK		
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34102
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[illegible]

ALPEND: 74006

```
;ALPHANUMERIC DECK DATA TABLE
;THE VALUE IS THE ENCODED FORM OF THE DATA
```

	ALPCDP:	BYTE	ADDRESS	COLUMN	ASCII	PUNCH
		.BYTE	200	:1	&	12
		.BYTE	201	:2	A	12 1
		.BYTE	202	:3	B	12 2
		.BYTE	203	:4	C	12 3
		.BYTE	204	:5	D	12 4
		.BYTE	205	:6	E	12 5
		.BYTE	206	:7	F	12 6
		.BYTE	207	:8	G	12 7
		.BYTE	210	:9	H	12 8
		.BYTE	220	:10	I	12 9
		.BYTE	212	:11	[	12 8 2
		.BYTE	213	:12	.	12 8 3
		.BYTE	214	:13	<	12 8 4
		.BYTE	215	:14	(	12 8 5
		.BYTE	216	:15	+	12 8 6
		.BYTE	217	:16	!	12 8 7
		.BYTE	100	:17	-	11
		.BYTE	101	:18	J	11 1
		.BYTE	102	:19	K	11 2
		.BYTE	103	:20	L	11 3
		.BYTE	104	:21	M	11 4
		.BYTE	105	:22	N	11 5
		.BYTE	106	:23	O	11 6
		.BYTE	107	:24	P	11 7
		.BYTE	110	:25	Q	11 8
		.BYTE	120	:26	R	11 9
		.BYTE	112	:27	J	11 8 2
		.BYTE	113	:28	\$	11 8 3
		.BYTE	114	:29	*	11 8 4
		.BYTE	115	:30	)	11 8 5
		.BYTE	116	:31	:	11 8 6
		.BYTE	117	:32	^	11 8 7
		.BYTE	40	:33	0	0
		.BYTE	41	:34	/	0 1
		.BYTE	42	:35	S	0 2
		.BYTE	43	:36	T	0 3

2742		
2743	013210	200
2744	013211	201
2745	013212	202
2746	013213	203
2747	013214	204
2748	013215	205
2749	013216	206
2750	013217	207
2751	013220	210
2752	013221	220
2753	013222	212
2754	013223	213
2755	013224	214
2756	013225	215
2757	013226	216
2758	013227	217
2759	013230	100
2760	013231	101
2761	013232	102
2762	013233	103
2763	013234	104
2764	013235	105
2765	013236	106
2766	013237	107
2767	013240	110
2768	013241	120
2769	013242	112
2770	013243	113
2771	013244	114
2772	013245	115
2773	013246	116
2774	013247	117
2775	013250	040
2776	013251	041
2777	013252	042
2778	013253	043

.BYTE	44
.BYTE	45
.BYTE	46
.BYTE	47
.BYTE	50
.BYTE	60
.BYTE	52
.BYTE	53
.BYTE	54
.BYTE	55
.BYTE	56
.BYTE	57
.BYTE	0
.BYTE	1
.BYTE	2
.BYTE	3
.BYTE	4
.BYTE	5
.BYTE	6
.BYTE	7
.BYTE	10
.BYTE	20
.BYTE	12
.BYTE	13
.BYTE	14
.BYTE	15
.BYTE	16
.BYTE	17
.BYTE	200
.BYTE	201
.BYTE	202
.BYTE	203
.BYTE	204
.BYTE	205
.BYTE	206
.BYTE	207
.BYTE	210
.BYTE	220
.BYTE	212
.BYTE	213
.BYTE	214
.BYTE	215
.BYTE	216
ALPENP: .BYTE	217

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0	8	
0	9	
0	8	2
0	8	3
0	8	4
0	8	5
0	8	6
0	8	7
0	8	
BLANK		
1		
2		
3		
4		
5		
6		
7		
8		
9		
8	2	
8	3	
8	4	
8	5	
8	6	
8	7	
12		
12	1	
12	2	
12	3	
12	4	
12	5	
12	6	
12	7	
12	8	
12	9	
12	8	2
12	8	3
12	8	4
12	8	5
12	8	6
12	8	7

;BINARY DECK DATA TABLE

```

BINCD:  0
        1
        2
        70004
        60010
        50020
        40040
        30100
        20200

```

COLUMN	PUNCH BLANK
:1	
:2	
:3	
:4	
:5	
:6	
:7	
:8	
:9	

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

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	174567	:80

BINEND: 174567

:BINARY DECK DATA TABLE
:THE VALUE IS THE ENCODED VALUE, WHICH ORS THE OCTAL REPRESENTATION OF
:ROWS ONE THRU SEVEN

			COLUMN	ASCII	PUNCH
				SPACE	BLANK
2911	013570	000	:1		
2912	013571	020	:2	9	9
2913	013572	010	:3	8	8
2914	013573	007	:4	7	7
2915	013574	006	:5	6	6
2916	013575	005	:6	5	5
2917	013576	004	:7	4	4
2918	013577	003	:8	3	3
2919	013600	002	:9	2	2
2920	013601	001	:10	1	1
2921	013602	040	:11	0	0
2922	013603	100	:12		11
2923	013604	200	:13	8	12
2924	013605	067	:14		
2925	013606	117	:15		
2926	013607	177	:16		
2927	013610	207	:17		
2928	013611	267	:18		
2929	013612	317	:19		
2930	013613	377	:20		
2931	013614	046	:21		
2932	013615	056	:22		
2933	013616	077	:23		
2934	013617	047	:24		
2935	013620	067	:25		
2936	013621	057	:26		
2937	013622	077	:27		
2938	013623	105	:28		
2939	013624	127	:29		
2940	013625	137	:30		
2941	013626	107	:31		
2942	013627	127	:32		
2943	013630	117	:33		
2944	013631	137	:34		
2945	013632	147	:35		
2946	013633	167	:36		

