CR11

DIAGNOSTIC

MD-11-DZCRA-A

EP-DZCRA-A-DL-A

FICHE 1 OF 1

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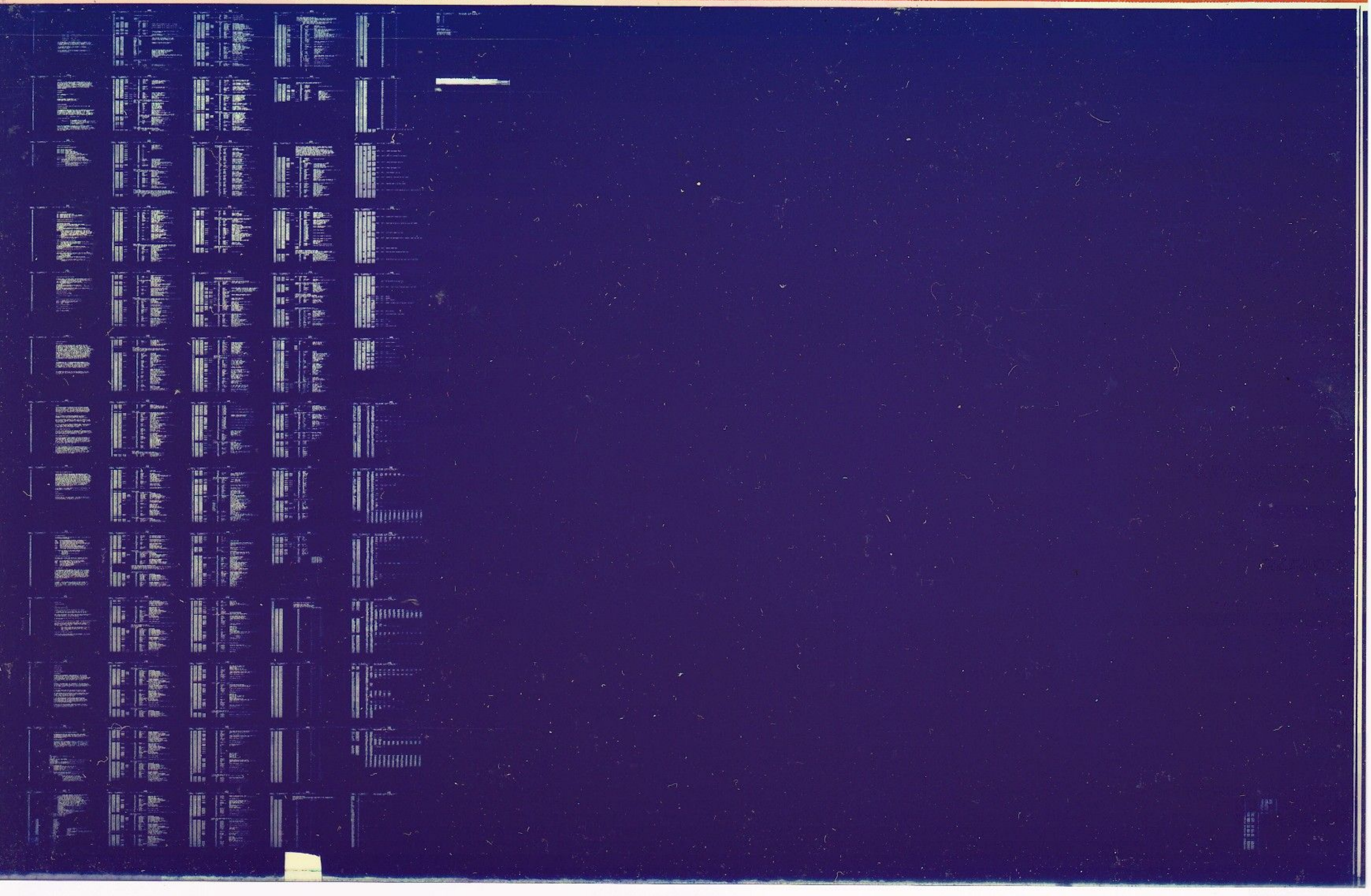
MADE IN U.S.A.



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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZCRA-D
PRODUCT NAME: CR11 DIAGNOSTIC TEST
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. OR 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 G.D.I. 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 BIT 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
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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 CRB1
READ2 -THIS IS WHAT WAS IN CRB1 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 TABLE BEGINNING AT THE TAG BINCD IN THE LISTING FOR THE CODES PUNCHED FOR EACH OF THE 80 COLUMNS OF THE 1ST CARD. AS WITH THE ALPHANUMERIC DECK EACH SUCCESSIVE CARD HAS THE SAME SEQUENCE OF CODES ROTATED ONE COLUMN TO THE LEFT.

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 80TH 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.

