CR11/CM11F

DIAGNOSTIC

MD-~~11~~-DZCRB-C

EP-DZCRB-C-DL-A

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZCRB-C

PRODUCT NAME: CR11/CM11F 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 STANDARD COMPUTER
CR11 CARD READER OR
CM11F CARD READER

2.2 TEST DECKS

MAINDEC-00-DZCRA-A-CA ALPHANUMERIC TEST DECK[ROTATING PATTERN]
WITH CLOCK MARKS.
MAINDEC-00-DZCRA-A-CB BINARY TEST DECK[ROTATING PATTERN]
WITH CLOCK MARKS.
MAINDEC-00-DZCMA-A-CA ALPHANUMERIC TEST DECK [SAME PATTERN]
MAINDEC-00-DZCMA-A-CB BINARY TEST DECK [SAME PATTERN]
MAINDEC-00-DZCMB-A-CO MARK SENSE BINARY [SAME PATTERN]

EXTRA CARDS (FOR ERROR FUNCTION TEST)

2.3 STORAGE

THE PROGRAM RUNS IN 8K MEMORY.

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

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                                        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.

                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 M7329 MODULE
                                       (IF SW10 & SW09 IS DOWN, ASSUMES THE M8291 MODULE)
                        SW09=1 OR UP---THE M8290 CR11 CONTROL BOARD IS BEING USED
                                       (IF SW10 & SW09 IS DOWN, ASSUMES THE M8291 MODULE)
                        SW08=1 OR UP---LOOP ON THE MAINTENANCE TEST PORTION OF
                                        THIS DIAGNOSTIC (MUST BE M8291 CONTROL
                                        MODULE FOR CR11/CM11F).
                        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 & SW02=0 --- RUN BINARY TEST DECK M-00-DZCRA-A-CB
                        SW04=0 & SW02=0 --- RUN ALPHA TEST DECK M-00-DZCRA-A-CA
                        SW04=1 & SW02=1 --- RUN BINARY TEST DECK M-00-DZCMA-A-CB
                        SW04=0 & SW02=1 --- RUN ALPHA TEST DECK M-00-DZCMA-A-CA
                        SW03=1 OR UP---MARK SENSE BINARY TEST DECK M-00-DZCMB-A-CO
                        SW00=1 OR UP---DISABLE TEST TESTG(DARK-LIGHT TEST)

                4.2     STARTING ADDRESSES

                        200 = INSTRUCTION AND DATA TEST
                        204 = ERROR FUNCTION TEST (WITH G.D.I. READER)
                        210 = ERROR FUNCTION TEST (WITH DOCUMATION READER)
                        214 = SINGLE SUBTEST LOOP
                        220 = READ SINGLE DATA PATTERN TEST

                4.3     PROGRAM AND/OR OPERATOR ACTION

                4.3.1   INSTRUCTION AND DATA RELIABILITY TEST (SA 200)
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                        LOAD PROGRAM INTO MEMORY.
                        LOAD ONE TEST DECK IN THE CARD READER INPUT HOPPER.
                        PRESS MOTOR START AND READ START ("RESET" ON DOCUMATION READER).
                        SET SWITCH REGISTER TO STARTING ADDRESS.
                        LOAD ADDRESS.
                        IF HARDWARE SWITCH REGISTER IS AVAILABLE SET SWITCH
                        SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
                        PRESS START.
                        WHEN THE INPUT HOPPER IS EMPTY THE PROGRAM WILL HANG WAITING
                                FOR AN INTERRUPT FROM THE CARD READER.  LOAD ONE OR MORE
                                TEST DECKS INTO THE INPUT HOPPER.  PRESSING "MOTOR START" AND
                                "READ START" ("RESET" ON DOCUMATION READER) ON THE CARD
                                READER SHOULD CAUSE PROGRAM EXECUTION TO RESUME.
                        THIS ENTIRE SEQUENCE IS NECESSARY TO RUN THE FULL TEST ON THE CARD
                                READER.
                        ALL PRINTOUTS INDICATE FAILURE, INCLUDING THOSE SAYING
                                THAT BIT 8 OR BIT 15 WAS SET.

                4.3.2   ERROR FUNCTION TEST (SA 204 OR 210)

                        LOAD A FEW SPARE CARDS INTO THE INPUT HOPPER (DO NOT LOAD A
                                TEST DECK-THIS TEST IS DESTRUCTIVE!)
                        PRESS "MOTOR START" AND "READ START" ("RESET" ON DOCUMATION READER)
                                ON THE CARD READER.
                        LOAD THE STARTING ADDRESS.
                        IF HARDWARE SWITCH REGISTER IS AVAILABLE SET SWITCH
                        SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
                        PRESS START.
                        FOLLOW THE INSTRUCTIONS AS THEY ARE PRINTED OUT.

                4.3.3   SINGLE SUBTEST LOOP (SA 214)

                        LOAD CARDS (SPARE CARDS OR A TEST DECK) INTO THE INPUT HOPPER.
                        PRESS "MOTOR START" AND "READ START" ("RESET" ON DOCUMATION READER)
                                ON THE CARD READER.
                        LOAD THE STARTING ADDRESS.
                        IF HARDWARE SWITCH REGISTER IS AVAILABLE SET SWITCH
                        SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
                        PRESS START.
                        WHEN ASKED ENTER THE STARTING ADDRESS OF THE DESIRED TEST
                                (ADDRESS OF THE TESTXX TAG, WHERE XX MAY BE 1 THRU 24
                                OR A THRU G OR TSTM00-22).


                4.3.4   SINGLE DATA PATTERN TEST (SA 220)

                        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 220.
                        IF HARDWARE SWITCH REGISTER IS AVAILABLE SET SWITCH
                        SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
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                        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 204 OR 210 (ERROR FUNCTION TEST FOR CR11/CM11)

                        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 220 (SINGLE SUBTEST LOOP)

                        SEE 4.1 FOR SR OPTIONS

                5.1.4   AT SA 220 (SINGLE DATA PATTERN TEST)

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


                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
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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 .

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 PROGRAM
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
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 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 SW. SETTING
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

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                        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 15 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.  IF THE PROGRAM HALTS IN THE MAIN FLOW, CONSULT THE
                        LISTING IF NO MESSAGE IS TYPED OUT.


        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.
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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 204 FOR G.D.I. READER - SA 210 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 220)

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. THIS PROGRAM WILL SUPPORT CARD DECKS THAT HAVE THE SAME PATTERN ON EACH CARD.

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. THIS PROGRAM WILL SUPPORT CARD DECKS THAT HAVE THE SAME PATTERN ON EACH CARD.

8.3 SPECIAL NOTES

IF THE CARD READER GOES OFF-LINE BEFORE THE END OF A CARD,

BUSY REMAINS SET UNTIL THE CARD ACTUALLY CLEARS THE READER.

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

IF THE CARD READER USES AN M829 MODULE, SW10 MUST BE SET IN THE SWITCH REGISTER. WITH THE M829 MODULE, CARD DONE NEVER OCCURS AFTER THE LAST CARD IN THE INPUT HOPPER IS READ. IF THE CARD READER USES AN M8290 MODULE, SW09 MUST BE SET. WITH THE M8290 MODULE, CARD DONE IS ISSUED AFTER THE LAST CARD IN THE INPUT HOPPER IS READ.

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

8.4 TESTING CR11/CM11'S WITH NON-STANDARD ADDRESSES

BY SUBSTITUTING INTO THE LOCATIONS KCRS, KCRB1, KCRB2, AND KCRM THE ADDRESSES OF THE CRS, CRB1, AND CRB2 OF A CARD READER ASSIGNED A NON-STANDARD ADDRESS, AND SUBSTITUTING ITS INTERRUPT VECTOR ADDRESS INTO INTVC & INPRI, 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. MAINTENANCE TEST

1. THE M8291 CR11 CONTROL MODULE (M8291) HAS BEEN ADDED TO THE CR11 CONTROL BOARDS. THIS MODULE (M8291) HAS AN ADDITIONAL REGISTER (THE MAINTENANCE REG.). THE FIRST TWENTY TWO TEST (TSTM01-22) ADDED TO THE CR11 DIAGNOSTIC HAVE BEEN DESIGNED TO CHECK OUT THE NEW REGISTER ON A BIT RESPONSE & TO EXERCISE THE WHOLE CR11/CM11F CONTROL BOARD (M8291).

   THIS ADDITIONAL CODE WILL RUN ON AN AUTOMATIC COMPUTER TESTING (ACT-11) SYSTEM, BUT ONLY THE MAINTENANCE PORTION.

   THE SELECTION FOR TESTING OF THE M8291 STAND ALONE

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                                DIAGNOSTIC  IS SW09 & SW10 = ZERO 0.

                                THE M8291 MAINTENANCE REGISTER IS A WRITE ONLY
                                REGISTER, THEREFORE CREATING DIFFICULT TESTING
                                CODE.



                        2.      MAINTENANCE SUB TITLES OF EACH ROUTINES

                                TSTM01: SCOPE
                                        THIS TEST MAINTENANCE REGISTERS ADDRESS
                                TSTM02: SCOPE
                                        THIS TEST WILL CHECK OUT THE CSR INTERRUPT ENABLE
                                        BIT SETTING & CLEARING OF THAT BIT.
                                        AT THE TIME OF TEST IT WILL PROTECT AGAINST FALSE INTR.
                                TSTM03: SCOPE
                                        THIS TEST WILL CHECK THE EJECT BIT IN THE CSR
                                        THIS IS REQUIRE FOR TIMING ERROR, COLUMN READY TO TEST
                                        IN THE MAINT MODE & NORMAL MODE
                                TSTM04: SCOPE
                                        THIS PROGRAM WILL VERIFY BIT 13 OF THE CR11 MAINTENANCE
                                        REGISTER MAINT 3 TEST AND MAINT 4 TEST WILL INDICATE TRUE FAULT
                                TSTM05: SCOPE
                                        THIS TEST WILL BIT BANG BIT 14 IN CR11 MAINTENANCE REGISTER
                                TSTM06: SCOPE
                                        THIS TEST WILL BIT BANG BIT 13 IN THE CR11 MAINT. REG.
                                        ON LINE TRANSITION
                                TSTM07: SCOPE
                                        THIS TEST WILL EXERCISE (BIT BANG) BIT 12 MOT/HOP IN
                                        THE CR11 MAINTENANCE REGISTER.
                                TSTM08: SCOPE
                                        THIS TEST WILL PASS DATA PATTERNS THRU ZONE BIT(S) OF
                                        THE MAINTENANCE REGISTER & CHECK COMPARE WITH CRB1 REG.
                                TSTM09: SCOPE
                                        THIS TEST WILL CHECKOUT DATA PATHS FROM THE
                                        MAINTENANCE BUFFER REGISTER THRU TO CRB2 (COMPRESSED CODE)
                                TSTM10: SCOPE
                                        TEST WILL CHECK THE SETTING & CLEARING OF
                                        TRANSISION ON LINE BIT IN THE CSR.
                                        THIS TEST IS REQ'S BEFORE WE CAN PROCED & CHECK
                                        SOME OF THE MAINT. FUNCTIONS
                                TSTM11: SCOPE
                                        THIS TEST WILL CHECK THE MAINT. FUNCTION CAUSE
                                        AN OFF-LINE & ERROR CONDITION
                                TSTM12: SCOPE
                                        THIS TEST WILL SET CONDITIONS TO SET CARD DONE BIT
                                        THRU THE MAINT. REG. FOR TEST.
                                TSTM13: SCOPE
                                        COLUMN READY TEST THRU MAINT. REG., SETTING READY,0
                                        BUSY WILL GIVE AN INDEX MARK WHICH SET COLUMN READY.
                                TSTM14: SCOPE
                                        TEST WILL CHECK OUT CONDITIONS THAT SET TIMING ERROR
                                        BIT
                                TSTM15: SCOPE
                                        TEST ON LINE FUNCTION TO CREATE AN INTERRUPT
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                                TSTM16: SCOPE
                                        TEST OF LINE FUNCTION TO INTERRUPT
                                TSTM17: SCOPE
                                        TEST CARD DONE FUNCTION TO CAUSE AN INTERRUPT
                                TSTM18: SCOPE
                                        TEST COLUMN READY FUNCTION TO CAUSE AN INTERRUPT
                                TSTM19: SCOPE
                                        THIS TEST WILL CAUSE A TIMING ERROR WHICH SHOULD
                                        CREATE AN INTERRUPT.  A CHECK FOR THE RIGHT
                                        INTERRUPT FUNCTIONS WILL BE MADE.
                                TSTM20: SCOPE
                                        SET ALL CONTROL BITS IN CR11'S CONTROL & STATUS
                                        REGISTER PERFORM A RESET COMMAND VERIFY
                                        THAT RESET DID CLEAR FUNCTION IN CSR.
                                TSTM21: SCOPE
                                        THIS TEST WILL LOOK FOR INTERACTION BETWEEN
                                        MOTION CHECK BIT 12 & HOPPER CHECK BIT 13
                                TSTM22: SCOPE
                                        THIS TEST WILL PASS SIMULATED DATA OF AN
                                        ALPHANUMERIC CARD DECK & ALSO A BINARY CARD
                                        DECK IN THE INTERRUPT MODE
```

```
                        ;DIAGNOSTIC FOR CR11 CARD READER
                        ;BY RICK FADDEN
                        ;(MODIFIED MAY 75 TO ACCOMIDATE THE M8291 MODULE (AL COSSETTE)
                        ;(MODIFIED APRIL-72 FOR HARDWARE ECO)
                        ;MODIFIED APRIL 1976 FOR SWITCH REGISTER-LESS PROCESSORS
                        ;BY RON PLATUKIS



                        ;STARTING ADDRESSES ARE.
                        ;       200=INSTRUCTION AND DATA TEST FOR THE CR11
                        ;       204=ERROR FUNCTION TEST OF CR11 (GDI)
                        ;       210=ERROR FUNCTION TEST OF CR11/CM11F USING DOCUMATION READER.
                        ;       214=SINGLE TEST LOOP
                        ;       220=READ SINGLE DATA PATTERN TEST

                        ;SWITCH REGISTER SETTINGS FOR THE INSTRUCTION AND DATA TEST ARE:
                        ;       SW00=1 FOR DISABLE OF TEST TESTG(DARK-LIGHT TEST)
                        ;       SW03=1 RUN MARK SENSE BINARY TEST DECK M-00-DZCMB-A-CO
                        ;       SW04=0 & SW02=1 RUN ALPH TEST DECK M-11-DZCMA-A-CA(FIX PAT)
                        ;       SW04=1 & SW02=1 RUN BINARY TEST DECK M-11-DZCMA-A-CB(FIX PAT)
                        ;       SW04=0 & SW02=0 RUN ALPHA TEST DECK M-00-DZCRA-A-CA(ROT PAT)
                        ;       SW04=1 & SW02=0 RUN BINARY TEST DECK M-00-DZCRA-A-CB(ROT PAT)
                        ;       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
                        ;                CHECKS ARE COMPLETE, THE DATA TEST IS RESUMED.
                        ;       SW06=1 TO RUN THE COMBINED INSTRUCTION AND DATA TEST
                        ;             WHEN CONTINUING FROM ONE DECK TO THE NEXT
                        ;          =0 TO RUN ONLY THE DATA TEST ON EVERY DECK AFTER THE FIRST
                        ;       SW07=1 TO RUN ONLY THE INSTRUCTION TEST CONTINUALLY
                        ;        SETTING SW06 AND SW07 AT THE END OF A DECK WILL
                        ;        CAUSE THE INSTRUCTION TEST TO BE RUN CONTINUOUSLY FROM THEN ON
                        ;        NOTE:  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.
                        ;       SW08=1 OR UP---LOOP ON THE MAINTENANCE TEST PORTION OF
                        ;                THIS DIAGNOSTIC (MUST BE M8291 CONTROL
                        ;                MODULE FOR CR11/CM11F).
                        ;       SW09=1  CR11/CM11 UNDER TEST IS NOT MODULE M8290.
                        ;       SW10=1 TO INDICATE THAT THE CR11 BEING TESTED USES THE
                        ;        M829 MODULE
                        ;        SW10 & SW09 BOTH = ZERO TO INDICATE THAT THE CR11/CM11 BEING TESTED USES
                        ;        M8291 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
                        .TITLE DZCRB-C  CR11/CM11F DIAGNOSTIC TEST
                        .ABS
  177776                PSR=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 READER STATUS REGISTER
  000004                CRB1=%4         ;CONTAINS ADDRESS OF CARD READER BUFFER (12 BIT DATA)
  000005                R5=%5           ;SCRATCH
  000006                R6=%6
  000006                SP=%6           ;STACK POINTER
  000007                PC=%7           ;PROGRAM COUNTER
                ;LOAD TRAP CATCHER INTO LOCATIONS 0 THRU 377
  000000  000002        .+2
  000002  000000        HALT
  000004  000006        .+2
  000006  000000        HALT
  000010  000012        .+2
  000012  000000        HALT
  000014  000016        .+2
  000016  000000        HALT
  000020  000022        .+2
  000022  000000        HALT
  000024  000026        .+2
  000026  000000        HALT
  000030  000032        .+2
  000032  000000        HALT
  000034  000036        .+2
  000036  000000        HALT
  000040  000042        .+2
  000042  000000        HALT
  000044  000046        .+2
  000046  000000        HALT
  000050  000052        .+2
  000052  000000        HALT
```