2947	013634	157			.BYTE	157	:37
2948	013635	147			.BYTE	147	:38
2949	013636	167			.BYTE	167	:39
2950	013637	157			.BYTE	157	:40
2951	013640	177			.BYTE	177	:41
2952	013641	204			.BYTE	204	:42
2953	013642	227			.BYTE	227	:43
2954	013643	216			.BYTE	216	:44
2955	013644	237			.BYTE	237	:45
2956	013645	227			.BYTE	227	:46
2957	013646	217			.BYTE	217	:47
2958	013647	237			.BYTE	237	:48
2959	013650	246			.BYTE	246	:49
2960	013651	267			.BYTE	267	:50
2961	013652	256			.BYTE	256	:51
2962	013653	277			.BYTE	277	:52
2963	013654	247			.BYTE	247	:53
2964	013655	257			.BYTE	257	:54
2965	013656	277			.BYTE	277	:55
2966	013657	305			.BYTE	305	:56
2967	013660	327			.BYTE	327	:57
2968	013661	317			.BYTE	317	:58
2969	013662	337			.BYTE	337	:59
2970	013663	307			.BYTE	307	:60
2971	013664	327			.BYTE	327	:61
2972	013665	337			.BYTE	337	:62
2973	013666	347			.BYTE	347	:63
2974	013667	367			.BYTE	367	:64
2975	013670	357			.BYTE	357	:65
2976	013671	377			.BYTE	377	:66
2977	013672	347			.BYTE	347	:67
2978	013673	367			.BYTE	367	:68
2979	013674	357			.BYTE	357	:69
2980	013675	023			.BYTE	23	:70
2981	013676	012			.BYTE	12	:71
2982	013677	033			.BYTE	33	:72
2983	013700	007			.BYTE	7	:73
2984	013701	027			.BYTE	27	:74
2985	013702	017			.BYTE	17	:75
2986	013703	037			.BYTE	37	:76
2987	013704	146			.BYTE	146	:77
2988	013705	037			.BYTE	37	:78
2989	013706	347			.BYTE	347	:79
2990	013707	237			.BYTE	237	:80
2991							
2992	013710	020040	020040	040	SPACE:	.ASCII / / /	
2993	013715	040	000040			.ASCII / /	
2994	013720	005012	012		CRLF:	.ASCII <12><12><12>	
2995	013723	015	000012			.ASCII <15><12>	
2996							
2997	013726	005015	051120	051505	MSG1:	.ASCII <15><12>/PRESS CARD READER 'RESET'/'	
2998	013734	020123	040503	042122			
2999	013742	051040	040505	042504			
3000	013750	020122	051047	051505			
3001	013756	052105	000047				
3002	013762	005015	044124	047105	MSG2:	.ASCII <15><12>/THEN HIT 'CONTINUE' ON THE CONSOLE/	

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	047440	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	

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	.ASCIIZ <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: .ASCIIZ <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: .ASCIIZ <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	.ASCIIZ <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: .ASCIIZ <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: .ASCIIZ <15><12>/ALPHA /
3112	015130	020101	000		
3113	015133	015	041012	047111	MSG15: .ASCIIZ <15><12>/BINARY/
3114	015140	051101	000131		

3115	015144	005015	044502	020124	MSG16: .ASCIIZ <15><12>/BIT 15 WAS SET/
3116	015152	032461	053440	051501	
3117	015160	051440	052105	000	
3118	015165	015	051012	046505	MSG17: .ASCIIZ <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: .ASCIIZ <15><12>/BIT 12 WAS SET/
3128	015254	030440	020062	040527	
3129	015262	020123	042523	000124	
3130	015270	005015	047503	052514	MSG19: .ASCIIZ <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: .ASCIIZ <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: .ASCIIZ <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: .ASCIIZ <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: .ASCIIZ <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	0 5516	040440	042116	044040	
3157	0 5524	052111	023440	047503	
3158	015532	052116	047111	042525	
3159	015540	020047	047117	052040	
3160	015546	042510	000		
3161	015551	015	041412	047117	MSG24: .ASCIIZ <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: .ASCIIZ <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: .ASCIIZ <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: .ASCIIZ <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 BUFBE: 0
3213 000001 .END
```

ALLDON	006334	1710	1713#															
ALPCD	012750	1360	2659#															
ALPCDP	013210	2743#																
ALPEND	013206	1361	2738#															
ALPENP	C*3327	2822#																
ALPI	004336	1355	1360#															
BEGIN	001000	701	761#															
BELL	012166	1336	1715	2327	2431	2499#												
BINCD	013330	1356	2826#															
BINC DP	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#														
CDPKO	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#															
CKSTR1	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#															

CZCDAD0 CD11 CARD READER DIAG
CZCDAD.P11 26-MAR-80 11:18MACY11 30A(1052) 26-MAR-80 11:21 PAGE 61
CROSS REFERENCE TABLE -- USER SYMBOLS

SEQ 0060

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#											
DUPPY =	000000	667#	1583											
D.1	012410	2544	2550#											
D.2	012422	2546	2548	2553#										
ENDCK	004240	1333#												
ERCD11	006546	704	1778#											
ERFLG	000532	757#	1353*	1678	1680*	2396*	2448	2450*						
ER12CD	006554	1777	1779#	2328										
CR1200	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				
		730#	747	748	749*									
INTVC	000516													
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											
ISRNK	004720	1434#												
ISRNK1	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#								
OFF SET	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								

[illegible]

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)