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                        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. 100 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%




                        .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
000014  000642          ;               TRTRAP
000016  000340          ;               340
000030                  ;               .=30
000030  012752          ;               EMTSRV
000032  000340          ;               340
                        ;
000046                  ;               .=46
000046  006466          ;               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. 100 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 (DOCUMATI

                        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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  654  000676  016704  177734                        MOV     KCRB1,CRB1
  655  000702  016700  177676                        MOV     INTVC,ADINT     ;LOAD ADDRESS OF INTERRUPT VECTOR
  656  000706  005067  177670                        CLR     INTFLG          ;INITIALIZE INTERRUPT FLAG
  657  000712  005067  177726                        CLR     TRFLG           ;INITIALIZE TRACE FLAG
  658  000716  012767  000340  177052                MOV     #340,PSR        ;SETUP PROCESSOR STATUS
  659  000724  000207                                RTS     %7              ;RETURN
  660  000726  104007                        BEGIN:  TIT
  661  000730  012702  016214                        MOV     #SUBTI,R2
  662  000734  004767  177712                        JSR     %7,SETUP        ;INITIALIZE POINTERS AND FLAGS
  663  000740  000424                                BR      TEST            ;GO TO INSTRUCTION TESTS
  664  000742  022767  000176  177646        RESTRT: CMP     #SWREG,SWR
  665  000750  001002                                BNE     1$
  666  000752  104002                                CNTLU
  667  000754  104006                                CKU
  668  000756  005767  177662                1$:     TST     TRFLG           ;CHECK FOR TRACE TRAPPING
  669  000762  001004                                BNE     TRAPX           ;IF SET, TRACE TRAP
  670  000764  012767  000340  177004        NOTRP:  MOV     #340,PSR        ;IF ZERO, CLEAR TRACE BIT
  671  000772  000407                                BR      TEST            ;GO TO INSTRUCTION TESTS
  672  000774  032777  010000  177614        TRAPX:  BIT     #10000,@SWR     ;CHECK SW12
  673  001002  001370                                BNE     NOTRP           ;BRANCH IF SET TO CLEAR TRACE BIT
  674  001004  012767  000360  176764                MOV     #360,PSR        ;SET TRACE BIT
  675
  676                                   ;TEST FOR CORRECT INITIALIZATION OF STATUS REGISTER
  677  001012  012767  001022  011130  TEST:   MOV     #TEST1A,RETURN  ;SETUP SCOPE LOOP RETURN ADDRESS
  678  001020  104001                  TEST1:  SCOPE
  679  001022  004767  010460                  TEST1A: JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
  680  001026  016767  176744  177612                  MOV     PSR,PROC        ;STORE PROCESSOR STATUS
  681  001034  005067  176736                         CLR     PSR             ;CLEAR TRACE BIT
  682  001040  005001                                  CLR     COUNT           ;INITIALIZE COUNTER
  683  001042  005201                                  INC     COUNT           ;WAIT TO BE CERTAIN
  684  001044  001376                                  BNE     .-2             ;THAT ALL CARDS ARE
  685  001046  005201                                  INC     COUNT           ;THRU BEFORE ISSUING
  686  001050  001376                                  BNE     .-2             ;INIT
  687  001052  016767  177570  176716                  MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
  688  001060  000005                                  RESET                   ;SEND OUT INIT
  689  001062  005713                                  TST     @CRS            ;CHECK FOR STATUS REGISTER ALL ZERO
  690  001064  001401                                  BEQ     .+4             ;BRANCH IF OK
  691  001066  104000                                  HLT                     ;STATUS REGISTER NOT CORRECTLY INITIALIZED
  692                                                   ;ONLY BITS 1 AND 6 OF THE STATUS REGISTER SHOULD BE ABLE TO BE SET TO ONE
  693                                                   ;AND READ BACK AS ONE
  694  001070  052713  177776                          BIS     #177776,@CRS    ;SET ALL BITS BUT 0
  695  001074  022713  000102                          CMP     #102,@CRS       ;ONLY BITS 1 AND 6 SHOULD BE SET
  696  001100  001402                                  BEQ     .+6             ;BRANCH IF OK
  697  001102  104000                                  HLT                     ;STATUS REGISTER DIDN'T CONTAIN 102
  698  001104  000404                                  BR      TEST2           ;BRANCH AFTER FAILURE
  699                                                   ;CLEARING STATUS REGISTER SHOULD CLEAR BITS 1 AND 6
  700  001106  005013                                  CLR     @CRS            ;CLEAR BITS 1 AND 6
  701  001110  005713                                  TST     @CRS            ;CHECK FOR ALL BITS CLEAR
  702  001112  001401                                  BEQ     .+4             ;BRANCH IF OK
  703  001114  104000                                  HLT                     ;BIT 1 AND/OR BIT 6 DIDN'T CLEAR
  704
  705  001116  104001                  TEST2:  SCOPE
  706                                   ;START SHOULD CAUSE CARD DONE WITHIN 1 SECOND
  707                                   ;BIT 0 SHOULD ALWAYS READ AS BEING EQUAL TO ZERO
  708  001120  004767  010362                  JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
  709  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      ;CHECK 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 WASN'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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                                        HLT                     ;BIT 15 WAS SET, 8 WASN'T
                                        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 BOTH COLUMN READY, BRANCH
002006  005714                          TST     @CRB1           ;CLEAR DONE
002010  000762                          BR      LOOP7           ;LOOP
002012  032713  140000                  BIT     #140000,@CRS    ;WAIT FOR DONE OR 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                          TSTB    @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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                                        BIT     #400,@CRS       ;CHECK BIT 8
                                        BNE     TEST8           ;BRANCH IF READER OFF-LINE
                                        TST     @CRS            ;SPECIAL CONDITION SHOULDN'T SET
                                        BPL     .+4             ;SINCE DATOB CLEARED TIMING ERROR
                                        HLT                     ;BIT 15 WAS SET, 8 WASN'T