```
000054 000056                      .+2
000056 000000                      HALT
000060 000062                      .+2
000062 000000                      HALT
000064 000066                      .+2
000066 000000                      HALT
000070 000072                      .+2
000072 000000                      HALT
000074 000076                      .+2
000076 000000                      HALT
000100 000102                      .+2
000102 000000                      HALT
000104 000106                      .+2
000106 000000                      HALT
000110 000112                      .+2
000112 000000                      HALT
000114 000116                      .+2
000116 000000                      HALT
000120 000122                      .+2
000122 000000                      HALT
000124 000126                      .+2
000126 000000                      HALT
000130 000132                      .+2
000132 000000                      HALT
000134 000136                      .+2
000136 000000                      HALT
000140 000142                      .+2
000142 000000                      HALT
000144 000146                      .+2
000146 000000                      HALT
000150 000152                      .+2
000152 000000                      HALT
000154 000156                      .+2
000156 000000                      HALT
000160 000162                      .+2
000162 000000                      HALT
000164 000166                      .+2
000166 000000                      HALT
000170 000172                      .+2
000172 000000                      HALT
000174 000176                      .+2
000176 000000                      HALT
000200 000202                      .+2
000202 000000                      HALT
000204 000206                      .+2
000206 000000                      HALT
000210 000212                      .+2
000212 000000                      HALT
000214 000216                      .+2
000216 000000                      HALT
000220 000222                      .+2
000222 000000                      HALT
000224 000226                      .+2
000226 000000                      HALT
000230 000232                      .+2
000232 000000                      HALT
```

```
 786  000234  000236                .+2
 787  000236  000000                HALT
 788  000240  000242                .+2
 789  000242  000000                HALT
 790  000244  000246                .+2
 791  000246  000000                HALT
 792  000250  000252                .+2
 793  000252  000000                HALT
 794  000254  000256                .+2
 795  000256  000000                HALT
 796  000260  000262                .+2
 797  000262  000000                HALT
 798  000264  000266                .+2
 799  000266  000000                HALT
 800  000270  000272                .+2
 801  000272  000000                HALT
 802  000274  000276                .+2
 803  000276  000000                HALT
 804  000300  000302                .+2
 805  000302  000000                HALT
 806  000304  000306                .+2
 807  000306  000000                HALT
 808  000310  000312                .+2
 809  000312  000000                HALT
 810  000314  000316                .+2
 811  000316  000000                HALT
 812  000320  000322                .+2
 813  000322  000000                HALT
 814  000324  000326                .+2
 815  000326  000000                HALT
 816  000330  000332                .+2
 817  000332  000000                HALT
 818  000334  000336                .+2
 819  000336  000000                HALT
 820  000340  000342                .+2
 821  000342  000000                HALT
 822  000344  000346                .+2
 823  000346  000000                HALT
 824  000350  000352                .+2
 825  000352  000000                HALT
 826  000354  000356                .+2
 827  000356  000000                HALT
 828  000360  000362                .+2
 829  000362  000000                HALT
 830  000364  000366                .+2
 831  000366  000000                HALT
 832  000370  000372                .+2
 833  000372  000000                HALT
 834  000374  000376                .+2
 835  000376  000000                HALT
 836  000400  000402                .+2
 837  000402  000000                HALT
 838  000404  000406                .+2
 839  000406  000000                HALT
 840  000410  000412                .+2
 841  000412  000000                HALT
```

```
                000414  000416          .+2
                000416  000000          HALT
                000420  000422          .+2
                000422  000000          HALT
                000424  000426          .+2
                000426  000000          HALT
                000430  000432          .+2
                000432  000000          HALT
                000434  000436          .+2
                000436  000000          HALT
                000440  000442          .+2
                000442  000000          HALT
                000444  000446          .+2
                000446  000000          HALT
                000450  000452          .+2
                000452  000000          HALT
                000454  000456          .+2
                000456  000000          HALT
                000460  000462          .+2
                000462  000000          HALT
                000464  000466          .+2
                000466  000000          HALT
                000470  000472          .+2
                000472  000000          HALT
                000474  000476          .+2
                000476  000000          HALT
                000500  000502          .+2
                000502  000000          HALT
                000504  000506          .+2
                000506  000000          HALT
                000510  000512          .+2
                000512  000000          HALT
                000514  000516          .+2
                000516  000000          HALT
                000520  000522          .+2
                000522  000000          HALT
                000524  000526          .+2
                000526  000000          HALT
                000530  000532          .+2
                000532  000000          HALT
                000534  000536          .+2
                000536  000000          HALT
                000540  000542          .+2
                000542  000000          HALT
                000544  000546          .+2
                000546  000000          HALT
                000550  000552          .+2
                000552  000000          HALT
                000554  000556          .+2
                000556  000000          HALT
                000560  000562          .+2
                000562  000000          HALT
                000564  000566          .+2
                000566  000000          HALT
                000570  000572          .+2
                000572  000000          HALT
```

```
 898  000574  000576                .+2
 899  000576  000000                HALT
 900  000600  000602                .+2
 901  000602  000000                HALT
 902  000604  000606                .+2
 903  000606  000000                HALT
 904  000610  000612                .+2
 905  000612  000000                HALT
 906  000614  000616                .+2
 907  000616  000000                HALT
 908  000620  000622                .+2
 909  000622  000000                HALT
 910  000624  000626                .+2
 911  000636  000000                HALT
 912  000630  000632                .+2
 913  000632  000000                HALT
 914  000634  000636                .+2
 915  000636  000000                HALT
 916  000640  000642                .+2
 917  000642  000000                HALT
 918  000644  000646                .+2
 919  000646  000000                HALT
 920  000650  000652                .+2
 921  000652  000000                HALT
 922  000654  000656                .+2
 923  000656  000000                HALT
 924  000660  000662                .+2
 925  000662  000000                HALT
 926  000664  000666                .+2
 927  000666  000000                HALT
 928  000670  000672                .+2
 929  000672  000000                HALT
 930  000674  000676                .+2
 931  000676  000000                HALT
 932  000700  000702                .+2
 933  000702  000000                HALT
 934  000704  000706                .+2
 935  000706  000000                HALT
 936  000710  000712                .+2
 937  000712  000000                HALT
 938  000714  000716                .+2
 939  000716  000000                HALT
 940  000720  000722                .+2
 941  000722  000000                HALT
 942  000724  000726                .+2
 943  000726  000000                HALT
 944  000730  000732                .+2
 945  000732  000000                HALT
 946  000734  000736                .+2
 947  000736  000000                HALT
 948  000740  000742                .+2
 949  000742  000000                HALT
 950  000744  000746                .+2
 951  000746  000000                HALT
 952  000750  000752                .+2
 953  000752  000000                HALT
```

```
                                        .+2
                                        HALT
                                        .+2
                                        HALT
                                        .+2
                                        HALT
                                        .+2
                                        HALT
                                ;LOAD TRAP VECTORS FOR HLT AND SCOPE ROUTINES
                        000014          .=14
000014  001146                         TRTRAP
000016  000340                         340
                        000030          .=30
000030  017162                         EMTSRV
000032  000340                         340
                        000046          .=46
000046  004776                         LOGICAL
                                        .LIST   ME
                                        .NLIST  MC,CND


                                ;SOFTWARE SWITCH REGISTER LOCATIONS
                        000174          .=174
000174  000000                 DISPREG:0
000176  000000                 SWREG:  0

                                ;LOAD STARTING ADDRESS AREA
                        000200          .=200
000200  000167  000752                   JMP     START1          ;INSTRUCTION & DATA TEST FOR CR11
000204  000167  000762                   JMP     START2          ;ERROR FUNCTION TEST OF CR11 (G.D.I.)
000210  000167  000772                   JMP     START3          ;ERROR FUNCTION TEST OF CR11 USING DOCUMATION READER
000214  000167  001002                   JMP     START4          ;SINGLE TEST LOOP
000220  000167  001012                   JMP     START5          ;READ SINGLE DATA PATTERN TEST


                                ;LOAD POINTERS AND GENERAL STORAGE
                        001100          .=1100
001100  000000                 STACK:  0                       ;STACK POINTER INITIALIZED TO POINT HERE
001102  000000                 INTFLG: 0                       ;CONTAINS LEVEL THAT INTERRUPT IS FOUND AT
001104  000230                 INTVC:  230                     ;ADDRESS OF CARD READER INTERRUPT VECTOR
001106  000232                 INPRI:  232                     ;INTERRUPT STATUS WORD
001110  177160                 KCRS:   177160                  ;CONTROL AND STATUS REG.
001112  177162                 KCRB1:  177162                  ;DATA BUFFER HOLL. CODE
001114  177164                 KCRB2:  177164                  ;DATA BUFFER COMPRESED HOLL. CODE
001116  177166                 KCRM:   177166                  ;MAINTENANCE REG.
001120  177570                 DISPLAY:177570
001122  177570                 SWR:    177570
001124  177560                 KBCSR:  177560
001126  177562                 KBDBR:  177562
001130  177564                 TCSR:   177564                  ;ADDRESS OF TELETYPE STATUS REGISTER
001132  177566                 TDBR:   177566                  ;ADDRESS OF TELETYPE DATA BUFFER
001134  000000                 TMP1:   0
001136  177777                 TIFLG:  -1
001140  000000                 CSNT:   0
```

```
1010  001142  000000                  TIB:    0
1011  001144  000000                  FLAG:   0                       ;SET TO ONE FOR MARK-SENSE CARD READER
1012  001146  000002                  TRTRAP: RTI                     ;RETURN FROM TRACE LOOP
1013  001150  000000                  TRFLG:  0                       ;TOGGLED TO SWITCH BETWEEN TRACE TPAPPING AND NORMAL FLO
1014  001152  000000                  PROC:   0                       ;STORES PROCESSOR STATUS WHEN TRACE TRAP MUST BE CLEARED
1015                                                                  ;IN A SUBTEST
1016  001154  000000                  ERFLG:  0                       ;SET TO ZERO TO OUTPUT DATA ERROR HEADING
1017
1018
1019                                  ;THIS ROUTINE WILL CHECK FOR THE PRESENCE OF THE NEW CR11
1020                                  ;MODULE M8291 BOARD
1021
1022  001156  012706  001100          START1: MOV     #STACK,SP               ;SET STACK POINTER
1023  001162  004767  000064                  JSR     PC,BOARD
1024  001166  000167  003732                  JMP     BEGIN           ;INSRUCTION AND DATA TEST
1025
1026  001172  012706  001100          START2: MOV     #STACK,SP               ;SET STACK POINTER
1027  001176  004767  000050                  JSR     PC,BOARD
1028  001202  000167  012234                  JMP     ERCR11          ;ERROR FUNCTION TEST (G.D.I. READER)
1029
1030  001206  012706  001100          START3: MOV     #STACK,SP               ;SET STACK POINTER
1031  001212  004767  000034                  JSR     PC,BOARD
1032  001216  000167  012226                  JMP     ERCM11          ;ERROR FUNCTIO TEST (DUCUMATIOON READER)
1033
1034  001222  012706  001100          START4: MOV     #STACK,SP               ;SET STACK POINTER
1035  001226  004767  000020                  JSR     PC,BOARD
1036  001232  000167  013704                  JMP     TESTX           ;SINGLE SUB TEST LOOP
1037
1038  001236  012706  001100          START5: MOV     #STACK,SP               ;SET STACK POINTER
1039  001242  004767  000004                  JSR     PC,BOARD
1040  001246  000167  014010                  JMP     CKSAME          ;READ SINGLE PATTERN TEST
1041
1042
1043                                  ;TEST CR11 REGISTERS RESPOND TO ADDRESS REQUEST
1044  001252  104007                  BOARD:  TIT
1045  001254  013746  000004                  MOV     @#4,-(SP)       ;SAVE RETURN INFO
1046  001260  012737  001300  000004          MOV     #2$,@#4         ;RESET RETURN CALL
1047  001266  005777  177616                  TST     @KCRS           ;TEST ADDRESS
1048  001272  012637  000004                  MOV     (SP)+,@#4       ;ADDRESS GOOD RESTORE RETURN ADDR.
1049  001276  000405                  BR      3$              ;CONT. TEST
1050  001300  022626                  2$:     CMP     (SP)+,(SP)+     ;UPDATE STACK
1051  001302  012637  000004                  MOV     (SP)+,@#4       ;UPDATE TRAP RETURN ADDR.
1052  001306  104000                  HLT                     ;ERROR IN ADDRESSIING THIS REGISTER
1053  001310  000760                  BR      BOARD           ;CONT. ERROR REPORT
1054  001312  013746  000004          3$:     MOV     @#4,-(SP)       ;SAVE RETURN INFO
1055  001316  012737  001336  000004          MOV     #4$,@#4         ;RESET RETURN CALL
1056  001324  005777  177562                  TST     @KCRB1          ;TEST ADDRESS
1057  001330  012637  000004                  MOV     (SP)+,@#4       ;ADDRESS GOOD RESTORE RETURN ADDR.
1058  001334  000405                  BR      5$              ;CONT. TEST
1059  001336  022626                  4$:     CMP     (SP)+,(SP)+     ;UPDATE STACK
1060  001340  012637  000004                  MOV     (SP)+,@#4       ;UPDATE TRAP RETURN ADDR.
1061  001344  104000                  HLT                     ;ERROR IN ADDRESSING THIS REGISTER
1062  001346  000761                  BR      3$              ;CONT. ERROR REPORT
1063  001350  013746  000004          5$:     MOV     @#4,-(SP)       ;SAVE RETURN INFO
1064  001354  012737  001374  000004          MOV     #6$,@#4         ;RESET RETURN CALL
1065  001362  005777  177526                  TST     @KCRB2          ;TEST ADDRESS
```

```
1066  001366  012637  000004          MOV     (SP)+,@#4       ;ADDRESS GOOD RESTORE RETURN ADDR.
1067  001372  000405                  BR      MBRD            ;CONT. TEST
1068  001374  022626          6$:     CMP     (SP)+,(SP)+     ;UPDATE STACK
1069  001376  012637  000004          MOV     (SP)+,@#4       ;UPDATE TRAP RETURN ADDR.
1070  001402  104000                  HLT                     ;ERROR IN ADDRESSING THIS REGISTER
1071  001404  000761                  BR      5$              ;CONT. ERROR REPORT
1072
1073  001406  104005          MBRD:   SUSWRR
1074  001410  104002                  CNTLU
1075  001412  104006                  CKU
1076  001414  032777  002000  177500  BIT     #2000,@SWR      ;IS THIS A M829 CR11 CONTROL MODULE
1077  001422  001401                  BEQ     4$              ;NO-BRANCH
1078  001424  000207                  RTS     PC              ;YES-JUMP OVER MAIN. TEST
1079  001426  032777  001000  177466  4$:     BIT     #1000,@SWR      ;IS THIS A M8291 CR11 CONTROL MODULE
1080  001434  001401                  BEQ     1$              ;BRANCH TO SET MAINTENANCE FLAG
1081  001436  000207                  RTS     PC              ;RETURN TO CALLING ROUTINE
1082  001440  012767  177777  003410  1$:     MOV     #-1,MFLG        ;SET MAINTENANCE FLAG (SR09=1)
1083  001446  005767  003404          2$:     TST     MFLG            ;TEST TO SEE IF MAINT REG IS TO BE TESTED.
1084  001452  001001                  BNE     3$              ;YES GO CHECK MAINT REG.
1085  001454  000207                  RTS     PC              ;NO MAINTENANCE REG RETURN TO CALLER
1086  001456  012767  001472  014740  3$:     MOV     #TSTM1A,RETURN  ;SET UP SCOPE RETURN SEQUENCE
1087  001464  004767  003372          JSR     PC,SETUP        ;SET REG. & VECTORS
1088
```

```


                                        ;*******************************************************************
                                        ;                           MAINTENANCE TEST
                                        ;*******************************************************************

   001470  104001                       TSTM01: SCOPE
                                        ;THIS TEST MAINTENANCE REGISTERS ADDRESS

   001472  013746  000004               TSTM1A: MOV     @#4,-(SP)       ;SAVE OLD TRAP ADDRESS RETURN LOCATION
   001476  012737  001516  000004               MOV     #2$,@#4         ;SET TRAP TO RETURN TO THIS ROUTINE TEST
                                                                        ;LOCATION
   001504  005777  177406                       TST     @KCRM           ;TEST MAINT. REG. ADDRESS
   001510  012637  000004                       MOV     (SP)+,@#4       ;TEST GOOD UPDATE TRAP RETURN LOCATION
   001514  000404                               BR      TSTM02          ;RETURN TO NEXT TEST SEQUENCE
   001516  022626                       2$:     CMP     (SP)+,(SP)+     ;UPDATE STACK
   001520  012637  000004                       MOV     (SP)+,@#4       ;UPDATE TRAP RETURN LOCATION
   001524  104000                               HLT                     ;MAINT. ADDRESS REGISTER FAILURE

   001526  104001                       TSTM02: SCOPE
                                        ;THIS TEST WILL CHECK OUT THE CSR INTERRUPT ENABLE
                                        ;BIT SETTING & CLEARING .
                                        ;AT THE TIME OF TEST IT WILL PROTECT AGAINST FALSE INTR.

