CR11

DIAGNOSTIC

MD-11-DZCRA-A

EP-DZCRA-A-DL-A

FICHE 1 OF 1

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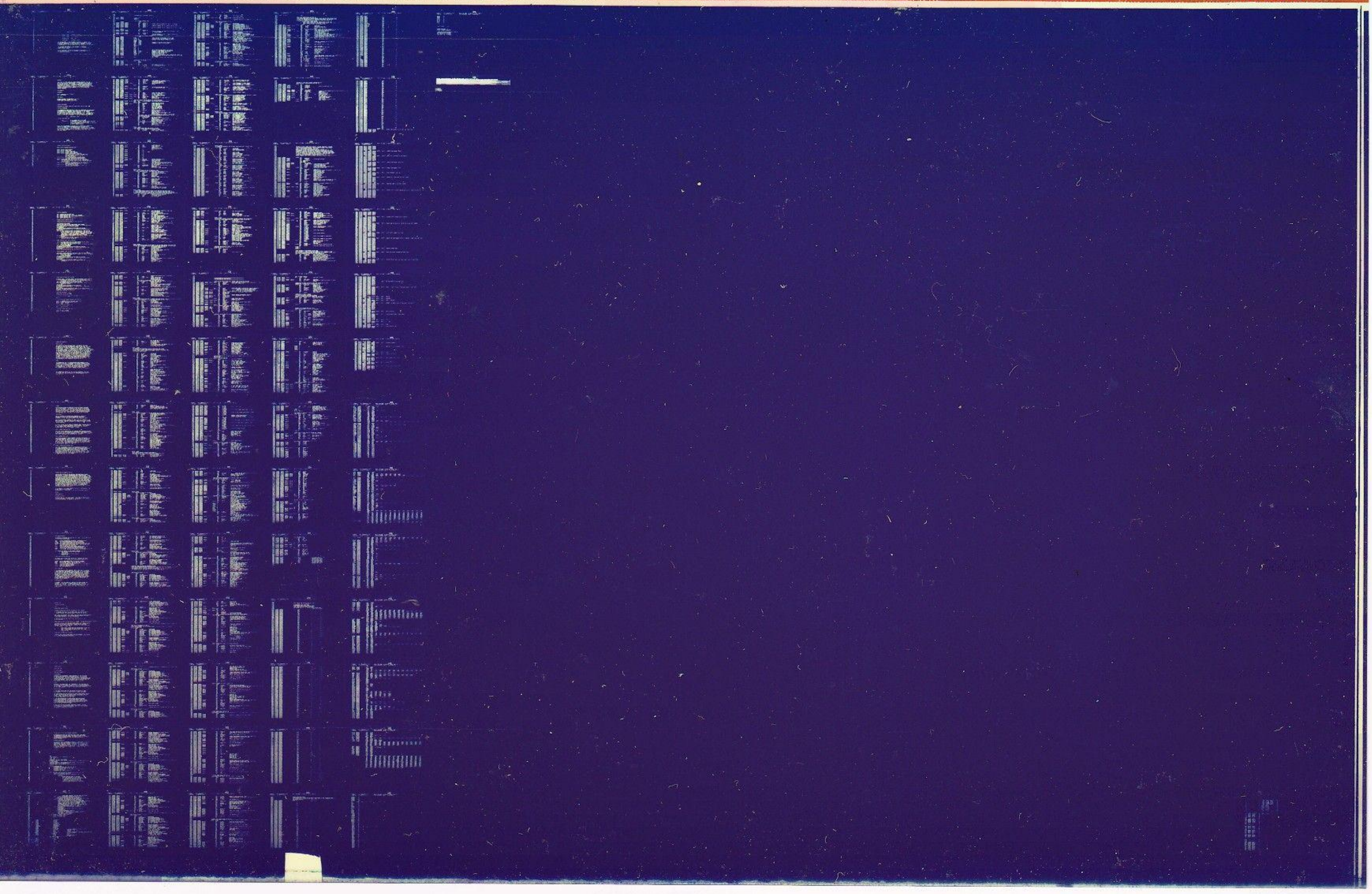
MADE IN U.S.A.



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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZCRA-D
PRODUCT NAME: CR11 DIAGNOSTIC TES"
PROGRAM DATE: APRIL 1976
MAINTAINER: DIAGNOSTIC GROUP

1. ABSTRACT

THIS TEST IS TO BE USED AS A CARD READER DIAGNOSTIC FOR THE PDP-11 WITH THE CR11 CARD READER. IT TESTS ALL LOGIC FUNCTIONS OF THE CARD READER, AND INCLUDES AN EXERCISER FOR ALPHANUMERIC AND BINARY TEST DECKS. A SEPARATE STARTING ADDRESS ALLOWS THE ERROR SENSING FUNCTIONS OF THE G.D.I. OF DOCUMATION READER TO BE CHECKED. ANOTHER STARTING ADDRESS TESTS SPECIAL DECKS WHICH HAVE ALL COLUMNS AND CARDS PUNCHED IDENTICALLY, TO AID IN DIAGNOSING SPECIAL PROBLEMS.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11 COMPUTER WITH 4K MEMORY
CR11 CARD READER

2.2 TEST DECKS

MAINDEC-89-D2A1-C ALPHANUMERIC TEST DECK
MAINDEC-89-D2A2-C BINARY TEST DECK
EXTRA CARDS (FOR ERROR FUNCTION TEST)

3. LOADING PROCEDURE

PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.

4. STARTING PROCEDURE

THIS PROGRAM HAS BEEN MODIFIED TO RUN ON A PROCESSOR WITH OR WITHOUT A HARDWARE SWITCH REGISTER. WHEN FIRST EXECUTED THE PROGRAM TESTS THE EXISTENCE OF A HARDWARE SWITCH REGISTER. IF NOT FOUND A SOFTWARE SWITCH REGISTER LOCATION (SWREG=LOC. 176) IS DEFAULTED TO. IF THIS IS THE CASE, UPON EXECUTION THE CONTENTS OF THE SWREG ARE DUMPED IN OCTAL ON THE CONSOLE TTY AND ANY CHANGES ARE REQUESTED

(IE) SWR=XXXXXX NEW=

POSSIBLE RESPONSES ARE:

1.	<CR>	IF NO CHANGES ARE TO BE MADE
2.	6 DIGITS 0-7	TO REPRESENT IN OCTAL THE NEW SWITCH REGISTER VALUE ;LAST DIGIT FOLLOWED BY <CR>.
3.	↑U	TO ALLOW REENTERING VALUE IF ERROR IS COMMITTED KEYING IN SWREG VALUE.

BUILT INTO THE PROGRAM IS THE ABILITY TO DYNAMICALLY CHANGE THE CONTENTS OF SWREG DURING PROGRAM EXECUTION. BY STRIKING ↑G (CNTL G) ON CONSOLE TTY THE OPERATOR SETS A REQUEST FLAG TO CHANGE THE CONTENTS OF SWREG, WHICH IS PROCESSED IN KEY AREAS OF THE PROGRAM CODE (IE) ERROR ROUTINES, AFTER HALTS END OF PASS, AND OTHER APPLICABLE AREAS.

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                        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
                                               (NOTE THAT IF SW11 IS SET, THE CARD COUNT
                                               WILL BE ALTERED, CAUSING FAILURES IN THE
                                               DATA TEST SECTION.)
                                SW10=1 OR UP---CR11 CONTROLLER USES THE M829 MODULE
                                               (IF DOWN, ASSUMES THE M8290 MODULE)
                                SW07=1 OR UP---LOOP THRU THE INSTRUCTION TEST PORTION
                                NOTE:   DATA ERRORS MAY OCCUR IF SW7 IS SET, THEN CLEARED.
                                        ALSO THE TEST MAY HANG WHEN THE INPUT HOPPER GOES EMPTY
                                        IF SW7 WAS 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
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126
127                             4.2     STARTING ADDRESSES
128
129                                     200 = INSTRUCTION AND DATA TEST
130                                     210 = ERROR FUNCTION TEST (WITH C.D.C. READER)
131                                     220 = ERROR FUNCTION TEST (WITH DOCUMATION READER)
132                                     240 = SINGLE SUBTEST LOOP
133                                     250 = READ SINGLE DATA PATTERN TEST
134
135                             4.3     PROGRAM AND/OR OPERATOR ACTION
136
137                             4.3.1   INSTRUCTION AND DATA RELIABILITY TEST (SA 200)
138
139                                     LOAD PROGRAM INTO MEMORY.
140                                     LOAD ONE TEST DECK IN THE CARD READER INPUT HOPPER.
141                                     PRESS MOTOR START AND READ START ("RESET" ON DOCUMATION READER).
142                                     SET SWITCH REGISTER TO STARTING ADDRESS.
143                                     LOAD ADDRESS.
144                                     IF HARDWARE SWITCH REGISTER IS AVAILABLE SET SWITCHE
145                                     SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
146                                     PRESS START.
147                                     WHEN THE INPUT HOPPER IS EMPTY THE PROGRAM WILL HANG WAITING
148                                             FOR AN INTERRUPT FROM THE CARD READER.  LOAD ONE OR MORE
149                                             TEST DECKS INTO THE INPUT HOPPER.  PRESSING "MOTOR START" AND
150                                             "READ START" ("RESET" ON DOCUMATION READER) ON THE CARD
151                                             READER SHOULD CAUSE PROGRAM EXECUTION TO RESUME.
152                                     THIS ENTIRE SEQUENCE IS NECESSARY TO RUN THE FULL TEST ON THE CARD
153                                             READER.
154                                     ALL PRINTOUTS INDICATE FAILURE, INCLUDING THOSE SAYING
155                                             THAT BIT 8 OR 9IT 15 WAS SET.
156
157                             4.3.2   ERROR FUNCTION TEST (SA 210 OR 220)
158
159                                     LOAD A FEW SPARE CARDS INTO THE INPUT HOPPER (DO NOT LOAD A
160                                             TEST DECK-THIS TEST IS DESTRUCTIVE!)
161                                     PRESS "MOTOR START" AND "READ START" ("RESET" ON DOCUMATION READER)
162                                             ON THE CARD READER.
163                                     LOAD THE STARTING ADDRESS.
164                                     IF HARDWARE SWITCH REGISTER IS AVAILABLE SET SWITCHE
165                                     SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
166                                     PRESS START.
167                                     FOLLOW THE INSTRUCTIONS AS THEY ARE PRINTED OUT.
168
169                             4.3.3   SINGLE SUBTEST LOOP (SA 240)
170
171                                     LOAD CARDS (SPARE CARDS OR A TEST DECK) INTO THE INPUT HOPPER.
172                                     PRESS "MOTOR START" AND "READ START" ("RESET" ON DOCUMATION READER)
173                                             ON THE CARD READER.
174                                     LOAD THE STARTING ADDRESS.
175                                     IF HARDWARE SWITCH REGISTER IS AVAILABLE SET SWITCHE
176                                     SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
177                                     PRESS START.
178                                     WHEN ASKED,ENTER THE STARTING ADDRESS OF DESIRED TEST
179                                             (ADDRESS OF THE TESTXX TAG, WHERE XX MAY BE 1 THRU 24
180                                             OR A THRU G).
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4.3.4 SINGLE DATA PATTERN TEST (SA 250)

A SPECIAL DECK (1 OR MORE CARDS) MUST BE PUNCHED TO RUN THIS TEST
ANY DATA PATTERN MAY BE USED, BUT IT MUST BE IDENTICAL IN ALL
80 COLUMNS OF ALL THE CARDS (I.E. ONLY ONE PIECE OF DATA)
LOAD THIS PREPARED DECK INTO THE INPUT HOPPER.
PRESS CARD READER "MOTOR START" AND "READ START" ("RESET" ON
DOCUMATION READER).
LOAD SA 250.
IF HARDWARE SWITCH REGISTER IS AVAILABLE SET THE
SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
PRESS START.
WHEN THE CARD READER RUNS OUT OF CARDS IT WILL RING THE BELL.
RELOADING THE DECK AND PRESSING "READ START" ("RESET") ON THE CARD
READER WILL CONTINUE THE TEST.

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

5.1.1 AT SA 200 (INSTRUCTION AND DATA RELIABILITY TEST)

SEE 4.1

5.1.2 AT SA 210 OR 220 (ERROR FUNCTION TEST FOR CR11)

SW00=1 TO INHIBIT TESTING THE DARK-LIGHT ERROR.
SW14=1 TO LOOP THRU THE CURRENT SUBTEST
SW15=1 TO HALT ON ERROR

5.1.3 AT SA 240 (SINGLE SUBTEST LOOP)

SEE 4.1 FOR SR OPTIONS

5.1.4 AT SA 250 (SINGLE DATA PATTERN TEST)

SW15=1 TO HALT ON ERROR
SW13=1 TO INHIBIT PRINTOUTS

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 NEXT DECK. IF THE INPUT HOPPER IS EMPTY AT THE END OF A DECK, THE PROGRAM WILL RUN A SET OF TESTS OF OFF-LINE OPERATIONS. AT THE END OF THESE TESTS, IT WAITS FOR THE CARD READER TO BE PUT BACK ON-LINE. FURTHER CHECKS ARE MADE OF THE OFF-LINE TO ON-LINE OPERATIONS, AND THEN THE DATA RELIABILITY TEST IS RUN ON THE ENTIRE DECK. IF SW5=1, HITTING CONTINUE WILL RESUME PROGRAM OPERATION AFTER THE HALT. IF ALL OTHER SWITCHES WERE DOWN, FOR EXAMPLE, THE DATA RELIABILITY TEST WOULD THEN BE RUN ON THE NEXT DECK. THE OTHER SWITCHES AFFECT PROGRAM FLOW AS NOTED IN 4.1.

5.2.2 SCOPE

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

5.2.3 HLT

THIS SUBROUTINE PRINTS OUT THE LOCATION COUNTER AT THE TIME OF FAILURE, AND THE CONTENTS OF THE PROCESSOR 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 TEST, AND ON ALL LOOPS OF THE CHANNEL 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 ERCR11 (ERROR FUNCTION TEST)

THIS TEST CHECKS OPERATION OF THE VARIOUS ERROR SENSING FEATURES OF THE G.D.I. OR THE DOCUMATION CARD READER. CARD READER OFF-LINE, INPUT HOPPER EMPTY, OUTPUT STACKER FULL, FEED ERROR, MOTION ERROR, STACK FAIL, AND DARK-LIGHT ERROR ARE ALL 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 OPTION 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 TEST0 THRU TEST24 AND TESTA THRU TESTG 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 MOTOR START AND READ START (RESET ON THE DOCUMATION READER). IF THE CARD READER IS WORKING PROPERLY, THE BELL WILL RING ONCE WHEN READ START IS PRESSED AND 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 240. SEE 4.3.3 FOR DETAILS.
THE PROGRAM WILL CONTINUOUSLY LOOP THRU THE DESIRED SUBTEST.

6. ERRORS

6.1 ERROR PRINTOUT

6.1.1 STANDARD PRINTOUT

PRINTOUTS ARE IN A TWO-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.

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 SW4
CARD -THE CARD NUMBER WHERE THE FAILURE OCCURRED
COLUMN -THE COLUMN NUMBER WHERE THE FAILURE OCCURRED
PATTERN -THE CORRECT CARD IMAGE DATA THAT SHOULD HAVE BEEN READ
READ1 -THE CARD IMAGE DATA IS READ TWICE. THIS IS WHAT WAS READ THE FIRST TIME FROM CR81
READ2 -THIS IS WHAT WAS IN CR81 AFTER A BRIEF TIMING LOOP. IT SHOULD BE THE SAME AS THE PREVIOUS READING.
CODED -THIS IS WHAT THE DATA SHOULD BE IN ENCODED FORM
READ -THIS IS WHAT WAS READ BY ADDRESSING THE ENCODED BUFFER

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 WITH EACH ERROR PRINTOUT. THE COLUMNS HAVE THE FOLLOWING SIGNIFICANCE:

COLUMN -THE COLUMN NUMBER WHERE THE FAILURE OCCURRED.
READ1 -DATA IS READ TWICE. THIS IS THE FIRST READING.
READ2 -THIS IS WHAT WAS READ THE SECOND TIME.
CARDS -THE TOTAL NUMBER OF CARDS (IN OCTAL) THAT HAVE BEEN RUN SINCE THE TEST WAS STARTED.
ERRORS -THE TOTAL NUMBER OF ERRORS DETECTED (IN OCTAL) SINCE THE TEST WAS STARTED.

6.1.4 "BIT 8 WAS SET"

AT THE BEGINNING OF MOST SUBTESTS, BIT 8 (OFF-LINE) IS CHECKED TO MAKE SURE THAT THE READER IS NOT OFF-LINE. IT IS ALSO CHECKED IN THE DATA TEST WHEN AN INTERRUPT OCCURS DUE TO BIT IS BEING SET. IF BIT 8 IS SET WHEN IT WAS NOT SUPPOSED TO BE, THE ERROR MESSAGE "BIT 8 WAS SET. REMEDY THE ERROR CONDITION AND PRESS 'CONTINUE'." IS PRINTED OUT. THE PROCESSOR THEN HALTS. SINCE THE CARD READER GOES OFF-LINE WHEN A CARD READER FUNCTION ERROR OCCURS (CARD JAM, PICK FAIL, ETC.), THE CARD READER ERROR MUST BE FIXED AND THE READER MUST BE PUT BACK ON-LINE BEFORE THE PROGRAM CAN BE CONTINUED.

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.

7. 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.

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.

IF THE CR11 USES AN M829 MODULE SW10 MUST BE SET IN THE SWITCH REGISTER.

7.2.2 ERROR FUNCTION TEST (SA 210 FOR G.D.I. READER - SA 220 FOR DOCUMATION READER)

THE ERROR FUNCTION TEST REQUIRES SPARE CARDS, AS IT BENDS SEVERAL. ALSO, TO RUN THE DARK-LIGHT CHECK 2 CARDS MUST BE SPECIALLY PREPARED. THE TEST WILL TYPE OUT A REQUEST FOR THESE CARDS WHEN THEY ARE NEEDED. TO MAKE THEM:

1. TEAR A SMALL PIECE FROM THE LEADING EDGE OF ONE CARD.
2. TAPE 2 OTHER CARDS TOGETHER TO MAKE ONE "LONG" CARD - IT ONLY NEEDS TO BE ABOUT 1/2 INCH LONGER THAN A REGULAR CARD

7.2.3 SINGLE DATA PATTERN TEST (SA 250)

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

8. 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 CODES PUNCHED FOR EACH OF 80 COLUMNS OF THE FIRST CARD. THE FIRST VALUE GIVEN FOR A COLUMN IS THE CARD IMAGE OF THAT COLUMN, WHILE THE SECOND VALUE IS THE ENCODED FORM OF THE SAME PATTERN. 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 ALT 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.

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.

THE CARD READER GOES OFF-LINE DUE TO "INPUT HOPPER EMPTY" AFTER THE BOTH COLUMN OF THE LAST CARD IS READ, BUT BEFORE CARD DONE OCCURS. THUS, THE SPECIAL CONDITION BIT IN THE CSR WILL BE SET BEFORE CARD DONE ON THE LAST CARD.

IF THE CARD READER USES AN M829 MODULE, SW10 MUST BE SET IN THE SWITCH REGISTER. WITH THE M829 MODULE, CARD DONE NEVER OCCURS AFTER THE LAST CARD IN THE INPUT HOPPER IS READ.
IF THE CARD READER USES AN M8290 MODULE, SW10 MUST NOT BE SET.
WITH THE M8290 MODULE, CARD DONE IS ISSUED AFTER THE LAST CARD IN THE INPUT HOPPER IS READ.

IF BIT 0 OF THE CRS IS CLEARED IMMEDIATELY AFTER BEING SET, THE READING OF A CARD MAY NOT OCCUR. SINCE THIS BIT IS WRITE ONLY, A BIS OR BIC DONE AFTER SETTING BIT 0 MAY CLEAR THE BIT AND PREVENT THE READ FROM OCCURRING.

8.4 TESTING CR11'S WITH NON-STANDARD ADDRESSES

BY SUBSTITUTING INTO THE LOCATIONS KCRS, KCRB1, AND CRB2 THE ADDRESSES OF THE CRS, CRB1, AND CRB2 OF A CARD READER ASSIGNED A NON-STANDARD ADDRESS, AND SUBSTITUTING ITS INTERRUPT VECTOR ADDRESS INTO ADINT, A CR11 MAY BE TESTED AT ANY ADDRESS ASSIGNED TO IT.

9. PROGRAM DESCRIPTION

THIS SET OF TESTS IS DESIGNED TO CHECK ALL OPERATIONS OF THE CR11 CARD READER, WITH THE NECESSARY EXCEPTION THAT TIMING IN MOST CASES IS ONLY PARTIALLY TESTED. A SPECIAL TEST IS INCLUDED TO CHECK OUT THE ERROR FUNCTIONS OF THE G.D.I. IOC READER, WHICH PRINTS OUT DIRECTIONS AS IT GOES ALONG. A TEST IS ALSO INCLUDED TO ISOLATE DIFFICULT DATA ERRORS USING A SPECIAL TEST DECK PUNCHED BY THE USER.

10. LISTING%

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.ABS
.TITLE DZCRA-D     CR11 DIAGNOSTIC TEST
.NLIST  MD,MC,CND
.LIST   ME
;DIAGNOSTIC FOR CR11 CARD READER
;COPYRIGHT 1970,1971,1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
;BY RICK FADDEN
;(MODIFIED AUGUST-71 FOR DOCUMATION CARD READER (JOHN RODENHISER))
;(MODIFIED APRIL-72 FOR HARDWARE ECO)
;MODIFIED MARCH 1976 FOR SWITCH-LESS PROCESSORS BY RON PLATUKIS

;STARTING ADDRESSES ARE:
;       200=INSTRUCTION AND DATA TEST FOR THE CR11
;       210=ERROR FUNCTION TEST OF CR11 (GDI)
;       220=ERROR FUNCTION TEST OF CR11 USING DOCUMATION READER.
;       240=SINGLE TEST LOOP
;       250=READ SINGLE DATA PATTERN TEST

;SWITCH REGISTER SETTINGS FOR THE INSTRUCTION AND DATA TEST ARE:
;       SW04=1 FOR THE BINARY TEST DECK
;       SW05=1 TO HALT AT THE END OF A STANDARD 80 CARD
;              TEST DECK.
;              =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
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                                        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 CONINUOUSLY FROM THEN ON
                                       NOTE:  IF SW7 IS SET, CHECKED BY PROGRAM, AND THEN
                                       CLEARED, THE DATA TEST WILL BE INCORRECT.  THIS IS
                                       TRUE BECAUSE THE FIRST CARD IN THE DATA TEST WILL NOT
                                       BE THE ONE EXPECTED.  WITH SW7 SET THE TEST MAY HANG
                                       WHEN THE INPUT HOPPER RUNS OUT OF CARDS.
                                SW10=1 TO INDICATE THAT THE CR11 BEING TESTED USES THE
                                       M829 MODULE
                                    =0 TO INDICATE THAT THE CR11 BEING TESTED USES THE
                                       M8290 MODULE
                                SW11=1 TO INHIBIT SUBPROGRAM ITERATION
                                       (NOTE THAT IF PROGRAM FLOW IS ALLOWED TO ENTER THE
                                       DATA SUBTEST, 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


  177776                        FSR=177776
  000240                        NOP=240
  104000                        HLT=EMT
  104001                        SCOPE=EMT+1
  104002                        CNTLU=EMT+2
  104003                        KBINTT=EMT+3
  104004                        READC=EMT+4
  104005                        SUSWRR=EMT+5
  104006                        CKU=EMT+6
  104007                        TIT=EMT+7
  000000                        ADINT=%0                ;CONTAINS ADDRESS OF INTERRUPT VECTOR
  000001                        COUNT=%1                ;USED FOR TIMING, ETC.
  000002                        R2=%2                   ;SCRATCH
  000003                        CRS=%3                  ;CONTAINS ADDRESS OF CARD READ STATUS REGISTER
  000004                        CRB1=%4                 ;CONTAINS ADDRESS OF CARD READER BUFFER (12 BIT DATA)
  000005                        R5=%5                   ;SCRATCH
  000006                        SP=%6                   ;STACK POINTER
  000007                        PC=%7                   ;PROGRAM COUNTER
                        ;LOAD TRAP CATCHER INTO LOCATIONS 0 THRU 377
                        ;LOAD TRAP VECTORS
  000014                        .=14
  000642                        TRTRAP
  000340                        340
  000030                        .=30
  001342                        EMTSRV
  000340                        340

  000046                        .=46
  001446                        LOGIC
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                                ;SOFTWARE SWITCH REGISTER LOCATIONS

                    000174              .=174
000174  000000     DISPREG:0
000176  000000     SWREG:  0

                                ;LOAD STARTING ADDRESS AREA
                    000200              .=200
000200  012706  000600          MOV     #STACK,SP
000204  000167  000516          JMP     BEGIN           ;NORMAL STARTING ADDRESS FOR G.D.I. IOC READER
000210  012706  000600          MOV     #STACK,SP
000214  000167  006760          JMP     ERCR11          ;STARTING ADDRESS FOR CR11 ERROR FUNCTION TEST (G.D.I)
000220  012706  000600          MOV     #STACK,SP
000224  000167  006756          JMP     ERCM11          ;STARTING ADDRESS FOR CR11 ERROR FUNCTION TEST (DOCUMAT