                        TEST8:  SCOPE
                        ;DATA SHOULD BE AVAILABLE IN THE DATA BUFFER FOR AT LEAST 1.0 MILLISECOND
                                        JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
                                        MOV     PSR,PROC        ;STORE CURRENT PROCESSOR STATUS
                                        CLR     PSR             ;CLEAR TRACE BIT
                                        INC     @CRS            ;START READ
                        LOOP8:          BIT     #140200,@CRS    ;WAIT FOR COLUMN READY OR CARD DONE
                                        BEQ     .-4             ;OR SPECIAL CONDITION
                                        BIT     #40000,@CRS     ;CARD DONE?
                                        BNE     DBRCK8          ;YES, GO TO CHECK STROBING OF DBR
                                        TST     @CRS            ;NO, CHECK BIT 15
                                        BPL     .+6             ;BRANCH IF NOT SET
                                        HLT                     ;BIT 15 WAS SET
                                        BR      TEST9           ;GO TO NEXT TEST AFTER ERROR
                                        CLR     @CRS            ;DATO TO CRS - SHOULDN'T CLEAR BUSY OR READY
                                        CMP     #1200,@CRS      ;CHECK FOR BUSY AND READY
                                        BEQ     .+6             ;BRANCH IF STILL SET
                                        HLT                     ;CRS IN WRONG STATE
                                        BR      TEST9           ;GO TO NEXT TEST AFTER ERROR
                                        MOV     @CRB1,R5        ;STORE DATA
                                        MOV     #300,COUNT      ;INITIALIZE COUNTER
                                        DEC     COUNT           ;WAIT FOR 1 MILLISECOND (APPROX.)
                                        BNE     .-2
                                        CMP     @CRB1,R5        ;DATA UNCHANGED?
                                        BEQ     LOOP8           ;OK, CONTINUE
                                        HLT                     ;DATA NOT AVAILABLE FOR 1.0 MILLISECONDS
                                        BR      TEST9           ;GO TO NEXT TEST AFTER FAILURE
                        DBRCK8:         MOV     @CRB2,R2        ;STORE ENCODED DATA IN REGISTER 2
                                        MOV     #100,COUNT      ;SET UP COUNTER
                        CONT8:          CMP     @CRB1,R5        ;READ CARD-IMAGE DATA BUFFER
                                        BEQ     .+6             ;BRANCH IF UNCHANGED
                                        HLT                     ;CRB1 READ INCORRECTLY
                                        BR      REST8           ;BRANCH TO RESTORE PROCESSOR STATUS AND EXIT
                                        CMP     @CRB2,R2        ;READ ENCODED DATA BUFFER
                                        BEQ     .+6             ;BRANCH IF UNCHANGED
                                        HLT                     ;CRB2 READ INCORRECTLY
                                        BR      REST8           ;BRANCH AFTER FAILURE
                                        DEC     COUNT           ;COUNT DOWN
                                        BNE     CONT8           ;LOOP IF NOT DONE
                        REST8:          MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS


                        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
                                        JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
                                        MOV     PSR,PROC        ;SAVE PROCESSOR STATUS
                                        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     @CRBI           ;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  0004**                          BR      CONT10
 1026  002464  03**    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                    ;DISABLE 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     SET5    ;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  SET5:  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
```