   001530  012767  000340  176240               MOV     #340,PSR        ;PROC. AT LOCK OUT PRIORITY
   001536  017705  177342                       MOV     @INTVC,R5       ;SAVE INTERRUPT VECTOR
   001542  012777  001624  177334               MOV     #1$,@INTVC      ;SET NEW INTERRUPT
                                                                        ;RETURN FOR SERVICE
   001550  012777  000300  177330               MOV     #300,@INPRI     ;SET INTER. PRIOR.
   001556  012777  000100  177324               MOV     #100,@KCRS      ;SET INTERRUPT ENABLE (I.E.)
   001564  032777  000100  177316               BIT     #100,@KCRS      ;DID INTERRUPT ENABLE SET
   001572  001001                               BNE     2$              ;BRANCH I.E. DID SET
   001574  104000                               HLT                     ;ERROR I.E. SHOULD BE SET & DID NOT
   001576  042777  000100  177304       2$:     BIC     #100,@KCRS      ;CLEAR I.E.
   001604  032777  000100  177276               BIT     #100,@KCRS      ;TEST I.E. FUNCTION
   001612  001401                               BEQ     3$              ;I.E. DID CLEAR GOOD BRANCH
   001614  104000                               HLT                     ;I.E. DID NOT CLEAR ERROR
   001616  010577  177262               3$:     MOV     R5,@INTVC       ;RESTORE VECTOR
   001622  000404                               BR      TSTM03          ;GO
   001624  022626                       1$:     CMP     (R6)+,(R6)+     ;UPDATE STACK POINTER
   001626  010577  177252                       MOV     R5,@INTVC       ;RESTORE INTERRUPT VECTOR
   001632  104000                               HLT                     ;ERROR-THERE SHOULD NOT BE
                                                                        ;ANY INTERRUPTS

   001634  104001                       TSTM03: SCOPE
                                        ;THIS TEST WILL CHECK THE EJECT BIT IN THE CSR
                                        ;THIS IS REQUIRED FOR TIMING ERROR AND COLUMN READY TESTING
                                        ;IN THE MAINT MODE & NORMAL MODE

   001636  012777  000002  177244               MOV     #2,@KCRS        ;SET EJECT
   001644  032777  000002  177236               BIT     #2,@KCRS        ;TEST EJECT
   001652  001001                               BNE     1$              ;BRANCH-TEST GOOD
   001654  104000                               HLT                     ;EJECT BIT DID NOT SET
   001656  042777  000002  177224       1$:     BIC     #2,@KCRS        ;CLEAR EJECT
   001664  032777  000002  177216               BIT     #2,@KCRS        ;DID EJECT BIT CLEAR
   001672  001401                               BEQ     TSTM04          ;GO TO NEXT TEST
   001674  104000                               HLT                     ;EJECT BIT DID NOT CLEAR
```

```
1145
1146  001676  104001                    TSTM04: SCOPE
1147                                    ;THIS PROGRAM WILL VERIFY BIT 12(MOT/HOP) OF THE CR11 MAINTENANCE
1148                                    ;REGISTER.
1149
1150  001700  004767  003130                    JSR     PC,MINIT        ;INIT. MAINT. TEST
1151  001704  052777  110000  177204          BIS     #110000,@KCRM   ;SET MAINT & MOT/HOP(BIT 12)
1152  001712  032777  020000  177170          BIT     #20000,@KCRS    ;TEST BIT 13 IN CSR REG.
1153  001720  001001                          BNE     2$              ;TEST GOOD BRANCH
1154  001722  104000                          HLT                     ;INDICATE ERROR
1155  001724  012777  000000  177156  2$:     MOV     #0,@KCRS        ;CLEAR CONTROL STATUS
1156  001732  012777  100000  177156          MOV     #100000,@KCRM   ;CLEAR MAINTENANCE REG.
1157  001740  032777  020000  177142          BIT     #20000,@KCRS    ;DID BIT 13 CLEAR
1158  001746  001401                          BEQ     3$              ;YES BRANCH & DO ANOTHER TEST CYCLE
1159  001750  104000                          HLT                     ;INDICATE ERROR
1160  001752  005077  177140          3$:     CLR     @KCRM           ;CLEAR MAINT. REG.
1161
1162
1163  001756  104001                    TSTM05: SCOPE
1164                                    ;THIS TEST WILL BIT BANG BIT 14(BUSY) IN CR11 MAINTENANCE REGISTER
1165
1166  001760  004767  003050                    JSR     PC,MINIT        ;INIT. MAINT. TEST
1167  001764  052777  140000  177124          BIS     #140000,@KCRM   ;SET MAINT. MODE & BUSY BIT (MAINT.)
1168  001772  032777  001000  177110          BIT     #1000,@KCRS     ;DID BUSY MAINT. BIT SET BUSY CSR BIT
1169  002000  001001                          BNE     2$              ;TEST GOOD CONTINUE.
1170  002002  104000                          HLT                     ;ERROR CONDITION
1171  002004  012777  000000  177076  2$:     MOV     #0,@KCRS        ;CLEAR BUSY BIT (CSR)
1172  002012  012777  100000  177076          MOV     #100000,@KCRM   ;CLEAR MAINT. REG.
1173  002020  032777  001000  177062          BIT     #1000,@KCRS     ;DID WE CLEAR BIT 09
1174  002026  001401                          BEQ     3$              ;BIT 09 DID CLEAR
1175  002030  104000                          HLT                     ;ERROR
1176  002032  052777  140000  177056  3$:     BIS     #140000,@KCRM   ;SET MAINT. MODE & BUSY BIT (MAINT.)
1177  002040  032777  001000  177042          BIT     #1000,@KCRS     ;DID BUSY MAINT. BIT SET BUSY CSR BIT
1178  002046  001001                          BNE     4$              ;TEST GOOD CONTINUE.
1179  002050  104000                          HLT                     ;ERROR CONDITION
1180  002052  000005                  4$:     RESET                   ;INIT.
1181  002054  032777  001000  177026          BIT     #1000,@KCRS     ;TEST BUSY BIT
1182  002062  001401                          BEQ     5$              ;BUSY = 0, YES BRANCH
1183  002064  104000                          HLT                     ;NO, ERROR
1184  002066  005077  177024          5$:     CLR     @KCRM           ;CLEAR MAINT. REG.
1185
1186  002072  104001                    TSTM06: SCOPE
1187                                    ;THIS TEST WILL BIT BANG BIT 13 IN THE CR11 MAINT. REG.
1188                                    ;ON LINE TRANSITION
1189
1190
1191  002074  004767  002734                    JSR     PC,MINIT        ;INIT. MAINT. TEST
1192  002100  052777  120000  177010          BIS     #120000,@KCRM   ;SET MAINT. AND READY BIT
1193  002106  032777  002000  176774          BIT     #2000,@KCRS     ;TEST TRANSITION ON LINE
1194  002114  001001                          BNE     2$              ;TEST GOOD BRANCH
1195  002116  104000                          HLT                     ;ERROR CONDITION
1196  002120  012777  000000  176762  2$:     MOV     #0,@KCRS        ;CLEAR STATUS REG.
1197  002126  012777  100000  176762          MOV     #100000,@KCRM   ;CLEAR MAINT. REG.
1198  002134  032777  002000  176746          BIT     #2000,@KCRS     ;DID WE CLEAR BIT 10
1199  002142  001401                          BEQ     3$              ;BRANCH IF CLEAR
1200  002144  104000                          HLT                     ;ERROR DID NOT CLEAR BIT 10
```

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1201  002146  005077  176744          3$:     CLR     @#CRM           ;CLEAR MAINT. REG.
1202
1203  002152  104001                  TSTM07: SCOPE
1204                                  ;THIS TEST WILL EXERCISE (BIT BANG) BIT 12 (MOT/HOP) IN
1205                                  ;THE CR11 MAINTENANCE REGISTER.
1206
1207  002154  004767  002654                  JSR     PC,MINIT        ;INIT. MAINT. TEST
1208  002160  052777  110000  176730          BIS     #110000,@#CRM   ;SET MAINT & MOT/HOP(BIT 12)
1209  002166  032777  010000  176714          BIT     #10000,@#CRS    ;TEST BIT 12
1210  002174  001001                          BNE     2$              ;TEST GOOD-BRANCH
1211  002176  104000                          HLT                     ;INDICATE ERROR
1212  002200  012777  000000  176702  2$:     MOV     #0,@#CRS        ;CLEAR CONTROL STATUS
1213  002206  012777  100000  176702          MOV     #100000,@#CRM   ;CLEAR MAINT. REG.
1214  002214  032777  010000  176666          BIT     #10000,@#CRS    ;DID BIT 12 CLEAR
1215  002222  001401                          BEQ     3$              ;YES BRANCH & DO ANOTHER TEST CYCLE
1216  002224  104000                          HLT                     ;INDICATE ERROR
1217  002226  005077  176664          3$:     CLR     @#CRM           ;CLEAR MAINT. REG.
1218
1219  002232  104001                  TSTM08: SCOPE
1220                                  ;THIS TEST WILL PASS DATA PATTERMS THRU ZONE BIT(S) OF
1221                                  ;THE MAINTENANCE REGISTER & CHECK COMPARE WITH CRB1 REG.
1222
1223
1224  002234  004767  002574                  JSR     PC,MINIT        ;INIT. MAINT. TEST
1225  002240  012702  017300                  MOV     #ALPCD,R2       ;GET BUF STARTING ADDRESS
1226  002244  012705  017776                  MOV     #ALPEND,R5      ;GET BUF ENDING ADDRESS
1227  002250  162705  000002                  SUB     #2,R5           ;UPDATE R5
1228  002254  012767  160000  002576  2$:     MOV     #160000,TSTW    ;SET MAINT. CMMD. FUNC.
1229  002262  051267  002572                  BIS     (R2),TSTW       ;GET DATA TO PASS
1230  002266  016777  002566  176622          MOV     TSTW,@#CRM      ;PASS WORD TO MAINT REG
1231  002274  022277  176612                  CMP     (R2)+,@#CRB1    ;CHECK DATA WORD
1232  002300  001401                          BEQ     3$              ;GOOD WORD
1233  002302  104000                          HLT                     ;BAD WORD.  ERROR
1234  002304  005722                  3$:     TST     (R2)+           ;UPDATE REG. #2
1235  002306  020205                          CMP     R2,R5           ;PATTERN DONE
1236  002310  001361                          BNE     2$              ;BRANCH IF NOT
1237  002312  005077  176600                  CLR     @#CRM           ;CLEAR MAINT. REG.
1238
1239
1240  002316  104001                  TSTM09: SCOPE
1241                                  ;THIS TEST WILL CHECKOUT DATA PATHS FROM THE
1242                                  ;MAINTENANCE BUFFER REGISTER THRU TO CRB2 (COMPRESSED CODE)
1243
1244
1245  002320  004767  002510                  JSR     PC,MINIT        ;INIT. MAINT. TEST
1246  002324  012702  017300                  MOV     #ALPCD,R2       ;GET BUF STARTING ADDRESS
1247  002330  012705  017776                  MOV     #ALPEND,R5      ;GET BUF ENDING ADDRESS
1248  002334  062705  000002                  ADD     #2,R5           ;
1249  002340  012767  160000  002512  2$:     MOV     #160000,TSTW    ;GET DATA TO PASS
1250  002346  052267  002506                  BIS     (R2)+,TSTW      ;SET MAINT. FUNCTION
1251  002352  016777  002502  176536          MOV     TSTW,@#CRM      ;PASS WORD TO MAINT REG
1252  002360  022277  176530                  CMP     (R2)+,@#CRB2    ;CHECK DATA WORD COMPRESSED DATA
1253  002364  001401                          BEQ     3$              ;GOOD WORD
1254  002366  104000                          HLT                     ;BAD WORD.  ERROR
1255  002370  020205                  3$:     CMP     R2,R5           ;PATTERN DONE
1256  002372  001362                          BNE     2$              ;BRANCH IF NOT
```