                    000240              .=240
000240  012706  000600          MOV     #STACK,SP
000244  000167  010426          JMP     TESTX           ;STARTING ADDRESS FOR LOOP WHICH CONTINUALLY RUNS
                                                        ;ANY SINGLE SUBTEST
000250  012706  000600          MOV     #STACK,SP
000254  000167  010534          JMP     CKSAME          ;STARTING ADDRESS OF TEST TO READ A SINGLE DATA
                                                        ;PATTERN CONTINUOUSLY
                                ;LOAD POINTERS AND GENERAL STORAGE
                    000600              .=600
000600  000000     STACK:  0               ;STACK POINTER INITIALIZED TO POINT HERE
000602  000000     INTFLG: 0               ;CONTAINS LEVEL THAT INTERRUPT IS FOUND AT
000604  000230     INTVC:  230             ;ADDRESS OF CARD READER INTERRUPT VECTOR
000606  177560     KBCSR:  177560
000610  177562     KBDBR:  177562
000612  177564     TCSR:   177564          ;ADDRESS OF TELETYPE STATUS REGISTER
000614  177566     TDBR:   177566          ;ADDRESS OF TELETYPE DATA BUFFER
000616  177570     SWR:    177570
000620  177570     DISPLAY:177570
000622  000000     TMP1:   0
000624  177777     TIFLG:  -1
000626  000000     TIB:    0
000630  000000     CSNT:   0
000632  000000     FLAG:   0               ;SET TO ONE FOR MARK-SENSE CARD READER
000634  177160     KCRS:   177160          ;ADDRESS OF CARD READER STATUS REGISTER
000636  177162     KCRB1:  177162          ;ADDRESS OF CARD READER DATA BUFFER
000640  177164     CRB2:   177164          ;ADDRESS TO READ ENCODED DATA
000642  000002     TRTRAP: RTI             ;RETURN FROM TRACE LOOP
000644  000000     TRFLG:  0               ;TOGGLED TO SWITCH BETWEEN TRACE TRAPPING AND NORMAL FLO
000646  000000     PROC:   0               ;STORES PROCESSOR STATUS WHEN TRACE TRAP MUST BE CLEARED
                                                        ;IN A SUBTEST
000650  000000     ERFLG:  0               ;SET TO ZERO TO OUTPUT DATA ERROR HEADING


                                ;INITIALIZE CSR AND DBR POINTERS
000652  004767  011274      SETUP:  JSR     %7,TOUT
000656  104005                      SUSWRR
000660  104002                      CNTLU
000662  104006                      CKU
000664  012767  000001  011252      MOV     #1,ITMAX        ;SET ITERATION MAXIMUM TO 1 ITERATION
000672  016703  177736              MOV     KCRS,CRS        ;SET UP REGISTER POINTERS
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000676 016704 177734                    MOV     KCRB1,CRB1
000702 016700 177676                    MOV     INTVC,ADINT     ;LOAD ADDRESS OF INTERRUPT VECTOR
000706 005067 177670                    CLR     INTFLG          ;INITIALIZE INTERRUPT FLAG
000712 005067 177726                    CLR     TRFLG           ;INITIALIZE TRACE FLAG
000716 012767 000340 177052             MOV     #340,PSR        ;SETUP PROCESSOR STATUS
000724 000207                           RTS     %7              ;RETURN
000726 104007                   BEGIN:  TIT
000730 012702 016214                    MOV     #SUBTI,R2
000734 004767 177712                    JSR     %7,SETUP        ;INITIALIZE POINTERS AND FLAGS
000740 000424                           BR      TEST            ;GO TO INSTRUCTION TESTS
000742 022767 000176 177646     RESTRT: CMP     #SWREG,SWR
000750 001002                           BNE     1$
000752 104002                           CNTLU
000754 104006                           CKU
000756 005767 177662            1$:     TST     TRFLG           ;CHECK FOR TRACE TRAPPING
000762 001004                           BNE     TRAPX           ;IF SET, TRACE TRAP
000764 012767 000340 177004     NOTRP:  MOV     #340,PSR        ;IF ZERO, CLEAR TRACE BIT
000772 000407                           BR      TEST            ;GO TO INSTRUCTION TESTS
000774 032777 010000 177614     TRAPX:  BIT     #10000,@SWR     ;CHECK SW12
001002 001370                           BNE     NOTRP           ;BRANCH IF SET TO CLEAR TRACE BIT
001004 012767 000360 176764             MOV     #360,PSR        ;SET TRACE BIT

                                ;TEST FOR CORRECT INITIALIZATION OF STATUS REGISTER
001012 012767 001022 011130     TEST:   MOV     #TEST1A,RETURN  ;SETUP SCOPE LOOP RETURN ADDRESS
001020 104001                   TEST1:  SCOPE
001022 004767 010460            TEST1A: JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
001026 016767 176744 177612             MOV     PSR,PROC        ;STORE PROCESSOR STATUS
001034 005067 176736                    CLR     PSR             ;CLEAR TRACE BIT
001040 005001                           CLR     COUNT           ;INITIALIZE COUNTER
001042 005201                           INC     COUNT           ;WAIT TO BE CERTAIN
001044 001376                           BNE     .-2             ;THAT ALL CARDS ARE
001046 005201                           INC     COUNT           ;THRU BEFORE ISSUING
001050 001376                           BNE     .-2             ;INIT
001052 016767 177570 176716             MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
001060 000005                           RESET                   ;SEND OUT INIT
001062 005713                           TST     @CRS            ;CHECK FOR STATUS REGISTER ALL ZERO
001064 001401                           BEQ     .+4             ;BRANCH IF OK
001066 104000                           HLT                     ;STATUS REGISTER NOT CORRECTLY INITIALIZED
                                ;ONLY BITS 1 AND 6 OF THE STATUS REGISTER SHOULD BE ABLE TO BE SET TO ONE
                                ;AND READ BACK AS ONE
001070 052713 177776                    BIS     #177776,@CRS    ;SET ALL BITS BUT 0
001074 022713 000102                    CMP     #102,@CRS       ;ONLY BITS 1 AND 6 SHOULD BE SET
001100 001402                           BEQ     .+6             ;BRANCH IF OK
001102 104000                           HLT                     ;STATUS REGISTER DIDN'T CONTAIN 102
001104 000404                           BR      TEST2           ;BRANCH AFTER FAILURE
                                ;CLEARING STATUS REGISTER SHOULD CLEAR BITS 1 AND 6
001106 005013                           CLR     @CRS            ;CLEAR BITS 1 AND 6
001110 005713                           TST     @CRS            ;CHECK FOR ALL BITS CLEAR
001112 001401                           BEQ     .+4             ;BRANCH IF OK
001114 104000                           HLT                     ;BIT 1 AND/OR BIT 6 DIDN'T CLEAR

001116 104001                   TEST2:  SCOPE
                                ;START SHOULD CAUSE CARD DONE WITHIN 1 SECOND
                                ;BIT 0 SHOULD ALWAYS READ AS BEING EQUAL TO ZERO
001120 004767 010362                    JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
001124 016767 176646 177514             MOV     PSR,PROC        ;STORE CURRENT PROCESSOR STATUS
```

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 710  001132  005067  176640                  CLR     PSR             ;CLEAR TRACE BIT
 711  001136  005213                          INC     @CRS            ;START READING A CARD
 712  001140  032713  000001                  BIT     #1,@CRS         ;CHECK BIT 0
 713  001144  001401                          BEQ     .+4             ;BRANCH IF NOT SET
 714  001146  104000                          HLT                     ;BIT 0 READ AS A ONE
 715  001150  005227  000000                  INC     #0              ;WAIT
 716  001154  001375                          BNE     .-4
 717  001156  005227  000000                  INC     #0
 718  001162  001375                          BNE     .-4
 719  001164  005227  000000                  INC     #0
 720  001170  001375                          BNE     .-4
 721  001172  005227  000000                  INC     #0
 722  001176  001375                          BNE     .-4
 723  001200  005227  000000                  INC     #0
 724  001204  001375                          BNE     .-4
 725  001206  016767  177434  176562          MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
 726  001214  032713  040000                  BIT     #40000,@CRS     ;CHECK CARD DONE
 727  001220  001002                          BNE     CONT2           ;CONTINUE IF SET
 728  001222  104000                          HLT                     ;CARD DONE DIDN'T SET WITHIN 400 MS
 729  001224  000406                          BR      TEST3           ;NOTE THAT FAILURE COULD BE DUE TO READ
 730                                                                  ;NOT BEING RESET
 731  001226  052713  040000          CONT2:  BIS     #40000,@CRS     ;DATO TO STATUS REGISTER SHOULD CLEAR
 732  001232  032713  040000                  BIT     #40000,@CRS     ;CARD DONE
 733  001236  001401                          BEQ     .+4             ;BRANCH IF IT DID
 734  001240  104000                          HLT                     ;DATO DIDN'T CLEAR CARD DONE
 735
 736  001242  104001          TEST3:  SCOPE
 737                          ;BUSY (BIT 9) SHOULD BE SET BY READING A CARD
 738                          ;IT SHOULD REMAIN SET UNTIL CARD DONE SETS, WHICH SHOULD CLEAR IT
 739  001244  004767  010236          JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
 740  001250  005013                  CLR     @CRS            ;INITIALIZE STATUS REGISTER
 741  001252  005213                  INC     @CRS            ;READ A CARD
 742  001254  032713  001000          BIT     #1000,@CRS      ;CHECK BUSY
 743  001260  001002                  BNE     LOOP3           ;BRANCH IF SET
 744  001262  104000                  HLT                     ;READING A CARD DIDN'T SET BUSY
 745  001264  000417                  BR      TEST4
 746  001266  032713  040000  LOOP3:  BIT     #40000,@CRS     ;CHECK CARD DONE
 747  001272  001010                  BNE     DONE3           ;BRANCH IF SET
 748  001274  032713  001000          BIT     #1000,@CRS      ;CHE  . BUSY
 749  001300  001372                  BNE     LOOP3           ;BRANCH IF STILL SET
 750  001302  032713  040000          BIT     #40000,@CRS     ;CHECK CARD DONE
 751  001306  001006                  BNE     TEST4           ;GO TO NEXT TEST IF SET
 752  001310  104000                  HLT                     ;BUSY CLEARED BEFORE CARD DONE SET
 753  001312  000404                  BR      TEST4
 754  001314  032713  001000  DONE3:  BIT     #1000,@CRS      ;CHECK BUSY
 755  001320  001401                  BEQ     TEST4           ;GO ON TO NEXT TEST IF CLEAR
 756  001322  104000                  HLT                     ;CARD DONE DIDN'T CLEAR BUSY
 757
 758  001324  104001          TEST4:  SCOPE
 759                          ;A TIMING ERROR SHOULD OCCUR IF DATA IS NOT READ AND NEW DATA COMES IN
 760                          ;A TIMING ERROR SHOULD SET THE SPECIAL CONDITION BIT WHEN CARD DONE OCCURS
 761                          ;COLUMN READY SHOULD BE CLEARED BY THE TIMING ERROR AND PREVENTED FROM RESETTING
 762                          ;BITS 11,14, AND 15 SHOULD BE CLEARED BY A DATO TO THE STATUS REGISTER
 763  001326  004767  010102          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 764  001332  005001                  CLR     COUNT           ;INITIALIZE COUNTER
 765  001334  005213                  INC     @CRS            ;INITIATE READ
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 766  001336  032713  140200        LOOP4:  BIT     #140200, @CRS   ;WAIT FOR SPECIAL CONDITION, CARD DONE,
 767                                                                 ;OR COLUMN READY
 768  001342  001775                        BEQ     LOOP4           ;LOOP IF NONE OCCURRED
 769  001344  032713  140000                BIT     #140000, @CRS   ;SPECIAL CONDITION OR CARD DONE?
 770  001350  001007                        BNE     CK4             ;YES, BRANCH
 771  001352  005201                        INC     COUNT           ;NO, COUNT COLUMN READYS
 772  001354  105713                LOOP4B: TSTB    @CRS            ;WAIT FOR COLUMN READY TO CLEAR
 773  001356  100367                        BPL     LOOP4           ;IF CLEAR, RETURN TO LOOP4
 774  001360  032713  140000                BIT     #140000, @CRS   ;CHECK FOR SPECIAL CONDITION OR CARD DONE
 775  001364  001001                        BNE     CK4             ;BRANCH IF EITHER SET
 776  001366  000772                        BR      LOOP4B          ;OTHERWISE, CHECK AGAIN
 777  001370  032713  040000        CK4:    BIT     #40000, @CRS    ;CHECK CARD DONE
 778  001374  001002                        BNE     .+6             ;BRANCH IF SET
 779  001376  104000                        HLT                     ;SPECIAL CONDITION SET BEFORE CARD DONE
 780  001400  000403                        BR      CONT4
 781  001402  005713                        TST     @CRS            ;CHECK SPECIAL CONDITION
 782  001404  100401                        BMI     .+4             ;BRANCH IF SET
 783  001406  104000                        HLT                     ;SPECIAL CONDITION WAS''T  SET
 784  001410  032713  004000        CONT4:  BIT     #4000,  @CRS    ;CHECK TIMING ERROR
 785  001414  001001                        BNE     .+4             ;BRANCH IF SET
 786  001416  104000                        HLT                     ;TIMING ERROR WASN'T SET
 787  001420  005301                        DEC     COUNT           ;CHECK NUMBER OF COLUMN READYS
 788  001422  100002                        BPL     .+6             ;BRANCH IF ANY OCCURRED
 789  001424  104000                        HLT                     ;COLUMN READY NEVER OCCURRED
 790  001426  000402                        BR      .+6
 791  001430  001401                        BEQ     .+4             ;BRANCH IF ONLY ONE OCCURRED
 792  001432  104000                        HLT                     ;COLUMN READY OCCURRED MORE THAN ONCE
 793  001434  105713                        TSTB    @CRS            ;CHECK COLUMN READY
 794  001436  100001                        BPL     .+4             ;BRANCH IF NOT SET
 795  001440  104000                        HLT                     ;COLUMN READY WASN'T CLEARED
 796  001442  005013                        CLR     @CRS            ;CLEAR BITS 11,14, AND 15 VIA DATO
 797  001444  032713  144000                BIT     #144000, @CRS   ;CHECK
 798  001450  001401                        BEQ     .+4
 799  001452  104000                        HLT                     ;BITS 11,14, AND 15 WEREN'T ALL CLEARED
 800
 801
 802  001454  104001                TEST5:  SCOPE
 803                                ;SETTING READ SHOULD CAUSE COLUMN READY TO SET 80 TIMES BEFORE CARD DONE SETS
 804                                ;READING THE DATA BUFFER SHOULD CLEAR COLUMN READY AND PREVENT A TIMING ERROR
 805  001456  004767  007752                JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 806  001462  005001                        CLR     COUNT           ;INITIALIZE COUNTER
 807  001464  005213                        INC     @CRS            ;INITIATE READ
 808  001466  032713  140200        LOOP5:  BIT     #140200,@CRS    ;WAIT FOR COLUMN READY, CARD DONE
 809  001472  001775                        BEQ     .-4             ;OR SPECIAL CONDITION
 810  001474  032713  040000                BIT     #40000, @CRS    ;CARD DONE?
 811  001500  001015                        BNE     CK5             ;YES, BRANCH
 812  001502  005713                        TST     @CRS            ;CHECK BIT 15
 813  001504  100002                        BPL     .+6             ;SKIP ERROR HALT IF NOT SET
 814  001506  104000                        HLT                     ;BIT 15 WAS SET
 815  001510  000437                        BR      TEST6           ;GO TO NEXT TEST
 816  001512  020127  000117                CMP     COUNT,  #79.    ;CHECK FOR 80
 817  001516  100363                        BPL     LOOP5           ;BRANCH IF 80 OR MORE WITHOUT CLEARING READY
 818  001520  005201                        INC     COUNT           ;INCREMENT COUNTER
 819  001522  005714                        TST     @CRB1           ;CLEAR READY
 820  001524  105713                        TSTB    @CRS            ;MAKE SURE IT CLEARED
 821  001526  100001                        BPL     .+4             ;BRANCH IF IT DID
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001530  104000                  HLT                     ;READING DATA BUFFER DIDN'T CLEAR READY
001532  000755                  BR      LOOP5           ;LOOP
001534  032713  004000  CK5:    BIT     #4000, @CRS     ;CHECK TIMING ERROR BIT
001540  001401                  BEQ     .+4             ;BRANCH IF NOT SET
001542  104000                  HLT                     ;TIMING ERROR WAS SET
                                ;NOTE THAT IF COLUMN READY SET MORE THAN 80 TIMES
                                ;A TIMING ERROR WILL OCCUR AND THE COUNT WILL BE 79 (=117 OCTAL)
001544  000421                  BR      TEST6           ;BRANCH AFTER ERROR
001546  020127  000117          CMP     COUNT, #79.     ;CHECK COUNT
001552  001401                  BEQ     .+4             ;BRANCH IF 80 COLUMN READYS OCCURRED
001554  104000                  HLT                     ;COLUMN READY DIDN'T OCCUR 80 TIMES
                                                        ;BEFORE CARD DONE
001556  021327  040200          CMP     @CRS,#40200     ;ONLY CARD DONE AND COLUMN READY SHOULD BE SET
001562  001401                  BEQ     .+4
001564  104000                  HLT                     ;STATUS REGISTER IN WRONG STATE
001566  005013                  CLR     @CRS            ;SHOULD CLEAR DONE BUT NOT READY
001570  021327  000200          CMP     @CRS,#200       ;CHECK FOR ONLY READY SET
001574  001401                  BEQ     .+4             ;BRANCH IF OK
001576  104000                  HLT                     ;STATUS REGISTER IN WRONG STATE
001600  005714                  TST     @CRB1           ;READING DATA BUFFER SHOULD CLEAR COLUMN READY
001602  005713                  TST     @CRS            ;CHECK STATUS REGISTER
001604  001401                  BEQ     .+4             ;BRANCH IF ALL BITS ZERO
001606  104000                  HLT                     ;STATUS REGISTER NOT EQUAL TO ZERO

001610  104001  TEST6:  SCOPE
                ;A TIMING ERROR SHOULD SET BIT 11 BEFORE CARD DONE OCCURS, EVEN IF IT OCCURS AT COLUMN 8
                ;A DATOB TO THE LOW BYTE OF THE CRS SHOULD CLEAR BITS 15,14, AND 11
001612  004767  007616          JSR     %7,INIT         ;INITIALIZE
001616  012701  000115          MOV     #77.,COUNT      ;SETUP COUNTER
001622  005213                  INC     @CRS            ;START READING A CARD
001624  105713  LOOP6:  TSTB    @CRS            ;WAIT FOR COLUMN READY
001626  100376                  BPL     .-2
001630  005714                  TST     @CRB1           ;CLEAR COLUMN READY
001632  005301                  DEC     COUNT           ;GO THRU LOOP FOR 1ST 78 COLUMN READY'S
001634  100373                  BPL     LOOP6
001636  032713  144000          BIT     #144000,@CRS    ;WAIT FOR CARD DONE OR TIMING ERROR
001642  001775                  BEQ     .-4             ;OR SPECIAL CONDITION
001644  032713  040000          BIT     #40000,@CRS     ;CARD DONE SET?
001650  001026                  BNE     ERR6            ;YES, 2 POSSIBLE TEST FAILURES
001652  032713  004000          BIT     #4000,@CRS      ;CHECK TIMING ERROR
001656  001416                  BEQ     OFF6            ;IF NOT SET, READER IS PROBABLY OFF-LINE
001660  105713                  TSTB    @CRS            ;CHECK COLUMN READY
001662  100001                  BPL     .+4             ;BRANCH IF CLEAR
001664  104000                  HLT                     ;TIMING ERROR DIDN'T CLEAR READY
001666  005713                  TST     @CRS            ;WAIT FOR SPECIAL CONDITION
001670  100376                  BPL     .-2
001672  032713  040000          BIT     #40000,@CRS     ;CHECK CARD DONE
001676  001406                  BEQ     OFF6            ;IF NOT SET, READER IS PROBABLY OFF-LINE
001700  105013                  CLRB    @CRS            ;DATOB TO LOW BYTE OF CRS
001702  032713  144000          BIT     #144000,@CRS    ;CHECK BITS 15,14,11
001706  001415                  BEQ     TEST7           ;BRANCH IF CLEAR TO NEXT TEST
001710  104000                  HLT                     ;DATOB TO LOW BYTE OF CRS DIDN'T CLEAR
                                                        ;BITS 15,14 AND/OR 11
001712  000413                  BR      TEST7           ;GO TO NEXT TEST
001714  032713  000400  OFF6:   BIT     #400,@CRS       ;CHECK BIT 8
001720  001010                  BNE     TEST7           ;BRANCH IF SET
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001722  104000                  HLT                     ;BIT 15 WAS SET, 8 WASN'T
001724  000406                  BR      TEST7           ;GO TO NEXT TEST
001726  032713  004000  ERR6:   BIT     #4000,@CRS      ;TIMING ERROR SET?
001732  001402                  BEQ     .+6             ;NO, BRANCH
001734  104000                  HLT                     ;TIMING ERROR DIDN'T SET BEFORE CARD DONE
001736  000401                  BR      TEST7           ;GO TO NEXT TEST AFTER ERROR
001740  104000                  HLT                     ;TIMING ERROR WASN'T SET

001742  104001          TEST7:  SCOPE
                        ;NOT READING THE EIGHTIETH COLUMN OF DATA FROM THE BUFFER
                        ;SHOULD CAUSE A TIMING ERROR ON THE FIRST COLUMN OF THE NEXT CARD
                        ;SETTING EJECT SHOULD CLEAR TIMING ERROR, AND BIT 15 SHOULDN'T SET
                        ;INCB SHOULD START A READ

001744  004767  007464          JSR     %7,INIT         ;INITIALIZE
001750  005213                  INC     @CRS            ;START READ
001752  012701  000120          MOV     #80.,COUNT      ;INITIALIZE COUNTER
001756  032713  140200  LOOP7:  BIT     #140200,@CRS    ;TEST FOR ERROR, DONE OR READY
001762  001775                  BEQ     LOOP7           ;LOOP IF NONE SET
001764  005713                  TST     @CRS            ;CHECK ERROR
001766  100002                  BPL     .+6             ;BRANCH IF NOT SET
001770  104000                  HLT                     ;BIT 15 WAS SET
001772  000455                  BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
001774  032713  040000          BIT     #40000,@CRS     ;CHECK FOR CARD DONE
002000  001013                  BNE     DONE7           ;BRANCH IF SET
002002  005301                  DEC     COUNT           ;COUNT
002004  001402                  BEQ     .+6             ;IF 80TH COLUMN READY, BRANCH
002006  005714                  TST     @CRB1           ;CLEAR DONE
002010  000762                  BR      LOOP7           ;LOOP
002012  032713  140000          BIT     #140000,@CRS    ;WAIT FOR '     'R SPECIAL CONDITION
002016  001775                  BEQ     .-4
002020  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION
002022  100002                  BPL     DONE7           ;BRANCH IF NOT SET
002024  104000                  HLT                     ;SPECIAL CONDITION WAS SET
002026  000437                  BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
002030  005701          DONE7:  TST     COUNT           ;TEST FOR 80 COLUMN READY'S
002032  001402                  BEQ     .+6             ;BRANCH IF OK
002034  104000                  HLT                     ;COLUMN READY DID NOT OCCUR 80 TIMES
002036  000433                  BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
002040  105213                  INCB    @CRS            ;START READ
002042  105713                  TSTB    @CRS            ;CHECK COLUMN READY
002044  100401                  BMI     .+4             ;BRANCH IF STILL SET
002046  104000                  HLT                     ;READY DID NOT REMAIN SET
002050  032713  004000          BIT     #4000,@CRS      ;TEST FOR TIMING ERROR
002054  001775                  BEQ     .-4             ;LOOP IF NOT SET
002056  105713                  TST2    @CRS            ;CHECK COLUMN READY
002060  100002                  BPL     .+6             ;BRANCH IF NOT SET
002062  104000                  HLT                     ;TIMING ERROR DIDN'T CLEAR READY
002064  000420                  BR      TEST8
002066  112713  000002          MOVB    #2,@CRS         ;SET EJECT
002072  032713  004000          BIT     #4000,@CRS      ;CHECK TIMING ERROR
002076  001402                  BEQ     .+6             ;BRANCH IF CLEARED
002100  104000                  HLT                     ;TIMING ERROR NOT CLEARED BY DATOB
002102  000411                  BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
002104  032713  140000          BIT     #140000,@CRS    ;WAIT FOR DONE OR SPECIAL CONDITION
002110  001775                  BEQ     .-4
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002112  032713  000400          BIT     #400,@CRS       ;CHECK BIT 8
002116  001003                  BNE     TEST8           ;BRANCH IF READER OFF-LINE
002120  005713                  TST     @CRS            ;SPECIAL CONDITION SHOULDN'T SET
002122  100001                  BPL     .+4             ;SINCE DATOB CLEARED TIMING ERROR
002124  104000                  HLT                     ;BIT 15 WAS SET, 8 WASN'T


002126  104001          TEST8:  SCOPE
                        ;DATA SHOULD BE AVAILABLE IN THE DATA BUFFER FOR AT LEAST 1.0 MILLISECOND
002130  004767  007300          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
002134  016767  175636  176504  MOV     PSR,PROC        ;STORE CURRENT PROCESSOR STATUS
002142  005067  175630          CLR     PSR             ;CLEAR TRACE BIT
002146  005213                  INC     @CRS            ;START READ
002150  032713  140200  LOOP8:  BIT     #140200,@CRS    ;WAIT FOR COLUMN READY OR CARD DONE
002154  001775                  BEQ     .-4             ;OR SPECIAL CONDITION
002156  032713  040000          BIT     #40000,@CRS     ;CARD DONE?
002162  001023                  BNE     DBRCK8          ;YES, GO TO CHECK STROBING OF DBR
002164  005713                  TST     @CRS            ;NO, CHECK BIT 15
002166  100002                  BPL     .+6             ;BRANCH IF NOT SET
002170  104000                  HLT                     ;BIT 15 WAS SET
002172  000441                  BR      TEST9           ;GO TO NEXT TEST AFTER ERROR
002174  005013                  CLR     @CRS            ;DATO TO CRS - SHOULDN'T CLEAR BUSY OR READY
002176  022713  001200          CMP     #1200,@CRS      ;CHECK FOR BUSY AND READY
002202  001402                  BEQ     .+6             ;BRANCH IF STILL SET
002204  104000                  HLT                     ;CRS IN WRONG STATE
002206  000433                  BR      TEST9           ;GO TO NEXT TEST AFTER ERROR
002210  011405                  MOV     @CRB1,R5        ;STORE DATA
002212  012701  000300          MOV     #300,COUNT      ;INITIALIZE COUNTER
002216  005301                  DEC     COUNT           ;WAIT FOR 1 MILLISECOND (APPROX.)
002220  001376                  BNE     .-2
002222  021405                  CMP     @CRB1,R5        ;DATA UNCHANGED?
002224  001751                  BEQ     LOOP8           ;OK, CONTINUE
002226  104000                  HLT                     ;DATA NOT AVAILABLE FOR 1.0 MILLISECONDS
002230  000422                  BR      TEST9           ;GO TO NEXT TEST AFTER FAILURE
002232  017702  176402  DBRCK8: MOV     @CRB2,R2        ;STORE ENCODED DATA IN REGISTER 2
002236  012701  000100          MOV     #100,COUNT      ;SET UP COUNTER
002242  021405          CONT8:  CMP     @CRB1,R5        ;READ CARD-IMAGE DATA BUFFER
002244  001402                  BEQ     .+6             ;BRANCH IF UNCHANGED
002246  104000                  HLT                     ;CRB1 READ INCORRECTLY
002250  000407                  BR      REST8           ;BRANCH TO RESTORE PROCESSOR STATUS AND EXIT
002252  027702  176362          CMP     @CRB2,R2        ;READ ENCODED DATA BUFFER
002256  001402                  BEQ     .+6             ;BRANCH IF UNCHANGED
002260  104000                  HLT                     ;CRB2 READ INCORRECTLY
002262  000402                  BR      REST8           ;BRANCH AFTER FAILURE
002264  005301                  DEC     COUNT           ;COUNT DOWN
002266  001365                  BNE     CONT8           ;LOOP IF NOT DONE
002270  016767  176352  175500  REST8:  MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS


002276  104001          TEST9:  SCOPE
                        ;EJECT SHOULD PREVENT FURTHER COLUMN READY'S
                        ;CARD DONE SHOULD STILL OCCUR, AND TIMING ERRORS SHOULD BE
                        ;PREVENTED IF THE CURRENT COLUMN READY IS CLEARED
002300  004767  007130          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
002304  016767  175466  176334  MOV     PSR,PROC        ;SAVE PROCESSOR STATUS
002312  005067  175460          CLR     PSR             ;CLEAR TRACE BIT
```

```
  990  002316  005213                          INC     @CRS            ;START READ
  991  002320  105713                          TSTB    @CRS            ;WAIT FOR COLUMN READY
  992  002322  001776                          BEQ     .-2
  993  002324  052713  000002                  BIS     #2,@CRS         ;SET EJECT
  994  002330  005714                          TST     @CRB1           ;CLEAR COLUMN READY
  995  002332  005001                          CLR     COUNT           ;LOOP TAKES 11.4 MICROSECONDS ONCE THRU
  996  002334  032713  044200          WAIT9:  BIT     #44200,@CRS     ;WAIT FOR CARD DONE, TIMING ERROR, OR
  997  002340  001004                          BNE     CK9             ;COLUMN READY
  998  002342  005201                          INC     COUNT           ;TIME FOR ABOUT 3/4 SECOND
  999  002344  001373                          BNE     WAIT9           ;CONTINUE WAITING
 1000  002346  104000                          HLT                     ;NO CARD DONE OCCURRED WITHIN 3/4 SECOND
 1001  002350  000411                          BR      REST9           ;CONTINUE AFTER FAILURE
 1002  002352  032713  040000          CK9:    BIT     #40000,@CRS     ;CHECK FOR CARD DONE
 1003  002356  001006                          BNE     REST9
 1004  002360  032713  000200                  BIT     #200,@CRS       ;CHECK COLUMN READY
 1005  002364  001402                          BEQ     .+6             ;BRANCH IF NOT SET
 1006  002366  104000                          HLT                     ;COLUMN READY WAS SET
 1007  002370  000401                          BR      REST9
 1008  002372  104000                          HLT                     ;EJECT DID NOT PREVENT A TIMING ERROR
 1009  002374  016767  176246  175374  REST9:  MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
 1010
 1011
 1012  002402  104001                  TEST10: SCOPE
 1013                                  :CARD DONE SHOULD CAUSE AN INTERRUPT
 1014  002404  004767  007024                  JSR     %7,INIT         ;INITIALIZE
 1015  002410  012710  002464                  MOV     #TINT10,@ADINT  ;LOAD RETURN POINTER
 1016  002414  052767  000340  175354          BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
 1017  002422  016760  175350  000002          MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
 1018  002430  042767  000340  175340          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
 1019  002436  012713  000103                  MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
 1020  002442  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
 1021  002446  001775                          BEQ     .-4
 1022  002450  016067  000002  175320          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
 1023  002456  105013                          CLRB    @CRS            ;CLEAR INTERRUPT ENABLE
 1024  002460  104000                          HLT                     ;NO INTERRUPT OCCURRED
 1025  002462  000[illegible]                  BR      CONT10
 1026  002464  03[illegible]  040000  TINT10: BIT     #40000,@CRS     ;CHECK CARD DONE
 1027  002470  001001                          BNE     .+4             ;BRANCH IF SET
 1028  002472  104000                          HLT                     ;CARD DONE NOT SET
 1029  002474  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
 1030  002476  005713                          TST     @CRS            ;MAKE SURE NO ERROR OCCURRED
 1031  002500  100001                          BPL     .+4
 1032  002502  104000                          HLT                     ;BIT 15 WAS SET
 1033  002504  105713                          TSTB    @CRS            ;CHECK COLUMN READY
 1034  002506  100001                          BPL     .+4             ;BRANCH IF NOT SET
 1035  002510  104000                          HLT                     ;COLUMN READY WAS SET
 1036  002512  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
 1037  002514  012710  000232          CONT10: MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
 1038  002520  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 1039
 1040  002524  104001                  TEST11: SCOPE
 1041                                  ;COLUMN READY SHOULD CAUSE AN INTERRUPT
 1042  002526  004767  006702                  JSR     %7,INIT         ;INITIALIZE
 1043  002532  012710  002604                  MOV     #TINT11,@ADINT  ;LOAD RETURN POINTER
 1044  002536  052767  000340  175232          BIS     #340,PSR        ;SET PROCESSOR STATUS TO LEVEL 7
 1045  002544  016760  175226  000002          MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
```