```
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     #232,@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  005406                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,TOUT         ;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     #TINT20,@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
1492
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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,CKBIT8       ;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,CKBIT8       ;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,@R5        ;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,(R5)+      ;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     DAT ENC,(R5)+   ;CHECK ENCODED DATA
1607  005762  001037                          BNE     FAIL            ;BRANCH IF WRONG
1608  005764  020567  000654                  CMP     R5,TEND         ;CHECK FOR END OF TABLE
1609  005770  100402                          BMI     .+6             ;IF NOT THERE, RTI
1610  005772  016705  000644                  MOV     TSTART,R5       ;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                          KBINTT
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  015640          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  NOMD:     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:   JMP     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
 1715                                          ;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 80TH 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  002166                  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
```

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1876  007434  104000                  HLT                     ;OFF-LINE (BIT 8) WASN'T SET
1877  007436  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
1878  007440  100401                  BMI     .+4             ;BRANCH IF SET
1879  007442  104000                  HLT                     ;SPECIAL CONDITION NOT SET
1880  007444  012702  014607          MOV     #MSG6,R2        ;"RESTORE CARDS IN INPUT HOPPER"
1881  007450  004767  002476          JSR     %7,TOUT
1882  007454  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
1883  007460  005767  171146          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1884  007464  001402                  BEQ     .+6             ;NO
1885  007466  012702  014307          MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
1886  007472  004767  002454          JSR     %7,TOUT
1887  007476  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1888  007502  004767  002444          JSR     %7,TOUT
1889  007506  004767  002562          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1890  007512  000000                  HALT
1891  007514  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
1892  007520  001375                  BNE     .-4
1893
1894                                  ;OUTPUT STACKER FULL SHOULD SET BIT 15
1895  007522  104001          TESTC:  SCOPE
1896  007524  004767  001704          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1897  007530  012702  014653          MOV     #MSG7,R2        ;"RAISE OUTPUT STACKER PRESSURE ARM ABOVE HORIZONTAL THE
1898  007534  005767  171072          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1899  007540  001402                  BEQ     .+6             ;NO
1900  007542  012702  014771          MOV     #MSG7A,R2       ;"LOWER OUTPUT STACKER PLATE TO BOTTOM"
1901  007546  004767  002400          JSR     %7,TOUT
1902  007552  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1903  007556  004767  002370          JSR     %7,TOUT
1904  007562  004767  002506          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1905  007566  000000                  HALT
1906  007570  032713  000400          BIT     #400,@CRS       ;CHECK BIT 8
1907  007574  001001                  BNE     .+4             ;BRANCH IF SET
1908  007576  104000                  HLT                     ;OFF-LINE (BIT 8) WASN'T SET
1909  007600  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
1910  007602  100401                  BMI     .+4             ;BRANCH IF SET
1911  007604  104000                  HLT                     ;SPECIAL CONDITION NOT SET
1912  007606  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
1913  007612  005767  171014          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1914  007616  001402                  BEQ     .+6             ;NO
1915  007620  012702  014307          MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
1916  007624  004767  002322          JSR     %7,TOUT
1917  007630  012702  014343          MOV     #MSG2,R2
1918  007634  004767  002312          JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1919  007640  004767  002430          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1920  007644  000000                  HALT
1921  007646  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
1922  007652  001375                  BNE     .-4
1923
1924                                  ;A FEED ERROR SHOULD SET BIT 15
1925                                  ;THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO THE READ STATION
1926  007654  104001          TESTD:  SCOPE
1927  007656  004767  001552          JSR     %7,INIT
1928  007662  012702  014536          MOV     #MSG5,R2        ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
1929  007666  004767  002260          JSR     %7,TOUT
1930  007672  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1931  007676  004767  002250          JSR     %7,TOUT
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 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 13)
 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
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 2044  010442  001375                        BNE     .-4
 2045
 2046
 2047                                  ;DARK-LIGHT ERROR SHOULD SET BIT 15
 2048                                  ;THIS OCCURS WHEN DATA IS SENSED BEFORE COLUMN ONE OR AFTER COLUMN EIGHTY
 2049                                  ;OR WHEN THE SENSORS ARE NOT ALL SENSING A HOLE AFTER THE CARD HAS PASSED
 2050                                  ;THIS TEST IS SKIPPED IF BIT 0 OF THE SWITCH REGISTER EQUALS ONE
 2051                                  ;TO MAKE THE 2 DARK-LIGHT CHECK CARDS:
 2052                                  ;       1.  TEAR A SMALL PIECE FROM THE LEADING EDGE OF ONE CARD
 2053                                  ;       2.  TAPE 2 CARDS TOGETHER TO MAKE ONE "LONG" CARD-IT ONLY NEEDS TO BE
 2054                                  ;           ABOUT 1/2 INCH LONGER THAN A REGULAR CARD
 2055  010444  104401                  TESTG:  SCOPE
 2056  010446  032767  000001  170142          BIT     #1,@SWR         ;CHECK SWO
 2057  010454  001410                          BEQ     CONTG           ;RUN TEST IF NOT SET
 2058  010456  004767  001000                  JSR     %7,BELL         ;IF SET, RING BELL AND
 2059  010462  000000                          HALT                    ;HALT
 2060  010464  012767  007236  001456          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS TO LOOP THRU TESTS
 2061  010472  000167  176536                  JMP     TESTA           ;START ERROR TESTS OVER ON CONTINUING
 2062  010476  004767  000732          CONTG:  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 2063  010502  005001                          CLR     COUNT           ;INITIALIZE COUNTER
 2064  010504  005201                          INC     COUNT           ;SET TO INDICATE FIRST PASS
 2065  010506  012702  015371                  MOV     #MSG12,R2       ;"PLACE SPECIAL DARK-LIGHT CHECK CARDS (SEE LISTING, TES
 2066  010512  004767  001434                  JSR     %7,TOUT         ;AT THE BOTTOM OF THE INPUT STACK"
 2067  010516  012702  014224          LOOPG:  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
 2068  010522  005767  170104                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
 2069  010526  001402                          BEQ     .+6             ;NO
 2070  010530  012702  014307                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
 2071  010534  004767  001412                  JSR     %7,TOUT
 2072  010540  012702  014343                  MOV     #MSG2,R2
 2073  010544  004767  001402                  JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 2074  010550  004767  001520                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 2075  010554  000000                          HALT
 2076  010556  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
 2077  010562  001375                          BNE     .-4
 2078  010564  012713  000003                  MOV     #3,@CRS         ;EJECT THE CARD
 2079  010570  032713  140000                  BIT     #140000,@CRS    ;WAIT FOR ERROR OR CARD DONE
 2080  010574  001775                          BEQ     .-4
 2081  010576  005713                          TST     @CRS            ;CHECK SPECIAL CONDITION
 2082  010600  100401                          BMI     .+4             ;CONTINUE IF SET
 2083  010602  104000                          HLT                     ;SPECIAL CONDITION NOT SET
 2084  010604  005301                          DEC     COUNT           ;COUNT DOWN
 2085  010606  001743                          BEQ     LOOPG           ;IF FIRST PASS, LOOP
 2086  010610  004767  000646                  JSR     %7,BELL         ;RING BELL
 2087  010614  000000                          HALT
 2088  010616  012702  014224                  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
 2089  010622  005767  170004                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
 2090  010626  001402                          BEQ     .+6             ;NO
 2091  010630  012702  014307                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET' "
 2092  010634  004767  001312                  JSR     %7,TOUT
 2093  010640  012702  014343                  MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 2094  010644  004767  001302                  JSR     %7,TOUT
 2095  010650  004767  001420                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 2096  010654  000000                          HALT
 2097  010656  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
 2098  010662  001375                          BNE     .-4
 2099  010664  012767  007236  001256          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS
 2100  010672  000167  176336                  JMP     TESTA           ;LOOP THRU TEST ON CONTINUING
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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     #SUBT4,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
```