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1257  002374  005077  176516              CLR     @KCRM           ;CLEAR MAINT. REG.
1258
1259  002400  104001                  TSTM10: SCOPE
1260                                  ;TEST WILL CHECK THE SETTING & CLEARING OF
1261                                  ;TRANSITION TO ON LINE BIT IN THE CSR.
1262                                  ;THIS TEST IS REQ'D BEFORE WE CAN PROCEED & CHECK
1263                                  ;SOME OF THE MAINT. FUNCTIONS
1264
1265  002402  004767  002426              JSR     PC,MINIT        ;SET MAINT. CONDITION
1266  002406  012777  100000  176502      MOV     #100000,@KCRM   ;CLR READY MAINT. REG.
1267  002414  052777  120000  176474      BIS     #120000,@KCRM   ;SET READY MAINT. REG.
1268  002422  000240                      NOP                     ;TEMP PAUSE
1269  002424  032777  002000  176456      BIT     #2000,@KCRS     ;TEST ON LINE TRANSITION BIT ON
1270  002432  001001                      BNE     1$              ;TRANSITION ON LINE BIT TEST GOOD
1271  002434  104000                      HLT                     ;TRANSITION ON LINE BIT TEST BAD
1272  002436  012777  000000  176444  1$: MOV     #0,@KCRS        ;CLEAR ON LINE TRANSITION BIT
1273  002444  032777  002000  176436      BIT     #2000,@KCRS     ;TEST ON LINE TRANSITION BIT OFF
1274  002452  001401                      BEQ     2$              ;GOOD TEST PROCEED TO NEXT ONE
1275  002454  104000                      HLT                     ;ON LINE TRANSITION BIT DID NOT CLEAR
1276  002456  005077  176434          2$: CLR     @KCRM           ;CLEAR MAINT.
1277
1278  002462  104001                  TSTM11: SCOPE
1279                                  ;THIS TEST WILL CHECK THAT THE MAINT. FUNCTION CAUSES
1280                                  ;AN OFF-LINE & ERROR CONDITION
1281
1282  002464  004767  002344              JSR     PC,MINIT        ;SET UP MAINT. CONDITION
1283  002470  052777  120000  176420      BIS     #120000,@KCRM   ;SET READY MAINT. BIT
1284  002476  012777  100000  176412      MOV     #100000,@KCRM   ;CLR READY MAINT. REG.
1285  002504  000240                      NOP                     ;TIME PAUSE
1286  002506  032777  100000  176374      BIT     #100000,@KCRS   ;TEST FOR ERROR  BIT
1287  002514  001001                      BNE     1$              ;BRANCH IF BIT IS SET
1288  002516  104000                      HLT                     ;ERROR & OFFLINE BIT SHOULD BE ON
1289  002520  032777  000400  176362  1$: BIT     #400,@KCRS      ;OFF LINE BIT SHOULD BE ON
1290  002526  001001                      BNE     2$              ;GOOD TEST
1291  002530  104000                      HLT                     ;ERROR OFF LINE BIT ABSENT
1292  002532  012777  000000  176350  2$: MOV     #0,@KCRS        ;CLEAR CR11'S CONTROL REG.
1293  002540  032777  100000  176342      BIT     #100000,@KCRS   ;ERROR BITS OFF
1294  002546  001401                      BEQ     3$              ;BITS CLEAR GO TO NEXT TEST
1295  002550  104000                      HLT                     ;ERROR ON ERROR & OFF LINE BIT
1296  002552  032777  000400  176330  3$: BIT     #400,@KCRS      ;OFFLINE SHOULD BE SET
1297  002560  001001                      BNE     4$              ;YES, BRANCH
1298  002562  104000                      HLT                     ;NO,ERROR
1299  002564  005077  176326          4$: CLR     @KCRM           ;CLEAR MAINT.
1300
1301  002570  104001                  TSTM12: SCOPE
1302                                  ;THIS TEST WILL SET CONDITIONS TO SET CARD DONE BIT
1303                                  ;THRU THE MAINT. REG. FOR TEST.
1304
1305  002572  004767  002236              JSR     PC,MINIT        ;GO SET UP MAINT. CONDITION
1306  002576  052777  160000  176312      BIS     #160000,@KCRM   ;SET BUSY & READY BIT
1307  002604  000240                      NOP                     ;TIME PAUSE
1308  002606  012777  100000  176302      MOV     #100000,@KCRM   ;CLR READY MAINT. REG.
1309  002614  000240                      NOP                     ;TIME PAUSE
1310  002616  032777  040000  176264      BIT     #40000,@KCRS    ;TEST CARD DONE BIT
1311  002624  001001                      BNE     1$              ;BRANCH IF CARD DONE SET
1312  002626  104000                      HLT                     ;ERROR CARD DONE BIT NOT SET
```

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1313  002630  012777  000000  176252  1$:     MOV     #0,@KCRS        ;CLEAR CONTROL REG.
1314  002636  032777  040000  176244          BIT     #40000,@KCRS    ;TEST IF CARD DONE BIT CLEARED
1315  002644  001401                          BEQ     2$              ;YES BRANCH TO NEXT TEST
1316  002646  104000                          HLT                     ;ERROR CARD DONE DIDN'T CLEAR.
1317  002650  005077  176242          2$:     CLR     @KCRM           ;CLEAR MAINT.
1318
1319  002654  104001                  TSTM13: SCOPE
1320                                  ;COLUMN READY TEST THRU MAINT. REG., SETTING READY,0
1321                                  ;BUSY WILL GIVE AN INDEX MARK WHICH SETS COLUMN READY.
1322
1323  002656  004767  002152                  JSR     PC,MINIT        ;SET UP MAINT. CONDITION
1324  002662  052777  160000  176226          BIS     #160000,@KCRM   ;SET BUSY & READY MAINT BIT
1325  002670  032777  000200  176212          BIT     #200,@KCRS      ;TEST COLUMN READY BIT SET
1326  002676  001001                          BNE     1$              ;COLUMN READY DID SET BRANCH
1327  002700  104000                          HLT                     ;ERROR COLUMN READY DID NOT SET
1328  002702  017767  176204  002150  1$:     MOV     @KCRB1,TSTW     ;READ BUF #1
1329  002710  032777  000200  176172          BIT     #200,@KCRS      ;TEST COLUMN READY BIT CLEARED
1330  002716  001401                          BEQ     2$              ;COLUMN READY WAS CLEARED
1331  002720  104000                          HLT                     ;COLUMN READY SHOULD HAVE CLEARED
1332  002722  052777  160000  176166  2$:     BIS     #160000,@KCRM   ;SET BUSY & READY MAINT BITS
1333  002730  032777  000200  176152          BIT     #200,@KCRS      ;TEST COLUMN READY SET
1334  002736  001001                          BNE     3$              ;COLUMN READY DID SET
1335  002740  104000                          HLT                     ;COLUMN READY DIDN'T SET
1336  002742  017767  176146  002110  3$:     MOV     @KCRB2,TSTW     ;READY BUF #2
1337  002750  032777  000200  176132          BIT     #200,@KCRS      ;TEST COLUMN READY BIT CLEAR
1338  002756  001401                          BEQ     4$              ;COLUMN READY DID CLR BRANCH
1339  002760  104000                          HLT                     ;ERROR ON COLUMN READ BIT
1340  002762  052777  160000  176126  4$:     BIS     #160000 @K M    ;SET BUSY & READY MAINT BIT
1341  002770  032777  000200  176112          BIT     #200,@KCRS      ;COLUMN READY
1342  002776  001001                          BNE     5$              ;COLUMN READY DID SET BRANCH
1343  003000  104000                          HLT                     ;ERROR COLUMN READY DID NOT SET
1344  003002  000005                  5$:     RESET                   ;INIT.
1345  003004  032777  000200  176076          BIT     #200,@KCRS      ;COL. READY SHOULD = ZERO
1346  003012  001401                          BEQ     6$              ;YES,BRANCH
1347  003014  104000                          HLT                     ;NO, ERROR
1348  003016  005077  176074          6$:     CLR     @KCRM           ;CLEAR MAINT.
1349
1350  003022  104001                  TSTM14: SCOPE
1351                                  ;TEST WILL CHECK OUT CONDITIONS THAT SET TIMING ERROR
1352                                  ;BIT
1353
1354  003024  004767  002004                  JSR     PC,MINIT        ;SET UP MAINT. CONDITICN
1355  003030  052777  160000  176060          BIS     #160000,@KCRM   ;MAINT. SET BUSY, READY & INDEX MARK
1356  003036  032777  000200  176044          BIT     #200,@KCRS      ;TEST FOR COLUMN READY
1357  003044  001001                          BNE     1$              ;COLUMN RDY SET BRANCH
1358  003046  104000                          HLT                     ;ERROR ON COLUMN READY
1359  003050  032777  004000  176032  1$:     BIT     #4000,@KCRS     ;TEST TIMING ERROR (T.E.)
1360  003056  001401                          BEQ     2$              ;T.E. SHOULD BE CLEARED
1361  003060  104000                          HLT                     ;T.E. IS SET & SHOULDN'T BE
1362  003062  052777  160000  176026  2$:     BIS     #160400,@KCRM   ;SECOND INDEX MARK
1363  003070  032777  000200  176012          BIT     #200,@KCRS      ;IS COLUM READY SET
1364  003076  001401                          BEQ     3$              ;COLUMN READY SHOULD NOT BE SET
1365  003100  104000                          HLT                     ;WASN'T SET ERROR
1366  003102  032777  004000  175000  3$:     BIT     #4000,@KCRS     ;TEST TIMING ERROR
1367  003110  001001                          BNE     4$              ;TIMING ERROR SHOULD BE SET
1368  003112  104000                          HLT                     ;TIMING WASN'T SET
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1369  003114  052777  160000  175774  4$:     BIS     #160000,@#KCRM  ;THIRD INDEX MARK
1370  003122  032777  000200  175760          BIT     #200,@#KCRS     ;TEST COLUMN READY
1371  003130  001401                          BEQ     5$              ;COLUMN READY NOT SET BRANCH
1372  003132  104000                          HLT                     ;COLUMN READY SHOULD BE OFF
1373  003134  032777  004000  175746  5$:     BIT     #4000,@#KCRS    ;TEST TIMING ERROR
1374  003142  001001                          BNE     6$              ;BRANCH IF T.E. SET
1375  003144  104000                          HLT                     ;T.E. SHOULD NOT BE ZERO
1376  003146  052777  000002  175734  6$:     BIS     #2,@#KCRS       ;SET EJECT BIT
1377  003154  052777  160000  175734          BIS     #160000,@#KCRM  ;FOURTH INDEX MARK.
1378  003162  032777  000200  175720          BIT     #200,@#KCRS     ;COLUMN READY SET?
1379  003170  001401                          BEQ     7$              ;COLUMN READY NOT SET
1380  003172  104000                          HLT                     ;COLUMN READY IS NOT CLEAR ERROR
1381  003174  032777  004000  175706  7$:     BIT     #4000,@#KCRS    ;TEST TIMING ERROR
1382  003202  001401                          BEQ     8$              ;TIMING ERROR SET BRANCH
1383  003204  104000                          HLT                     ;TIMING ERROR CLEARED ERROR
1384  003206  012777  100000  175702  8$:     MOV     #100000,@#KCRM  ;CLR READY MAINT. REG.
1385  003214  032777  100000  175666          BIT     #100000,@#KCRS  ;TIMING ERROR SET?
1386  003222  001001                          BNE     81$             ;TIMING ERROR IN ERROR ?
1387  003224  104000                          HLT                     ;TIMING ERROR IN ERROR
1388  003226  032777  040000  175654  81$:    BIT     #40000,@#KCRS   ;CARD DONE SET ?
1389  003234  001001                          BNE     9$              ;CARD DONE IN ERROR ?
1390  003236  104000                          HLT                     ;CARD DONE ERROR
1391  003240  005077  175644          9$:     CLR     @#KCRS          ;CLEAR CONTROL REG.
1392  003244  032777  044202  175636          BIT     #44202,@#KCRS   ;DID THIS CLEAR ALL
1393  003252  001401                          BEQ     10$             ;GO DO NEXT TEST
1394  003254  104000                          HLT                     ;ALL CONDITION WHERE NOT
1395  003256  005077  175634          10$:    CLR     @#KCRM          ;CLEAR MAINT.
1396                                                                  ;RIGHT.
1397
1398  003262  104001                  TSTM15: SCOPE
1399                                  ;TEST ON LINE FUNCTION TO CREATE AN INTERRUPT
1400
1401  003264  004767  001544                  JSR     PC,MINIT        ;SET UP MAINT. FUNCTION
1402  003270  012767  000340  174500          MOV     #340,PSR        ;SET PRIORITY LOCK OUT
1403  003276  012777  000100  175604          MOV     #100,@#KCRS     ;SET INTERRUPT ENABLE (I.E)
1404  003304  052777  120000  175604          BIS     #120000,@#KCRM  ;SET READY EQUALS TRANSITION
1405                                                                  ;TO ON LINE
1406  003312  017702  175566                  MOV     @#INTVC,R2      ;SAVE OLD INTVC
1407  003316  012777  003366  175560          MOV     #1$,@#INTVC     ;SET UP NEW SERVICE ROUTINE
1408  003324  012777  000300  175554          MOV     #300,@#INPRI    ;SET UP PRIORITY INTERRUPT
1409  003332  005067  174440                  CLR     PSR             ;ALLOW INTERRUPT
1410  003336  000240                          NOP                     ;TIME
1411  003340  000240                          NOP                     ;TIME
1412  003342  000240                          NOP                     ;TIME
1413  003344  104000                          HLT                     ;NO INTERRUPT HAPPENED
1414  003346  012767  000340  174422  2$:     MOV     #340,PSR        ;SET PROC. PRIORITY
1415  003354  005077  175530                  CLR     @#KCRS          ;CLR I.E. & TRANSITION ON LINE
1416  003360  010277  175520                  MOV     R2,@#INTVC      ;RESTORE OLD SERVICE ROUTINE
1417  003364  000402                          BR      3$              ;CONTINUE TO NEXT TEST
1418  003366  022626                  1$:     CMP     (R6)+,(R6)+     ;RESTORE STACK FROM INTR.
1419  003370  000766                          BR      2$              ;GOOD INTR RETURN TO CONT.
1420  003372  005077  175520          3$:     CLR     @#KCRM          ;CLEAR MAINT.
1421
1422  003376  104001                  TSTM16: SCOPE
1423                                  ;TEST OFF LINE FUNCTION TO INTERRUPT
1424
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1425  003400  004767  001430                    JSR     PC,MINIT        ;GO SET UP MAINT. CONDITION
1426  003404  012767  000340  174364            MOV     #340,PSR        ;SET PROC. PRIORITY
1427  003412  052777  120000  175476            BIS     #120000,@KCRM   ;SET READY
1428  003420  012777  000100  175462            MOV     #100,@KCRS      ;SET I.E.
1429  003426  012777  100000  175462            MOV     #100000,@KCRM   ;CLR READY MAINT. REG.
1430  003434  017702  175444                    MOV     @INTVC,R2       ;SAVE OLD SERVICE ROUTINE
1431  003440  012777  003510  175436            MOV     #1$,@INTVC      ;SET NEW SERVICE ROUTINE
1432  003446  012777  000300  175432            MOV     #300,@INPRI     ;SET INTR PRIORITY
1433  003454  005067  174316                    CLR     PSR             ;DROP PROC. PRIORITY
1434  003460  000240                            NOP                     ;TIME
1435  003462  000240                            NOP                     ;TIME
1436  003464  000240                            NOP                     ;TIME
1437  003466  104000                            HLT                     ;ERROR NO INTERRUPT
1438  003470  012767  000340  174300  2$:       MOV     #340,PSR        ;SET PROC. PRIORITY
1439  003476  005077  175406                    CLR     @KCRS           ;CLEAR INTR. ENA & OFF LINE
1440  003502  010277  175376                    MOV     R2,@INTVC       ;RESTORE INTERRUPT VECTOR
1441  003506  000402                            BR      3$              ;CONTINUE TESTING
1442  003510  022626                    1$:     CMP     (R6)+,(R6)+     ;RESTORE STACK
1443  003512  000766                            BR      2$              ;GOOD TEST CONTINUE
1444  003514  005077  175376            3$:     CLR     @KCRM           ;CLEAR MAINT.
1445
1446  003520  104001                    TSTM17: SCOPE
1447                                    ;TEST CARD DONE FUNCTION TO CAUSE AN INTERRUPT
1448
1449  003522  004767  001306                    JSR     PC,MINIT        ;SET MAINT. CONDITION
1450  003526  012767  000340  174242            MOV     #340,PSR        ;SET PRIORITY
1451  003534  052777  160000  175354            BIS     #160000,@KCRM   ;SET READY & BUSY
1452  003542  012777  000100  175340            MOV     #100,@KCRS      ;SET I.E.
1453  003550  000240                            NOP                     ;TIME
1454  003552  012777  120000  175336            MOV     #120000,@KCRM   ;CLR READY MAINT. REG.
1455  003560  017702  175320                    MOV     @INTVC,R2       ;SAVE INTR. SERV (OLD)
1456  003564  012777  003634  175312            MOV     #1$,@INTVC      ;SET NEW SERVICE ROUTINE
1457  003572  012777  000300  175306            MOV     #300,@INPRI     ;SET BR 6 FOR CARD READER
1458  003600  005067  174.72                    CLR     PSR             ;LOWER PROC. PRIORITY
1459  003604  000240                            NOP                     ;TIME
1460  003606  000240                            NOP                     ;TIME
1461  003610  000240                            NOP                     ;TIME
1462  003612  104000                            HLT                     ;ERROR NO INTER. HAPPENED.
1463  003614  012767  000340  174154  2$:       MOV     #340,PSR        ;RESTORE PROC. STATUS
1464  003622  005077  175262                    CLR     @KCRS           ;CLEAR CONTROL REG.
1465  003626  010277  175252                    MOV     R2,@INTVC       ;RESTORE OLD SERV. ROUTINE
1466  003632  000402                            BR      3$              ;CONT. TEST
1467  003634  022626                    1$:     CMP     (R6)+,(R6)+     ;RESTORE STACK
1468  003636  000766                            BR      2$              ;CONTINUE TEST
1469  003640  005077  175252            3$:     CLR     @KCRM           ;CLEAR MAINT.
1470
1471  003644  104001                    TSTM18: SCOPE
1472                                    ;TEST COLUMN READY FUNCTION TO CAUSE AN INTERRUPT
1473
1474  003646  004767  001162                    JSR     PC,MINIT        ;SET UP MAINT.
1475  003652  012767  000340  174116            MOV     #340,PSR        ;SET PROC. PRIORITY
1476  003660  012777  000100  175222            MOV     #100,@KCRS      ;SET I.E.
1477  003666  052777  160000  175222            BIS     #160000,@KCRM   ;SET BUSY, READY CAUSE IND. MARK
1478  003674  017702  175204                    MOV     @INTVC,R2       ;SAVE OLD SERV. ROUTINE
1479  003700  012777  003750  175176            MOV     #1$,@INTVC      ;SET NEW SERV. ROUTINE
1480  003706  012777  000300  175172            MOV     #300,@INPRI     ;SET BR 6 FOR CARD READER
```

```
1481  003714  005067  174056                  CLR     PSR             ;LOWER PROC. PRIORITY
1482  003720  000240                          NOP                     ;TIME
1483  003722  000240                          NOP                     ;TIME
1484  003724  000240                          NOP                     ;TIME
1485  003726  104000                          HLT                     ;ERROR COLUMN READY SHOULD INTR.
1486  003730  012767  000340  174040  2$:     MOV     #340,PSR        ;RESTORE PROC PRIORITY
1487  003736  005077  175146                  CLR     @#KCRS          ;CLEAR CONTROL REG.
1488  003742  010277  175136                  MOV     R2,@#INTVC      ;RESTORE OLD SERV. ROUTINE
1489  003746  000402                          BR      3$              ;GO TO NEXT TEST
1490  003750  022626                  1$:     CMP     (R6)+,(R6)+     ;RESTORE STACK
1491  003752  000766                          BR      2$              ;CONT. TEST
1492  003754  005077  175136          3$:     CLR     @#KCRM          ;CLEAR MAINT.
1493
1494  003760  104001                  TSTM19: SCOPE
1495                                  ;THIS TEST WILL CAUSE A TIMING ERROR WHICH SHOULD
1496                                  ;CREATE AN INTERRUPT AT CARD DONE.
1497
1498  003762  004767  001046                  JSR     PC,MINIT        ;SET MAINT. CONDITION
1499  003766  012767  000340  174002          MOV     #340,PSR        ;SET CPU PRIORITY
1500  003774  017702  175104                  MOV     @#INTVC,R2      ;SAVE OLD SERVICE ROUTINE
1501  004000  012777  004072  175076          MOV     #1$,@#INTVC     ;SET NEW SERVICE ROUTINE
1502  004006  012777  000300  175072          MOV     #300,@#INPRI    ;SET BR 6 FOR CARD READER
1503  004014  052777  160000  175074          BIS     #160000,@#KCRM  ;SET FIRST INDEX MARK
1504  004022  012777  000100  175060          MOV     #100,@#KCRS     ;SET INTR. ENABLE
1505  004030  052777  120000  175060          BIS     #120000,@#KCRM  ;SET SECOND INDEX MARK
1506  004036  005067  173734                  CLR     PSR             ;LOWER CPU PRIORITY
1507  004042  000240                          NOP
1508  004044  000240                          NOP
1509  004046  000240                          NOP
1510  004050  104000                          HLT                     ;ERROR NO INTERRUPT
1511  004052  012767  000340  173716  2$:     MOV     #340,PSR        ;RESTORE CPU PRIORITY
1512  004060  005077  175024                  CLR     @#KCRS          ;CLEAR CR11 CONTROL & STATUS
1513  004064  010277  175014                  MOV     R2,@#INTVC      ;RESTORE INTR. VECTOR
1514  004070  000402                          BR      3$              ;GO DO NEXT TEST
1515  004072  022626                  1$:     CMP     (R6)+,(R6)+     ;RESTORE STACK
1516  004074  000766                          BR      2$              ;CONTINUE TEST
1517  004076  005077  175014          3$:     CLR     @#KCRM          ;INIT. MAINT. REG.
1518
1519
1520  004102  104001                  TSTM20: SCOPE
1521                                  ;SET ALL CONTROL BITS IN CR11'S CONTROL & STATUS
1522                                  ;REGISTER PERFORM A RESET COMMAND VERIFY
1523                                  ;THAT RESET DID CLEAR FUNCTION IN CSR.
1524
1525  004104  004767  000724                  JSR     PC,MINIT        ;SET MAINT. CONDITION
1526  004110  052777  160000  175000          BIS     #160000,@#KCRM  ;SET MAINT BUSY & READY = 1
1527  004116  032777  000200  174764          BIT     #200,@#KCRS     ;COLUMN READY (BIT 07)
1528  004124  001001                          BNE     1$              ;COLUMN READY SET BRANCH
1529  004126  104000                          HLT                     ;COLUMN READY SHOULD HAVE BEEN SET
1530  004130  052777  120000  174760  1$:     BIS     #120000,@#KCRM  ;SET READY & MAINT.
1531  004136  032777  002000  174744          BIT     #2000,@#KCRS    ;TEST BIT 10 ON LINE TRANS.
1532  004144  001001                          BNE     2$              ;BRANCH IF SET
1533  004146  104000                          HLT                     ;ERROR BIT 10 WAS ZERO
1534  004150  052777  160000  174740  2$:     BIS     #160000,@#KCRM  ;SET MAINT BUSY,READY,CAUSE INDEX MARK
1535  004156  052777  160000  174732          BIS     #160000,@#KCRM  ;SECOND INDEX MARK
1536  004164  032777  004000  174716          BIT     #4000,@#KCRS    ;BIT 11 SET
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1537  004172  001001                          BNE     3$              ;YES BRANCH
1538  004174  104000                          HLT                     ;NO ERROR
1539  004176  052777  110000  174712  3$:     BIS     #110000,@KCRM   ;SET MAINT & MOT/HOP
1540  004204  032777  010000  174676          BIT     #10000,@KCRS    ;BIT 12 SET
1541  004212  001001                          BNE     4$              ;YES BRANCH
1542  004214  104000                          HLT                     ;NO ERROR
1543  004216  052777  110000  174672  4$:     BIS     #110000,@KCRM   ;SET MAINT & MOT/HOP
1544  004224  032777  020000  174656          BIT     #20000,@KCRS    ;BIT 13 SET
1545  004232  001001                          BNE     5$              ;YES BRANCH
1546  004234  104000                          HLT                     ;NO ERROR
1547  004236  052777  160000  174652  5$:     BIS     #160000,@KCRM   ;MAINT BUSY READY
1548  004244  000240                          NOP                     ;TIME?
1549  004246  042777  140000  174642          BIC     #140000,@KCRM   ;CLEAR BUSY
1550  004254  000240                          NOP                     ;TIME?
1551  004256  032777  040000  174624          BIT     #40000,@KCRS    ;BIT 14 SET
1552  004264  001001                          BNE     6$              ;YES BRANCH
1553  004266  104000                          HLT                     ;NO ERROR
1554  004270  052777  120000  174620  6$:     BIS     #120000,@KCRM   ;MAINT & READY
1555  004276  042777  120000  174612          BIC     #120000,@KCRM   ;CLEAR MAINT & READY
1556  004304  000240                          NOP
1557  004306  032777  100000  174574          BIT     #100000,@KCRS   ;BIT 15 SET
1558  004314  001001                          BNE     7$              ;YES BRANCH
1559  004316  104000                          HLT                     ;NO ERROR
1560  004320  052777  000100  174562  7$:     BIS     #100,@KCRS      ;SET INTR. ENABLE
1561  004326  032777  000100  174554          BIT     #100,@KCRS      ;TEST FOR INTR. ENABLE SET
1562  004334  001001                          BNE     8$              ;BRANCH IF I.E. SET
1563  004336  104000                          HLT                     ;
1564  004340  052777  000002  174542  8$:     BIS     #2,@KCRS        ;SET EJECT BIT
1565  004346  032777  000002  174534          BIT     #2,@KCRS        ;TEST EJECT BIT SET
1566  004354  001001                          BNE     9$              ;EJECT BIT IS SET BRANCH
1567  004356  104000                          HLT                     ;EJECT BIT NOT SET ERROR
1568  004360  000005                  9$:     RESET                   ;INIT. THE SYSTEM
1569  004362  032777  000002  174520          BIT     #2,@KCRS        ;TEST BIT SHOULD = ZERO
1570  004370  001401                          BEQ     10$             ;YES,BRANCH
1571  004372  104000                          HLT                     ;NO, ERROR
1572  004374  032777  000100  174506  10$:    BIT     #100,@KCRS      ;TEST BIT SHOULD = ZERO
1573  004402  001401                          BEQ     12$             ;YES,BRANCH
1574  004404  104000                          HLT                     ;NO, ERROR
1575  004406  032777  002000  174474  12$:    BIT     #2000,@KCRS     ;TEST BIT SHOULD = ZERO
1576  004414  001401                          BEQ     13$             ;YES,BRANCH
1577  004416  104000                          HLT                     ;NO, ERROR
1578  004420  032777  004000  174462  13$:    BIT     #4000,@KCRS     ;TEST BIT SHOULD = ZERO
1579  004426  001401                          BEQ     14$             ;YES,BRANCH
1580  004430  104000                          HLT                     ;NO, ERROR
1581  004432  032777  040000  174450  14$:    BIT     #40000,@KCRS    ;TEST BIT SHOULD = ZERO
1582  004440  001401                          BEQ     15$             ;YES,BRANCH
1583  004442  104000                          HLT                     ;NO, ERROR
1584  004444  032777  100000  174436  15$:    BIT     #100000,@KCRS   ;TEST BIT SHOULD = ZERO
1585  004452  001401                          BEQ     16$             ;YES,BRANCH
1586  004454  104000                          HLT                     ;NO, ERROR
1587  004456  005077  174434          16$:    CLR     @KCRM           ;CONTINUE TO NEXT TEST
1588
1589
1590  004462  104001                  TSTM21: SCOPE
1591                                  ;THIS TEST WILL LOOK FOR INTERACTION BETWEEN
1592                                  ;MOTION CHECK BIT 12 & HOPPER CHECK BIT 13
```

```
1593
1594  004464  004767  000344                  JSR     PC,MINIT        ;SET UP MAINT. FUNCTION
1595  004470  052777  150000  174420          BIS     #150000,@KCRM   ;SET MAINT BUSY MOT/HOP
1596  004476  032777  010000  174404          BIT     #10000,@KCRS    ;MOTION CHCK. SHOULD BE SET
1597  004504  001001                          BNE     1$              ;YES BRANCH
1598  004506  104000                          HLT                     ;NO ERROR
1599  004510  032777  020000  174400  1$:     BIT     #20000,@KCRM    ;HOPPER CHCK. SHOULD BE CLEARED
1600  004516  001401                          BEQ     2$              ;YES BRANCH
1601  004520  104000                          HLT                     ;NO ERROR
1602  004522  012777  100000  174366  2$:     MOV     #100000,@KCRM   ;CLR BUSY MOT/HOP MAINT. REG.
1603  004530  032777  010000  174352          BIT     #10000,@KCRS    ;MOTION CHCK. SHOULD BE CLEARED
1604  004536  001401                          BEQ     3$              ;YES BRANCH
1605  004540  104000                          HLT                     ;NO ERROR
1606  004542  032777  020000  174340  3$:     BIT     #20000,@KCRS    ;HOPPER CHCK. SHOULD BE CLEARED
1607  004550  001401                          BEQ     4$              ;YES BRANCH
1608  004552  104000                          HLT                     ;NO. ERROR
1609  004554  005077  174336          4$:     CLR     @KCRM           ;
1610
1611
1612  004560  104001                  TSTM22: SCOPE
1613                                  ;THIS TEST WILL PASS SIMULATED DATA OF AN
1614                                  ;ALPHANUMERIC CARD DECK & ALSO A BINARY CARD
1615                                  ;DECK IN THE INTERRUPT MODE
1616
1617  004562  004767  000246                  JSR     PC,MINIT        ;SETUP MAINT. CONDITION
1618  004566  012767  000340  173202          MOV     #340,PSR        ;SET CPU PRIORITY
1619  004574  012702  017300                  MOV     #ALPCD,R2       ;GET STARTING ADDRESS INTO R2
1620  004600  012705  020476                  MOV     #BINEND,R5      ;GET END ADDRESS INTO R5
1621  004604  062705  000002                  ADD     #2,R5           ;UPDATE END ADDRESS
1622  004610  017767  174270  000234          MOV     @INTVC,MCNT     ;SAVE
1623  004616  017767  174264  000230          MOV     @INPRI,MTST     ;SAVE
1624  004624  012777  004702  174252          MOV     #2$,@INTVC      ;NEW SERVICE ROUTINE
1625  004632  012777  000300  174246          MOV     #300,@INPRI     ;SET BR6 FOR SERVICE
1626  004640  012767  160000  000212  1$:     MOV     #160000,TSTW    ;SET CONTROL FUNCTIONS
1627  004646  051267  000206                  BIS     (R2),TSTW       ;COMPLETE TEST WORD
1628  004652  012777  000100  174230          MOV     #100,@KCRS      ;SET INTERRUPT ENABLE
1629  004660  016777  000174  174230          MOV     TSTW,@KCRM      ;PASS CONTROL & DATA
1630  004666  005067  173104                  CLR     PSR             ;LOWER CPU PRIORITY
1631  004672  000240                          NOP
1632  004674  000240                          NOP
1633  004676  000240                          NOP
1634  004700  104000                          HLT                     ;ERROR NO INTR. RESPONSE
1635  004702  022626                  2$:     CMP     (R6)+,(R6)+     ;UPDATE STACK
1636  004704  000257                          CCC                     ;CLEAR CONDITION CODE
1637  004706  022277  174200                  CMP     (R2)+,@KCRB1    ;CHECK DATA
1638  004712  001401                          BEQ     3$              ;YES GOOD DATA BRANCH
1639  004714  104000                          HLT                     ;DATA ERROR
1640  004716  022277  174172          3$:     CMP     (R2)+,@KCRB2    ;CHECK COMPRESSED DATA
1641  004722  001401                          BEQ     4$              ;YES GOOD DATA BRANCH
1642  004724  104000                          HLT                     ;DATA ERROR
1643  004726  020205                  4$:     CMP     R2,R5           ;ARE WE DONE
1644  004730  001343                          BNE     1$              ;CONTINUE TEST
1645  004732  005077  174160                  CLR     @KCRM           ;INIT. MAINT. REG.
1646  004736  005077  174146                  CLR     @KCRS           ;INIT. CONTROL REG.
1647  004742  016777  000104  174134          MOV     MCNT,@INTVC     ;RESTORE
1648  004750  016777  000100  174130          MOV     MTST,@INPRI     ;RESTORE
```