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1046  002552  042767  000340  175216          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1047  002560  012713  000101                  MOV     #101,@CRS       ;SET READ AND INTERRUPT ENABLE
1048  002564  105713                          TSTB    @CRS            ;WAIT FOR COLUMN READY
1049  002566  100376                          BPL     .-2
1050  002570  016067  000002  175200          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1051  002576  005013                          CLR     @CRS            ;CLEAR INTERRUPT ENABLE
1052  002600  104000                          HLT                     ;COLUMN READY DID NOT INTERRUPT
1053  002602  000405                          BR      CONT11
1054  002604  005013                  TINT11: CLR     @CRS            ;CLEAR INTERRUPT ENABLE
1055  002606  105713                          TSTB    @CRS            ;MAKE SURE COLUMN READY IS SET
1056  002610  100401                          BMI     .+4             ;BRANCH IF SET
1057  002612  104000                          HLT                     ;COLUMN READY WASN'T SET
1058  002614  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1059  002616  012710  000232          CONT11: MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1060  002622  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF ANOTHER INTERRUPT OCCURS
1061
1062  002626  104001                  TEST12: SCOPE
1063                                  ;CARD DONE SHOULDN'T CAUSE AN INTERRUPT IF THE PROCESSOR IS AT LEVEL 7 PRIORITY
1064  002630  004767  006600                  JSR     %7,INIT         ;INITIALIZE
1065  002634  012710  002670                  MOV     #TINT12,@ADINT  ;SETUP RETURN
1066  002640  052767  000340  175130          BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7 PRIORITY
1067  002646  016760  175124  000002          MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
1068  002654  012713  000103                  MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
1069  002660  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1070  002664  001775                          BEQ     .-4
1071  002666  000402                          BR      .+6             ;CONTINUE IF NO INTERRUPT OCCURRED
1072  002670  104000                  TINT12: HLT                     ;AN INTERRUPT OCCURRED
1073  002672  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1074  002674  005013                          CLR     @CRS            ;CLEAR INTERRUPT ENABLE AND EJECT
1075  002676  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1076  002702  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1077
1078                                  ;FIND THE LEVEL AT WHICH AN INTERRUPT OCCURS
1079                                  ;PRINT OUT A MESSAGE STATING THIS LEVEL IF IT IS OTHER THAN THE STANDARD (LEVEL 6)
1080                                  ;MAKE CERTAIN THAT IT ALWAYS OCCURS AT THIS LEVEL
1081                                  ;THE MESSAGE STATING THE LEVEL IS PRINTED ONLY ONCE, AND THE PROGRAM MUST
1082                                  ;BE STARTED OVER AT LOCATION 200 FOR IT TO BE PRINTED AGAIN
1083
1084
1085                                  ;TEST FOR AN INTERRUPT ON LEVEL 7
1086  002706  104001                  TEST13: SCOPE
1087  002710  004767  006520                  JSR     %7,INIT         ;INITIALIZE
1088  002714  012710  003024                  MOV     #TINT13,@ADINT  ;SETUP RETURN ADDRESS
1089  002720  052767  000340  175050          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1090  002726  016760  175044  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1091  002734  042767  000340  175034          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1092  002742  052767  000300  175026          BIS     #300,PSR        ;SET PROCESSOR TO LEVEL 6 PRIORITY
1093  002750  012713  000103                  MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
1094  002754  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1095  002760  001775                          BEQ     .-4
1096  002762  016067  000002  175006          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1097  002770  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
1098  002772  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1099  002776  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1100  003002  005767  175574                  TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1101  003006  100044                          BPL     TEST14          ;IF NO, GO TO NEXT TEST
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1102  003010  026727  175566  100007          CMP     INTFLG,#100007  ;IF SO, CHECK TO SEE
1103  003016  100440                          BMI     TEST14          ;THAT THE INTERRUPT LEVEL RECORDED
1104                                                                  ;IS BELOW THE CURRENT LEVEL
1105  003020  104000                          HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1106                                                                  ;AT LEVEL 7, BUT PREVIOUSLY OCCURRED
1107                                                                  ;AT OR ABOVE THIS LEVEL
1108  003022  000436                          BR      TEST14
1109  003024  032713  040000          TINT13: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1110  003030  001001                          BNE     .+4             ;BRANCH IF SET
1111  003032  104000                          HLT                     ;CARD DONE WASN'T SET
1112  003034  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1113  003036  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1114  003042  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1115  003046  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1116  003050  005767  175526                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1117  003054  100414                          BMI     SET7    ;BRANCH IF FLAG SET
1118  003056  012767  100007  175516          MOV     #100007,INTFLG ;SET FLAG AND LEVEL
1119  003064  012702  014503                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1120  003070  004767  007056                  JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1121  003074  012702  000007                  MOV     #7,R2
1122  003100  004767  006630                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1123  003104  000405                          BR      TEST14
1124  003106  026727  175470  100007  SET7: CMP     INTFLG,#100007  ;CHECK PREVIOUS LEVEL
1125  003114  100001                          BPL     TEST14
1126  003116  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1127
1128                                          ;TEST FOR AN INTERRUPT ON LEVEL 6
1129                                          ;SINCE THIS IS WHERE THE CARD READER NORMALLY IS, DON'T PRINT OUT A MESSAGE
1130                                          ;IF IT IS FOUND HERE
1131  003120  104001                  TEST14: SCOPE
1132  003122  004767  006306                  JSR     %7,INIT         ;INITIALIZE
1133  003126  012710  003216                  MOV     #TINT14,@ADINT  ;SETUP RETURN ADDRESS
1134  003132  052767  000340  174636          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1135  003140  016760  174632  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1136  003146  042767  000340  174622          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1137  003154  052767  000240  174614          BIS     #240,PSR        ;SET PROCESSOR TO LEVEL 5 PRIORITY
1138  003162  012713  000103                  MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
1139  003166  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1140  003172  001775                          BEQ     .-4
1141  003174  016067  000002  174574          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1142  003202  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
1143  003204  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1144  003210  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1145  003214  000426                          BR      TEST15
1146  003216  032713  040000          TINT14: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1147  003222  001001                          BNE     .+4             ;BRANCH IF SET
1148  003224  104000                          HLT                     ;CARD DONE WASN'T SET
1149  003226  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1150  003230  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1151  003234  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1152  003240  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1153  003242  005767  175334                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1154  003246  100404                          BMI     SET14           ;BRANCH IF FLAG SET
1155  003250  012767  100006  175324          MOV     #100006,INTFLG  ;SET FLAG AND LEVEL
1156  003256  000405                          BR      TEST15
1157  003260  026727  175316  100006  SET14:  CMP     INTFLG,#100006  ;CHECK PREVIOUS LEVEL
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1158  003266  100001                          BPL     TEST15
1159  003270  104000                          HLT                             ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1160
1161                                          ;TEST FOR AN INTERRUPT ON LEVEL 5
1162  003272  104001                  TEST15: SCOPE
1163  003274  004767  006134                  JSR     %7,INIT                 ;INITIALIZE
1164  003300  012710  003410                  MOV     #TINT15,@ADINT          ;SETUP RETURN ADDRESS
1165  003304  052767  000340  174464          BIS     #340,PSR                ;SET PROCESSOR PRIORITY TO 7
1166  003312  016760  174460  000002          MOV     PSR,2(ADINT)            ;SETUP RETURN PROCESSOR STATUS
1167  003320  042767  000340  174450          BIC     #340,PSR                ;SET PROCESSOR PRIORITY TO 0
1168  003326  052767  000200  174442          BIS     #200,PSR                ;SET PROCESSOR TO LEVEL 4 PRIORITY
1169  003334  012713  000103                  MOV     #103,@CRS               ;SET EJECT INTERRUPT ENABLE, AND READ
1170  003340  032713  040000                  BIT     #40000,@CRS             ;WAIT FOR CARD DONE
1171  003344  001775                          BEQ     .-4
1172  003346  016067  000002  174422          MOV     2(ADINT),PSR            ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1173  003354  005013                          CLR     @CRS                    ;D.  BLE INTERRUPTS
1174  003356  012710  000232                  MOV     #232,@ADINT             ;CHANGE INTERRUPT RETURN ADDRESS
1175  003362  005037  000232                  CLR     @#232                   ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1176  003366  005767  175210                  TST     INTFLG                  ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1177  003372  100044                          BPL     TEST16                  ;IF NO, GO TO NEXT TEST
1178  003374  026727  175202  100005          CMP     INTFLG,#100005          ;IF SO, CHECK TO SEE
1179  003402  100440                          BMI     TEST16                  ;THAT THE INTERRUPT LEVEL RECORDED
1180                                                                          ;IS BELOW THE CURRENT LEVEL
1181  003404  104000                          HLT                             ;INTERRUPT DIDN'T OCCUR WITH STATUS
1182                                                                          ;AT LEVEL 5, BUT PREVIOUSLY OCCURRED
1183                                                                          ;AT OR ABOVE THIS LEVEL
1184  003406  000436                          BR      TEST16
1185  003410  032713  040000          TINT15: BIT     #40000,@CRS             ;MAKE SURE CARD DONE IS SET
1186  003414  001001                          BNE     .+4                     ;BRANCH IF SET
1187  003416  104000                          HLT                             ;CARD DONE WASN'T SET
1188  003420  005013                          CLR     @CRS                    ;DISABLE FURTHER INTERRUPTS
1189  003422  012710  000232                  MOV     #232,@ADINT             ;CHANGE INTERRUPT RETURN ADDRESS
1190  003426  005037  000232                  CLR     @#232                   ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1191  003432  022626                          CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
1192  003434  005767  175142                  TST     INTFLG                  ;CHECK FOR PREVIOUS FLAG
1193  003440  100414                          BMI     SETS    ;BRANCH IF FLAG SET
1194  003442  012767  100005  175132          MOV     #100005,INTFLG ;SET FLAG AND LEVEL
1195  003450  012702  014503                  MOV     #MSG4,R2                ;SETUP FOR PRINTOUT
1196  003454  004767  006472                  JSR     %7,TOUT                 ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1197  003460  012702  000005                  MOV     #5,R2
1198  003464  004767  006244                  JSR     %7,PROCT                ;PRINT LEVEL NUMBER
1199  003470  000405                          BR      TEST16
1200  003472  026727  175104  100005  SETS:  CMP     INTFLG,#100005          ;CHECK PREVIOUS LEVEL
1201  003500  100001                          BPL     TEST16
1202  003502  104000                          HLT                             ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1203
1204                                          ;TEST FOR AN INTERRUPT ON LEVEL 4
1205  003504  104001                  TEST16: SCOPE
1206  003506  004767  005722                  JSR     %7,INIT                 ;INITIALIZE
1207  003512  012710  003622                  MOV     #TINT16,@ADINT          ;SETUP RETURN ADDRESS
1208  003516  052767  000340  174252          BIS     #340,PSR                ;SET PROCESSOR PRIORITY TO 7
1209  003524  016760  174246  000002          MOV     PSR,2(ADINT)            ;SETUP RETURN PROCESSOR STATUS
1210  003532  042767  000340  174236          BIC     #340,PSR                ;SET PROCESSOR PRIORITY TO 0
1211  003540  052767  000140  174230          BIS     #140,PSR                ;SET PROCESSOR TO LEVEL 3 PRIORITY
1212  003546  012713  000103                  MOV     #103,@CRS               ;SET EJECT INTERRUPT ENABLE, AND READ
1213  003552  032713  040000                  BIT     #40000,@CRS             ;WAIT FOR CARD DONE
```

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1214  003556  001775                    BEQ     .-4
1215  003560  016067  000002  174210    MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1216  003566  005013                    CLR     @CRS            ;DISABLE INTERRUPTS
1217  003570  012710  000232            MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1218  003574  005037  000232            CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1219  003600  005767  174776            TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1220  003604  100044                    BPL     TEST17          ;IF NO, GO TO NEXT TEST
1221  003606  026727  174770  100004    CMP     INTFLG,#100004  ;IF SO, CHECK TO SEE
1222  003614  100440                    BMI     TEST17          ;THAT THE INTERRUPT LEVEL RECORDED
1223                                                            ;IS BELOW THE CURRENT LEVEL
1224  003616  104000                    HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1225                                                            ;AT LEVEL 4, BUT PREVIOUSLY OCCURRED
1226                                                            ;AT OR ABOVE THIS LEVEL
1227  003620  000436                    BR      TEST17
1228  003622  032713  040000  TINT16:  BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1229  003626  001001                    BNE     .+4             ;BRANCH IF SET
1230  003630  104000                    HLT                     ;CARD DONE WASN'T SET
1231  003632  005013                    CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1232  003634  012710  000232            MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1233  003640  005037  000232            CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1234  003644  022626                    CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1235  003646  005767  174730            TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1236  003652  100414                    BMI     SET4    ;BRANCH IF FLAG SET
1237  003654  012767  100004  174720    MOV     #100004,INTFLG  ;SET FLAG AND LEVEL
1238  003662  012702  014503            MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1239  003666  004767  006260            JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1240  003672  012702  000004            MOV     #4,R2
1241  003676  004767  006032            JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1242  003702  000405                    BR      TEST17
1243  003704  026727  174672  100004  SET4:   CMP     INTFLG,#100004  ;CHECK PREVIOUS LEVEL
1244  003712  100001                            BPL     TEST17
1245  003714  104000                            HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1246
1247                                    ;TEST FOR AN INTERRUPT ON LEVEL 3
1248  003716  104001                    TEST17: SCOPE
1249  003720  004767  005510                    JSR     %7,INIT         ;INITIALIZE
1250  003724  012710  004034                    MOV     #TINT17,@ADINT  ;SETUP RETURN ADDRESS
1251  003730  052767  000340  174040            BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1252  003736  016760  174034  000002            MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1253  003744  042767  000340  174024            BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1254  003752  052767  000100  174016            BIS     #100,PSR        ;SET PROCESSOR TO LEVEL 2 PRIORITY
1255  003760  012713  000103                    MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
1256  003764  032713  040000                    BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1257  003770  001775                            BEQ     .-4
1258  003772  016067  000002  173776            MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1259  004000  005013                            CLR     @CRS            ;DISABLE INTERRUPTS
1260  004002  012710  000232                    MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1261  004006  005037  000232                    CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1262  004012  005767  174564                    TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1263  004016  100044                            BPL     TEST18          ;IF NO, GO TO NEXT TEST
1264  004020  026727  174556  100003            CMP     INTFLG,#100003  ;IF SO, CHECK TO SEE
1265  004026  100440                            BMI     TEST18          ;THAT THE INTERRUPT LEVEL RECORDED
1266                                                                    ;IS BELOW THE CURRENT LEVEL
1267  004030  104000                            HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1268                                                                    ;AT LEVEL 3, BUT PREVIOUSLY OCCURRED
1269                                                                    ;AT OR ABOVE THIS LEVEL
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1270  004032  000436                          BR      TEST18
1271  004034  032713  040000          TINT17: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1272  004040  001001                          BNE     .+4             ;BRANCH IF SET
1273  004042  104000                          HLT                     ;CARD DONE WASN'T SET
1274  004044  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1275  004046  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1276  004052  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1277  004056  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1278  004060  005767  174516                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1279  004064  100414                          BMI     SET3    ;BRANCH IF FLAG SET
1280  004066  012767  100003  174506          MOV     #100003,INTFLG ;SET FLAG AND LEVEL
1281  004074  012702  014503                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1282  004100  004767  006046                  JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1283  004104  012702  000003                  MOV     #3,R2
1284  004110  004767  005620                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1285  004114  000405                          BR      TEST18
1286  004116  026727  174460  100003  SET3: CMP     INTFLG,#100003  ;CHECK PREVIOUS LEVEL
1287  004124  100001                          BPL     TEST18
1288  004126  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1289
1290                                  ;TEST FOR AN INTERRUPT ON LEVEL 2
1291  004130  104001                  TEST18: SCOPE
1292  004132  004767  005276                  JSR     %7,INIT         ;INITIALIZE
1293  004136  012710  004246                  MOV     #TINT18,@ADINT  ;SETUP RETURN ADDRESS
1294  004142  052767  000340  173626          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1295  004150  016760  173622  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1296  004156  042767  000340  173612          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1297  004164  052767  000040  173604          BIS     #040,PSR        ;SET PROCESSOR TO LEVEL 1 PRIORITY
1298  004172  012713  000103                  MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
1299  004176  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1300  004202  001775                          BEQ     .-4
1301  004204  016067  000002  173564          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1302  004212  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
1303  004214  012710  000232                  MOV     #23.,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1304  004220  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1305  004224  005767  174352                  TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1306  004230  100044                          BPL     TEST19          ;IF NO, GO TO NEXT TEST
1307  004232  026727  174344  100002          CMP     INTFLG,#100002  ;IF SO, CHECK TO SEE
1308  004240  100440                          BMI     TEST19          ;THAT THE INTERRUPT LEVEL RECORDED
1309                                                                  ;IS BELOW THE CURRENT LEVEL
1310  004242  104000                          HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1311                                                                  ;AT LEVEL 2, BUT PREVIOUSLY OCCURRED
1312                                                                  ;AT OR ABOVE THIS LEVEL
1313  004244  000436                          BR      TEST19
1314  004246  032713  040000          TINT18: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1315  004252  001001                          BNE     .+4             ;BRANCH IF SET
1316  004254  104000                          HLT                     ;CARD DONE WASN'T SET
1317  004256  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1318  004260  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1319  004264  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1320  004270  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1321  004272  005767  174304                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1322  004276  100414                          BMI     SET2    ;BRANCH IF FLAG SET
1323  004300  012767  100002  174274          MOV     #100002,INTFLG ;SET FLAG AND LEVEL
1324  004306  012702  014503                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1325  004312  004767  005634                  JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
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1326  004316  012702  000002                  MOV     #2,R2
1327  004322  004767  005402                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1328  004326  000405                          BR      TEST19
1329  004330  026727  174246  100002  SET2:   CMP     INTFLG,#100002  ;CHECK PREVIOUS LEVEL
1330  004336  100001                          BPL     TEST19
1331  004340  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1332
1333                                  ;TEST FOR AN INTERRUPT ON LEVEL 1
1334  004342  104001                  TEST19: SCOPE
1335  004344  004767  005064                  JSR     %7,INIT         ;INITIALIZE
1336  004350  012710  004460                  MOV     #TINT19,@#ADINT ;SETUP RETURN ADDRESS
1337  004354  052767  000340  173414          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1338  004362  016760  173410  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1339  004370  042767  000340  173400          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1340  004376  052767  000000  173372          BIS     #000,PSR        ;SET PROCESSOR TO LEVEL 0 PRIORITY
1341  004404  012713  000103                  MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
1342  004410  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1343  004414  001775                          BEQ     .-4
1344  004416  016067  000002  173352          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1345  004424  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
1346  004426  012710  000232                  MOV     #232,@#ADINT    ;CHANGE INTERRUPT RETURN ADDRESS
1347  004432  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1348  004436  005767  174140                  TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1349  004442  100044                          BPL     TEST20          ;IF NO, GO TO NEXT TEST
1350  004444  026727  174132  100001          CMP     INTFLG,#100001  ;IF SO, CHECK TO SEE
1351  004452  100440                          BMI     TEST20          ;THAT THE INTERRUPT LEVEL RECORDED
1352                                                                  ;IS BELOW THE CURRENT LEVEL
1353  004454  104000                          HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1354                                                                  ;AT LEVEL 1, BUT PREVIOUSLY OCCURRED
1355                                                                  ;AT OR ABOVE THIS LEVEL
1356  004456  000436                          BR      TEST20
1357  004460  032713  040000          TINT19: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1358  004464  001001                          BNE     .+4             ;BRANCH IF SET
1359  004466  104000                          HLT                     ;CARD DONE WASN'T SET
1360  004470  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1361  004472  012710  000232                  MOV     #232,@#ADINT    ;CHANGE INTERRUPT RETURN ADDRESS
1362  004476  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1363  004502  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1364  004504  005767  174072                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1365  004510  100414                          BMI     SET1    ;BRANCH IF FLAG SET
1366  004512  012767  100001  174062          MOV     #100001,INTFLG ;SET FLAG AND LEVEL
1367  004520  012702  014503                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1368  004524  004767  005422                  JSR     %7,$OUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1369  004530  012702  000001                  MOV     #1,R2
1370  004534  004767  005174                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1371  004540  000405                          BR      TEST20
1372  004542  026727  174034  100001  SET1:  CMP     INTFLG,#100001  ;CHECK PREVIOUS LEVEL
1373  004550  100001                          BPL     TEST20
1374  004552  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1375
1376                                  ;A TIMING ERROR SHOULDN'T CAUSE AN INTERRUPT
1377  004554  104001                  TEST20: SCOPE
1378  004556  004767  004652                  JSR     %7,INIT         ;INITIALIZE
1379  004562  012710  004634                  MOV     #TINT2C,@#ADINT ;LOAD RETURN POINTER
1380  004566  052767  000340  173202          BIS     #340,PSR        ;SET PROCESSOR TO HIGHEST PRIORITY
1381  004574  016760  173176  000002          MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
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1382  004602  012713  000101          MOV     #101,@CRS       ;SET INTERRUPT ENABLE AND READ
1383  004606  032713  004000          BIT     #4000,@CRS      ;WAIT FOR TIMING ERROR TO SET
1384  004612  001775                  BEQ     .-4
1385  004614  042767  000340  173154  BIC     #340,PSR        ;MOVE PROCESSOR TO LOWEST PRIORITY
1386  004622  000240                  NOP                     ;CLOCK INTERRUPT IF IT OCCURRED
1387  004624  016067  000002  173144  MOV     2(ADINT),PSR    ;MOVE PROCESSOR BACK TO HIGHEST PRIORITY
1388  004632  000402                  BR      .+6
1389  004634  104000          TINT20: HLT                     ;TIMING ERROR CAUSED AN INTERRUPT
1390  004636  022626                  CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1391  004640  012710  000232          MOV     #232,@ADINT     ;CHANGE INTERRUPT ADDRESS TO CAUSE A
1392  004644  005037  000232          CLR     @#232           ;HALT IF AN INTERRUPT OCCURS
1393  004650  032713  040000          BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1394  004654  001775                  BEQ     .-4
1395  004656  005013                  CLR     @CRS            ;CLEAR INTERRUPT ENABLE
1396
1397  004660  104001          TEST21: SCOPE