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                                ;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
                                BELL:   TSTB    @TCSR           ;WAIT FOR TTY READY
                                        BPL     .-4
                                        MOV     #207,@TDBR      ;RING BELL
                                        MOV     #1,ITMAX        ;MAKE CERTAIN ITERATION MAXIMUM IS CORRECT
                                        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
                                CKBIT8: BIT     #400,@CRS       ;CHECK BIT 8
                                        BNE     .+4             ;BRANCH IF SET
                                        RTS     %7              ;RETURN IF NOT SET
                                        MOV     #MSG18,R2       ;OUTPUT MESSAGE
                                        JSR     %7,TOUT         ;"BIT 8 WAS SET"
                                        MOV     #MSG17,R2       ;"REMEDY THE ERROR CONDITION
                                        JSR     %7,TOUT         ;AND PRESS 'CONTINUE'"
                                        HALT                    ;WAIT FOR CONTINUE
                                        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
                                SPACE:  TSTB    @TCSR           ;WAIT FOR TTY READY
                                        BPL     .-4
                                        MOV     #240,@TDBR      ;OUTPUT A SPACE
                                        DEC     SPACEX          ;DECREMENT COUNT
                                        BPL     SPACE           ;LOOP IF NOT DONE
                                        CLR     SPACEX          ;RESET COUNT TO ZERO
                                        RTS     %7              ;RETURN
                                SPACEX: 0


                                        ;ENTERED WITH SYSTEM TRAP CALL (HLT)
                                        ;PRINT OUT THE ERROR PC AND STATUS REGISTER
                                PRINT:  KBINTT
                                        BIT     @SWR,#20000     ;TEST FOR INHIBIT PRINT OUT
                                        BEQ     .+4             ;BRANCH TO PRINT
                                        BR      B.CK            ;INHIBIT, CHECK FOR HALT
                                        MOV     (6)+,   SAVPC   ;PC OF FAILING ROUTINE
                                        MOV     (6)+,   SAVPSR  ;PSR OR ERROR CONDITION
                                        CMP     -(6),   -(6)    ;RESTORE STACK
                                        JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
                                        MOV     %2,     SAVR2   ;SAVE R2
                                        MOV     SAVPC,  %2
                                        JSR     %7,     PROCT   ;PRINT PC+2 IN OCTAL
                                        TSTB    @TCSR           ;WAIT FOR TTY READY
                                        BPL     .-4
                                        MOV     #240,   @TDBR   ;OUTPUT A SPACE
                                        MOV     SAVPSR, %2
                                        JSR     %7,     PROCT   ;PRINT PROCESSOR STATUS AT TIME OF FAILURE
                                        MOV     SAVR2,  %2      ;RESTORE REGISTER 2
                                        TSTB    @TCSR           ;WAIT FOR TTY READY
                                        BPL     .-4
                                        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 NOT 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  165650               MOV     (6)+,   PSR     ;RESTORE PROCESSOR STATUS
  2347  012126  000177  000016               JMP     @RETURN         ;RETURN TO RERUN TEST
```