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1649  004756  032777  000400  174136          BIT     #400,@SWR               ;DO YOU WANT TO LOOP ON MAINT. MODE TEST
1650  004764  001010                          BNE     MAINTL          ;YES-BRANCH TO MAINT. LOOP
1651  004766  013702  000042                  MOV     @#42,R2
1652  004772  001411                          BEQ     CONT
1653  004774  000005                          RESET
1654  004776  004712                  LOGICAL:        JSR     PC,(R2)
1655  005000  000240                          NOP
1656  005002  000240                          NOP
1657  005004  000240                          NOP
1658  005006  005726                  MAINTL: TST     (SP)+
1659  005010  000257                          CCC
1660  005012  000167  174140                  JMP     START1
1661  005016  012702  023506          CONT:   MOV     #MSG20,R2       ;GO TELL A STORY ABOUT
1662  005022  004767  011400                  JSR     PC,TOUT         ;WHAT WILL BE WRONG
1663  005026  004767  011516                  JSR     PC,CRLF4        ;ADVANCE MESSAGE
1664
1665
1666
1667                                  ;*****************************************************************
1668
1669  005032  000207                          RTS     PC              ;RETURN TO STARTING ADDRESS CALL
1670
1671                                  ;*****************************************************************
1672
1673
1674
1675
1676
1677  005034  012777  100000  174054  MINIT:  MOV     #100000,@KCRM   ;SET MAINT. CONTROL BIT
1678  005042  005777  174044                  TST     @KCRB1          ;STROBE BUFFER FOR CLEARING
1679  005046  005013                          CLR     @CRS            ;CLEAR CONTROL STATUS REG.
1680  005050  000207                          RTS     PC              ;RETURN TO CALLER
1681
1682
1683  005052  000000          MCNT:   0               ;COUNT REGISTER
1684  005054  000000          MTST:   0               ;MAINT. TEST WORD
1685  005056  000000          MFLG:   0               ;FLAG INDICAING M8291 MODULE WITH MAINT REG
1686  005060  000000          TSTW:   0               ;WORD USED FOR DATA TEST PATTERN
1687
1688
1689
1690
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```
                                        ;*****************************************************************
                                        ;                   CARD READER TEST
                                        ;*****************************************************************
                                        ;INITIALIZE CSR AND DBR POINTERS
005062  012767  000001  011330  SETUP:  MOV     #1,ITMAX        ;SET ITERATION MAXIMUM TO 1 ITERATION
005070  016703  174014          MOV     KCRS,CRS        ;SET UP REGISTER POINTERS
005074  016704  174012          MOV     KCRB1,CRB1
005100  016700  174000          MOV     INTVC,ADINT     ;LOAD ADDRESS OF INTERRUPT VECTOR
005104  005067  173772          CLR     INTFLG          ;INITIALIZE INTERRUPT FLAG
005110  005067  174034          CLR     TRFLG           ;INITIALIZE TRACE FLAG
005114  012767  000340  172654  MOV     #340,PSR        ;SETUP PROCESSOR STATUS
005122  000207                  RTS     %7              ;RETURN

005124  004767  177732  BEGIN:  JSR     %7,SETUP        ;INITIALIZE POINTERS AND FLAGS
005130  000424                  BR      TEST            ;GO TO INSTRUCTION TESTS
005132  022767  000176  173762  RESTRT: CMP     #SWREG,SWR
005140  001002                  BNE     1$
005142  104002                  CNTLU
005144  104006                  CKU
005146  005767  173776  1$:     TST     TRFLG           ;CHECK FOR TRACE TRAPPING
005152  001004                  BNE     TRAPX           ;IF SET, TRACE TRAP
005154  012767  000340  172614  NOTRP:  MOV     #340,PSR        ;IF ZERO, CLEAR TRACE BIT
005162  000407                  BR      TEST            ;GO TO INSTRUCTION TESTS
005164  032777  010000  173730  TRAPX:  BIT     #10000,@SWR     ;CHECK SW12
005172  001370                  BNE     NOTRP           ;BRANCH IF SET TO CLEAR TRACE BIT
005174  012767  000360  172574          MOV     #360,PSR        ;SET TRACE BIT