1398                          ;TEST FOR NO INTERRUPT OCCURING WITH INTERRUPT ENABLE SET AND REST CLEARED
1399  004662  004767  004546          JSR     %7,INIT         ;INITIALIZE CSR TO ZERO
1400  004666  012710  004736          MOV     #TNINT,@ADINT   ;SETUP RETURN ADDRESS
1401  004672  052767  000340  173076  BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
1402  004700  016760  173072  000002  MOV     PSR,2(ADINT)    ;STORE PROCESSOR STATUS
1403  004706  005067  173064          CLR     PSR             ;SET PROCESSOR TO LEVEL 0
1404  004712  012713  000100          MOV     #100,@CRS       ;ENABLE INTERRUPTS
1405  004716  005227  000000          INC     #0              ;WAIT AWHILE
1406  004722  001375                  BNE     .-4
1407  004724  016067  000002  173044  MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO LEVEL 7
1408  004732  005013                  CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1409  004734  000403                  BR      CONT21
1410  004736  104000          TNINT:  HLT                     ;AN INTERRUPT OCCURRED
1411  004740  022626                  CMP     (SP)+,(SP)+     ;RESTORE STACK
1412  004742  005013                  CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1413  004744  005037  000232  CONT21: CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
1414  004750  012710  000232          MOV     #232,@ADINT     ;CAUSE A HALT IF AN INTERRUPT OCCURS
1415
1416  004754  104001          TEST22: SCOPE
1417                          ;CHECK FOR SIMULTANEOUS INTERRUPTS ON MORE THAN ONE LEVEL
1418  004756  004767  004452          JSR     %7,INIT         ;INITIALIZE CSR TO ZERO
1419  004762  012710  005020          MOV     #T2INT,@ADINT   ;SETUP RETURN ADDRESS
1420  004766  052767  000340  173002  BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
1421  004774  016760  172776  000002  MOV     PSR,2(ADINT)    ;STORE PROCESSOR STATUS
1422  005002  042767  000340  172766  BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
1423  005010  012713  000103          MOV     #103,@CRS       ;SET INTERRUPT ENABLE AND EJECT A CARD
1424  005014  000001                  WAIT                    ;WAIT FOR INTERRUPT
1425  005016  000776                  BR      .-2             ;SIT IF TRACE BIT IS SET
1426  005020  022626          T2INT:  CMP     (6)+,(6)+       ;RESTORE STACK POINTER
1427  005022  012710  005044          MOV     #T2INTA,@ADINT  ;CHANGE RETRUN ADDRESS
1428  005026  005067  172744          CLR     PSR             ;SET PROCESSOR TO LEVEL 0
1429  005032  000240                  NOP                     ;WAIT
1430  005034  016067  000002  172734  MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO LEVEL 7
1431  005042  000402                  BR      CONT22
1432  005044  022626          T2INTA: CMP     (6)+,(6)+       ;RESTORE STACK
1433  005046  104000                  HLT                     ;THE INTERRUPT OCCURRED AT 2 LEVELS
1434  005050  005013          CONT22: CLR     @CRS            ;DISABLE INTERRUPTS
1435  005052  005037  000232          CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
1436  005056  012710  000232          MOV     #232,@ADINT     ;CAUSE A HALT IF AN INTERRUPT OCCURS
1437
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1438  005062  104001                  TEST23: SCOPE
1439                                  ;ALL MODES OF ADDRESSING CRB1 OR CRB2 (DATO,DATOB,DATI) SHOULD CLEAR
1440                                  ;COLUMN READY
1441  005064  004767  004344                JSR     %7,INIT         ;INITIALIZE
1442  005070  005213                         INC     @CRS            ;START READING A CARD
1443  005072  105713                         TSTB    @CRS            ;WAIT FOR COLUMN READY
1444  005074  100376                         BPL     .-2
1445  005076  005014                         CLR     @CRB1           ;DATO TO CRB1
1446  005100  105713                         TSTB    @CRS            ;CHECK COLUMN READY
1447  005102  100002                         BPL     CNT23A          ;BRANCH IF CLEARED
1448  005104  104000                         HLT                     ;DATO TO CRB1 DIDN'T CLEAR READY
1449  005106  000467                         BR      TEST24          ;GO TO NEXT TEST
1450  005110  105713                CNT23A:  TSTB    @CRS            ;WAIT FOR COLUMN READY
1451  005112  100376                         BPL     .-2
1452  005114  105014                         CLRB    @CRB1           ;DATOB TO LOW BYTE OF CRB1
1453  005116  105713                         TSTB    @CRS            ;CHECK COLUMN READY
1454  005120  100002                         BPL     CNT23B          ;BRANCH IF CLEARED
1455  005122  104000                         HLT                     ;DATOB TO CRB1 LOW BYTE DIDN'T CLEAR READY
1456  005124  000460                         BR      TEST24          ;GO TO NEXT TEST
1457  005126  105713                CNT23B:  TSTB    @CRS            ;WAIT FOR COLUMN READY
1458  005130  100376                         BPL     .-2
1459  005132  105064  000001                CLRB    1(CRB1)         ;DATOB TO HIGH BYTE OF CRB1
1460  005136  105713                         TSTB    @CRS            ;CHECK COLUMN READY
1461  005140  100002                         BPL     CNT23C          ;BRANCH IF CLEARED
1462  005142  104000                         HLT                     ;DATOB TO CRB1 HIGH BYTE DIDN'T CLEAR READY
1463  005144  000450                         BR      TEST24          ;GO TO NEXT TEST
1464  005146  105713                CNT23C:  TSTB    @CRS            ;WAIT FOR COLUMN READY
1465  005150  100376                         BPL     .-2
1466  005152  005714                         TST     @CRB1           ;DATI TO CRB1
1467  005154  105713                         TSTB    @CRS            ;CHECK COLUMN READY
1468  005156  100002                         BPL     CNT23D          ;BRANCH IF CLEARED
1469  005160  104000                         HLT                     ;DATI TO CRB1 DIDN'T CLEAR READY
1470  005162  000441                         BR      TEST24          ;GO TO NEXT TEST
1471  005164  105713                CNT23D:  TSTB    @CRS            ;WAIT FOR COLUMN READY
1472  005166  100376                         BPL     .-2
1473  005170  005077  173444                CLR     @CRB2           ;DATO TO CRB2
1474  005174  105713                         TSTB    @CRS            ;CHECK COLUMN READY
1475  005176  100002                         BPL     CNT23E          ;BRANCH IF CLEARED
1476  005200  104000                         HLT                     ;DATO TO CRB2 DIDN'T CLEAR READY
1477  005202  000431                         BR      TEST24          ;GO TO NEXT TEST
1478  005204  105713                CNT23E:  TSTB    @CRS            ;WAIT FOR COLUMN READY
1479  005206  100376                         BPL     .-2
1480  005210  105077  173424                CLRB    @CRB2           ;DATOB TO LOW BYTE OF CRB2
1481  005214  105713                         TSTB    @CRS            ;CHECK COLUMN READY
1482  005216  100002                         BPL     CNT23F          ;BRANCH IF CLEARED
1483  005220  104000                         HLT                     ;DATOB TO CRB2 LOW BYTE DIDN'T CLEAR READY
1484  005222  000421                         BR      TEST24          ;GO TO NEXT TEST
1485  005224  105713                CNT23F:  TSTB    @CRS            ;WAIT FOR COLUMN READY
1486  005226  100376                         BPL     .-2
1487  005230  016702  173404                MOV     CRB2,R2         ;LOAD POINTER
1488  005234  105062  000001                CLRB    1(R2)           ;DATOB TO HIGH BYTE OF CRB2
1489  005240  105713                         TSTB    @CRS            ;CHECK COLUMN READY
1490  005242  100002                         BPL     CNT23G          ;BRANCH IF CLEARED
1491  005244  104000                         HLT                     ;DATOB TO CRB2 HIGH BYTE DIDN'T CLEAR READY
1492  005246  000407                         BR      TEST24          ;GO TO NEXT TEST
1493
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 1494  005250  105713                CNT23G: TSTB    @CRS            ;WAIT FOR COLUMN READY
 1495  005252  100376                        BPL     .-2
 1496  005254  005777  173360              TST     @CRB2           ;DATI TO CRB2
 1497  005260  105713                      TSTB    @CRS            ;CHECK COLUMN READY
 1498  005262  100001                      BPL     TEST24          ;BRANCH IF CLEARED
 1499  005264  104000                      HLT                     ;DATI TO CRB2 DIDN'T CLEAR READY
 1500
 1501  005266  104001                TEST24: SCOPE
 1502                                ;SETTING EJECT AFTER A COLUMN READY WITHOUT CLEARING THE COLUMN READY
 1503                                ;SHOULD SET TIMING ERROR (WHICH IN TURN SHOULD CLEAR COLUMN READY)
 1504  005270  004767  004140              JSR     %7,INIT         ;INITIALIZE
 1505  005274  005213                      INC     @CRS            ;START READING A CARD
 1506  005276  105713                      TSTB    @CRS            ;CHECK COLUMN READY - WAIT
 1507  005300  100376                      BPL     .-2
 1508  005302  052713  000002              BIS     #2,@CRS         ;SET EJECT
 1509  005306  105713                      TSTB    @CRS            ;CHECK COLUMN READY
 1510  005310  100402                      BMI     CNT24A          ;BRANCH IF STILL SET
 1511  005312  104000                      HLT                     ;SETTING EJECT CLEARED COLUMN READY
 1512  005314  000421                      BR      END24           ;BRANCH TO WAIT FOR DONE AFTER ERROR
 1513  005316  032713  004000      CNT24A: BIT     #4000,@CRS      ;CHECK TIMING ERROR
 1514  005322  001013                      BNE     TIM24           ;BRANCH IF SET
 1515  005324  032713  040400              BIT     #40400,@CRS     ;CHECK CARD DONE AND OFF-LINE
 1516  005330  001772                      BEQ     CNT24A          ;LOOP IF NONE SET
 1517  005332  032713  040000              BIT     #40000,@CRS     ;CARD DONE SET?
 1518  005336  001003                      BNE     CNT24B          ;YES - BRANCH TO ERROR PRINTOUT
 1519  005340  004767  004142              JSR     %7,CKBITB       ;NO - BIT 8 WAS SET SO OUTPUT MESSAGE
 1520  005344  000415                      BR      ENDCK           ;BRANCH AFTER COMING BACK ON-LINE
 1521  005346  104000      CNT24B: HLT                             ;CARD DONE SET BUT TIMING ERROR DIDN'T
 1522  005350  000413                      BR      ENDCK           ;BRANCH TO NEXT SECTION
 1523  005352  105713      TIM24:  TSTB    @CRS            ;CHECK COLUMN READY
 1524  005354  100001                      BPL     .+4             ;BRANCH IF NOT SET
 1525  005356  104000                      HLT                     ;TIMING ERROR DIDN'T CLEAR READY
 1526  005360  032713  040400      END24:  BIT     #40400,@CRS     ;WAIT FOR CARD DONE OR OFF-LINE
 1527  005364  001775                      BEQ     END24
 1528  005366  032713  000400              BIT     #400,@CRS       ;CHECK OFF LINE
 1529  005372  001402                      BEQ     ENDCK           ;BRANCH IF NOT SET
 1530  005374  004767  004106              JSR     %7,CKBITB       ;OUTPUT ERROR MESSAGE
 1531
 1532                                ;CHECK SW7 AND RETURN TO TEST1 IF SET, AFTER RINGING BELL
 1533                                ;OTHERWISE GO INTO THE DATA TEST
 1534  005400  104001      ENDCK:  SCOPE
 1535  005402  032777  000200  173206      BIT     #200,@SWR
 1536  005410  001406                      BEQ     DATST
 1537  005412  004767  004044              JSR     %7,BELL
 1538  005416  005167  173222              COM     TRFLG           ;TOGGLE TRACE FLAG
 1539  005422  000167  173314              JMP     RESTRT
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1540
1541
1542                                    ;*********************************************************
1543                                    ;DATA RELIABILITY TEST FOR CR11
1544                                    ;*********************************************************
1545
1546                                    ;CHECK SR FOR TYPE OF DECK BEING TESTED, AND INITIALIZE POINTERS
1547  005426  012767  000056  001212  DATST:  MOV     #56,CDCNT       ;SETUP CARD COUNT TO ENTER TABLE CORRESPONDING TO NEXT C
1548  005434  000410                          BR      DATST2          ;SKIP NEXT INSTRUCTION
1549  005436  022767  000176  173152  DATST1: CMP     #SWREG,SWR
1550  005444  001002                          BNE     1$
1551  005446  104002                          CNTLU
1552  005450  104006                          CKU
1553  005452  005067  001170          1$:     CLR     CDCNT           ;SETUP CARD COUNT TO ENTER DATA TABLE AT BEGINNING
1554  005456  005067  173166          DATST2: CLR     ERFLG           ;FLAG SET PREVENTS PRINTING OUT ERROR HEADING
1555  005462  032777  000020  173126          BIT     #20,@SWR                ;CHECK BIT 4 OF SR FOR TYPE OF DECK
1556  005470  001412                          BEQ     ALP1            ;BRANCH IF NOT SET TO LOAD ALPHANUMERIC POINTERS
1557  005472  012767  013524  001142          MOV     #BINCD,TSTART   ;BIT 2 SET, LOAD BINARY TABLE POINTERS
1558  005500  012767  014222  001136          MOV     #BINEND,TEND
1559  005506  012767  015627  001124          MOV     #MSG15,DECK
1560  005514  000411                          BR      CONTD           ;BRANCH AROUND ALPHANUMERIC POINTERS
1561  005516  012767  013024  001116  ALP1:   MOV     #ALPCD,TSTART   ;LOAD ALPHANUMERIC TABLE POINTERS
1562  005524  012767  013522  001112          MOV     #ALPEND,TEND
1563  005532  012767  015616  001100          MOV     #MSG14,DECK
1564  005540  005767  173100          CONTD:  TST     TRFLG           ;CHECK TRACE TRAP FLAG
1565  005544  001004                          BNE     TRP1            ;BRANCH IF FLAG WAS SET
1566  005546  012767  000340  172222  NOTRP1: MOV     #340,PSR        ;CLEAR TRACE BIT
1567  005554  000407                          BR      DCNT1
1568  005556  032777  010000  173032  TRP1:   BIT     #10000,@SWR     ;CHECK SW12 TO INHIBIT TRACE TRAPPING
1569  005564  001370                          BNE     NOTRP1          ;BRANCH IF SET
1570  005566  012767  000360  172202          MOV     #360,PSR        ;SET TRACE BIT
1571  005574  004767  003634          DCNT1:  JSR     %7,INIT         ;INITIALIZE CARD READER STATUS REGISTER
1572                                    ;SET UP INTERRUPT SERVICING, AND START READING
1573  005600  012710  005634                  MOV     #SRVC,@ADINT    ;SETUP RETURN POINTER
1574  005604  042767  000340  172164          BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
1575  005612  016760  172160  000002          MOV     PSR,2(ADINT)    ;STORE CURRENT STATUS
1576  005620  004767  000714                  JSR     %7,NXCRD        ;ADJUST POINTER AND START READING
1577  005624  052713  000101                  BIS     #101,@CRS       ;ENABLE INTERRUPTS
1578  005630  000001                          WAIT                    ;WAIT FOR INTERRUPTS
1579  005632  000776                          BR      .-2
1580
1581                                    ;INTERRUPT SERVICE ROUTINE WHICH RUNS DATA RELIABILITY TEST
1582  005634  005713          SRVC:   TST     @CRS            ;CHECK SPECIAL CONDITION (BIT 15)
1583  005636  100460                  BMI     ERSET           ;BRANCH IF SET
1584  005640  105713                  TSTB    @CRS            ;CHECK COLUMN READY
1585  005642  100402                  BMI     .+6             ;BRANCH IF SET
1586  005644  000167  000542          JMP     NOTCOL          ;JUMP IF NOT SET
1587  005650  005267  000774          INC     CLCNT           ;KEEP TRACK OF COLUMN NUMBER
1588  005654  011467  000772          MOV     @CRB1,DAT1      ;STORE DATA OF FIRST READ
1589  005660  105713                  TSTB    @CRS            ;MAKE SURE COLUMN READY CLEARED
1590  005662  100006                  BPL     SCONT1          ;BRANCH IF IT DID
1591  005664  052767  000340  172104          BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
1592  005672  104000                  HLT                     ;READING DATA DIDN'T CLEAR COLUMN READY
1593  005674  000167  000532          JMP     LASTCK          ;GO TO NEXT CARD AFTER ERROR PRINTOUT
1594  005700  017767  172734  000750  SCONT1: MOV     @CRB2,DATENC    ;STORE ENCODED DATA
1595  005706  012701  000010          MOV     #10.,COUNT      ;WAIT AWHILE
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 1596  005712  005301                          DEC     COUNT
 1597  005714  001376                          BNE     .-2
 1598  005716  011467  000732                  MOV     @CRB1,DAT2      ;STORE DATA OF SECOND READ
 1599  005722  005067  000732                  CLR     PTOFF           ;CLEAR POINTER OFFSET
 1600  005726  026715  000720                  CMP     DAT1,@RS        ;CHECK FIRST DATA READ
 1601  005732  001053                          BNE     FAIL            ;PRINTOUT IF WRONG
 1602  005734  012767  000002  000716          MOV     #2,PTOFF        ;SET POINTER OFFSET
 1603  005742  026725  000706                  CMP     DAT2,(RS)+      ;CHECK SECOND READING OF SAME DATA
 1604  005746  001045                          BNE     FAIL            ;BRANCH IF WRONG
 1605  005750  012767  000004  000702          MOV     #4,PTOFF        ;SET POINTER OFFSET
 1606  005756  026725  000674                  CMP     DATENC,(RS)+    ;CHECK ENCODED DATA
 1607  005762  001037                          BNE     FAIL            ;BRANCH IF WRONG
 1608  005764  020567  000654                  CMP     RS,TEND         ;CHECK FOR END OF TABLE
 1609  005770  100402                          BMI     .+6             ;IF NOT THERE, RTI
 1610  005772  016705  000644                  MOV     TSTART,RS       ;MOVE POINTER TO LOOP THRU TABLE
 1611  005776  000002                          RTI
 1612                                  ;SPECIAL CONDITION BIT 15 WAS SET WHEN THE INTERRUPT SERVICE ROUTINE
 1613                                  ;WAS ENTERED
 1614                                  ;OUTPUT A MESSAGE AND HALT
 1615  006000  052767  000340  171770  ERSET:  BIS     #340,PSR        ;LOCK OUT INTERRUPTS
 1616  006006  104003                          XBINTT
 1617  006010  022767  000120  000630          CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
 1618  006016  001006                          BNE     ER1             ;IF NOT, PRINT OUT MESSAGE
 1619  006020  022767  000120  000622          CMP     #80.,CLCNT      ;IF LAST CARD, CHECK FOR LAST COLUMN
 1620  006026  001002                          BNE     ER1             ;IF NOT, PRINT MESSAGE
 1621  006030  000167  000626                  JMP     ALLDON          ;IF END OF DECK, JUMP
 1622  006034  012702  0156.0          ER1:    MOV     #MSG16,R2       ;"BIT 15 WAS SET."
 1623  006040  004767  004106                  JSR     %7,TOUT
 1624  006044  012702  015661                  MOV     #MSG17,R2       ;"REMEDY THE ERROR CONDITION
 1625  006050  004767  004076                  JSR     %7,TOUT         ;AND PRESS CONTINUE"
 1626  006054  000000                          HALT
 1627  006056  000167  000350                  JMP     LASTCK          ;SET UP FOR NEXT CARD AND GO ON
 1628  006062  052767  000340  171706  FAIL:   BIS     #340,PSR        ;LOCK OUT INTERRUPTS
 1629  006070  052713  000002                  BIS     #2,@CRS         ;SET EJECT TO PREVENT TIMING ERROR
 1630  006074  005714                          TST     @CRB1           ;MAKE SURE COLUMN READY IS CLEARED
 1631  006076  032777  020000  172512          BIT     #20000,@SWR     ;CK SW13
 1632  006104  001431                          BEQ     FAILCN          ;CONTINUE IF NOT SET
 1633  006106  005777  172504                  TST     @SWR            ;IF SET, CHECK FOR HALT ON ERROR
 1634  006112  100003                          BPL     FAILC           ;BRANCH IF HALT ON ERROR NOT SET
 1635  006114  000000                          HALT                    ;HALT ON ERROR SET
 1636  006116  000167  000310                  JMP     LASTCK          ;CONTINUE  AFTER  HALT
 1637  006122  032713  040000          FAILC:  BIT     #40000, @CRS    ;CHECK FOR CARD DONE
 1638  006126  001402                          BEQ     .+6
 1639  006130  000167  000276                  JMP     LASTCK          ;INHIBIT PRINTOUT AFTER CARD DONE SET
 1640  006134  032713  000400                  BIT     #400,@CRS       ;CHECK FOR OFF-LINE
 1641  006140  001770                          BEQ     FAILC           ;BRANCH IF NOT
 1642  006142  022767  000120  000476          CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
 1643  006150  001002                          BNE     .+6
 1644  006152  000167  000504                  JMP     ALLDON          ;IF LAST CARD, WAIT FOR NEXT DECK
 1645  006156  004767  003324                  JSR     %7,CKBITB       ;IF NOT LAST CARD, PRINT MESSAGE
 1646  006162  004767  000352                  JSR     %7,NXCRD        ;START NEXT CARD THRU READER
 1647  006166  000002                          RTI
 1648  006170  005767  172454          FAILCN: TST     ERFLG           ;TEST FLAG FOR PREVIOUS PRINTOUT
 1649  006174  001006                          BNE     NOHD            ;IF SET,  DON'T OUTPUT HEADING
 1650  006176  005267  172446                  INC     ERFLG           ;SET FLAG
 1651  006202  012702  015526                  MOV     #MSG13,R2       ;OUTPUT HEADING FOR DATA ERROR PRINTOUT
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1652  006206  004767  003740          JSR     %7,TOUT
1653  006212  016702  000422  NOHD:   MOV     DECK,R2         ;OUTPUT TYPE OF DECK
1654  006216  004767  003730          JSR     %7,TOUT
1655  006222  004767  003314          JSR     %7,SPACE
1656  006226  016702  000414          MOV     CDCNT,R2        ;OUTPUT CARD NUMBER WHERE ERROR OCCURRED
1657  006232  004767  003476          JSR     %7,PROCT
1658  006236  004767  003300          JSR     %7,SPACE
1659  006242  016702  000402          MOV     CLCNT,R2        ;OUTPUT COLUMN NUMBER WHERE ERROR OCCURRED
1660  006246  004767  003462          JSR     %7,PROCT
1661  006252  004767  003264          JSR     %7,SPACE
1662  006256  166705  000376          SUB     PTOFF,R5        ;SUBTRACT OFFSET FROM POINTER TO POINT TO
1663                                                          ;ADDRESS OF DESIRED PATTERN
1664  006262  012502                  MOV     (R5)+,R2        ;OUTPUT CORRECT DATA PATTERN  NOT ENCODED
1665  006264  004767  003444          JSR     %7,PROCT
1666  006270  004767  003246          JSR     %7,SPACE
1667  006274  016702  000352          MOV     DAT1,R2         ;OUTPUT DATA READ ON FIRST READING OF BUFFER
1668  006300  004767  003430          JSR     %7,PROCT
1669  006304  004767  003232          JSR     %7,SPACE
1670  006310  016702  000340          MOV     DAT2,R2         ;OUTPUT DATA READ ONE MILLISECOND LATER
1671  006314  004767  003414          JSR     %7,PROCT
1672  006320  004767  003216          JSR     %7,SPACE
1673  006324  011502                  MOV     @R5,R2          ;OUTPUT CORRECT DATA PATTERN  ENCODED FORM
1674  006326  004767  003402          JSR     %7,PROCT
1675  006332  004767  003204          JSR     %7,SPACE
1676  006336  016702  000314          MOV     DATENC,R2       ;OUTPUT DATA READ .ENCODED
1677  006342  004767  003366          JSR     %7,PROCT
1678  006346  104003                  KBINTT
1679  006350  005777  172242          TST     @SWR            ;CHECK "HALT ON ERROR" SWITCH
1680  006354  100001                  BPL     .+4             ;BRANCH IF NOT SET
1681  006356  000000                  HALT                    ;HALT AFTER AN ERROR
1682  006360  005713                  TST     @CRS            ;CHECK ERROR
1683  006362  100023                  BPL     LASTCK          ;BRANCH IF NOT SET
1684  006364  022767  000120  000254  CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
1685  006372  001005                  BNE     FAILC1
1686  006374  032713  000400          BIT     #400,@CRS
1687  006400  001423                  BEQ     LASTCD
1688  006402  000167  000254          JMP     ALLDON
1689  006406  000167  177366  FAILC1: J       ERSET           ;OUTPUT ERROR MESSAGE
1690
1691                                  ;INTERRUPT NOT DUE TO ERROR OR COLUMN READY
1692  006412  032713  040000  NOTCOL: BIT     #40000,@CRS     ;CHECK FOR CARD DONE
1693  006416  001474                  BEQ     NOTCD           ;BRANCH IF NOT SET
1694  006420  022767  000120  000222  CMP     #80.,CLCNT      ;CHECK COLUMN COUNT
1695  006426  001401                  BEQ     .+4             ;SKIP ERROR HALT IF 80 COLUMNS WERE READ
1696  006430  104000                  HLT                     ;LESS THAN EIGHTY COLUMNS WERE READ
1697  006432  022767  000120  000206  LASTCK: CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
1698  006440  001403                  BEQ     LASTCD          ;BRANCH IF LAST CARD
1699  006442  004767  000072          JSR     %7,NXCRD        ;IF NOT LAST CARD
1700  006446  000002                  RTI                     ;GO ON
1701  006450  022626          LASTCD: CMP     (SP)+,(SP)+     ;IF LAST CARD, RESTORE STACK POINTER
1702  006452  004767  003004          JSR     %7,BELL         ;RING BELL TO SIGNIFY "PASS COMPLETE"
1703  006456  013702  000042          MOV     @#42,R2         ;MONITOR HOOK
1704  006462  001405                  BEQ     END
1705  006464  000005                  RESET
1706  006466  004712          LOGIC:  JSR     %7,(R2)
1707  006470  000240                  NOP
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 1708  006472  000240                          NOP
 1709  006474  000240                          NOP
 1710  006476  032777  000040  172112  END:    BIT     #40,@SWR                ;CHECK SR FOR CONTINUATION TO ANOTHER DECK
 1711  006504  001002                          BNE     .+6             ;BRANCH TO HALT IF SW5 SET
 1712  006506  000167  000002                  JMP     DECKCK          ;CONTINUE TO ANOTHER DECK
 1713  006512  000000                          HALT                    ;DATA TEST DONE
 1714
 1715                                  ;WHEN CONTINUING FROM ONE DECK TO ANOTHER, CHECK SW6 FOR TYPE
 1716                                  ;OF TESTING TO BE PERFORMED
 1717  006514  005167  172124          DECKCK: COM     TRFLG           ;TOGGLE TRACE FLAG
 1718  006520  032777  000100  172070          BIT     #100,@SWR               ;CHECK SW6
 1719  006526  001402                          BEQ     .+6             ;BRANCH IF NOT SET
 1720  006530  000167  172206                  JMP     RESTRT          ;RERUN COMBINED INSTRUCTION AND DATA TEST
 1721  006534  000167  176676                  JMP     DATST1
 1722
 1723  006540  016705  000076          NXCRD:  MOV     TSTART,R5       ;LOAD R5 WITH TABLE STARTING ADDRESS
 1724  006544  006367  000076                  ASL     CDCNT           ;MULTIPLY CARD COUNT BY FOUR
 1725  006550  006367  000072                  ASL     CDCNT
 1726  006554  066705  000066                  ADD     CDCNT,R5        ;ADD OFFSET TO R5 TO POINT TO NEXT DATUM
 1727  006560  006267  000062                  ASR     CDCNT           ;RESTORE CARD COUNT
 1728  006564  006267  000056                  ASR     CDCNT
 1729  006570  042713  000002                  BIC     #2,@CRS         ;CLEAR EJECT IF SET
 1730  006574  005213                          INC     @CRS            ;READ ANOTHER CARD
 1731  006576  005267  000044                  INC     CDCNT           ;KEEP TRACK OF CARD NUMBER
 1732  006602  005067  000042                  CLR     CLCNT           ;INITIALIZE COLUMN COUNT
 1733  006606  000207                          RTS     %7              ;RETURN
 1734                                  ;INTERRUPT NOT CAUSED BY ERROR, COLUMN READY, OR CARD DONE
 1735  006610  052767  000340  171160  NOTCD:  BIS     #340,PSR        ;LOCK OUT FURTHER INTERRUPTS
 1736  006616  032713  002000                  BIT     #2000,@CRS      ;TEST ON-LINE TRANSITION BIT
 1737  006622  001003                          BNE     NOTCD1          ;BRANCH IF SET
 1738  006624  104000                          HLT                     ;NO BITS SET TO CAUSE AN INTERRUPT
 1739  006626  000167  177600                  JMP     LASTCK          ;START NEXT CARD
 1740  006632  104000          NOTCD1: HLT                     ;ON-LINE TRANSITION CAUSED AN INTERRUPT
 1741  006634  000167  177572                  JMP     LASTCK          ;START NEXT CARD
 1742  006640  000000          DECK:   0                       ;POINTER TO LITERAL "ALPHA" OR "BINARY"
 1743  006642  000000          TSTART: 0                       ;STARTING ADDRESS OF DATA TABLE
 1744  006644  000000          TEND:   0                       ;END ADDRESS OF DATA TABLE
 1745  006646  000000          CDCNT:  0                       ;NUMBER OF CARD BEING READ
 1746  006650  000000          CLCNT:  0                       ;NUMBER OF COLUMN BEING CHECKED
 1747  006652  000000          DAT1:   0                       ;DATA ON FIRST READ FROM CRB1
 1748  006654  000000          DAT2:   0                       ;DATA ON SECOND READ OF CRB1
 1749  006656  000000          DATENC: 0                       ;DATA READ FROM CRB2
 1750  006660  000000          PTOFF:  0                       ;OFFSET TO POINTER FOR DATA PRINTOUT
 1751  006662  004767  002574  ALLDON: JSR     %7,BELL         ;RING BELL
 1752  006666  032713  000400          BIT     #400,@CRS       ;CHECK OFF-LINE BIT
 1753  006672  001001                  BNE     .+4             ;BRANCH IF SET
 1754  006674  104000                  HLT                     ;OFF-LINE NOT SET, BUT SPECIAL CONDITION
 1755                                                          ;WAS SET AFTER 80 COLUMNS OF THE 81ST CARD WERE READ
 1756  006676  032777  000040  171712          BIT     #40,@SWR                ;CHECK SR FOR HALT AT END OF DECK
 1757  006704  001403                          BEQ     ALCNT           ;CONTINUE IF NOT SET
 1758  006706  000000                          HALT                    ;END OF DECK,SW5 SET
 1759  006710  000167  177600                  JMP     DECKCK          ;CHECK FOR TYPE OF TESTING