```
2345  012132  005067  000010          D.2:    CLR     ITCNT           ;CLEAR COUNTER
2346  012136  011667  000006                  MOV     @#6,    RETURN  ;SAVE SCOPE RETURN POINTER
2350  012142  000002                          RTI                     ;RETURN INLINE-NEXT TEST
2351  012144  000001                  ITMAX:  1                       ;MAX NUMBER OF ITERATIONS
2352  012146  000000                  ITCNT:  0                       ;COUNT LOCATION FOR ITERATION LOOP
2353  012150  001022                  RETURN: TEST1+2                 ;ADDRESS OF LAST TEST
2354
2355                                  ;MOV ADDRESS OF MESSAGE TO REGISTER 2
2356                                  ;THEN JSR %7, TOUT
2357  012152  142777  000177  166432  TOUT:   BICB    #177,   @TCSR   ;CLEAR INT FLAG
2360  012160  111267  000054                  MOVB    @%2,    L.EOMK  ;MOVE IN EOM MARKER
2361  012164  005202                  L.INC:  INC     %2              ;MOVE DATA POINTER TO NEXT BYTE
2362  012166  121267  000046          L.TOUT: CMPB    @%2,    L.EOMK  ;COMPARE FOR EOM
2363  012172  001006                          BNE     L.CNT           ;BRANCH IF NOT END OF MESSAGE
2364  012174  105777  166412                  TSTB    @TCSR           ;WAIT FOR TTY READY
2365  012200  100375                          BPL     .-4
2366  012202  005077  166406                  CLR     @TDBR           ;OUTPUT NULL
2367  012206  000207                          RTS     %7              ;RETURN IF EOM
2370  012210  121227  000100          L.CNT:  CMPB    @%2,    #'@     ;CHECK FOR CR,LF REQUEST
2371  012214  001003                          BNE     .+10            ;BRANCH IF NOT
2372  012216  004767  000020                  JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
2373  012222  000760                          BR      L.INC           ;LOOP
2374  012224  105777  166362                  TSTB    @TCSR           ;WAIT FOR TTY
2375  012230  100375                          BPL     .-4
2376  012232  112277  166356                  MOVB    (2)+,   @TDBR   ;OUTPUT NEXT CHARACTER
2377  012236  000753                          BR      L.TOUT          ;CONTINUE
2400  012240  000000                  L.EOMK: 0
2401
2402                                  ;SUBROUTINE TO ISSUE CARRIAGE RETURN AND LINEFEED
2403  012242  105777  166344          CRLF:   TSTB    @TCSR           ;WAIT FOR TTY READY
2404  012246  100375                          BPL     .-4
2405  012250  112777  000215  166336          MOVB    #215,   @TDBR   ;SEND CARRIAGE RETURN
2406  012256  105777  166330                  TSTB    @TCSR           ;WAIT FOR TTY
2407  012262  100375                          BPL     .-4
2410  012264  112777  000212  166322          MOVB    #212,   @TDBR   ;SEND LINE FEED
2411  012272  000207                          RTS     %7              ;RETURN
2412
2413                                  ;DO 4 CRLF'S TO MOVE MESSAGES ON TELETYPE
2414  012274  004767  177742          CRLF4:  JSR     %7,CRLF
2415  012300  004767  177736                  JSR     %7,CRLF
2416  012304  004767  177732                  JSR     %7,CRLF
2417  012310  004767  177726                  JSR     %7,CRLF
2420  012314  000207                          RTS     %7
2421
2422  012316  022767  000176  166272  CNTLUU: CMP     #SWREG,SWR
2423  012324  001403                          BEQ     1$
2424  012326  062716  000002                  ADD     #2,(SP)
2425  012332  000504                          BR      OUT
2426  012334  012702  016055          1$:     MOV     #SWREG,R2
2427  012340  004767  177606                  JSR     PC,TOUT
2430  012344  016702  165626                  MOV     SWREG,R2
2431  012350  004767  177360                  JSR     PC,PROCT
2432  012354  012702  016040                  MOV     #NEWIS,R2
2433  012360  004767  177566                  JSR     PC,TOUT
2434  012364  005067  166232          AGN:    CLR     TMP1
2435  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,DISPLAY
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                          CNTLU
2457  012702  104006                          CKU
2458  012704  000002                  1$:     RTI
2459
```