                                        ;TEST FOR CORRECT INITIALIZATION OF STATUS REGISTER
005202  012767  005212  011214  TEST:   MOV     #TEST1A,RETURN  ;SETUP SCOPE LOOP RETURN ADDRESS
005210  104001                  TEST1:  SCOPE
005212  004767  010540          TEST1A: JSR     %7,CKBITB       ;CHECK FOR OFF. LINE SET
005216  016767  172554  173726          MOV     PSR,PROC        ;STORE PROCESSOR STATUS
005224  005067  172546          CLR     PSR             ;CLEAR TRACE BIT
005230  005001                  CLR     COUNT           ;INITIALIZE COUNTER
005232  005201                  INC     COUNT           ;WAIT TO BE CERTAIN
005234  001376                  BNE     .-2             ;THAT ALL CARDS ARE
005236  005201                  INC     COUNT           ;THRU BEFORE ISSUING
005240  001376                  BNE     .-2             ;INIT
005242  016767  173704  172526          MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
005250  000005                  RESET                   ;SEND OUT INIT
005252  005713                  TST     @CRS            ;CHECK FOR STATUS REGISTER ALL ZERO
005254  001401                  BEQ     .+4             ;BRANCH IF OK
005256  104000                  HLT                     ;STATUS REGISTER NOT CORRECTLY INITIALIZED
                                        ;ONLY BITS 1 AND 6 OF THE STATUS REGISTER SHOULD BE ABLE TO BE SET TO ONE
                                        ;AND READ BACK AS ONE
005260  052713  177776          BIS     #177776,@CRS    ;SET ALL BITS BUT 0
005264  022713  000102          CMP     #102,@CRS       ;ONLY BITS 1 AND 6 SHOULD BE SET
005270  001402                  BEQ     .+6             ;BRANCH IF OK
005272  104000                  HLT                     ;STATUS REGISTER DIDN'T CONTAIN 102
005274  000404                  BR      TEST2           ;BRANCH AFTER FAILURE
                                        ;CLEARING STATUS REGISTER SHOULD CLEAR BITS 1 AND 6
005276  005013                  CLR     @CRS            ;CLEAR BITS 1 AND 6
005300  005713                  TST     @CRS            ;CHECK FOR ALL BITS CLEAR
005302  001401                  BEQ     .+4             ;BRANCH IF OK
005304  104000                  HLT                     ;BIT 1 AND/OR BIT 6 DIDN'T CLEAR
```

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1747  005306  104001                  TEST2:  SCOPE
1748                                  ;START SHOULD CAUSE CARD DONE WITHIN 1 SECOND
1749                                  ;BIT 0 SHOULD ALWAYS READ AS BEING EQUAL TO ZERO
1750  005310  004767  010442                  JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
1751  005314  016767  172456  173630        MOV     PSR,PROC        ;STORE CURRENT PROCESSOR STATUS
1752  005322  005067  172450                CLR     PSR             ;CLEAR TRACE BIT
1753  005326  005213                        INC     @CRS            ;START READING A CARD
1754  005330  032713  000001                BIT     #1,@CRS         ;CHECK BIT 0
1755  005334  001401                        BEQ     .+4             ;BRANCH IF NOT SET
1756  005336  104000                        HLT                     ;BIT 0 READ AS A ONE
1757  005340  005227  000000                INC     #0              ;WAIT
1758  005344  001375                        BNE     .-4
1759  005346  005227  000000                INC     #0
1760  005352  001375                        BNE     .-4
1761  005354  005227  000000                INC     #0
1762  005360  001375                        BNE     .-4
1763  005362  005227  000000                INC     #0
1764  005366  001375                        BNE     .-4
1765  005370  005227  000000                INC     #0
1766  005374  001375                        BNE     .-4
1767  005376  016767  173550  172372        MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
1768  005404  032713  040000                BIT     #40000,@CRS     ;CHECK CARD DONE
1769  005410  001002                        BNE     CONT2           ;CONTINUE IF SET
1770  005412  104000                        HLT                     ;CARD DONE DIDN'T SET WITHIN 400 MS
1771  005414  000406                        BR      TEST3           ;NOTE THAT FAILURE COULD BE DUE TO READ
1772                                                                ;NOT BEING RESET
1773  005416  052713  040000        CONT2:  BIS     #40000,@CRS     ;DATO TO STATUS REGISTER SHOULD CLEAR
1774  005422  032713  040000                BIT     #40000,@CRS     ;CARD DONE
1775  005426  001401                        BEQ     .+4             ;BRANCH IF IT DID
1776  005430  104000                        HLT                     ;DATO DIDN'T CLEAR CARD DONE
1777
1778  005432  104001                  TEST3:  SCOPE
1779                                  ;BUSY (BIT 9) SHOULD BE SET BY READING A CARD
1780                                  ;IT SHOULD REMAIN SET UNTIL CARD DONE SETS, WHICH SHOULD CLEAR IT
1781  005434  004767  010316                  JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
1782  005440  005013                        CLR     @CRS            ;INITIALIZE STATUS REGISTER
1783  005442  005213                        INC     @CRS            ;READ A CARD
1784  005444  032713  001000                BIT     #1000,@CRS      ;CHECK BUSY
1785  005450  001002                        BNE     LOOP3           ;BRANCH IF SET
1786  005452  104000                        HLT                     ;READING A CARD DIDN'T SET BUSY
1787  005454  000417                        BR      TEST4
1788  005456  032713  040000        LOOP3:  BIT     #40000,@CRS     ;CHECK CARD DONE
1789  005462  001010                        BNE     DONE3           ;BRANCH IF SET
1790  005464  032713  001000                BIT     #1000,@CRS      ;CHECK BUSY
1791  005470  001372                        BNE     LOOP3           ;BRANCH IF STILL SET
1792  005472  032713  040000                BIT     #40000,@CRS     ;CHECK CARD DONE
1793  005476  001006                        BNE     TEST4           ;GO TO NEXT TEST IF SET
1794  005500  104000                        HLT                     ;BUSY CLEARED BEFORE CARD DONE SET
1795  005502  000404                        BR      TEST4
1796  005504  032713  001000        DONE3:  BIT     #1000,@CRS      ;CHECK BUSY
1797  005510  001401                        BEQ     TEST4           ;GO ON TO NEXT TEST IF CLEAR
1798  005512  104000                        HLT                     ;CARD DONE DIDN'T CLEAR BUSY
1799
1800  005514  104001                  TEST4:  SCOPE
1801                                  ;A TIMING ERROR SHOULD OCCUR IF DATA IS NOT READ AND NEW DATA COMES IN
1802                                  ;A TIMING ERROR SHOULD SET THE SPECIAL CONDITION BIT WHEN CARD DONE OCCURS
```

```
1803                                    ;COLUMN READY SHOULD BE CLEARED BY THE TIMING ERROR AND PREVENTED FROM RESETTING
1804                                    ;BITS 11,14, AND 15 SHOULD BE CLEARED BY A DATO TO THE STATUS REGISTER
1805  005516  004767  010162                    JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1806  005522  005001                            CLR     COUNT           ;INITIALIZE COUNTER
1807  005524  005213                            INC     @CRS            ;INITIATE READ
1808  005526  032713  140200          LOOP4:    BIT     #140200,@CRS    ;WAIT FOR SPECIAL CONDITION, CARD DONE,
1809                                                                    ;OR COLUMN READY
1810  005532  001775                            BEQ     LOOP4           ;LOOP IF NONE OCCURRED
1811  005534  032713  140000                    BIT     #140000,@CRS    ;SPECIAL CONDITION OR CARD DONE
1812  005540  001007                            BNE     CK4             ;YES, BRANCH
1813  005542  005201                            INC     COUNT           ;NO, COUNT COLUMN READYS
1814  005544  105713          LOOP4B:   TSTB    @CRS            ;WAIT FOR COLUMN READY TO CLEAR
1815  005546  100367                            BPL     LOOP4           ;IF CLEAR, RETURN TO LOOP4
1816  005550  032713  140000                    BIT     #140000,@CRS    ;CHECK FOR SPECIAL CONDITION OR CARD DONE
1817  005554  001001                            BNE     CK4             ;BRANCH IF EITHER SET
1818  005556  000772                            BR      LOOP4B          ;OTHERWISE, CHECK AGAIN
1819  005560  032713  040000          CK4:      BIT     #40000,@CRS     ;CHECK CARD DONE
1820  005564  001002                            BNE     .+6             ;BRANCH IF SET
1821  005566  104000                            HLT                     ;SPECIAL CONDITION SET BEFORE CARD DONE
1822  005570  000403                            BR      CONT4
1823  005572  005713                            TST     @CRS            ;CHECK SPECIAL CONDITION
1824  005574  100401                            BMI     .+4             ;BRANCH IF SET
1825  005576  104000                            HLT                     ;SPECIAL CONDITION WASN'T  SET
1826  005600  032713  004000          CONT4:    BIT     #4000,  @CRS    ;CHECK TIMING ERROR
1827  005604  001001                            BNE     .+4             ;BRANCH IF SET
1828  005606  104000                            HLT                     ;TIMING ERROR WASN'T SET
1829  005610  005301                            DEC     COUNT           ;CHECK NUMBER OF COLUMN READYS
1830  005612  100002                            BPL     .+6             ;BRANCH IF ANY OCCURRED
1831  005614  104000                            HLT                     ;COLUMN READY NEVER OCCURRED
1832  005616  000402                            BR      .+6
1833  005620  001401                            BEQ     .+4             ;BRANCH IF ONLY ONE OCCURRED
1834  005622  104000                            HLT                     ;COLUMN READY OCCURRED MORE THAN ONCE
1835  005624  105713                            TSTB    @CRS            ;CHECK COLUMN READY
1836  005626  100001                            BPL     .+4             ;BRANCH IF NOT SET
1837  005630  104000                            HLT                     ;COLUMN READY WASN'T CLEARED
1838  005632  005013                            CLR     @CRS            ;CLEAR BITS 11,14, AND 15 VIA DATO
1839  005634  032713  144000                    BIT     #144000,@CRS    ;CHECK
1840  005640  001401                            BEQ     .+4
1841  005642  104000                            HLT                     ;BITS 11,14, AND 15 WEREN'T ALL CLEARED
1842
1843
1844  005644  104001                    TEST5:  SCOPE
1845                                    ;SETTING READ SHOULD CAUSE COLUMN READY TO SET 80 TIMES BEFORE CARD DONE SETS
1846                                    ;READING THE DATA BUFFER SHOULD CLEAR COLUMN READY AND PREVENT A TIMING ERROR
1847  005646  004767  010032                    JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1848  005652  005001                            CLR     COUNT           ;INITIALIZE COUNTER
1849  005654  005213                            INC     @CRS            ;INITIATE READ
1850  005656  032713  140200          LOOP5:    BIT     #140200,@CRS    ;WAIT FOR COLUMN READY, CARD DONE
1851  005662  001775                            BEQ     .-4             ;OR SPECIAL CONDITION
1852  005664  032713  040000                    BIT     #40000, @CRS    ;CARD DONE
1853  005670  001015                            BNE     CK5             ;YES, BRANCH
1854  005672  005713                            TST     @CRS            ;CHECK BIT 15
1855  005674  100002                            BPL     .+6             ;SKIP ERROR HALT IF NOT SET
1856  005676  104000                            HLT                     ;BIT 15 WAS SET
1857  005700  000437                            BR      TEST6           ;GO TO NEXT TEST
1858  005702  020127  000117                    CMP     COUNT,  #79.    ;CHECK FOR 80
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1859  005706  100363                  BPL     LOOP5           ;BRANCH IF 80 OR MORE WITHOUT CLEARING READY
1860  005710  005201                  INC     COUNT           ;INCREMENT COUNTER
1861  005712  005214                  TST     @CRB1           ;CLEAR READY
1862  005714  105713                  TSTB    @CRS            ;MAKE SURE IT CLEARED
1863  005716  100001                  BPL     .+4             ;BRANCH IF IT DID
1864  005720  104000                  HLT                     ;READING DATA BUFFER DIDN'T CLEAR READY
1865  005722  000755                  BR      LOOP5           ;LOOP
1866  005724  032713  004000  CK5:    BIT     #4000, @CRS     ;CHECK TIMING ERROR BIT
1867  005730  001401                  BEQ     .+4             ;BRANCH IF NOT SET
1868  005732  104000                  HLT                     ;TIMING ERROR WAS SET
1869                                  ;NOTE THAT IF COLUMN READY SET MORE THAN 80 TIMES
1870                                  ;A TIMING ERROR WILL OCCUR AND THE COUNT WILL BE 79 (=117 OCTAL)
1871  005734  000421                  BR      TEST6           ;BRANCH AFTER ERROR
1872  005736  020127  000117          CMP     COUNT, #79.     ;CHECK COUNT
1873  005742  001401                  BEQ     .+4             ;BRANCH IF 80 COLUMN READYS OCCURRED
1874  005744  104000                  HLT                     ;COLUMN READY DIDN'T OCCUR 80 TIMES
1875                                                          ;BEFORE CARD DONE
1876  005746  021327  040200          CMP     @CRS,#40200     ;ONLY CARD DONE AND COLUMN READY SHOULD BE SET
1877  005752  001401                  BEQ     .+4
1878  005754  104000                  HLT                     ;STATUS REGISTER IN WRONG STATE
1879  005756  005013                  CLR     @CRS            ;SHOULD CLEAR DONE BUT NOT READY
1880  005760  021327  000200          CMP     @CRS,#200       ;CHECK FOR ONLY READY SET
1881  005764  001401                  BEQ     .+4             ;BRANCH IF OK
1882  005766  104000                  HLT                     ;STATUS REGISTER IN WRONG STATE
1883  005770  005714                  TST     @CRB1           ;READING DATA BUFFER SHOULD CLEAR COLUMN READY
1884  005772  005713                  TST     @CRS            ;CHECK STATUS REGISTER
1885  005774  001401                  BEQ     .+4             ;BRANCH IF ALL BITS ZERO
1886  005776  104000                  HLT                     ;STATUS REGISTER NOT EQUAL TO ZERO
1887
1888  006000  104001          TEST6:  SCOPE
1889                                  ;TIMING ERROR SHOULD SET BIT 11 BEFORE CARD DONE OCCURS, EVEN IF IT OCCURS AT COLUMN 80
1890                                  ;DATOB TO THE LOW BYTE OF THE CRS SHOULD CLEAR BITS 15,14, AND 11
1891  006002  004767  007676          JSR     %7,INIT         ;INITIALIZE
1892  006006  012701  000115          MOV     #77.,COUNT      ;SETUP COUNTER
1893  006012  005213                  INC     @CRS            ;START READING A CARD
1894  006014  105713          LOOP6:  TSTB    @CRS            ;WAIT FOR COLUMN READY
1895  006016  100376                  BPL     .-2
1896  006020  005714                  TST     @CRB1           ;CLEAR COLUMN READY
1897  006022  005301                  DEC     COUNT           ;GO THRU LOOP FOR 1ST 78 COLUMN READY'S
1898  006024  100373                  BPL     LOOP6
1899  006026  032713  144000          BIT     #144000,@CRS    ;WAIT FOR CARD DONE OR TIMING ERRCR
1900  006032  001775                  BEQ     .-4             ;OR SPECIAL CONDITION
1901  006034  032713  040000          BIT     #40000,@CRS     ;CARD DONE SET
1902  006040  001026                  BNE     ERR6            ;YES, 2 POSSIBLE TEST FAILURES
1903  006042  032713  004000          BIT     #4000,@CRS      ;CHECK TIMING ERROR
1904  006046  001416                  BEQ     OFF6            ;IF NOT SET, READER IS PROBABLY OFF-LINE
1905  006050  105713                  TSTB    @CRS            ;CHECK COLUMN READY
1906  006052  100001                  BPL     .+4             ;BRANCH IF CLEAR
1907  006054  104000                  HLT                     ;TIMING ERROR DIDN'T CLEAR READY
1908  006056  005713                  TST     @CRS            ;WAIT FOR SPECIAL CONDITION
1909  006060  100376                  BPL     .-2
1910  006062  032713  040000          BIT     #40000,@CRS     ;CHECK CARD DONE
1911  006066  001406                  BEQ     OFF6            ;IF NOT SET, READER IS PROBABLY OFF-LINE
1912  006070  105013                  CLRB    @CRS            ;DATOB TO LOW BYTE OF CRS
1913  006072  032713  144000          BIT     #144000,@CRS    ;CHECK BITS 15,14,11
1914  006076  001415                  BEQ     TEST7           ;BRANCH IF CLEAR TO NEXT TEST
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1915  006100  104000                        HLT                     ;DATOB TO LOW BYTE OF CRS DIDN'T CLEAR
1916                                                                  ;BITS 15,14 AND/OR 11
1917  006102  000413                        BR      TEST7           ;GO TO NEXT TEST
1918  006104  032713  000400      OFF6:     BIT     #400,@CRS       ;CHECK BIT 8
1919  006110  001010                        BNE     TEST7           ;BRANCH IF SET
1920  006112  104000                        HLT                     ;BIT 15 WAS SET, 8 WASN'T
1921  006114  000406                        BR      TEST7           ;GO TO NEXT TEST
1922  006116  032713  004000      ERR6:     BIT     #4000,@CRS      ;TIMING ERROR SET
1923  006122  001402                        BEQ     .+6             ;NO, BRANCH
1924  006124  104000                        HLT                     ;TIMING ERROR DIDN'T SET BEFORE CARD DONE
1925  006126  000401                        BR      TEST7           ;GO TO NEXT TEST AFTER ERROR
1926  006130  104000                        HLT                     ;TIMING ERROR WASN'T SET
1927
1928  006132  104001      TEST7:  SCOPE
1929                      ;NOT READING THE EIGHTIETH COLUMN OF DATA FROM THE BUFFER
1930                      ;SHOULD CAUSE A TIMING ERROR ON THE FIRST COLUMN OF THE NEXT CARD
1931                      ;SETTING EJECT SHOULD CLEAR TIMING ERROR, AND BIT 15 SHOULDN'T SET
1932                      ;INCB SHOULD START A READ
1933
1934  006134  004767  007544                JSR     %7,INIT         ;INITIALIZE
1935  006140  005213                        INC     @CRS            ;START READ
1936  006142  012701  000120                MOV     #80.,COUNT      ;INITIALIZE COUNTER
1937  006146  032713  140200      LOOP7:    BIT     #140200,@CRS    ;TEST FOR ERROR, DONE OR READY
1938  006152  001775                        BEQ     LOOP7           ;LOOP IF NONE SET
1939  006154  005713                        TST     @CRS            ;CHECK ERROR
1940  006156  100002                        BPL     .+6             ;BRANCH IF NOT SET
1941  006160  104000                        HLT                     ;BIT 15 WAS SET
1942  006162  000455                        BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
1943  006164  032713  040000                BIT     #40000,@CRS     ;CHECK FOR CARD DONE
1944  006170  001013                        BNE     DONE7           ;BRANCH IF SET
1945  006172  005301                        DEC     COUNT           ;COUNT
1946  006174  001402                        BEQ     .+6             ;IF BOTH COLUMN READY, BRANCH
1947  006176  005714                        TST     @CRB1           ;CLEAR DONE
1948  006200  000762                        BR      LOOP7           ;LOOP
1949  006202  032713  140000                BIT     #140000,@CRS    ;WAIT FOR DONE OR SPECIAL CONDITION
1950  006206  001775                        BEQ     .-4
1951  006210  005713                        TST     @CRS            ;CHECK SPECIAL CONDITION
1952  006212  100002                        BPL     DONE7           ;BRANCH IF NOT SET
1953  006214  104000                        HLT                     ;SPECIAL CONDITION WAS SET
1954  006216  000437                        BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
1955  006220  005701      DONE7:    TST     COUNT           ;TEST FOR 80 COLUMN READY'S
1956  006222  001402                        BEQ     .+6             ;BRANCH IF OK
1957  006224  104000                        HLT                     ;COLUMN READY DID NOT OCCUR 80 TIMES
1958  006226  000433                        BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
1959  006230  105213                        INCB    @CRS            ;START READ
1960  006232  105713                        TSTB    @CRS            ;CHECK COLUMN READY
1961  006234  100401                        BMI     .+4             ;BRANCH IF STILL SET