 1760  006714  032777  002000  171674  ALCNT:  BIT     #2000,@SWR      ;DOES THIS CR11 USE THE M829 MODULE?
 1761  006722  001025                          BNE     ALCNT1          ;YES- BRANCH
 1762  006724  005027  000000                  CLR     #0              ;NO-STALL TO ALLOW CARD DONE TO SET
 1763  006730  005367  177772                  DEC     .-2
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1764  006734  001375                          BNE     .-4
1765  006736  005327  000000                  DEC     #0
1766  006742  001375                          BNE     .-4
1767  006744  005327  000000                  DEC     #0
1768  006750  001375                          BNE     .-4
1769  006752  032713  040000                  BIT     #40000,@CRS     ;CHECK CARD DONE
1770  006756  001001                          BNE     .+4
1771  006760  104000                          HLT                     ;CARD DONE DIDN'T SET- THIS ERROR COULD BE
1772  006762  005013                          CLR     @CRS            ;CAUSED BY RUNNING A CR11 WHICH HAS THE
1773                                                                  ;M829 MODULE AND NOT SETTING SWITCH REGISTER
1774                                                                  ;SWITCH 10
1775
1776  006764  032713  157377                  BIT     #157377,@CRS    ;ONLY BIT 8 MAY STILL BE SET
1777  006770  001401                          BEQ     .+4             ;BRANCH IF OK
1778  006772  104000                          HLT                     ;STATUS REGISTER INCORRECT
1779  006774  000405                          BR ALCNT2
1780  006776  005013          ALCNT1: CLR     @CRS                    ;CLEAR ERROR
1781  007000  032713  156377                  BIT     #156377,@CRS    ;ONLY BITS 8 AND 9 MAY STILL BE SET
1782                                                                  ;BIT 9 MAY BE SET SINCE CARD MAY NOT
1783                                                                  ;YET HAVE CLEARED THE READER TO CAUSE
1784                                                                  ;CARD DONE
1785  007004  001401                          BEQ     .+4
1786  007006  104000                          HLT                     ;STATUS REGISTER INCORRECT
1787  007010  052767  000340  170760  ALCNT2: BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
1788  007016  016760  170754  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN STATUS
1789  007024  105213                          INCB    @CRS            ;ATTEMPT TO READ- SHOULD RESET ERROR
1790  007026  005713                          TST     @CRS            ;CHECK BIT 15
1791  007030  100402                          BMI     ALLOK           ;BRANCH IF OK
1792  007032  104000                          HLT                     ;SETTING READ DIDN'T RESET ERROR
1793  007034  000416                          BR      ALWAIT          ;BRANCH TO WAIT FOR ON-LINE
1794  007036  012710  007070          ALLOK:  MOV     #SRVC1,@ADINT   ;LOAD INTERRUPT RETURN ADDRESS
1795  007042  005067  170730                  CLR     PSR             ;SET PROCESSOR TO LEVEL 0
1796  007046  012713  000101                  MOV     #101,@CRS       ;ENABLE INTERRUPTS, KEEP ERROR SET BY SETTING READ
1797  007052  000240                          NOP                     ;CLOCK IN INTERRUPT
1798  007054  016067  000002  170714          MOV     2(ADINT),PSR    ;SET PROCESSOR TO LEVEL 7
1799  007062  005013                          CLR     @CRS            ;CLEAR INTERRUPT ENABLE AND ERROR
1800  007064  104000                          HLT                     ;BIT 15 DIDN'T CAUSE AN INTERRUPT
1801  007066  000402                          BR      .+6
1802  007070  022626          SRVC1:  CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
1803  007072  005013          ALWAIT: CLR     @CRS                    ;CLEAR INTERRUPT ENABLE AND ERROR
1804  007074  012710  007132                  MOV     #SRVC2,@ADINT   ;CHANGE INTERRUPT RETURN ADDRESS
1805  007100  112713  000100                  MOVB    #100,@CRS       ;ENABLE INTERRUPTS
1806  007104  042767  000340  170664          BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
1807  007112  032713  000400                  BIT     #400,@CRS       ;CHECK OFF-LINE BIT
1808  007116  001375                          BNE     .-4             ;LOOP UNTIL CLEAR
1809  007120  016067  000002  170650          MOV     2(ADINT),PSR    ;SET PROCESSOR TO LEVEL 7
1810  007126  104000                          HLT                     ;NO INTERRUPT OCCURRED
1811  007130  000403                          BR      SRVC2A          ;BRANCH AROUND
1812  007132  004767  002324          SRVC2:  JSR     %7,BELL         ;RING BELL
1813  007136  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1814  007140  032713  002000          SRVC2A: BIT     #2000,@CRS      ;CHECK BIT 10
1815  007144  001001                          BNE     .+4             ;BRANCH IF SET
1816  007146  104000                          HLT                     ;BIT 10 NOT SET
1817  007150  032713  000400                  BIT     #400,@CRS       ;CHECK BIT 8
1818  007154  001401                          BEQ     .+4             ;BRANCH IF NOT SET
1819  007156  104000                          HLT                     ;BIT 8 WAS SET
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1820  007160  005013                          CLR     @CRS            ;DATO TO CRS
1821  007162  032713  002000                  BIT     #2000,@CRS      ;CHECK BIT 10
1822  007166  001401                          BEQ     .+4             ;BRANCH IF NOT SET
1823  007170  104000                          HLT                     ;DATO DIDN'T CLEAR ON-LINE BIT
1824  007172  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK FROM INITIAL INTERRUPT
1825  007174  000167  177314                  JMP     DECKCK          ;RESTART
1826
1827  007200  005067  171426          ERCR11: CLR     FLAG
1828  007204  000403                          BR      TSTA
1829  007206  012767  000001  171416  ERCM11: MOV     #1,FLAG
1830  007214  104007                  TSTA:   TIT
1831  007216  012702  016240                  MOV     #SUBT2,R2
1832  007222  004767  171424                  JSR     %7,SETUP        ;INITIALIZE REGISTERS
1833  007226  012767  007236  002714          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS
1834                                  ;THE CARD READER GOING OFF-LINE SHOULD SET SPECIAL CONDITION (BIT 15) AND OFF-LINE  BIT
1835  007234  104001                  TESTA:  SCOPE
1836  007236  005067  002702                  CLR     ITMAX           ;RUN EACH ERROR TEST ONCE ONLY
1837  007242  004767  002156                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1838  007246  012702  014410                  MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
1839  007252  005767  171354                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1840  007256  001402                          BEQ     .+6             ;NO
1841  007260  012702  014450                  MOV     #MSG3A,R2       ;"PRESS CARD READER 'STOP'"
1842  007264  004767  002662                  JSR     %7,TOUT
1843  007270  012702  014343                  MOV     #MSG2,R2
1844  007274  004767  002652                  JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1845  007300  004767  002770                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1846  007304  000000                          HALT
1847  007306  032713  000400                  BIT     #400,@CRS       ;CHECK BIT 8
1848  007312  001001                          BNE     .+4             ;BRANCH IF SET
1849  007314  104000                          HLT                     ;OFF-LINE (BIT 8) WASN'T SET
1850  007316  005713                          TST     @CRS            ;CHECK BIT 15
1851  007320  100401                          BMI     .+4             ;BRANCH IF SET
1852  007322  104000                          HLT                     ;BIT 15 WASN'T SET
1853  007324  012702  014224                  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'";
1854  007330  005767  171276                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1855  007334  001402                          BEQ     .+6             ;NO
1856  007336  012702  014307                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
1857  007342  004767  002604                  JSR     %7,TOUT
1858  007346  012702  014343                  MOV     #MSG2,R2
1859  007352  004767  002574                  JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1860  007356  004767  002712                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1861  007362  000000                          HALT
1862  007364  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
1863  007370  001375                          BNE     .-4
1864
1865                                  ;INPUT HOPPER EMPTY SHOULD SET SPECIAL CONDITION
1866  007372  104001                  TESTB:  SCOPE
1867  007374  004767  002034                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1868  007400  012702  014536                  MOV     #MSG5,R2        ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
1869  007404  004767  002542                  JSR     %7,TOUT
1870  007410  012702  014343                  MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1871  007414  004767  002532                  JSR     %7,TOUT
1872  007420  004767  002650                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1873  007424  000000                          HALT
1874  007426  032713  000400                  BIT     #400,@CRS       ;CHECK BIT8
1875  007432  001001                          BNE     .+4             ;BRANCH IF SET
```

```
1876  007434  104000
1877  007436  005713
1878  007440  100401
1879  007442  104000
1880  007444  012702  014607
1881  007450  004767  002476
1882  007454  012702  014224
1883  007460  005767  171146
1884  007464  001402
1885  007466  012702  014307
1886  007472  004767  002454
1887  007476  012702  014343
1888  007502  004767  002444
1889  007506  004767  002562
1890  007512  000000
1891  007514  032713  000400
1892  007520  001375
1893
1894
1895  007522  104001
1896  007524  004767  001704
1897  007530  012702  014653
1898  007534  005767  171072
1899  007540  001402
1900  007542  012702  014771
1901  007546  004767  002[illegible]
1902  007552  012702  014343
1903  007556  004767  002370
1904  007562  004767  002506
1905  007566  000000
1906  007570  032713  000400
1907  007574  001001
1908  007576  104000
1909  007600  005713
1910  007602  100401
1911  007604  104000
1912  007606  012702  014224
1913  007612  005767  171014
1914  007616  001402
1915  007620  012702  014307
1916  007624  004767  002322
1917  007630  012702  014343
1918  007634  004767  002312
1919  007640  004767  002430
1920  007644  000000
1921  007646  032713  000400
1922  007652  001375
1923
1924
1925
1926  007654  104001
1927  007656  004767  001552
1928  007662  012702  014536
1929  007666  004767  002260
1930  007672  012702  014343
1931  007676  004767  002250
```

```
        HLT                     ;OFF-LINE (BIT 8) WASN'T SET
        TST     @CRS            ;CHECK SPECIAL CONDITION BIT
        BMI     .+4             ;BRANCH IF SET
        HLT                     ;SPECIAL CONDITION NOT SET
        MOV     #MSG6,R2        ;"RESTORE CARDS IN INPUT HOPPER"
        JSR     %7,TOUT
        MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ STAR"'"
        TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
        BEQ     .+6             ;NO
        MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
        JSR     %7,TOUT
        MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
        JSR     %7,TOUT
        JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
        HALT
        BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
        BNE     .-4

;OUTPUT STACKER FULL SHOULD SET BIT 15
TESTC:  SCOPE
        JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
        MOV     #MSG7,R2        ;"RAISE OUTPUT STACKER PRESSURE ARM ABOVE HORIZONTAL THE
        TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
        BEQ     .+6             ;NO
        MOV     #MSG7A,R2       ;"LOWER OUTPUT STACKER PLATE TO BOTTOM"
        JSR     %7,TOUT
        MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
        JSR     %7,TOUT
        JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
        HALT
        BIT     #400,@CRS       ;CHECK BIT 8
        BNE     .+4             ;BRANCH IF SET
        HLT                     ;OFF-LINE (BIT 8) WASN'T SET
        TST     @CRS            ;CHECK SPECIAL CONDITION BIT
        BMI     .+4             ;BRANCH IF SET
        HLT                     ;SPECIAL CONDITION NOT SET
        MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ STAR"'"
        TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
        BEQ     .+6             ;NO
        MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
        JSR     %7,TOUT
        MOV     #MSG2,R2
        JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
        JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
        HALT
        BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
        BNE     .-4

;A FEED ERROR SHOULD SET BIT 15
;THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO THE READ STATION
TESTD:  SCOPE
        JSR     %7,INIT
        MOV     #MSG5,R2        ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
        JSR     %7,TOUT
        MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
        JSR     %7,TOUT
```

```
 1932  007702  012702  015040          MOV     #MSG8,R2        ;"HOLD DOWN THE SWITCH AT THE BOTTOM OF INPUT HOPPER
 1933  007706  005767  170720          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
 1934  007712  001402                  BEQ     .+6             ;NO
 1935  007714  012702  015131          MOV     #MSG8A,R2       ;"LIFT SWITCH UNDER RIFFLE CAP
 1936  007720  004767  002226          JSR     %7,TOUT
 1937  007724  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'
 1938  007730  005767  170676          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
 1939  007734  001402                  BEQ     .+6             ;NO
 1940  007736  012702  014307          MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
 1941  007742  004767  002204          JSR     %7,TOUT
 1942  007746  004767  002322          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 1943  007752  000000                  HALT
 1944  007754  032713  002000          BIT     #2000,@CRS      ;WAIT FOR CARD READER TO COME ON-LINE
 1945  007760  001775                  BEQ     .-4
 1946  007762  004767  001446          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 1947  007766  012713  000003          MOV     #3,@CRS         ;SET EJECT AND READ
 1948  007772  005227  000000          INC     #0              ;WAIT AWHILE
 1949  007776  001375                  BNE     .-4
 1950  010000  005227  000000          INC     #0
 1951  010004  001375                  BNE     .-4
 1952  010006  005227  000000          INC     #0
 1953  010012  001375                  BNE     .-4
 1954  010014  005227  000000          INC     #0
 1955  010020  001375                  BNE     .-4
 1956  010022  032713  000400          BIT     #400,@CRS       ;TEST OFF-LINE BIT
 1957  010026  001001                  BNE     .+4             ;BRANCH IF SET
 1958  010030  104000                  HLT                     ;BIT 8 WAS NOT SET
 1959  010032  005713                  TST     @CRS            ;CHECK BIT 15
 1960  010034  100401                  BMI     .+4             ;BRANCH IF SET
 1961  010036  104000                  HLT                     ;BIT 15 WAS NOT SET
 1962  010040  012702  014607          MOV     #MSG6,R2
 1963  010044  004767  002102          JSR     %7,TOUT         ;"RESTORE CARDS IN THE INPUT HOPPER"
 1964  010050  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
 1965  010054  005767  170552          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
 1966  010060  001402                  BEQ     .+6             ;NO
 1967  010062  012702  014307          MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
 1968  010066  004767  002060          JSR     %7,TOUT
 1969  010072  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 1970  010076  004767  002050          JSR     %7,TOUT
 1971  010102  004767  002166          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 1972  010106  000000                  HALT
 1973  010110  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
 1974  010114  001375                  BNE     .-4
 1975  010116  005767  170510          TST     FLAG            ;SKIP NEXT TEST IF DOCUMATION READER
 1976  010122  001402                  BEQ     .+6
 1977  010124  000167  000314          JMP     TESTG
 1978
 1979                          ;A MOTION ERROR SHOULD SET BIT 15
 1980                          ;THIS ERROR OCCURS WHEN A CARD JAM OCCURS AT THE READ STATION
 1981  010130  104001          TESTE:  SCOPE
 1982  010132  004767  001276          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 1983  010136  012702  014410          MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
 1984  010142  004767  002004          JSR     %7,TOUT
 1985  010146  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 1986  010152  004767  001774          JSR     %7,TOUT
 1987  010156  012702  015170          MOV     #MSG9,R2        ;"BLOCK THE CARD READER STATION TO
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1988  010162  004767  001764          JSR     %7,TOUT         ;PREVENT A CARD GOING THRU, AND"
1989  010166  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
1990  010172  004767  001754          JSR     %7,TOUT
1991  010176  004767  002072          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1992  010202  000000                  HALT
1993  010204  032713  002000          BIT     #2000,@CRS      ;MONITOR ON-LINE TRANSITION (BIT 10)
1994  010210  001775                  BEQ     .-4             ;CONTINUE WHEN CARD READER COMES ON-LINE
1995  010212  012713  000003          MOV     #3,@CRS         ;READ A CARD AND SET EJECT
1996  010216  032713  140000          BIT     #140000,@CRS    ;CHECK DONE AND SPECIAL CONDITION BITS
1997  010222  001775                  BEQ     .-4             ;WAIT
1998  010224  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
1999  010226  100401                  BMI     .+4             ;CONTINUE IF SET
2000  010230  104000                  HLT                     ;SPECIAL CONDITION NOT SET
2001  010232  012702  015272          MOV     #MSG10,R2       ;"REMOVE JAMMED CARD"
2002  010236  004767  001710          JSR     %7,TOUT
2003  010242  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
2004  010246  004767  001700          JSR     %7,TOUT
2005  010252  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2006  010256  004767  001670          JSR     %7,TOUT
2007  010262  004767  002006          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2008  010266  000000                  HALT
2009  010270  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
2010  010274  001375                  BNE     .-4
2011
2012                                  ;A STACK FAIL ERROR SHOULD SET BIT 15
2013                                  ;ERROR OCCURS WHEN 3 CARDS IN A ROW HAVE NOT BEEN DELIVERED PROPERLY TO THE OUTPUT STACK
2014  010276  104001          TESTF:  SCOPE
2015  010300  004767  001130          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
2016  010304  012702  014410          MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
2017  010310  004767  001636          JSR     %7,TOUT
2018  010314  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2019  010320  004767  001626          JSR     %7,TOUT
2020  010324  012702  015317          MOV     #MSG11,R2       ;"HOLD THE OUTPUT STACKER GATE OPEN.  THEN"
2021  010330  004767  001616          JSR     %7,TOUT
2022  010334  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND
2023  010340  004767  001606          JSR     %7,TOUT         ;'READ START.'"
2024  010344  004767  001724          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2025  010350  000000                  HALT
2026  010352  032713  002000          BIT     #2000,@CRS      ;WAIT FOR CARD READER TO COME ON-LINE
2027  010356  001775                  BEQ     .-4
2028  010360  012701  000003          MOV     #3,COUNT        ;INITIALIZE COUNTER TO READ 3 CARDS
2029  010364  012713  000003  LOOPF:  MOV     #3,@CRS         ;EJECT A CARD
2030  010370  032713  140000          BIT     #140000,@CRS    ;WAIT FOR CARD DONE OR SPECIAL CONDITION
2031  010374  001775                  BEQ     .-4
2032  010376  005301                  DEC     COUNT           ;COUNT DOWN
2033  010400  001371                  BNE     LOOPF           ;READ 3 CARDS ALL TOGETHER
2034  010402  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT 15
2035  010404  100401                  BMI     .+4             ;BRANCH IF SET
2036  010406  104000                  HLT                     ;SPECIAL CONDITION NOT SET
2037  010410  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
2038  010414  004767  001532          JSR     %7,TOUT
2039  010420  012702  014343          MOV     #MSG2,R2        :"THEN HIT 'CONTINUE' ON THE CONSOLE"
2040  010424  004767  001522          JSR     %7,TOUT
2041  010430  004767  001640          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2042  010434  000000                  HALT
2043  010436  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
```

```
     010442  001375                          BNE     .-4

                                     ;DARK-LIGHT ERROR SHOULD SET BIT 15
                                     ;THIS OCCURS WHEN DATA IS SENSED BEFORE COLUMN ONE OR AFTER COLUMN EIGHTY
                                     ;OR WHEN THE SENSORS ARE NOT ALL SENSING A HOLE AFTER THE CARD HAS PASSED
                                     ;THIS TEST IS SKIPPED IF BIT 0 OF THE SWITCH REGISTER EQUALS ONE
                                     ;TO MAKE THE 2 DARK-LIGHT CHECK CARDS:
                                     ;       1.   TEAR A SMALL PIECE FROM THE LEADING EDGE OF ONE CARD
                                     ;       2.   TAPE 2 CARDS TOGETHER TO MAKE ONE "LONG" CARD-IT ONLY NEEDS TO BE
                                     ;            ABOUT 1/2 INCH LONGER THAN A REGULAR CARD
     010444  104001                  TESTG:  SCOPE
     010446  032777  000001  170142          BIT     #1,@SWR          ;CHECK SW0
     010454  001410                          BEQ     CONTG            ;RUN TEST IF NOT SET
     010456  004767  001000                  JSR     %7,BELL          ;IF SET, RING BELL AND
     010462  000000                          HALT                     ;HALT
     010464  012767  007236  001456          MOV     #TESTA+2,RETURN  ;SETUP SCOPE LOOP RETURN ADDRESS TO LOOP THRU TESTS
     010472  000167  176536                  JMP     TESTA            ;START ERROR TESTS OVER ON CONTINUING
     010476  004767  000732          CONTG:  JSR     %7,INIT          ;INITIALIZE STATUS REGISTER
     010502  005001                          CLR     COUNT            ;INITIALIZE COUNTER
     010504  005201                          INC     COUNT            ;SET TO INDICATE FIRST PASS
     010506  012702  015371                  MOV     #MSG12,R2        ;"PLACE SPECIAL DARK-LIGHT CHECK CARDS (SEE LISTING, TES
     010512  004767  001434                  JSR     %7,TOUT          ;AT THE BOTTOM OF THE INPUT STACK"
     010516  012702  014224          LOOPG:  MOV     #MSG1,R2         ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
     010522  005767  170104                  TST     FLAG             ;CHANGE MESSAGE FOR DOCUMATION READER?
     010526  001402                          BEQ     .+6              ;NO
     010530  012702  014307                  MOV     #MSG1A,R2        ;"PRESS CARD READER 'RESET'"
     010534  004767  001412                  JSR     %7,TOUT
     010540  012702  014343                  MOV     #MSG2,R2
     010544  004767  001402                  JSR     %7,TOUT          ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
     010550  004767  001520                  JSR     %7,CRLF4         ;MOVE MESSAGE UP ON TTY
     010554  000000                          HALT
     010556  032713  000400                  BIT     #400,@CRS        ;WAIT FOR OFF-LINE TO CLEAR
     010562  001375                          BNE     .-4
     010564  012713  000003                  MOV     #3,@CRS          ;EJECT THE CARD
     010570  032713  140000                  BIT     #140000,@CRS     ;WAIT FOR ERROR OR CARD DONE
     010574  001775                          BEQ     .-4
     010576  005713                          TST     @CRS             ;CHECK SPECIAL CONDITION
     010600  100401                          BMI     .+4              ;CONTINUE IF SET
     010602  104001                          HALT                     ;SPECIAL CONDITION NOT SET
     010604  005301                          DEC     COUNT            ;COUNT DOWN
     010606  001743                          BEQ     LOOPG            ;IF FIRST PASS, LOOP
     010610  004767  000646                  JSR     %7,BELL          ;RING BELL
     010614  000000                          HALT
     010616  012702  014224                  MOV     #MSG1,R2         ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
     010622  005767  170004                  TST     FLAG             ;CHANGE MESSAGE FOR DOCUMATION READER?
     010626  001402                          BEQ     .+6              ;NO
     010630  012702  014307                  MOV     #MSG1A,R2        ;"PRESS CARD READER 'RESET' "
     010634  004767  001312                  JSR     %7,TOUT
     010640  012702  014343                  MOV     #MSG2,R2         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
     010644  004767  001302                  JSR     %7,TOUT
     010650  004767  001420                  JSR     %7,CRLF4         ;MOVE MESSAGE UP ON TTY
     010654  000000                          HALT
     010656  032713  000400                  BIT     #400,@CRS        ;WAIT FOR OFF-LINE TO CLEAR
     010662  001375                          BNE     .-4
     010664  012767  007236  001256          MOV     #TESTA+2,RETURN  ;SETUP SCOPE LOOP RETURN ADDRESS
     010672  000167  176236                  JMP     TESTA            ;LOOP THRU TEST ON CONTINUING
```

```
2100
2101
2102                                    ;ROUTINE TO LOOP THRU A SINGLE INSTRUCTION TEST
2103                                    ;NOTE THAT SW11 MUST BE DOWN AFTER 2ND HALT
2104  010676  104007                   TESTX:  TIT
2105  010700  012702  016273                   MOV     #SUBTM,R2
2106  010704  004767  167742                   JSR     %7,SETUP                ;SETUP POINTERS AND FLAGS
2107  010710  012702  016115                   MOV     #STADD,R2
2108  010714  004767  001232                   JSR     PC,TOUT
2109  010720  104004                           READC
2110  010722  016767  167674  000062          MOV     TMP1,RETRNX
2111  010730  062767  000002  000054          ADD     #2,RETRNX               ;CHANGE TO FIRST ADDRESS AFTER SCOPE INSTRUCTION
2112  010736  032777  010000  167652  2$:     BIT     #10000,@SWR             ;CHECK SW12
2113  010744  001404                           BEQ     .+12                    ;BRANCH IF NOT SET
2114  010746  042767  000020  167022          BIC     #20,PSR                 ;CLEAR TRACE BIT
2115  010754  000403                           BR      .+10                    ;SKIP NEXT INSTRUCTION
2116  010756  052767  000020  167012          BIS     #20,PSR                 ;SET TRACE BIT
2117  010764  005067  001156                   CLR     ITCNT                   ;CLEAR ITERATION COUNTER
2118  010770  012767  011002  001152          MOV     &XLOOP,RETURN           ;LOAD RETURN ADDRESS
2119  010776  000177  000010                   JMP     @RETRNX                 ;JUMP TO TEST
2120  011002  005067  001140          XLOOP:  CLR     ITCNT                   ;KEEP ITERATION COUNTER AT ZERO
2121  011006  000177  000000                   JMP     @RETRNX                 ;JUMP TO TEST
2122  011012  000000                  RETRNX: 0
2123
```

```
                                ;ROUTINE TO CHECK CARDS WHICH HAVE ALL COLUMNS IDENTICALLY PUNCHED.
                                ;THIS ROUTINE ALLOWS SPECIFIC TYPES OF DATA FAILURES TO BE STUDIED
                                ;EASILY.  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.

011014  104007          CKSAME: TIT
011016  012702  016316          MOV     #SUBTS,R2
011022  004767  167624          JSR     %7,SETUP        ;INITIALIZE POINTERS
011026  012702  016066          MOV     #CIMPAT,R2
011032  004767  001114          JSR     PC,TOUT
011036  104004                  READC
011040  016767  167556  000364  MOV     TMP1,CARDIM
011046  042767  170000  000356  BIC     #170000,CARDIM  ;CLEAR UPPER BITS OF PATTERN
011054  005067  000350          CLR     TOTCRD          ;INITIALIZE CARD COUNT
011060  005067  000342          CLR     TOTERR          ;INITIALIZE ERROR COUNT
011064  005067  167560          CLR     ERFLG           ;CLEAR FLAG FOR PRINTING ERROR HEADING
011070  005067  175554  CKLOOP: CLR     CLCNT           ;INITIALIZE COLUMN COUNT
011074  104003                  KBINTT
011076  032713  000400          BIT     #400,@CRS       ;CHECK BIT 8
011102  001017                  BNE     CKSIT           ;BRANCH IF SET TO WAIT FOR READER TO COME ON-LINE.
011104  005213                  INC     @CRS            ;START READING CARD
011106  005267  000316          INC     TOTCRD          ;INCREMENT CARD COUNT
011112  105713          CKLP1:  TSTB    @CRS            ;CHECK COLUMN READY
011114  100426                  BMI     CKCOL           ;BRANCH IF SET
011116  032713  040000          BIT     #40000,@CRS     ;CHECK CARD DONE