```
2460                                    ;TYPE THE MAIN TITLE
2461   012706  005767  165712           TITTYP: TST     TIFLG
2462   012712  001406                           BEQ     1$
2463   012714  012702  016143                   MOV     #TITL,R2
2464   012720  004767  177226                   JSR     %7,TOUT
2465   012724  005067  165674                   CLR     TIFLG
2466   012730  000002                   1$:     RTI
2467
2468   012732  122767  000007  165670   CKUU:   CMPB    #7,CSNT
2469   012740  001403                           BEQ     1$
2470   012742  016777  165654  165646           MOV     TMP1,@SWR
2471   012750  000002                   1$:     RTI
2472
2473   012752  011646                   EMTSRV: MOV     (SP),-(SP)
2474   012754  162716  000002                   SUB     #2,(SP)
2475   012760  017616  000000                   MOV     @(SP),(SP)
2476   012764  006316                           ASL     (SP)
2477   012766  042716  177001                   BIC     #177001,(SP)
2478   012772  062716  013004                   ADD     #EMTTAB,(SP)
2479   012776  017616  000000                   MOV     @(SP),(SP)
2480   013002  000136                           JMP     @(SP)+
2481
2482   013004  011574                   EMTTAB: PRINT                   ;CALLED BY EMT HLT
2483   013006  011062                           SCOPEC                  ;CALLED BY EMT SCOPE
2484   013010  012316                           CNTLUU                  ;CALLED BY EMT CNTLU
2485   013012  012640                           KBINT                   ;CALLED BY EMT KBINTT
2486   013014  012376                           READ                    ;CALLED BY EMT READC
2487   013016  012560                           SUSWR                   ;CALLED BY EMT SUSWRR
2488   013020  012732                           CKUU                    ;CALLED BY EMT CKU
2489   013022  012706                           TITTYP                  ;CALLED BY EMT TIT
2490
2491
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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
```

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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  000116  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  000000  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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 2604  013344  000040                0040                ;53    4      4
 2605  013346  000004                4
 2606  013350  000020                0020                ;54    5      5
 2607  013352  000005                5
 2608  013354  000010                0010                ;55    6      6
 2609  013356  000006                6
 2610  013360  000004                0004                ;56    7      7
 2611  013362  000007                7
 2612  013364  000002                0002                ;57    8      8
 2613  013366  000010                10
 2614  013370  000001                0001                ;58    9      9
 2615  013372  000020                20
 2616  013374  000202                0202                ;59    :      8 2
 2617  013376  000012                12
 2618  013400  000102                0102                ;60    #      8 3
 2619  013402  000013                13
 2620  013404  000042                0042                ;61    A      8 4
 2621  013406  000014                14
 2622  013410  000022                0022                ;62    '      8 5
 2623  013412  000015                15
 2624  013414  000012                0012                ;63    =      8 6
 2625  013416  000016                16
 2626  013420  000006                0006                ;64    "      8 7
 2627  013422  000017                17
 2628  013424  004000                4000                ;65    &      12
 2629  013426  000200                200
 2630  013430  004400                4400                ;66    A      12 1
 2631  013432  000201                201
 2632  013434  004200                4200                ;67    B      12 2
 2633  013436  000202                202
 2634  013440  004100                4100                ;68    C      12 3
 2635  013442  000203                203
 2636  013444  004040                4040                ;69    D      12 4
 2637  013446  000204                204
 2638  013450  004020                4020                ;70    E      12 5
 2639  013452  000205                205
 2640  013454  004010                4010                ;71    F      12 6
 2641  013456  000206                206
 2642  013460  004004                4004                ;72    G      12 7
 2643  013462  000207                207
 2644  013464  004002                4002                ;73    H      12 8
 2645  013466  000210                210
 2646  013470  004001                4001                ;74    I      12 9
 2647  013472  000220                220
 2648  013474  004202                4202                ;75    CENT   12 8 2
 2649  013476  000212                212
 2650  013500  004102                4102                ;76    .      12 8 3
 2651  013502  000213                213
 2652  013504  004042                4042                ;77    <      12 8 4
 2653  013506  000214                214
 2654  013510  004022                4022                ;78    (      12 8 5
 2655  013512  000215                215
 2656  013514  004012                4012                ;79    +      12 8 6
 2657  013516  000216                216
 2658  013520  004006                4006                ;80    1      12 8 7
 2659  013522  000217    ALPEND:     217
```