1962  006236  104000                        HLT                     ;READY DID NOT REMAIN SET
1963  006240  032713  004000                BIT     #4000,@CRS      ;TEST FOR TIMING ERROR
1964  006244  001775                        BEQ     .-4             ;LOOP IF NOT SET
1965  006246  105713                        TSTB    @CRS            ;CHECK COLUMN READY
1966  006250  100002                        BPL     .+6             ;BRANCH IF NOT SET
1967  006252  104000                        HLT                     ;TIMING ERROR DIDN'T CLEAR READY
1968  006254  000420                        BR      TEST8
1969  006256  112713  000002                MOVB    #2,@CRS         ;SET EJECT
1970  006262  032713  004000                BIT     #4000,@CRS      ;CHECK TIMING ERROR
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1971  006266  001402                          BEQ     .+6             ;BRANCH IF CLEARED
1972  006270  104000                          HLT                     ;TIMING ERROR NOT CLEARED BY DATOB
1973  006272  000411                          BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
1974  006274  032713  140000                  BIT     #140000,@CRS    ;WAIT FOR DONE OR SPECIAL CONDITION
1975  006300  001775                          BEQ     .-4
1976  006302  032713  000400                  BIT     #400,@CRS       ;CHECK BIT 8
1977  006306  001003                          BNE     TEST8           ;BRANCH IF READER OFF-LINE
1978  006310  005713                          TST     @CRS            ;SPECIAL CONDITION SHOULDN'T SET
1979  006312  100001                          BPL     .+4             ;SINCE DATOB CLEARED TIMING ERROR
1980  006314  104000                          HLT                     ;BIT 15 WAS SET, 8 WASN'T
1981
1982
1983  006316  104001                  TEST8:  SCOPE
1984                                  ;DATA SHOULD BE AVAILABLE IN THE DATA BUFFER FOR AT LEAST 1.0 MILLISECOND
1985  006320  004767  007360                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1986  006324  016767  171446  172620          MOV     PSR,PROC        ;STORE CURRENT PROCESSOR STATUS
1987  006332  005067  171440                  CLR     PSR             ;CLEAR TRACE BIT
1988  006336  005213                          INC     @CRS            ;START READ
1989  006340  032713  140200          LOOP8:  BIT     #140200,@CRS    ;WAIT FOR COLUMN READY OR CARD DONE
1990  006344  001775                          BEQ     .-4             ;OR SPECIAL CONDITION
1991  006346  032713  040000                  BIT     #40000,@CRS     ;CARD DONE
1992  006352  001023                          BNE     DBRCK8          ;YES, GO TO CHECK STROBING OF DBR
1993  006354  005713                          TST     @CRS            ;NO, CHECK BIT 15
1994  006356  100002                          BPL     .+6             ;BRANCH IF NOT SET
1995  006360  104000                          HLT                     ;BIT 15 WAS SET
1996  006362  000441                          BR      TEST9           ;GO TO NEXT TEST AFTER ERROR
1997  006364  005013                          CLR     @CRS            ;DATO TO CRS - SHOULDN'T CLEAR BUSY OR READY
1998  006366  022713  001200                  CMP     #1200,@CRS      ;CHECK FOR BUSY AND READY
1999  006372  001402                          BEQ     .+6             ;BRANCH IF STILL SET
2000  006374  104000                          HLT                     ;CRS IN WRONG STATE
2001  006376  000433                          BR      TEST9           ;GO TO NEXT TEST AFTER ERROR
2002  006400  011405                          MOV     @CRB1,R5        ;STORE DATA
2003  006402  012701  000300                  MOV     #300,COUNT      ;INITIALIZE COUNTER
2004  006406  005301                          DEC     COUNT           ;WAIT FOR 1 MILLISECOND (APPROX.)
2005  006410  001376                          BNE     .-2
2006  006412  021405                          CMP     @CRB1,R5        ;DATA UNCHANGED
2007  006414  001751                          BEQ     LOOP8           ;OK, CONTINUE
2008  006416  104000                          HLT                     ;DATA NOT AVAILABLE FOR 1.0 MILLISECONDS
2009  006420  000422                          BR      TEST9           ;GO TO NEXT TEST AFTER FAILURE
2010  006422  017702  172466          DBRCK8: MOV     @KCRB2,R2       ;STORE ENCODED DATA IN REGISTER 2
2011  006426  012701  000100                  MOV     #100,COUNT      ;SET UP COUNTER
2012  006432  021405                  CONT8:  CMP     @CRB1,R5        ;READ CARD-IMAGE DATA BUFFER
2013  006434  001402                          BEQ     .+6             ;BRANCH IF UNCHANGED
2014  006436  104000                          HLT                     ;CRB1 READ INCORRECTLY
2015  006440  000407                          BR      REST8           ;BRANCH TO RESTORE PROCESSOR STATUS AND EXIT
2016  006442  027702  172446                  CMP     @KCRB2,R2       ;READ ENCODED DATA BUFFER
2017  006446  001402                          BEQ     .+6             ;BRANCH IF UNCHANGED
2018  006450  104000                          HLT                     ;KCRB2 READ INCORRECTLY
2019  006452  000402                          BR      REST8           ;BRANCH AFTER FAILURE
2020  006454  005301                          DEC     COUNT           ;COUNT DOWN
2021  006456  001365                          BNE     CONT8           ;LOOP IF NOT DONE
2022  006460  016767  172466  171310  REST8:  MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
2023
2024
2025  006466  104001                  TEST9:  SCOPE
2026                                  ;EJECT SHOULD PREVENT FURTHER COLUMN READY'S
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2027                                            ;CARD DONE SHOULD STILL OCCUR, AND TIMING ERRORS SHOULD BE
2028                                            ;PREVENTED IF THE CURRENT COLUMN READY IS CLEARED
2029  006470  004767  007210                          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
2030  006474  016767  171276  172450                  MOV     PSR,PROC        ;SAVE PROCESSOR STATUS
2031  006502  005067  171270                          CLR     PSR             ;CLEAR TRACE BIT
2032  006506  005213                                   INC     @CRS            ;START READ
2033  006510  105713                                   TSTB    @CRS            ;WAIT FOR COLUMN READY
2034  006512  001776                                   BEQ     .-2
2035  006514  052713  000002                          BIS     #2,@CRS         ;SET EJECT
2036  006520  005714                                   TST     @CRB1           ;CLEAR COLUMN READY
2037  006522  005001                                   CLR     COUNT           ;LOOP TAKES 11.4 MICROSECONDS ONCE THRU
2038  006524  032713  044200          WAIT9:  BIT     #44200,@CRS     ;WAIT FOR CARD DONE, TIMING ERROR, OR
2039  006530  001004                                   BNE     CK9             ;COLUMN READY
2040  006532  005201                                   INC     COUNT           ;TIME FOR ABOUT 3/4 SECOND
2041  006534  001373                                   BNE     WAIT9           ;CONTINUE WAITING
2042  006536  104000                                   HLT                     ;NO CARD DONE OCCURRED WITHIN 3/4 SECOND
2043  006540  000411                                   BR      REST9           ;CONTINUE AFTER FAILURE
2044  006542  032713  040000          CK9:    BIT     #40000,@CRS     ;CHECK FOR CARD DONE
2045  006546  001006                                   BNE     REST9
2046  006550  032713  000200                          BIT     #200,@CRS       ;CHECK COLUMN READY
2047  006554  001402                                   BEQ     .+6             ;BRANCH IF NOT SET
2048  006556  104000                                   HLT                     ;COLUMN READY WAS SET
2049  006560  000401                                   BR      REST9
2050  006562  104000                                   HLT                     ;EJECT DID NOT PREVENT A TIMING ERROR
2051  006564  016767  172362  171204  REST9:  MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
2052
2053
2054  006572  104001                    TEST10: SCOPE
2055                                            ;CARD DONE SHOULD CAUSE AN INTERRUPT
2056  006574  004767  007104                          JSR     %7,INIT         ;INITIALIZE
2057  006600  012710  006654                          MOV     #TINT10,@ADINT  ;LOAD RETURN POINTER
2058  006604  052767  000340  171164                  BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
2059  006612  016760  171160  000002                  MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
2060  006620  042767  000340  171150                  BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
2061  006626  012713  000103                          MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
2062  006632  032713  040000                          BIT     #40000,@CRS     ;WAIT FOR CARD DONE
2063  006636  001775                                   BEQ     .-4
2064  006640  016067  000C02  171130                  MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
2065  006646  105013                                   CLRB    @CRS            ;CLEAR INTERRUPT ENABLE
2066  006650  104000                                   HLT                     ;NO INTERRUPT OCCURRED
2067  006652  000414                                   BR      CONT10
2068  006654  032713  040000          TINT10: BIT     #40000,@CRS     ;CHECK CARD DONE
2069  006660  001001                                   BNE     .+4             ;BRANCH IF SET
2070  006662  104000                                   HLT                     ;CARD DONE NOT SET
2071  006664  062626                                   CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
2072  006666  005713                                   TST     @CRS            ;MAKE SURE NO ERROR OCCURRED
2073  006670  100001                                   BPL     .+4
2074  006672  104000                                   HLT                     ;BIT 15 WAS SET
2075  006674  105713                                   TSTB    @CRS            ;CHECK COLUMN READY
2076  006676  100001                                   BPL     .+4             ;BRANCH IF NOT SET
2077  006700  104000                                   HLT                     ;COLUMN READY WAS SET
2078  006702  005013                                   CLR     @CRS            ;DISABLE INTERRUPTS
2079  006704  012710  000232          CONT10: MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
2080  006710  005037  000232                          CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2081
2082  006714  104001                    TEST11: SCOPE
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                                        ;COLUMN READY SHOULD CAUSE AN INTERRUPT
006716  004767  006762                          JSR     %7,INIT         ;INITIALIZE
006722  012710  006774                          MOV     #TINT11,@ADINT  ;LOAD RETURN POINTER
006726  052767  000340  171042                  BIS     #340,PSR        ;SET PROCESSOR STATUS TO LEVEL 7
006734  016760  171036  000002                  MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
006742  042767  000340  171026                  BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
006750  012713  000101                          MOV     #101,@CRS       ;SET READ AND INTERRUPT ENABLE
006754  105713                                  TSTB    @CRS            ;WAIT FOR COLUMN READY
006756  100376                                  BPL     .-2
006760  016067  000002  171010                  MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
006766  005013                                  CLR     @CRS            ;CLEAR INTERRUPT ENABLE
006770  104000                                  HLT                     ;COLUMN READY DID NOT INTERRUPT
006772  000405                                  BR      CONT11
006774  005013                          TINT11: CLR     @CRS            ;CLEAR INTERRUPT ENABLE
006776  105713                                  TSTB    @CRS            ;MAKE SURE COLUMN READY IS SET
007000  100401                                  BMI     .+4             ;BRANCH IF SET
007002  104000                                  HLT                     ;COLUMN READY WASN'T SET
007004  022626                                  CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
007006  012710  000232                  CONT11: MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
007012  005037  000232                          CLR     @#232           ;TO CAUSE A HALT IF ANOTHER INTERRUPT OCCURS

007016  104001                          TEST12: SCOPE
                                        ;CARD DONE SHOULDN'T CAUSE AN INTERRUPT IF THE PROCESSOR IS AT LEVEL 7 PRIORITY
007020  004767  006660                          JSR     %7,INIT         ;INITIALIZE
007024  012710  007060                          MOV     #TINT12,@ADINT  ;SETUP RETURN
007030  052767  000340  170740                  BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7 PRIORITY
007036  016760  170734  000002                  MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
007044  012713  000103                          MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
007050  032713  040000                          BIT     #40000,@CRS     ;WAIT FOR CARD DONE
007054  001775                                  BEQ     .-4
007056  000402                                  BR      .+6             ;CONTINUE IF NO INTERRUPT OCCURRED
007060  104000                          TINT12: HLT                     ;AN INTERRUPT OCCURRED
007062  022626                                  CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
007064  005013                                  CLR     @CRS            ;CLEAR INTERRUPT ENABLE AND EJECT
007066  012710  000232                          MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
007072  005037  000232                          CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS


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


                                        ;TEST FOR AN INTERRUPT ON LEVEL 7
007076  104001                          TEST13: SCOPE
007100  004767  006600                          JSR     %7,INIT         ;INITIALIZE
007104  012710  007214                          MOV     #TINT13,@ADINT  ;SETUP RETURN ADDRESS
007110  052767  000340  170660                  BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
007116  016760  170654  000002                  MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
007124  042767  000340  170644                  BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
007132  052767  000300  170636                  BIS     #300,PSR        ;SET PROCESSOR TO LEVEL 6 PRIORITY
007140  012713  000103                          MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
007144  032713  040000                          BIT     #40000,@CRS     ;WAIT FOR CARD DONE
007150  001775                                  BEQ     .-4
007152  016067  000002  170616                  MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
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2139  007160  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
2140  007162  012710  000232                  MOV     #232,@#INT      ;CHANGE INTERRUPT RETURN ADDRESS
2141  007166  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2142  007172  005767  171704                  TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
2143  007176  100044                          BPL     TEST14          ;IF NO, GO TO NEXT TEST
2144  007200  026727  171676  100007          CMP     INTFLG,#100007  ;IF SO, CHECK TO SEE
2145  007206  100440                          BMI     TEST14          ;THAT THE INTERRUPT LEVEL RECORDED
                                                                      ;IS BELOW THE CURRENT LEVEL
2147  007210  104000                          HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
                                                                      ;AT LEVEL 7, BUT PREVIOUSLY OCCURRED
                                                                      ;AT OR ABOVE THIS LEVEL
2150  007212  000436                          BR      TEST14
2151  007214  032713  040000          TINT13: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
2152  007220  001001                          BNE     .+4             ;BRANCH IF SET
2153  007222  104000                          HLT                     ;CARD DONE WASN'T SET
2154  007224  005013                          CLR     @CRS            ;DISABLE FURTHER INTERPUPTS
2155  007226  012710  000232                  MOV     #232,@#INT      ;CHANGE INTERRUPT RETURN ADDRESS
2156  007232  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2157  007236  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
2158  007240  005767  171636                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
2159  007244  100414                          BMI     SET7    ;BRANCH IF FLAG SET
2160  007246  012767  100007  171626          MOV     #100007,INTFLG ;SET FLAG AND LEVEL
2161  007254  012702  022163                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
2162  007260  004767  007142                  JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
2163  007264  012702  000007                  MOV     #7,R2
2164  007270  004767  006114                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
2165  007274  000405                          BR      TEST14
2166  007276  026727  171600  100007  SET7: CMP     INTFLG,#100007  ;CHECK PREVIOUS LEVEL
2167  007304  100001                          BPL     TEST14
2168  007306  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
2169
2170
2171
2172                                  ;TEST FOR AN INTERRUPT ON LEVEL 6
2173                                  ;SINCE THIS IS WHERE THE CARD READER NORMALLY IS, DON'T PRINT OUT A MESSAGE
2174                                  ;IF IT IS FOUND HERE
2175  007310  104001                  TEST14: SCOPE
2176  007312  004767  006366                  JSR     %7,INIT         ;INITIALIZE
2177  007316  012710  007406                  MOV     #TINT14,@#INT   ;SETUP RETURN ADDRESS
2178  007322  052767  000340  170446          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
2179  007330  016760  170442  000002          MOV     PSR,2(@#INT)    ;SETUP RETURN PROCESSOR STATUS
2180  007336  042767  000340  170432          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
2181  007344  052767  000240  170424          BIS     #240,PSR        ;SET PROCESSOR TO LEVEL 5 PRIORITY
2182  007352  012713  000103                  MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
2183  007356  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
2184  007362  001775                          BEQ     .-4
2185  007364  016067  000002  170404          MOV     2(@#INT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
2186  007372  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
2187  007374  012710  000232                  MOV     #232,@#INT      ;CHANGE INTERRUPT RETURN ADDRESS
2188  007400  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2189  007404  000426                          BR      TEST15
2190  007406  032713  040000          TINT14: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
2191  007412  001001                          BNE     .+4             ;BRANCH IF SET
2192  007414  104000                          HLT                     ;CARD DONE WASN'T SET
2193  007416  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
2194  007420  012710  000232                  MOV     #232,@#INT      ;CHANGE INTERRUPT RETURN ADDRESS
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2195  007424  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2196  007430  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
2197  007432  005767  171444                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
2198  007436  100404                          BMI     SET14           ;BRANCH IF FLAG SET
2199  007440  012767  100006  171434          MOV     #100006,INTFLG  ;SET FLAG AND LEVEL
2200  007446  000405                          BR      TEST15
2201  007450  026727  171426  100006  SET14:  CMP     INTFLG,#100006  ;CHECK PREVIOUS LEVEL
2202  007456  100001                          BPL     TEST15
2203  007460  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