011122  001015                  BNE     CKCRD           ;BRANCH IF SET
011124  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION
011126  100371                  BPL     CKLP1           ;LOOP IF NOT SET
011130  032713  000400          BIT     #400,@CRS       ;CHECK BIT 8
011134  001002                  BNE     CKSIT           ;BRANCH IF SET TO WAIT FOR READER ON-LINE.
011136  104000                  HLT                     ;SPECIAL CONDITION SET, BIT 8 CLEAR
011140  000753                  BR      CKLOOP

011142  004767  000314  CKSIT:  JSR     %7,BELL         ;RING BELL TO SIGNIFY READER OFF-LINE
011146  032713  000400  CKSIT1: BIT     #400,@CRS       ;CHECK BIT 8
011152  001375                  BNE     CKSIT1          ;LOOP IF STILL SET
011154  000745                  BR      CKLOOP          ;START NEXT CARD
011156  022767  000120  175464  CKCRD:  CMP     #80.,CLCNT      ;CHECK FOR 80 COLUMNS READ
011164  001741                  BEQ     CKLOOP          ;START NEXT CARD IF OK
011166  104000                  HLT                     ;FINAL COLUMN COUNT WASN'T 80
011170  000737                  BR      CKLOOP          ;START NEXT CARD
011172  011467  175454  CKCOL:  MOV     @CRB1,DAT1      ;READ DATA BUFFER
011176  005267  175446          INC     CLCNT           ;COUNT COLUMNS
011202  105713                  TSTB    @CRS            ;CHECK COLUMN READY
011204  100002                  BPL     .+6             ;BRANCH IF OK
011206  104000                  HLT                     ;READING DBR DIDN'T CLEAR READY
011210  000727                  BR      CKLOOP          ;START NEXT CARD AFTER ERROR
011212  012701  000200          MOV     #200,COUNT      ;WAIT AWHILE
011216  005301          CKLP2:  DEC     COUNT
```

```
2180  011220  001376                        BNE     CKLP2
2181  011222  011467  175426                MOV     @CRB1,DAT2      ;READ CRB1 AGAIN
2182  011226  026767  175420  000176        CMP     DAT1,CARDIM     ;COMPARE FIRST DATA TO PATTERN
2183  011234  001005                        BNE     CKFAIL          ;BRANCH IF FAILURE
2184  011236  026767  175412  000166        CMP     DAT2,CARDIM     ;COMPARE SECOND READING TO PATTERN
2185  011244  001001                        BNE     CKFAIL          ;BRANCH IF FAILURE
2186  011246  000721                        BR      CKLP1           ;WAIT FOR NEXT COLUMN OR END OF CARD
2187  011250  005267  000152        CKFAIL: INC     TOTERR          ;COUNT ERRORS
2188  011254  104003                        KBINTT
2189  011256  032777  020000  167332        BIT     #20000,@SWR     ;CHECK FOR INHIBITING PRINTOUT
2190  011264  001047                        BNE     CKHLT           ;BRANCH AROUND PRINTOUT IF SET
2191  011266  005767  167356                TST     ERFLG           ;TEST FLAG TO PRINT HEADING
2192  011272  001006                        BNE     CKNOHD          ;BRANCH IF ALREADY DONE
2193  011274  005267  167350                INC     ERFLG           ;PRINT HEADING ONCE ONLY
2194  011300  012702  015764                MOV     #MSG19,R2       ;OUTPUT HEADING
2195  011304  004767  000642                JSR     %7,TOUT
2196  011310  004767  000726        CKNOHD: JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
2197  011314  016702  175330                MOV     CLCNT,R2        ;PRINT COLUMN NUMBER
2198  011320  004767  000410                JSR     %7,PROCT
2199  011324  004767  000212                JSR     %7,SPACE
2200  011330  016702  175316                MOV     DAT1,R2         ;PRINT FIRST READING
2201  011334  004767  000374                JSR     %7,PROCT
2202  011340  004767  000176                JSR     %7,SPACE
2203  011344  016702  175304                MOV     DAT2,R2         ;PRINT SECOND READING
2204  011350  004767  000360                JSR     %7,PROCT
2205  011354  004767  000162                JSR     %7,SPACE
2206  011360  016702  000044                MOV     TOTCRD,R2       ;PRINT TOTAL NUMBER OF CARDS READ
2207  011364  004767  000344                JSR     %7,PROCT
2208  011370  004767  000146                JSR     %7,SPACE
2209  011374  016702  000026                MOV     TOTERR,R2       ;PRINT TOTAL NUMBER OF DATA ERRORS
2210  011400  004767  000330                JSR     %7,PROCT
2211  011404  005777  167206        CKHLT:  TST     @SWR            ;CHECK SW15 TO HALT ON ERROR
2212  011410  100002                        BPL     CKDONE          ;BRANCH IF NOT SET
2213  011412  000000                        HALT                    ;HALT ON ERROR
2214  011414  000625                        BR      CKLOOP          ;CONTINUE
2215  011416  032713  140000        CKDONE: BIT     #140000,@CRS    ;WAIT FOR SPECIAL CONDITION OR DONE
2216  011422  001775                        BEQ     CKDONE
2217  011424  000621                        BR      CKLOOP          ;START NEXT CARD AFTER CHECKING BIT 8
2218  011426  000000                TOTERR: 0
2219  011430  000000                TOTCRD: 0
2220  011432  000000                CARDIM: 0
2221
2222                                  ;ISSUE MESSAGE IF CARD READER IS OFF-LINE
2223                                  ;WAIT FOR BUSY TO CLEAR IN CASE CARD READER IS STILL READING A CARD
2224                                  ;INITIALIZE STATUS REGISTER AND USE ERROR HALT IF IT DOESN'T CLEAR PROFERLY
2225                                  ;NOTE THAT PROGRAM WILL HANG HERE IF BUSY REMAINS SET
2226  011434  004767  000046        INIT:   JSR     %7,CKBIT8       ;SEE IF OFF-LINE BIT IS SET
2227  011440  032713  001000                BIT     #1000,@CRS      ;WAIT FOR BUSY TO CLEAR, IN CASE
2228  011444  001375                        BNE     .-4             ;A CARD IS STILL BEING READ
2229  011446  005013                        CLR     @CRS            ;INITIALIZE STATUS REGISTER
2230  011450  005714                        TST     @CRB1           ;READ DATA BUFFER TO CLEAR COLUMN READY
2231  011452  005713                        TST     @CRS            ;MAKE SURE INITIALIZATION OK
2232  011454  001401                        BEQ     .+4             ;BRANCH IF ALL BITS ZERO
2233  011456  104000                        HLT                     ;NOT ALL BITS OF STATUS REGISTER ARE ZERO
2234  011460  000207                        RTS     %7              ;RETURN
2235
```

```
                                        ;BELL ON PASS COMPLETE
011462  105777  167124        BELL:   TSTB    @TCSR           ;WAIT FOR TTY READY
011466  100375                        BPL     .-4
011470  012777  000207  167116        MOV     #207,@TDBR      ;RING BELL
011476  012767  000001  000440        MOV     #1,ITMAX        ;MAKE CERTAIN ITERATION MAXIMUM IS CORRECT
011504  000207                        RTS     %7              ;RETURN

                                        ;SUBROUTINE TO CHECK FOR BIT 8 (OFF-LINE) BEING SET IN CARD
                                        ;READER CSR, AND PRINT OUT A MESSAGE IF IT IS
011506  032713  000400        CKBIT8: BIT     #400,@CRS       ;CHECK BIT 8
011512  001001                        BNE     .+4             ;BRANCH IF SET
011514  000207                        RTS     %7              ;RETURN IF NOT SET
011516  012702  015744                MOV     #MSG18,R2       ;OUTPUT MESSAGE
011522  004767  000424                JSR     %7,TOUT         ;"BIT 8 WAS SET"
011526  012702  015661                MOV     #MSG17,R2       ;"REMEDY THE ERROR CONDITION
011532  004767  000414                JSR     %7,TOUT         ;AND PRESS 'CONTINUE'"
011536  000000                        HALT                    ;WAIT FOR CONTINUE
011540  000762                        BR      CKBIT8          ;CHECK AGAIN

                                        ;SUBROUTINE TO ISSUE N SPACES
                                        ;N IS ONE PLUS VALUE CONTAINED IN SPACEX
                                        ;SPACEX IS CLEARED WITHIN THE SUBROUTINE, SO THAT A CALL ON
                                        ;SPACE WITHOUT LOADING SPACEX ISSUES ONLY ONE SPACE
011542  105777  167044        SPACE:  TSTB    @TCSR           ;WAIT FOR TTY READY
011546  100375                        BPL     .-4
011550  012777  000240  167036        MOV     #240,@TDBR      ;OUTPUT A SPACE
011556  005367  000010                DEC     SPACEX          ;DECREMENT COUNT
011562  100367                        BPL     SPACE           ;LOOP IF NOT DONE
011564  005067  000002                CLR     SPACEX          ;RESET COUNT TO ZERO
011570  000207                        RTS     %7              ;RETURN
011572  000000                SPACEX: 0

                                        ;ENTERED WITH SYSTEM TRAP CALL (HLT)
                                        ;PRINT OUT THE ERROR PC AND STATUS REGISTER
011574  104003                PRINT:  KBINTT
011576  037727  167014  020000        BIT     @SWR,#20000     ;TEST FOR INHIBIT PRINT OUT
011604  001401                        BEQ     .+4             ;BRANCH TO PRINT
011606  000437                        BR      B.CK            ;INHIBIT, CHECK FOR HALT
011610  012667  000114                MOV     (6)+,   SAVPC   ;PC OF FAILING ROUTINE
011614  012667  000112                MOV     (6)+,   SAVPSR  ;PSR OR ERROR CONDITION
011620  024646                        CMP     -(6),   -(6)    ;RESTORE STACK
011622  004767  000414                JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
011626  010267  000070                MOV     %2,     SAVR2   ;SAVE R2
011632  016702  000072                MOV     SAVPC,  %2
011636  004767  000072                JSR     %7,     PROCT   ;PRINT PC+2 IN OCTAL
011642  105777  166744                TSTB    @TCSP           ;WAIT FOR TTY READY
011646  100375                        BPL     .-4
011650  012777  000240  166736        MOV     #240,   @TDBR   ;OUTPUT A SPACE
011656  016702  000050                MOV     SAVPSR, %2
011662  004767  000046                JSR     %7,     PROCT   ;PRINT PROCESSOR STATUS AT TIME OF FAILURE
011666  016702  000030                MOV     SAVR2,  %2      ;RESTORE REGISTER 2
011672  105777  166714                TSTB    @TCSR           ;WAIT FOR TTY READY
011676  100375                        BPL     .-4
011700  012777  000240  166706        MOV     #240,@TDBR
```

```
  2292  011706  104003                B.CK:   KBINTT
  2293  011710  005777  166702                TST     @SWR            ;CHECK SR FOR HALT SWITCH
  2294  011714  100001                        BPL     .+4             ;BRANCH IF NOT SET
  2295  011716  000000                        HALT                    ;HALT ON ERROR UP
  2296  011720  000002                        RTI                     ;RETURN TO MAIN LINE
  2297  011722  000000                SAVR2:  0
  2298  011724  000000                SAVR3:  0
  2299  011726  000000                SAVR4:  0
  2300  011730  000000                SAVPC:  0
  2301  011732  000000                SAVPSR: 0
  2302
  2303  011734  010367  177764       PROCT:  MOV     %3,SAVR3        ;SAVE R3
  2304  011740  010467  177762               MOV     %4,SAVR4        ;SAVE R4
  2305  011744  005004                        CLR     %4              ;CLEAR R4 TO USE AS COUNTER
  2306  011746  005001                        CLR     COUNT           ;CLEAR COUNT TO USE AS CARRY FLAG
  2307  011750  012703  000260               MOV     #260,   %3      ;SETUP ASCII ZERO IN R3
  2308  011754  005702                        TST     %2              ;CHECK BIT IS OF DESIRED NUMBER
  2309  011756  100001                        BPL     .+4             ;BRANCH IF NOT SET
  2310  011760  005203                        INC     %3              ;CHANGE TO ASCII ONE
  2311  011762  006102                        ROL     %2              ;ROTATE INTO RIGHTMOST BIT
  2312  011764  006102                        ROL     %2              ;TO PREPARE FOR LOOP
  2313  011766  005501                        ADC     COUNT           ;STORE CARRY
  2314  011770  105777  166616       C.WAIT: TSTB    @TCSR           ;WAIT FOR TTY READY
  2315  011774  100375                        BPL     C.WAIT
  2316  011776  010377  166612               MOV     %3,     @TDBR   ;OUTPUT ASCII
  2317  012002  005204                        INC     %4              ;COUNT CHARACTERS OUTPUT
  2318  012004  020427  000006               CMP     %4,     #6      ;CHECK FOR DONE
  2319  012010  001005                        BNE     C.CONT          ;BRANCH IF NOT DONE
  2320  012012  016703  177706               MOV     SAVR3,%3        ;RESTORE REGISTER 3
  2321  012016  016704  177704               MOV     SAVR4,%4        ;RESTORE REGISTER 4
  2322  012022  000207                        RTS     %7              ;RETURN
  2323  012024  000241               C.CONT: CLC                     ;CLEAR CARRY
  2324  012026  005701                        TST     COUNT           ;TEST CARRY FLAG
  2325  012030  001402                        BEQ     .+6             ;BRANCH IF NO SET
  2326  012032  005001                        CLR     COUNT           ;CLEAR FLAG
  2327  012034  000261                        SEC                     ;SET CARRY
  2328  012036  006102                        ROL     %2              ;ROTATE NEXT 3 BITS INTO RIGHTMOST 3
  2329  012040  006102                        ROL     %2
  2330  012042  006102                        ROL     %2
  2331  012044  005501                        ADC     COUNT           ;STORE CARRY
  2332  012046  010203                        MOV     %2,     %3      ;MOVE DATA FOR OUTPUT
  2333  012050  042703  177770               BIC     #177770,%3      ;CLEAR ALL BUT RIGHTMOST 3 BITS
  2334  012054  052703  000260               BIS     #260,   %3      ;SET TO ASCII EQUIVALENT
  2335  012060  000743                        BR      C.WAIT          ;LOOP
  2336                                ;SCOPE AND/OR ITERATION LOOP FOR EACH TEST 2 TIMES
  2337  012062  104003                SCOPEC: KBINTT
  2338  012064  032777  040000  166524       BIT     #40000,@SWR     ;TEST SR FOR SCOPE
  2339  012072  001012                        BNE     D.1             ;YES,SCOPE
  2340  012074  032777  004000  166514       BIT     #4000,@SWR      ;NO- TEST FOR ITERATION
  2341  012102  001013                        BNE     D.2             ;INHIBIT ITERATION
  2342  012104  026767  000036  000032       CMP     ITCNT,ITMAX     ;CHECK FOR ITERATIONS COMPLETE
  2343  012112  100007                        BPL     D.2             ;EXIT-DONE
  2344  012114  005267  000026               INC     ITCNT           ;INCREMENT COUNT
  2345  012120  022606               D.1:    CMP     (6)+,   (6)     ;REPOSITION STACK POINTER
  2346  012122  012667  165652               MOV     (6)+,   @PSW    ;RESTORE PROCESSOR STATUS
  2347  012126  000002                        RTI     @RETURN         ;RETURN TO RERUN TEST
```

```
012132  005067  000010          D 2:    CLR     I.CNT           ;CLEAR COUNTER
012136  011667  000006                  MOV     @#6,    RETURN  ;SAVE SCOPE RETURN POINTER
012142  000002                          RTI                     ;RETURN INLINE-NEXT TEST
012144  000001                  ITMAX:  1                       ;MAX NUMBER OF ITERATIONS
012146  000000                  ITCNT:  0                       ;COUNT LOCATION FOR ITERATION LOOP
012150  001022                  RETURN. TEST1+2                 ;ADDRESS OF LAST TEST

                                ;MOV ADDRESS OF MESSAGE TO REGISTER 2
                                ;THEN JSR %7, TOUT
012152  142777  000177  166432  TOUT:   BICB    #177,   @TCSR   ;CLEAR INT FLAG
012160  111267  000054                  MOVB    @%2,    L.EOMK  ;MOVE IN EOM MARKER
012164  005202                  L.INC:  INC     %2              ;MOVE DATA POINTER TO NEXT BYTE
012166  121267  000046          L.TOUT: CMPB    @%2,    L.EOMK  ;COMPARE FOR EOM
012172  001006                          BNE     L.CNT           ;BRANCH IF NOT END OF MESSAGE
012174  105777  166412                  TSTB    @TCSR           ;WAIT FOR TTY READY
012200  100375                          BPL     .-4
012202  005077  166406                  CLR     @TDBR           ;OUTPUT NULL
012206  000207                          RTS     %7              ;RETURN IF EOM
012210  121227  000100          L.CNT:  CMPB    @%2,    #'@     ;CHECK FOR CR,LF REQUEST
012214  001003                          BNE     .+10            ;BRANCH IF NOT
012216  004767  000020                  JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
012222  000760                          BR      L.INC           ;LOOP
012224  105777  166362                  TSTB    @TCSR           ;WAIT FOR TTY
012230  100375                          BPL     .-4
012232  112277  166356                  MOVB    (2)+,   @TDBR   ;OUTPUT NEXT CHARACTER
012236  000753                          BR      L.TOUT          ;CONTINUE
012240  000000                  L.EOMK: 0

                                ;SUBROUTINE TO ISSUE CARRIAGE RETURN AND LINEFEED
012242  105777  166344          CRLF:   TSTB    @TCSR           ;WAIT FOR TTY READY
012246  100375                          BPL     .-4
012250  112777  000215  166336          MOVB    #215,   @TDBR   ;SEND CARRIAGE RETURN
012256  105777  166330                  TSTB    @TCSR           ;WAIT FOR TTY
012262  100375                          BPL     .-4
012264  112777  000212  166322          MOVB    #212,   @TDBR   ;SEND LINE FEED
012272  000207                          RTS     %7              ;RETURN

                                ;DO 4 CRLF'S TO MOVE MESSAGES ON TELETYPE
012274  004767  177742          CRLF4:  JSR     %7,CRLF
012300  004767  177736                  JSR     %7,CRLF
012304  004767  177732                  JSR     %7,CRLF
012310  004767  177726                  JSR     %7,CRLF
012314  000207                          RTS     %7

012316  022767  000176  166272  CNTLZU: CMP     #SWREG,SWR
012324  001403                          BEQ     1$
012326  062716  000002                  ADD     #2,(SP)
012332  000504                          BR      OUT
012334  012702  016055          1$:     MOV     #SWREG,R2
012340  004767  177606                  JSR     PC,TOUT
012344  016702  165626                  MOV     SWREG,R2
012350  004767  177360                  JSR     PC,PROCT
012354  012702  016040                  MOV     #NEWIS,R2
012360  004767  177566                  JSR     PC,TOUT
012364  005067  166232          AGN:    CLR     TMP1
012370  012767  000007  166232          MOV     #7,CSNT
```

```
2404  012376  105777  166204          READ:   TSTB    @KBCSR
2405  012402  100375                  BPL     READ
2406  012404  117767  166200  166214          MOVB    @KBDBR,TIB
2407  012412  116777  166210  166174          MOVB    TIB,@TDBR
2408  012420  142767  000200  166200          BICB    #200,TIB
2409  012426  122767  000025  166172          CMPB    #25,TIB
2410  012434  001005                          BNE     2$
2411  012436  012702  016205                  MOV     #CTLU,R2
2412  012442  004767  177504                  JSR     PC,TOUT
2413  012446  000746                          BR      AGN
2414  012450  122767  000015  166150  2$:     CMPB    #15,TIB
2415  012456  001430                          BEQ     1$
2416  012460  122767  000060  166140          CMPB    #60,TIB
2417  012466  003027                          BGT     INERRR
2418  012470  122767  000067  166130          CMPB    #67,TIB
2419  012476  002423                          BLT     INERRR
2420  012500  142767  000060  166120          BICB    #60,TIB
2421  012506  006367  166110                  ASL     TMP1
2422  012512  006367  166104                  ASL     TMP1
2423  012516  006367  166100                  ASL     TMP1
2424  012522  156767  166100  166072          BISB    TIB,TMP1
2425  012530  005367  166074                  DEC     CSNT
2426  012534  001404                          BEQ     INERRR
2427  012536  000717                          BR      READ
2428  012540  004767  177476          1$:     JSR     %7,CRLF
2429  012544  000002                  OUT:    RTI
2430  012546  012702  016027          INERRR: MOV     #QEST,R2
2431  012552  004767  177374                  JSR     PC,TOUT
2432  012556  000702                          BR      AGN
2433
2434                                  ;ROUTINE TO CHECK EXISTANCE OF SWREG
2435
2436  012560  016746  165222          SUSWR:  MOV     6,-(SP)
2437  012564  016746  165214                  MOV     4,-(SP)
2438  012570  012767  012610  165206          MOV     #1$,4
2439  012576  022777  177777  166012          CMP     #-1,@SWR
2440  012604  001402                          BEQ     2$
2441  012606  000407                          BR      3$
2442  012610  022626                  1$:     CMP     (SP)+,(SP)+
2443  012612  012767  000176  165776  2$:     MOV     #SWREG,SWR
2444  012620  012767  000174  165772          MOV     #DISPREG,DISP_AY
2445  012626  012667  165152          3$:     MOV     (SP)+,4
2446  012632  012667  165150                  MOV     (SP)+,6
2447  012636  000002                          RTI
2448
2449  012640  022767  000176  165750  KBINT.  CMP     #SWREG,SWR
2450  012646  001016                          BNE     1$
2451  012650  005067  165746                  CLR     TMP1
2452  012654  117767  165730  165740          MOVB    @KBDBR,TMP1
2453  012662  142767  000200  165732          BICB    #200,TMP1
2454  012670  122767  000007  165724          CMPB    #7,TMP1
2455  012676  001002                          BNE     1$
2456  012700  104002                          CNTLC
2457  012702  104006                          CKO
2458  012704  000002                  1$:     RTI
2459
```

```
                                        ;TYPE THE MAIN TITLE
012706  005767  165712        TITYP:  TST     TIFLG
012712  001406                        BEQ     1$
012714  012702  016143                MOV     #TITL,R2
012720  004767  177226                JSR     %7,TOUT
012724  005067  165674                CLR     TIFLG
012730  000002                1$:     RTI

012732  122767  000007  165670  CKJU:   CMPB    #7,CSNT
012740  001403                        BEQ     1$
012742  016777  165654  165646        MOV     TMP1,@SWR
012750  000002                1$:     RTI

012752  011646                EMTSRV: MOV     (SP),-(SP)
012754  162716  000002                SUB     #2,(SP)
012760  017616  000000                MOV     @2(SP),(SP)
012764  006316                        ASL     (SP)
012766  042716  177001                BIC     #177001,(SP)
012772  062716  013004                ADD     #EMTTAB,(SP)
012776  017616  000000                MOV     @2(SP),(SP)
013002  000136                        JMP     @(SP)+

013004  013[illegible]          EMTTAB: PRINT                   ;CALLED BY EMT HLT
013006  0[illegible]                    SCOPEC                  ;CALLED BY EMT SCOPE
013010  0[illegible]                    CNTLJU                  ;CALLED BY EMT CNTLU
013012  012640                        KBINT                   ;CALLED BY EMT KBINTT
013014  012376                        READ                    ;CALLED BY EMT READC
013016  012560                        SUSWP                   ;CALLED BY EMT SUSWPP
013020  012732                        CKJU                    ;CALLED BY EMT CKU
013022  012706                        TITTYP                  ;CALLED BY EMT TIT
```

```
2492
2493                                    ;DATA TABLES FOR DATA RELIABILITY TESTS
2494
2495                                    ;ALPHANUMERIC DECK DATA TABLE
2496                                    ;FIRST VALUE FOR A COLUMN IS THE DIRECT
2497                                    ;CARD IMAGE FOR THAT COLUMN ON CARD 1
2498                                    ;THE SECOND VALUE IS THE ENCODED FORM OF THAT DATA
2499                                                                    ;COLUMN CHAR HOLLERITH
2500  013024  004000                    ALPCD:  4000                    ;1      &       12
2501  013026  000200                            200
2502  013030  004400                            4400                    ;2      A       12 1
2503  013032  000201                            201
2504  013034  004200                            4200                    ;3      B       12 2
2505  013036  000202                            202
2506  013040  004100                            4100                    ;4      C       12 3
2507  013042  000203                            203
2508  013044  004040                            4040                    ;5      D       12 4
2509  013046  000204                            204
2510  013050  004020                            4020                    ;6      E       12 5
2511  013052  000205                            205
2512  013054  004010                            4010                    ;7      F       12 6
2513  013056  000206                            206
2514  013060  004004                            4004                    ;8      G       12 7
2515  013062  000207                            207
2516  013064  004002                            4002                    ;9      H       12 8
2517  013066  000210                            210
2518  013070  004001                            4001                    ;10     I       12 9
2519  013072  000220                            220
2520  013074  004202                            4202                    ;11     CENT    12 8 2
2521  013076  000212                            212
2522  013100  004102                            4102                    ;12     .       12 8 3
2523  013102  000213                            213
2524  013104  004042                            4042                    ;13     (       12 8 4
2525  013106  000214                            214
2526  013110  004022                            4022                    ;14     :       12 8 5
2527  013112  000215                            215
2528  013114  004012                            4012                    ;15     +       12 8 6
2529  013116  000216                            216
2530  013120  004006                            4006                    ;16     !       12 8 7
2531  013122  000217                            217
2532  013124  002000                            2000                    ;17     -       11
2533  013126  000100                            100
2534  013130  002400                            2400                    ;18     J       11 1
2535  013132  000101                            101
2536  013134  002200                            2200                    ;19     K       11 2
2537  013136  000102                            102
2538  013140  002100                            2100                    ;20     L       11 3
2539  013142  000103                            103
2540  013144  002040                            2040                    ;21     M       11 4
2541  013146  000104                            104
2542  013150  002020                            2020                    ;22     N       11 5
2543  013152  000105                            105
2544  013154  002010                            2010                    ;23     O       11 6
2545  013156  000106                            106
2546  013160  002004                            2004                    ;24     P       11 7
2547  013162  000107                            107
```

```
2548  013164  002002          2002                ;25     Q       11 8
2549  013166  000110          110
2550  013170  002001          2001                ;26     R       11 9
2551  013172  000120          120
2552  013174  002202          2202                ;27     :       11 8 2
2553  013176  000112          112
2554  013200  002102          2102                ;28     $       11 8 3
2555  013202  000113          113
2556  013204  002042          2042                ;29     *       11 8 4
2557  013206  000114          114
2558  013210  002022          2022                ;30     )       11 8 5
2559  013212  000115          115
2560  013214  002012          2012                ;31     ;       11 8 6
2561  013216  000 116          116
2562  013220  002006          2006                ;32     BLANK   11 8 7
2563  013222  000117          117
2564  013224  001000          1000                ;33     0       0
2565  013226  000040          40
2566  013230  001400          1400                ;34     /       0 1
2567  013232  000041          41
2568  013234  001200          1200                ;35     S       0 2
2569  013236  000042          42
2570  013240  001100          1100                ;36     T       0 3
2571  013242  000043          43
2572  013244  001040          1040                ;37     U       0 4
2573  013246  000044          44
2574  013250  001020          1020                ;38     V       0 5
2575  013252  000045          45
2576  013254  001010          1010                ;39     W       0 6
2577  013256  000046          46
2578  013260  001004          1004                ;40     X       0 7
2579  013262  000047          47
2580  013264  001002          1002                ;41     Y       0 8
2581  013266  000050          50
2582  013270  001001          1001                ;42     Z       0 9
2583  013272  000060          60
2584  013274  001202          1202                ;43             0 8 2
2585  013276  000052          52
2586  013300  001102          1102                ;44     .       0 8 3
2587  013302  000053          53
2588  013304  001042          1042                ;45     %       0 8 4
2589  013306  000054          54
2590  013310  001022          1022                ;46     -       0 8 5
2591  013312  000055          55
2592  013314  001012          1012                ;47     >       0 8 6
2593  013316  000056          56
2594  013320  001006          1006                ;48     ?       0 8 7
2595  013322  000057          57
2596  013324  000C00          0000                ;49             BLANK
2597  013326  000000          0
2598  013330  000400          0400                ;50     1       1
2599  013332  000001          1
2600  013334  000200          0200                ;51     2       2
2601  013336  000002          2
2602  013340  000100          0100                ;52     3       3
2603  013342  000003          3
```