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                                ;BINARY DECK DATA TABLE
                                ;FIRST VALUE FOR A COLUMN IS THE DIRECT CARD IMAGE OF THAT COLUMN ON CARD1
                                ;THE SECOND VALUE IS THE ENCODED VALUE, WHICH ORS THE OCTAL REPRESENTATION OF
                                ;ROWS ONE THRU SEVEN
2664  013524  000000  BINCD:  0                       ;CARD COLUMN 1
2665  013526  000000          0
2666  013530  000001          1                       ;2
2667  013532  000020          20
2668  013534  000002          2                       ;3
2669  013536  000010          10
2670  013540  000004          4                       ;4
2671  013542  000007          7
2672  013544  000010          10                      ;5
2673  013546  000006          6
2674  013550  000020          20                      ;6
2675  013552  000005          5
2676  013554  000040          40                      ;7
2677  013556  000004          4
2678  013560  000100          100                     ;8
2679  013562  000003          3
2680  013564  000200          200                     ;9
2681  013566  000002          2
2682  013570  000400          400                     ;10
2683  013572  000001          1
2684  013574  001000          1000                    ;11
2685  013576  000040          40
2686  013600  002000          2000                    ;12
2687  013602  000100          100
2688  013604  004000          4000                    ;13
2689  013606  000200          200
2690  013610  001111          1111                    ;14
2691  013612  000067          67
2692  013614  002222          2222                    ;15
2693  013616  000117          117
2694  013620  003333          3333                    ;16
2695  013622  000177          177
2696  013624  004444          4444                    ;17
2697  013626  000207          207
2698  013630  005555          5555                    ;18
2699  013632  000267          267
2700  013634  006666          6666                    ;19
2701  013636  000317          317
2702  013640  007777          7777                    ;20
2703  013642  000377          377
2704  013644  001010          1010                    ;21
2705  013646  000046          46
2706  013650  001212          1212                    ;22
2707  013652  000056          56
2708  013654  001313          1313                    ;23
2709  013656  000077          77
2710  013660  001414          1414                    ;24
2711  013662  000047          47
2712  013664  001515          1515                    ;25
2713  013666  000067          67
2714  013670  001616          1616                    ;26
2715  013672  000057          57
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2716  013674  001717  1717                ;27
2717  013676  000077  77
2718  013700  002020  2020                ;28
2719  013702  000105  105
2720  013704  002121  2121                ;29
2721  013706  000127  127
2722  013710  002323  2323                ;30
2723  013712  000137  137
2724  013714  002424  2424                ;31
2725  013716  000107  107
2726  013720  002525  2525                ;32
2727  013722  000127  127
2728  013724  002626  2626                ;33
2729  013726  000117  117
2730  013730  002727  2727                ;34
2731  013732  000137  137
2732  013734  003030  3030                ;35
2733  013736  000147  147
2734  013740  003131  3131                ;36
2735  013742  000167  167
2736  013744  003232  3232                ;37
2737  013746  000157  157
2738  013750  003434  3434                ;38
2739  013752  000147  147
2740  013754  003535  3535                ;39
2741  013756  000167  167
2742  013760  003636  3636                ;40
2743  013762  000157  157
2744  013764  003737  3737                ;41
2745  013766  000177  177
2746  013770  004040  4040                ;42
2747  013772  000204  204
2748  013774  004141  4141                ;43
2749  013776  000227  227
2750  014000  004242  4242                ;44
2751  014002  000216  216
2752  014004  004343  4343                ;45
2753  014006  000237  237
2754  014010  004545  4545                ;46
2755  014012  000227  227
2756  014014  004646  4646                ;47
2757  014016  000217  217
2758  014020  004747  4747                ;48
2759  014022  000237  237
2760  014[illegible]  005050  5050        ;49
2761  014[illegible]  000246  246
2762  014[illegible]  005151  5151        ;50
2763  014036  000267  267
2764  014034  005252  5252                ;51
2765  014036  000256  256
2766  014040  005353  5353                ;52
2767  014042  000277  277
2768  014044  005454  5454                ;53
2769  014046  000247  247
2770  014050  005656  5656                ;54
2771  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  014245  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  042520  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, TESTG);
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  05'511
 2943  015450  044524  043516  0200'4
 2944  015456  043524  052123  02450'
 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  READ/;
 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  020104  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
```

```
 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  ;/@@DZCRA-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   40504
 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            000001                  .END
```

CROSS REFERENCE TABLE -- USER SYMBOLS

```
AGN      012364          2402*  2413   2432
ALCNT    006714          1757   1760*
ALCNT1   006776          1761   1780*
ALCNT2   007010          1779   1787*
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*
BELL     011462          1537   1702   1751   1812   2057   2085   2164   2237*
BINCD    013524          1557   2664*
BINEND   014222          1558   2823*
B.CK     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*
CKCRD    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
CNTLU  = 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*
CONT10   002514          1025   1037*
CONT11   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
CTLU    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   005420           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
ERI     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
INERRR  012546           2417    2419   2426   2430#
INIT    011434            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   1927
                         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  207:
                       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   736   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    016143          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   17.7#
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  2294    2309   2325   2363   2367   2371   2378   2381
```

```
COMMEN      1#
ENDCOM      1#
ESCAPE      1#
GETPRI      1#
GETSWR      1#
INT      1084#   1085    1161    1204    1247    1290    1333
MULT        1#
NEWTST      1#
POP         1#
PUSH        1#
REPORT      1#
SETPRI      1#
SETUP       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#
.$SB2O      1#
.$SCOP      1#
```

```
.$SIZE      18
.$SUPR      18
.$TRAP      18
.$TYPB      18
.$TYPD      18
.$TYPE      18
.$TYPO      18
.$4DCA      18
.117D       18

. ABS.  016351     000

 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

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