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013344  000040            0040          ;53    4     4
013346  000004            4
013350  000020            0020          ;54    5     5
013352  000005            5
013354  000010            0010          ;55    6     6
013356  000006            6
013360  000004            0004          ;56    7     7
013362  000007            7
013364  000002            0002          ;57    8     8
013366  000010            10
013370  000001            0001          ;58    9     9
013372  000020            20
013374  000202            0202          ;59    :     8 2
013376  000012            12
013400  000102            0102          ;60    #     8 3
013402  000013            13
013404  000042            0042          ;61    @     8 4
013406  000014            14
013410  000022            0022          ;62    '     8 5
013412  000015            15
013414  000012            0012          ;63    =     8 6
013416  000016            16
013420  000006            0006          ;64    "     8 7
013422  000017            17
013424  004000            4000          ;65    &     12
013426  000200            200
013430  004400            4400          ;66    A     12 1
013432  000201            201
013434  004200            4200          ;67    B     12 2
013436  000202            202
013440  004100            4100          ;68    C     12 3
013442  000203            203
013444  004040            4040          ;69    D     12 4
013446  000204            204
013450  004020            4020          ;70    E     12 5
013452  000205            205
013454  004010            4010          ;71    F     12 6
013456  000206            206
013460  004004            4004          ;72    G     12 7
013462  000207            207
013464  004002            4002          ;73    H     12 8
013466  000210            210
013470  004001            4001          ;74    I     12 9
013472  000220            220
013474  004202            4202          ;75    CENT  12 8 2
013476  000212            212
013500  004102            4102          ;76    .     12 8 3
013502  000213            213
013504  004042            4042          ;77    <     12 8 4
013506  000214            214
013510  004022            4022          ;78    (     12 8 5
013512  000215            215
013514  004012            4012          ;79    +     12 8 6
013516  000216            216
013520  004006            4006          ;80    !     12 8 7
013522  000217    ALPEND: 217
```

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2660
2661
2662
2663
2664  013524  000000  ;BINARY DECK DATA TABLE
2665  013526  000000  ;FIRST VALUE FOR A COLUMN IS THE DIRECT CARD IMAGE OF THAT COLUMN ON CARD1
2666  013530  000001  ;THE SECOND VALUE IS THE ENCODED VALUE, WHICH ORS THE OCTAL REPRESENTATION OF
2667  013532  000020  ;ROWS ONE THRU SEVEN
2668  013534  000002  BINCD:  0                       ;CARD COLUMN 1
2669  013536  000010          0
2670  013540  000004          1                       ;2
2671  013542  000007          20
2672  013544  000010          2                       ;3
2673  013546  000006          10
2674  013550  000020          4                       ;4
2675  013552  000005          7
2676  013554  000040          10                      ;5
2677  013556  000004          6
2678  013560  000100          20                      ;6
2679  013562  000003          5
2680  013564  000200          40                      ;7
2681  013566  000002          4
2682  013570  000400          100                     ;8
2683  013572  000001          3
2684  013574  001000          200                     ;9
2685  013576  000040          2
2686  013600  002000          400                     ;10
2687  013602  000100          1
2688  013604  004000          1000                    ;11
2689  013606  000200          40
2690  013610  001111          2000                    ;12
2691  013612  000067          100
2692  013614  002222          4000                    ;13
2693  013616  000117          200
2694  013620  003333          1111                    ;14
2695  013622  000177          67
2696  013624  004444          2222                    ;15
2697  013626  000207          117
2698  013630  005555          3333                    ;16
2699  013632  000267          177
2700  013634  006666          4444                    ;17
2701  013636  000317          207
2702  013640  007777          5555                    ;18
2703  013642  000377          267
2704  013644  001010          6666                    ;19
2705  013646  000046          317
2706  013650  001212          7777                    ;20
2707  013652  000056          377
2708  013654  001313          1010                    ;21
2709  013656  000077          46
2710  013660  001414          1212                    ;22
2711  013662  000047          56
2712  013664  001515          1313                    ;23
2713  013666  000067          77
2714  013670  001616          1414                    ;24
2715  013672  000057          47
                              1515                    ;25
                              67
                              1616                    ;26
                              57
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013674 001717          1717                    ;27
013676 000077          77
013700 002020          2020                    ;28
013702 000105          105
013704 002121          2121                    ;29
013706 000127          127
013710 002323          2323                    ;30
013712 000137          137
013714 002424          2424                    ;31
013716 000107          107
013720 002525          2525                    ;32
013722 000127          127
013724 002626          2626                    ;33
013726 000117          117
013730 002727          2727                    ;34
013732 000137          137
013734 003030          3030                    ;35
013736 000147          147
013740 003131          3131                    ;36
013742 000167          167
013744 003232          3232                    ;37
013746 000157          157
013750 003434          3434                    ;38
013752 000147          147
013754 003535          3535                    ;39
013756 000167          167
013760 003636          3636                    ;40
013762 000157          157
013764 003737          3737                    ;41
013766 000177          177
013770 004040          4040                    ;42
013772 000204          204
013774 004141          4141                    ;43
013776 000227          227
014000 004242          4242                    ;44
014002 000216          216
014004 004343          4343                    ;45
014006 000237          237
014010 004545          4545                    ;46
014012 000227          227
014014 004646          4646                    ;47
014016 000217          217
014020 004747          4747                    ;48
[illegible] 000237     237
[illegible] 005050     5050                    ;49
[illegible] 000246     246
[illegible] 005151     5151                    ;50
[illegible] 000267     267
014034 005252          5252                    ;51
014036 000256          256
014040 005353          5353                    ;52
014042 000277          277
014044 005454          5454                    ;53
014046 000247          247
014050 005656          5656                    ;54
014052 000257          257
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2772  014054  005757                          5757                    ;55
2773  014056  000277                          277
2774  014060  006060                          6060                    ;56
2775  014062  000305                          305
2776  014064  006161                          6161                    ;57
2777  014066  000327                          327
2778  014070  006262                          6262                    ;58
2779  014072  000317                          317
2780  014074  006363                          6363                    ;59
2781  014076  000337                          337
2782  014100  006464                          6464                    ;60
2783  014102  000307                          307
2784  014104  006565                          6565                    ;61
2785  014106  000327                          327
2786  014110  006767                          6767                    ;62
2787  014112  000337                          337
2788  014114  007070                          7070                    ;63
2789  014116  000347                          347
2790  014120  007171                          7171                    ;64
2791  014122  000367                          367
2792  014124  007272                          7272                    ;65
2793  014126  000357                          357
2794  014130  007373                          7373                    ;66
2795  014132  000377                          377
2796  014134  007474                          7474                    ;67
2797  014136  000347                          347
2798  014140  007575                          7575                    ;68
2799  014142  000367                          367
2800  014144  007676                          7676                    ;69
2801  014146  000357                          357
2802  014150  000101                          0101                    ;70
2803  014152  000023                          23
2804  014154  000202                          0202                    ;71
2805  014156  000012                          12
2806  014160  000303                          0303                    ;72
2807  014162  000033                          33
2808  014164  000404                          0404                    ;73
2809  014166  000007                          7
2810  014170  000505                          0505                    ;74
2811  014172  000027                          27
2812  014174  000606                          0606                    ;75
2813  014176  000017                          17
2814  014200  000707                          0707                    ;76
2815  014202  000037                          37
2816  014204  003210                          3210                    ;77
2817  014206  000146                          146
2818  014210  000123                          0123                    ;78
2819  014212  000037                          37
2820  014214  007654                          7654                    ;79
2821  014216  000347                          347
2822  014220  004567                          4567                    ;80
2823  014222  000237                  BINEND: 237
2824  014224  040057  051120  051505  MSG1:   .ASCII ;/@PRESS CARD READER 'MOTOR START' AND 'READ START' :
2825  014232  020123  040503  042122
2826  014240  051040  040505  042504
2827  014246  020122  046447  052117
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 2828  014254  051117  051440  040524
 2829  014262  052122  020047  047101
 2830  014270  020104  051047  040505
 2831  014276  020104  052123  051101
 2832  014304  023524      057
 2833  014307      057  050100  042522  MSG1A:  .ASCII  ;/@PRESS CARD READER 'RESET'/;
 2834  014314  051523  041440  051101
 2835  014322  020104  042522  042101
 2836  014330  051105  023440  042522
 2837  014336  042523  023524      057
 2838  014343      057  052100  042510  MSG2:   .ASCII   @THEN HIT 'CONTINUE' ON THE CONSOLE/;
 2839  014350  020116  044510  020124
 2840  014356  041447  047117  044524
 2841  014364  052516  023505  047440
 2842  014372  020116  044124  020105
 2843  014400  047503  051516  046117
 2844  014406  027505
 2845  014410  040057  051120  051505  MSG3:   .ASCII  ;/@PRESS CARD READER 'READ STOP' ;
 2846  014416  020123  040503  042122
 2847  014424  051040  040505  042504
 2848  014432  020122  051047  040505
 2849  014440  020104  052123  050117
 2850  014446  027447
 2851  014450  040057  051120  051505  MSG3A:  .ASCII  ;/@PRESS CARD READER 'STOP'/;
 2852  014456  020123  040503  042122
 2853  014464  051040  040505  042504
 2854  014472  020122  051447  047524
 2855  014500  023520      057
 2856  014503      057  052100  042510  MSG4:   .ASCII  ;/@THE INTERRUPT LEVEL WAS /;
 2857  014510  044440  052116  051105
 2858  014516  052522  052120  046040
 2859  014524  053105  046105  053440
 2860  014532  051501  027440
 2861  014536  040057  042522  047515  MSG5:   .ASCII  ;/@REMOVE ALL CARDS FROM THE INPUT HOPPER/;
 2862  014544  042526  040440  046114
 2863  014552  041440  051101  051504
 2864  014560  043040  047522  020115
 2865  014566  044124  020105  047111
 2866  014574  052520  020124  047510
 2867  014602  050120  051105      057
 2868  014607      057  051100  051505  MSG6:   .ASCII  ;/@RESTORE CARDS IN THE INPUT HOPPER/;
 2869  014614  047524  042522  041440
 2870  014622  051101  051504  044440
 2871  014630  020116  044124  020105
 2872  014636  047111  052520  020124
 2873  014644  047510  050120  051105
 2874  014652      057
 2875  014653      057  051100  044501  MSG7:   .ASCII  ;/@RAISE OUTPUT STACKER PRESSURE ARM SLIGHTLY ABOVE HORIZONTAL @ THEN LO
 2876  014660  042523  047440  052125
 2877  014666  052520  020124  052123
 2878  014674  041501  042513  020122
 2879  014702  051120  051505  052523
 2880  014710  042522  040440  046522
 2881  014716  051440  044514  044107
 2882  014724  046124  020131  041101
 2883  014732  053117  020105  047510
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2884  014740  044522  047532  052116
2885  014746  046101  040040  052040
2886  014754  042510  020116  047514
2887  014762  042527  020122  052111
2888  014770     057
2889  014771     057  046100  053517  MSG7A:  .ASCII  ;/@LOWER OUTPUT STACKER PLATE TO BOTTOM/;
2890  014776  051105  047440  052125
2891  015004  052520  020124  052123
2892  015012  041501  042513  020122
2893  015020  046120  052101  020105
2894  015026  047524  041040  052117
2895  015034  047524  027515
2896  015040  040057  047510  042114  MSG8:   .ASCII  ;/@HOLD DOWN THE SWITCH AT THE BOTTOM OF THE INPUT HOPPER/;
2897  015046  042040  053517  020116
2898  015054  044124  020105  053523
2899  015062  052111  044103  040440
2900  015070  020124  044124  020105
2901  015076  047502  052124  046517
2902  015104  047440  020106  044124
2903  015112  020105  047111  052520
2904  015120  020124  047510  050120
2905  015126  051105     057
2906  015131     057  046100  043111  MSG8A:  .ASCII  ;/@LIFT SWITCH UNDER RIFFLE CAP/;
2907  015136  020124  053523  052111
2908  015144  044103  052440  042116
2909  015152  051105  051040  043111
2910  015160  046106  020105  040503
2911  015166  027520
2912  015170  040057  046102  041517  MSG9:   .ASCII  ;/@BLOCK THE CARD READER STATION TO PREVENT A CARD GOING THRU. AND/;
2913  015176  020113  044124  020105
2914  015204  040503  042122  051040
2915  015212  040505  042504  020122
2916  015220  052123  052101  047511
2917  015226  020116  047524  050040
2918  015234  042522  042526  052116
2919  015242  040440  041440  051101
2920  015250  020104  047507  047111
2921  015256  020107  044124  052522
2922  015264  020054  047101  027504
2923  015272  040057  042522  047515  MSG10:  .ASCII  ;/@REMOVE JAMMED CARD/;
2924  015300  042526  045040  046501
2925  015306  042515  020104  040503
2926  015314  042122     057
2927  015317     057  044100  046117  MSG11:  .ASCII  ;/@HOLD THE OUTPUT STACKER GATE OPEN. THEN/;
2928  015324  020104  044124  020105
2929  015332  052517  050124  052125
2930  015340  051440  040524  045503
2931  015346  051105  043440  052101
2932  015354  020105  050117  047105
2933  015362  020056  044124  047105
2934  015370     057
2935  015371     057  050100  040514  MSG12:  .ASCII  ;/@PLACE SPECIAL DARK-LIGHT CHECK CARDS (SEE LISTING, TEST) ;
2936  015376  042503  051440  042520
2937  015404  044503  046101  042040
2938  015412  051101  026513  044514
2939  015420  044107  020124  044103
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2940  015426  041505  020113  040503
2941  015434  042122  020123  051450
2942  015442  042505  046040  051511
2943  015450  044524  043516  020054
2944  015456  042524  052123  024507
2945  015464  040500  020124  044124          .ASCII  ;@AT THE BOTTOM OF THE INPUT STAC
2946  015472  020105  047502  052124
2947  015500  046517  047440  020106
2948  015506  044124  020105  047111
2949  015514  052520  020124  052123
2950  015522  041501  027513
2951  015526  040057  042504  045503  MSG13:  .ASCII  ;/@DECK    CARD  COLUMN PATTERN READ1 READ2  CODED  REAC/;
2952  015534  020040  020040  040503
2953  015542  042122  020040  047503
2954  015550  052514  047115  050040
2955  015556  052101  042524  047122
2956  015564  051040  040505  030504
2957  015572  051040  040505  031104
2958  015600  020040  047503  042504
2959  015606  020054  051040  040505
2960  015614  027504
2961  015616  040057  046101  044120  MSG14:  .ASCII  ;/@ALPHA /;
2962  015624  020101      057
2963  015627      057  041100  047111  MSG15:  .ASCII  ;/@BINARY/;
2964  015634  051101  027531
2965  015640  040057  044502  020124  MSG16:  .ASCII  ;/@BIT 15 WAS SET/;
2966  015646  032461  053440  051501
2967  015654  051440  052105      057
2968  015661      057  051100  046505  MSG17:  .ASCII  ;/@REMEDY THE ERROR CONDITION AND PRESS 'CONTINUE'@/;
2969  015666  042105  020131  044124
2970  015674  020105  051105  047522
2971  015702  020122  047503  042116
2972  015710  052111  047511  020116
2973  015716  047101  020104  051120
2974  015724  051505  020123  041447
2975  015732  047117  044524  052516
2976  015740  023505  027500
2977  015744  040057  044502  020124  MSG18:  .ASCII  ;/@BIT 8 WAS SET/;
2978  015752  020070  040527  020123
2979  015760  042523  027524
2980  015764  040057  047503  052514  MSG19:  .ASCII  ;/@COLUMN READ1 READ2  CARDS ERRORS/;
2981  015772  047115  051040  040505
2982  016000  030504  051040  040505
2983  016006  031104  020040  040503
2984  016014  042122  020123  051105
2985  016022  047522  051522      057
2986  016027      057  037500  020100  QEST:   .ASCII  ;/@'@  = /;
2987  016034  036440  027440
2988  016040  020057  020040  020040  NEWIS:  .ASCII  ;/      NEW = /;
2989  016046  042516  020127  020075
2990  016054      057
2991  016055      057  051500  051127  SWREQ:  .ASCII  ;/@SWR = /;
2992  016062  036440  027440
2993  016066  040057  040503  042122  CIMPAT: .ASCII  ;/@CARD IMAGE PATTERN=  ;
2994  016074  044440  040515  042507
2995  016102  050040  052101  042524
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2996  016110  047122  020075     057
2997  016115     057  051500  040524  STADD:  .ASCII  :/@STARTING ADDRESS = /:
2998  016122  052122  047111  020107
2999  016130  042101  051104  051505
3000  016136  020123  020075     057
3001  016143     057  040100  055104  TITL    ASCII  :/@@D2CRA-D   CR11 DIAGNOSTIC TEST/:
3002  016150  051103  026501  020104
3003  016156  020040  051103  030461
3004  016164  042040  040511  047107
3005  016172  051517  044524  020103
3006  016200  042524  052123     057
3007  016205     057  052536  036500  CTLU:   .ASCII  :/↑U@= /:
3008  016212  027440
3009  016214  040057  047111  052123  SUBT1:  .ASCII  :/@INSTR + DATA TEST :
3010  016222  020122  020053  +0504
3011  016230  040524  052040  051505
3012  016236  027524
3013  016240  040057  051103  030461  SUBT2:  .ASCII  :/@CR11 ERROR FUNCTION TEST/:
3014  016246  042440  051122  051117
3015  016254  043040  047125  052103
3016  016262  047511  020116  042524
3017  016270  052123     057
3018  016273     057  051500  047111  SUBT4:  .ASCII  :/@SINGLE TEST LOOP/:
3019  016300  046107  020105  042524
3020  016306  052123  046040  047517
3021  016314  027520
3022  016316  040057  044523  043516  SUBT5:  .ASCII  :/@SINGLE DATA PATTERN TEST :
3023  016324  042514  042040  052101
3024  016332  020101  040520  052124
3025  016340  051105  020116  042524
3026  016346  052123     057
3027            000000'                .END
```

```
AGN     012364          2402#  2413   2432
ALCNT   006714          1757   1760#
ALCNT1  006776          1761   1780#
ALCNT2  007010          1779   1797#
ALLDON  006662          1621   1644   1688   1751#
ALLOK   007036          1791   1794#
ALPCD   013024          1561   2500#
ALPEND  013522          1562   2659#
ALPI    005516          1556   1561#
ALWAIT  007072          1793   1803#
BEGIN   000726           608    660#
BE...   011462          1537   1702   1751   1812   2057   2085   2164   2237#
BINCD   013524          1557   2664#
BINEND  014222          1558   2823#
BLOK    011706          2275   2292#
CARDIM  011432          2142#  2143#  2182   2184   2220#
CDCNT   006646          1547#  1553#  1617   1642   1656   1684   1697   1724#  1725#  1726   1727#  1728#  1731#
                        1745#
CIMPAT  016066          2139   2993#
CKBITB  011506           679    708    739   1519   1530   1645   2226   2245#  2253
CKCOL   011172          2154   2172#
CKCRC   011156          2156   2168#
CKDONE  011416          2212   2215#  2216
CKFAIL  011250          2183   2185   2187#
CKHLT   011404          2190   2211#
CKLOOP  011070          2147#  2162   2167   2169   2171   2177   2214   2217
CKLP1   011112          2153#  2158   2186
CKLP2   011216          2179#  2180
CKNOHD  011310          2192   2196#
CKSAME  011014           619   2136#
CKSIT   011142          2150   2160   2164#
CKSIT1  011146          2165#  2166
CKU   = 104006           576#   651    667   1552   2457
CKUU    012732          2468#  2488
CK4     001370           770    775    777#
CK5     001534           811    824#
CK9     002352           997   1002#
CLCNT   006650          1587#  1619   1659   1694   1732#  1746#  2147#  2168   2173#  2197
CNTLL = 104002           572#   650    666   1551   2456
CNTLUU  012316          2392#  2484
CNT23A  005110          1447   1450#
CNT23B  005126          1454   1457#
CNT23C  005146          1461   1464#
CNT23D  005164          1468   1471#
CNT23E  005204          1475   1478#
CNT23F  005224          1482   1485#
CNT23G  005250          1490   1494#
CNT24A  005316          1510   1513#  1516
CNT24B  005346          1518   1521#
CONTD   005540          1560   1564#
CONTG   010476          2056   2061#
CONTIO  002514          1025   1037#
CONTII  002616          1053   1059#
CONT2   001226           727    731#
CONT21  004744          1409   1413#
CONT22  005050          1431   1434#
```

```
CONT4   001410            780    784#
CONT8   002242            970#   979
CRB2    000640            639#   968     974    1473#  1480#  1487   1496   1594
CRLF    012242           2196   2279    2368   2377#  2386   2387   2388   2389   2428
CRLF4   012274           1845   1860    1872   1889   1904   1919   1942   1971   1991   2007   2024   2041   2073
                         2094   2386#
CSNT    000630            635#  2403#   2425#  2468
CTLL    016205           2411   3007#
C.CONT  012024           2319   2323#
C.WAIT  011770           2314#  2315    2335
DATENC  006656           1594#  1606    1676   1749#
DATST   005426           1536   1547#
DATST1  005436           1549#  1721
DATST2  005456           1548   1554#
DAT1    006652           1588#  1600    1667   1747#  2172#  2182   2200
DAT2    006654           1598#  1603    1670   1748#  2181#  2184   2203
DBRCKB  002232            950    968#
DCNT1   005574           1567   1571#
DECK    006640           1559#  1563#   1653   1742#
DECKCK  006514           1712   1717#   1759   1825
DISPLA  000620            631#  2444#
DISPRE  000174            602#  2444
DONE3   001314            747    754#
DONE7   002030            902    910     913#
D.1     012120           2339   2345#
D.2     012132           2341   2343    2348#
EMTSRV  012752            592   2473#
EMTTAB  013004           2478   2482#
END     006476           1704   1710#
ENDCK   005460           1520   1522    1529   1534#
END24   005360           1512   1526#   1527
ERCM11  007206            612   1829#
ERCR11  007200            610   1827#
ERFLG   000650            644#  1554#   1648   1650#  2146#  2191   2193#
ERR6    001726            860    880#
ERSET   006000           1583   1615#   1689
ER1     006034           1618   1620    1622#
FAIL    006062           1601   1604    1607   1628#
FAILC   006122           1634   1637#   1641
FAILCN  006170           1632   1648#
FAILC1  006406           1635   1689#
FLAG    000632            636#  1827#   1829#  1839   1854   1883   1898   1913   1933   1938   1965   1975   2067
                         2088
HLT     = 104000          570#   691     697    703    714    728    734    744    752    756    779    783    786
                          789    792     795    799    814    822    826    832    836    840    844    865    873
                          878    882     884    899    911    915    920    925    930    938    953    958    966
                          972    976    1000   1006   1008   1024   1028   1032   1035   1052   1057   1072   1105
                         1111   1126    1148   1159   1181   1187   1202   1224   1230   1245   1267   1273   1288
                         1310   1316    1331   1353   1359   1374   1389   1410   1433   1448   1455   1462   1469
                         1476   1483    1491   1499   1511   1521   1525   1592   1696   1738   1740   1754   1771
                         1778   1786    1792   1800   1810   1816   1819   1823   1849   1852   1876   1879   1908
                         1911   1958    1961   2000   2036   2082   2161   2170   2176   2233
INERR   001546           2417   2419    2426   2430#
INT     001434            763    805     849    892    943    987   1014   1042   1064   1087   1132   1163   1206
                         1249   1292    1335   1378   1399   1418   1441   1504   1571   1837   1867   1896   1925
                         1946   1982    2015   2061   2226#
```

```
INTFLG  000602   624#   656*  1100  1102  1116  1118*  1124  1153  1155*  1157  1176  1178  1192
                1194*  1200  1219  1221  1235  1237*  1243  1262  1264  1278  1280*  1286  1305
                1307   1321  1323* 1329  1348  1350   1364  1366*  1372
INTVC   000604   625#   655
ITCNT   012146  2117*  2120* 2342  2344*  2348*  2352#
ITMAX   012144   652*  1836* 2240*  2342  2351#
KBCSR   000606   626#  2404
KBDBR   000610   627#  2406  2452
KBINT   012640  2449#  2485
KBINTT= 104003   573#  1616  1678  2148  2188  2272  2292  2337
KCRB1   000636   638#   654
KCRS    000634   637#   653
LASTCD  006450  1687   1698  1701#
LASTCK  006432  1593   1627  1636  1639  1683  1697#  1739  1741
LOGIC   006466   596   1706#
LOOPF   010364  2029#  2033
LOOPG   010516  2066#  2084
LOOP3   001266   743    746#  749
LOOP4   001336   766#   768   773
LOOP4B  001354   772#   776
LOOP5   001466   808#   817   823
LOOP6   001624   852#   856
LOOP7   001756   895#   896   906
LOOP8   002150   947#   965
L.CNT   012210  2361   2366#
L.EOMK  012240  2358*  2360  2374#
L.INC   012164  2359#  2369
L.TOUT  012166  2360#  2373
MSG1    014224  1853   1882  1912  1937  1964  1989  2003  2022  2037  2066  2087  2824#
MSG1A   014307  1856   1885  1915  1940  1967  2069  2090  2833#
MSG10   015272  2001   2923#
MSG11   015317  2020   2927#
MSG12   015371  2064   2935#
MSG13   015526  1651   2951#
MSG14   015616  1563   2961#
MSG15   015627  1559   2963#
MSG16   015640  1622   2965#
MSG17   015661  1624   2250  2968#
MSG18   015744  2248   2977#
MSG19   015764  2194   2980#
MSG2    014343  1843   1858  1870  1887  1902  1917  1930  1969  1985  2005  2018  2039  2071
                2092   2838#
MSG3    014410  1838   1983  2016  2845#
MSG3A   014450  1841   2851#
MSG4    014503  1119   1195  1238  1281  1324  1367  2856#
MSG5    014536  1868   1928  2861#
MSG6    014607  1880   1962  2868#
MSG7    014653  1897   2875#
MSG7A   014771  1900   2889#
MSG8    015040  1932   2896#
MSG8A   015131  1935   2906#
MSG9    015170  1987   2912#
NEWIS   016040  2400   2988#
NOHD    006212  1649   1653#
NOP   = 000240   569#
NOTCD   006610  1693   1735#
```

```
NOTCD1  006632  1737  1740#
NOTCOL  006412  1586  1692#
NOTRP   000764   670#  673
NOTRP1  005546  1566#  1569
NXCRD   006540  1576  1646  1699  1723#
OFF6    001714   862   869   876#
OUT     012544  2395  2429#
PRINT   011574  2272#  2482
PROC    000646   642#  680*   687   709*   725   944*   980   988*  1009
PROCT   011734  1122  1198  1241  1284  1327  1370  1657  1660  1665  1668  1671  1674  1677
                2198  2201  2204  2207  2210  2282  2287  2303#  2399
PSR   = 177776   568#  658*   670*  674*   680   681*  687*   709   710*  725*   944   945*  980*
                 988   989*  1009*  1016*  1017  1018*  1022*  1044*  1045  1046*  1050*  1066*  1067
                1089*  1090  1091*  1092*  1096*  1134*  1135  1136*  1137*  1141*  1165*  1166  1167*
                1168*  1172*  1208*  1209  1210*  1211*  1215*  1251*  1252  1253*  1254*  1258*  1294*
                1295  1296*  1297*  1301*  1337*  1338  1339*  1340*  1344*  1380*  1381  1385*  1387*
                1401*  1402  1403*  1407*  1420*  1421  1422*  1428*  1430*  1566*  1570*  1574*  1575
                1591*  1615*  1628*  1735*  1787*  1788  1795*  1798*  1806*  1809*  2114*  2116*  2346*
PTOFF   006660  1599*  1602*  1605*  1662  1750#
QEST    016027  2430  2986#
READ    012376  2404#  2405  2427  2486
READC = 104004   574#  2109  2141
RESTRT  000742   664#  1539  1720
REST8   002270   973   977   980#
REST9   002374  1001  1003  1007  1009#
RETRNX  011012  2110*  2111*  2119  2121  2122#
RETURN  012150   677*  1833*  2059*  2098*  2118*  2347  2349*  2353#
SAVPC   011730  2276*  2281  2300#
SAVPSR  011732  2277*  2286  2301#
SAVR2   011722  2280*  2288  2297#
SAVR3   011724  2298#  2303*  2320
SAVR4   011726  2299#  2304*  2321
SCONT1  005700  1590  1594#
SCOPE = 104001   571#  678   705   726   758   802   846   886   941   983  1012  1040  1062
                1086  1131  1162  1205  1248  1291  1334  1377  1397  1416  1438  1501  1534
                1835  1866  1895  1926  1981  2014  2054
SCOPEC  012062  2337#  2483
SETUP   000652   648#  662  1832  2106  2138
SET1    004542  1365  1372#
SET14   003260  1154  1157#
SET2    004330  1322  1329#
SET3    004116  1279  1286#
SET4    003704  1236  1243#
SET5    003472  1193  1200#
SET7    003106  1117  1124#
SPACE   011542  1655  1658  1661  1666  1669  1672  1675  2199  2202  2205  2208  2259#  2263
SPACEX  011572  2262*  2264*  2266#
SRVC    005634  1573  1582#
SRVC1   007070  1794  1802#
SRVC2   007132  1804  1812#
SRVC2A  007140  1811  1814#
STACK   000600   607   609   611   615   618   623#
STADD   016115  2107  2997#
SUBT1   016214   661  3009#
SUBT2   016240  1831  3013#
SUBT4   016273  2105  3018#
```

```
SUBTS   016316          2137    3022#
SUSWR   012560          2436#   2487
SUSWRR= 104005           575#    649
SWR     000616           630#    664     672     1535    1549    1555    1568    1631    1633    1679    1710    1718    1756
                        1760    2055    2112    2189    2211    2273    2293    2338    2340    2392    2439    2443*   2449
                        2470*
SWREG   000176           603#    664     1549    2392    2398    2443    2449
SWREQ   016055          2396    2991#
TCSR    000612           628#   2237    2259    2283    2289    2314    2357*   2362    2370    2377    2380
TDBR    000614           629#   2239*   2261*   2285*   2291*   2316*   2364*   2372*   2379*   2382*   2407*
TEND    006644          1558*   1562*   1608    1744#
TEST    001012           663     671     677#
TESTA   007234          1833    1835#   2059    2060    2098    2099
TESTB   007372          1866#
TESTC   007522          1895#
TESTD   007654          1926#
TESTE   010130          1981#
TESTF   010276          2014#
TESTG   010444          1977    2054#
TESTX   010676           616    2104#
TEST1   001020           678#   2353
TEST1A  001022           677     679#
TEST10  002402          1012#
TEST11  002524          1040#
TEST12  002626          1062#
TEST13  002706          1086#
TEST14  003120          1101    1103    1108    1123    1125    1131#
TEST15  003272          1145    1156    1158    1162#
TEST16  003504          1177    1179    1184    1199    1201    1205#
TEST17  003716          1220    1222    1227    1242    1244    1248#
TEST18  004130          1263    1265    1270    1285    1287    1291#
TEST19  004342          1306    1308    1313    1328    1330    1334#
TEST2   001116           698     705#
TEST20  004554          1349    1351    1356    1371    1373    1377#
TEST21  004660          1397#
TEST22  004754          1416#
TEST23  005062          1438#
TEST24  005266          1449    1456    1463    1470    1477    1484    1492    1498    1501#
TEST3   001242           729     736#
TEST4   001324           745     751     753     755     758#
TEST5   001454           802#
TEST6   001610           815     829     846#
TEST7   001742           872     875     877     879     883     886#
TEST8   002126           900     912     916     926     931     935     941#
TEST9   002276           954     959     967     983#
TIB     000626           634#   2406*   2407    2408*   2409    2414    2416    2418    2420*   2424
TIFLG   000624           633#   2461    2465*
TIM24   005352          1514    1523#
TINT10  002464          1015    1026#
TINT11  002604          1043    1054#
TINT12  002670          1065    1072#
TINT13  003024          1088    1109#
TINT14  003216          1133    1146#
TINT15  003410          1164    1185#
TINT16  003622          1207    1228#
TINT17  004034          1250    1271#
```

```
TINT18  004246          1293    1314#
TINT19  004460          1336    1357#
TINT20  004634          1379    1389#
TIT     = 104007         577#    660    1830    2104    2136
TITL    015143          2463    3001#
TITTYP  012706          2461#   2489
TMP1    000622           632#   2110    2142    2402#   2421#   2422#   2423#   2424#   2451#   2452#   2453#   2454    2470
TNINT   004736          1400    1410#
TOTCRD  011430          2144#   2152#   2206    2219#
TOTERR  011426          2145#   2187#   2209    2218#
TOUT    012152           648    1120    1196    1239    1282    1325    1368    1623    1625    1652    1654    1842    1844
                        1857    1859    1869    1871    1881    1886    1888    1901    1903    1916    1918    1929    1931
                        1936    1941    1963    1968    1970    1984    1986    1988    1990    2002    2004    2006    2017
                        2019    2021    2023    2038    2040    2065    2070    2072    2091    2093    2108    2140    2195
                        2249    2251    2357#   2397    2401    2412    2431    2464
TRAPX   000774           669    672#
TRFLG   000644           641#   657#    668     1538#   1564    1717#
TRP1    005556          1565    1568#
TRTRAP  000642           589    640#
TSTA    007214          1828    1830#
TSTART  006642          1557#   1561#   1610    1723    1743#
T2INT   005020          1419    1426#
T2INTA  005044          1427    1432#
WAIT9   002334           996#   999
XLOOP   011002          2118    2120#
.       = 016351         587    588#    591#    595#    601#    606#    614#    622#    684     686     690     696     702
                         713    716     718     720     722     724     733     778     782     785     788     790     791
                         794    798     809     813     821     825     831     835     839     843     853     858     864
                         867    881     898     904     908     914     919     922     924     929     933     937     948
                         952    957     963     971     975     992     1005    1021    1027    1031    1034    1049    1056
                        1070    1071    1095    1110    1140    1147    1171    1186    1214    1229    1257    1272    1300
                        1315    1343    1358    1384    1388    1394    1406    1425    1444    1451    1458    1465    1472
                        1479    1486    1495    1507    1524    1579    1585    1597    1609    1638    1643    1680    1695
                        1711    1719    1753    1763#   1764    1766    1768    1770    1777    1785    1801    1808    1815
                        1818    1822    1840    1848    1851    1855    1863    1875    1878    1884    1892    1899    1907
                        1910    1914    1922    1934    1939    1945    1949    1951    1953    1955    1957    1960    1966
                        1974    1976    1994    1997    1999    2010    2027    2031    2035    2044    2068    2076    2079
                        2081    2089    2097    2113    2115    2175    2228    2232    2238    2246    2260    2274    2284
                        2290    2301    2309    2325    2363    2367    2371    2378    2381
```

```
COMMEN      1#
ENDCOM      1#
ESCAPE      1#
GETPRI      1#
GETSWR      1#
INT      1084#   1085    116.    1204    1247    1290    1333
MULT        1#
NEWTST      1#
POP         1#
PUSH        1#
REPORT      1#
SETPRI      1#
SETJP       1#
SKIP        1#
SLASH       1#
STARS       1#
SWRSU       1#
TYPBIN      1#
TYPDEC      1#
TYPNAM      1#
TYPNUM      1#
TYPOCS      1#
TYPOCT      1#
TYPTXT      1#
$$ESCA      1#
$$NEWT      1#
$$SKIP      1#
.EQUAT      1#
.HEADE      1#
.KT11       1#
.SETUP      1#
.SWRHI      1#
.$ACTI      1#
.$APTB      1#
.$APTH      1#
.$APTY      1#
.$ASTA      1#
.$CATC      1#
.$CMTA      1#
.$DB2D      1#
.$DB2O      1#
.$DIV       1#
.$EOP       1#
.$ERRO      1#
.$ERRT      1#
.$MULT      1#
.$POWE      1#
.$RAND      1#
.$RDDE      1#
.$RDOC      1#
.$READ      1#
.$R2AZ      1#
.$SAVE      1#
.$SB2D      1#
.$SB2C      1#
.$SCOP      1#
```

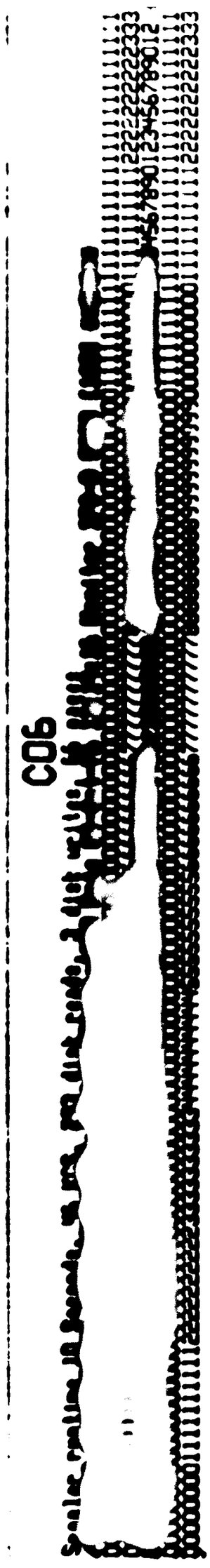
B06


```
.$SIZE      1#
.$SUPR      1#
.$TRAP      1#
.$TYPB      1#
.$TYPC      1#
.$TYPE      1#
.$TYP..     1#
.$4...      1#
....        1#

. ABS.  016351     000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 ,DZCRA.SEQ/CRF/SOL=SYSMAC.CD,DZCRA.SRC
 RUN-TIME: 27 38 2 SECONDS
 RUN-TIME RATIO: 151/68=2.2
 CORE USED:  33K  (65 PAGES)
```


COS