2204
2205                                  ;TEST FOR AN INTERRUPT ON LEVEL 5
2206  007462  104001                  TEST15: SCOPE
2207  007464  004767  006214                  JSR     %7,INIT         ;INITIALIZE
2208  007470  012710  007600                  MOV     #TINT15,@#VINT  ;SETUP RETURN ADDRESS
2209  007474  052767  000340  170274          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
2210  007502  016760  170270  000002          MOV     PSR,2(#VINT)    ;SETUP RETURN PROCESSOR STATUS
2211  007510  042767  000340  170260          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
2212  007516  052767  000200  170252          BIS     #200,PSR        ;SET PROCESSOR TO LEVEL 4 PRIORITY
2213  007524  012713  000103                  MOV     #103,@#CRS      ;SET EJECT INTERRUPT ENABLE, AND READ
2214  007530  032713  040000                  BIT     #40000,@#CRS    ;WAIT FOR CARD DONE
2215  007534  001775                          BEQ     .-4
2216  007536  016067  000002  170232          MOV     2(#VINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
2217  007544  005013                          CLR     @#CRS           ;DISABLE INTERRUPTS
2218  007546  012710  000232                  MOV     #232,@#VINT     ;CHANGE INTERRUPT RETURN ADDRESS
2219  007552  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2220  007556  005767  171320                  TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
2221  007562  100044                          BPL     TEST16          ;IF NO, GO TO NEXT TEST
2222  007564  026727  171312  100005          CMP     INTFLG,#100005  ;IF SO, CHECK TO SEE
2223  007572  100440                          BMI     TEST16          ;THAT THE INTERRUPT LEVEL RECORDED
2224                                          ;IS BELOW THE CURRENT LEVEL
2225  007574  104000                          HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
2226                                          ;AT LEVEL 5, BUT PREVIOUSLY OCCURRED
2227                                          ;AT OR ABOVE THIS LEVEL
2228  007576  000436                          BR      TEST16
2229  007600  032713  040000          TINT15: BIT     #40000,@#CRS    ;MAKE SURE CARD DONE IS SET
2230  007604  001001                          BNE     .+4             ;BRANCH IF SET
2231  007606  104000                          HLT                     ;CARD DONE WASN'T SET
2232  007610  005013                          CLR     @#CRS           ;DISABLE FURTHER INTERRUPTS
2233  007612  012710  000232                  MOV     #232,@#VINT     ;CHANGE INTERRUPT RETURN ADDRESS
2234  007616  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2235  007622  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
2236  007624  005767  171252                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
2237  007630  100414                          BMI     SET5    ;BRANCH IF FLAG SET
2238  007632  012767  100005  171242          MOV     #100005,INTFLG ;SET FLAG AND LEVEL
2239  007640  012702  022163                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
2240  007644  004767  006556                  JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
2241  007650  012702  000005                  MOV     #5,R2
2242  007654  004767  006330                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
2243  007660  000405                          BR      TEST16
2244  007662  026727  171214  100005  SET5:  CMP     INTFLG,#100005  ;CHECK PREVIOUS LEVEL
2245  007670  100001                          BPL     TEST16
2246  007672  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
2247
2248                                  ;TEST FOR AN INTERRUPT ON LEVEL 4
2249  007674  104001                  TEST16: SCOPE
2250  007676  004767  006002                  JSR     %7,INIT         ;INITIALIZE
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007702  012710  010012                   MOV    #TINT16,@ADINT   ;SETUP RETURN ADDRESS
007706  052767  000340  170062           BIS    #340,PSR         ;SET PROCESSOR PRIORITY TO 7
007714  016760  170056  000002           MOV    PSR,2(ADINT)     ;SETUP RETURN PROCESSOR STATUS
007722  042767  000340  170046           BIC    #340,PSR         ;SET PROCESSOR PRIORITY TO 0
007730  052767  000140  170040           BIS    #140,PSR         ;SET PROCESSOR TO LEVEL 3 PRIORITY
007736  012713  000103                   MOV    #103,@CRS        ;SET EJECT INTERRUPT ENABLE, AND READ
007742  032713  040000                   BIT    #40000,@CRS      ;WAIT FOR CARD DONE
007746  001775                           BEQ    .-4
007750  016067  000002  170020           MOV    2(ADINT),PSR     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
007756  005013                           CLR    @CRS             ;DISABLE INTERRUPTS
007760  012710  000232                   MOV    #232,@ADINT      ;CHANGE INTERRUPT RETURN ADDRESS
007764  005037  000232                   CLR    @#232            ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
007770  005767  171106                   TST    INTFLG           ;CHECK TO SEE IF LEVEL ALREADY RECORDED
007774  100044                           BPL    TEST17           ;IF NO, GO TO NEXT TEST
007776  026727  171100  100004           CMP    INTFLG,#100004   ;IF SO, CHECK TO SEE
010004  100440                           BMI    TEST17           ;THAT THE INTERRUPT LEVEL RECORDED
                                                                 ;IS BELOW THE CURRENT LEVEL
010006  104000                           HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
                                                                 ;AT LEVEL 4, BUT PREVIOUSLY OCCURRED
                                                                 ;AT OR ABOVE THIS LEVEL
010010  000436                           BR     TEST17
010012  032713  040000          TINT16:  BIT    #40000,@CRS      ;MAKE SURE CARD DONE IS SET
010016  001001                           BNE    .+4              ;BRANCH IF SET
010020  104000                           HLT                     ;CARD DONE WASN'T SET
010022  005013                           CLR    @CRS             ;DISABLE FURTHER INTERRUPTS
010024  012710  000232                   MOV    #232,@ADINT      ;CHANGE INTERRUPT RETURN ADDRESS
010030  005037  000232                   CLR    @#232            ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
010034  022626                           CMP    (SP)+,(SP)+      ;RESTORE STACK POINTER
010036  005767  171040                   TST    INTFLG           ;CHECK FOR PREVIOUS FLAG
010042  100414                           BMI    SET4    ;BRANCH IF FLAG SET
010044  012767  100004  171030           MOV    #100004,INTFLG ;SET FLAG AND LEVEL
010052  012702  022163                   MOV    #MSG4,R2         ;SETUP FOR PRINTOUT
010056  004767  006344                   JSR    %7,TOUT          ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
010062  012702  000004                   MOV    #4,R2
010066  004767  006116                   JSR    %7,PROCT         ;PRINT LEVEL NUMBER
010072  000405                           BR     TEST17
010074  026727  171002  100004  SET4:    CMP    INTFLG,#100004   ;CHECK PREVIOUS LEVEL
010102  100001                           BPL    TEST17
010104  104000                           HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL

                                ;TEST FOR AN INTERRUPT ON LEVEL 3
010106  104001                  TEST17:  SCOPE
010110  004767  005570                   JSR    %7,INIT          ;INITIALIZE
010114  012710  010224                   MOV    #TINT17,@ADINT   ;SETUP RETURN ADDRESS
010120  052767  000340  167650           BIS    #340,PSR         ;SET PROCESSOR PRIORITY TO 7
010126  016760  167644  000002           MOV    PSR,2(ADINT)     ;SETUP RETURN PROCESSOR STATUS
010134  042767  000340  167634           BIC    #340,PSR         ;SET PROCESSOR PRIORITY TO 0
010142  052767  000100  167626           BIS    #100,PSR         ;SET PROCESSOR TO LEVEL 2 PRIORITY
010150  012713  000103                   MOV    #103,@CRS        ;SET EJECT INTERRUPT ENABLE, AND READ
010154  032713  040000                   BIT    #40000,@CRS      ;WAIT FOR CARD DONE
010160  001775                           BEQ    .-4
010162  016067  000002  167606           MOV    2(ADINT),PSR     ;RESTORE PROCESSOR TO HIGHEST PRIORITY
010170  005013                           CLR    @CRS             ;DISABLE INTERRUPTS
010172  012710  000232                   MOV    #232,@ADINT      ;CHANGE INTERRUPT RETURN ADDRESS
010176  005037  000232                   CLR    @#232            ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
010202  005767  170674                   TST    INTFLG           ;CHECK TO SEE IF LEVEL ALREADY RECORDED
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2307  010206  100044                        BPL     TEST18          ;IF NO, GO TO NEXT TEST
2308  010210  026727  170666  100003        CMP     INTFLG,#100003  ;IF SO, CHECK TO SEE
2309  010216  100440                        BMI     TEST18          ;THAT THE INTERRUPT LEVEL RECORDED
2310                                                                 ;IS BELOW THE CURRENT LEVEL
2311  010220  104000                        HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
2312                                                                 ;AT LEVEL 3, BUT PREVIOUSLY OCCURRED
2313                                                                 ;AT OR ABOVE THIS LEVEL
2314  010222  000436                        BR      TEST18
2315  010224  032713  040000        TINT17: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
2316  010230  001001                        BNE     .+4             ;BRANCH IF SET
2317  010232  104000                        HLT                     ;CARD DONE WASN'T SET
2318  010234  005013                        CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
2319  010236  012710  000232                MOV     #232,@#OINT     ;CHANGE INTERRUPT RETURN ADDRESS
2320  010242  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2321  010246  022626                        CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
2322  010250  005767  170626                TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
2323  010254  100414                        BMI     SET3    ;BRANCH IF FLAG SET
2324  010256  012767  100003  170616        MOV     #100003,INTFLG  ;SET FLAG AND LEVEL
2325  010264  012702  022163                MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
2326  010270  004767  006132                JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
2327  010274  012702  000003                MOV     #3,R2
2328  010300  004767  005704                JSR     %7,PROCT        ;PRINT LEVEL NUMBER
2329  010304  000405                        BR      TEST18
2330  010306  026727  170570  100003  SET3: CMP     INTFLG,#100003  ;CHECK PREVIOUS LEVEL
2331  010314  100001                        BPL     TEST18
2332  010316  104000                        HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
2333
2334                                  ;TEST FOR AN INTERRUPT ON LEVEL 2
2335  010320  104001                TEST18: SCOPE
2336  010322  004767  005356                JSR     %7,INIT         ;INITIALIZE
2337  010326  012710  010436                MOV     #TINT18,@#OINT  ;SETUP RETURN ADDRESS
2338  010332  052767  000340  167436        BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
2339  010340  016760  167432  000002        MOV     PSR,2(#OINT)    ;SETUP RETURN PROCESSOR STATUS
2340  010346  042767  000340  167422        BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
2341  010354  052767  000040  167414        BIS     #040,PSR        ;SET PROCESSOR TO LEVEL 1 PRIORITY
2342  010362  012713  000103                MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
2343  010366  032713  040000                BIT     #40000,@CRS     ;WAIT FOR CARD DONE
2344  010372  001775                        BEQ     .-4
2345  010374  016067  000002  167374        MOV     2(#OINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
2346  010402  005013                        CLR     @CRS            ;DISABLE INTERRUPTS
2347  010404  012710  000232                MOV     #232,@#OINT     ;CHANGE INTERRUPT RETURN ADDRESS
2348  010410  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2349  010414  005767  170462                TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
2350  010420  100044                        BPL     TEST19          ;IF NO, GO TO NEXT TEST
2351  010422  026727  170454  100002        CMP     INTFLG,#100002  ;IF SO, CHECK TO SEE
2352  010430  100440                        BMI     TEST19          ;THAT THE INTERRUPT LEVEL RECORDED
2353                                                                 ;IS BELOW THE CURRENT LEVEL
2354  010432  104000                        HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
2355                                                                 ;AT LEVEL 2, BUT PREVIOUSLY OCCURRED
2356                                                                 ;AT OR ABOVE THIS LEVEL
2357  010434  000436                        BR      TEST19
2358  010436  032713  040000        TINT18: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
2359  010442  001001                        BNE     .+4             ;BRANCH IF SET
2360  010444  104000                        HLT                     ;CARD DONE WASN'T SET
2361  010446  005013                        CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
2362  010450  012710  000232                MOV     #232,@#OINT     ;CHANGE INTERRUPT RETURN ADDRESS
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2363  010454  005037  000232                  CLR     @#232           ;TO CAUSE A HALT.IF AN INTERRUPT OCCURS
2364  010460  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
2365  010462  005767  170414                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
2366  010466  100414                          BMI     SET2    ;BRANCH IF FLAG SET
2367  010470  012767  100002  170404          MOV     #100002,INTFLG ;SET FLAG AND LEVEL
2368  010476  012702  022163                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
2369  010502  004767  005720                  JSR     %7,TOUT         ;PRINT MESSAGE-"THE INTERRUPT LEVEL WAS"
2370  010506  012702  000002                  MOV     #2,R2
2371  010512  004767  005472                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
2372  010516  000405                          BR      TEST19
2373  010520  026727  170356  100002  SET2: CMP     INTFLG,#100002  ;CHECK PREVIOUS LEVEL
2374  010526  102001                          BPL     TEST19
2375  010530  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
2376
2377                                  ;TEST FOR AN INTERRUPT ON LEVEL 1
2378  010532  104001                  TEST19: SCOPE
2379  010534  004767  005144                  JSR     %7,INIT         ;INITIALIZE
2380  010540  012710  010650                  MOV     #TINT19,@ADINT  ;SETUP RETURN ADDRESS
2381  010544  052767  000340  167224          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
2382  010552  016760  167220  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
2383  010560  042767  000340  167210          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
2384  010566  052767  000000  167202          BIS     #000,PSR        ;SET PROCESSOR TO LEVEL 0 PRIORITY
2385  010574  012713  000103                  MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
2386  010600  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
2387  010604  001775                          BEQ     .-4
2388  010606  016067  000002  167162          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
2389  010614  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
2390  010616  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
2391  010622  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2392  010626  005767  170250                  TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
2393  010632  100044                          BPL     TEST20          ;IF NO, GO TO NEXT TEST
2394  010634  026727  170242  100001          CMP     INTFLG,#100001  ;IF SO, CHECK TO SEE
2395  010642  100440                          BMI     TEST20          ;THAT THE INTERRUPT LEVEL RECORDED
2396                                                                  ;IS BELOW THE CURRENT LEVEL
2397  010644  104000                          HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
2398                                                                  ;AT LEVEL 1, BUT PREVIOUSLY OCCURRED
2399                                                                  ;AT OR ABOVE THIS LEVEL
2400  010646  000436                          BR      TEST20
2401  010650  032713  040000          TINT19: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
2402  010654  001001                          BNE     .+4             ;BRANCH IF SET
2403  010656  104000                          HLT                     ;CARD DONE WASN'T SET
2404  010660  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
2405  010662  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
2406  010666  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
2407  010672  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
2408  010674  005767  170202                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
2409  010700  100414                          BMI     SET1    ;BRANCH IF FLAG SET
2410  010702  012767  100001  170172          MOV     #100001,INTFLG ;SET FLAG AND LEVEL
2411  010710  012702  022163                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
2412  010714  004767  005506                  JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
2413  010720  012702  000001                  MOV     #1,R2
2414  010724  004767  005260                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
2415  010730  000405                          BR      TEST20
2416  010732  026727  170144  100001  SET1: CMP     INTFLG,#100001  ;CHECK PREVIOUS LEVEL
2417  010740  100001                          BPL     TEST20
2418  010742  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
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2419
2420                                        ;A TIMING ERROR SHOULDN'T CAUSE AN INTERRUPT
2421  010744  104001                        TEST20: SCOPE
2422  010746  004767  004732                        JSR     %7,INIT         ;INITIALIZE
2423  010752  012710  011024                        MOV     #TINT20,@ADINT  ;LOAD RETURN POINTER
2424  010756  052767  000340  167012                BIS     #340,PSR        ;SET PROCESSOR TO HIGHEST PRIORITY
2425  010764  016760  167006  000002                MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
2426  010772  012713  000101                        MOV     #101,@CRS       ;SET INTERRUPT ENABLE AND READ
2427  010776  032713  004000                        BIT     #4000,@CRS      ;WAIT FOR TIMING ERROR TO SET
2428  011002  001775                              BEQ     .-4
2429  011004  042767  000340  166764                BIC     #340,PSR        ;MOVE PROCESSOR TO LOWEST PRIORITY
2430  011012  000240                              NOP                     ;CLOCK INTERRUPT IF IT OCCURRED
2431  011014  016067  000002  166754                MOV     2(ADINT),PSR    ;MOVE PROCESSOR BACK TO HIGHEST PRIORITY
2432  011022  000402                              BR      .+6
2433  011024  104000                        TINT20: HLT                     ;TIMING ERROR CAUSED AN INTERRUPT
2434  011026  022626                              CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
2435  011030  012710  000232                        MOV     #232,@ADINT     ;CHANGE INTERRUPT ADDRESS TO CAUSE A
2436  011034  005037  000232                        CLR     @#232           ;HALT IF AN INTERRUPT OCCURS
2437  011040  032713  040000                        BIT     #40000,@CRS     ;WAIT FOR CARD DONE
2438  011044  001775                              BEQ     .-4
2439  011046  005013                              CLR     @CRS            ;CLEAR INTERRUPT ENABLE
2440
2441  011050  104001                        TEST21: SCOPE
2442                                        ;TEST FOR NO INTERRUPT OCCURING WITH INTERRUPT ENABLE SET AND REST CLEARED
2443  011052  004767  004626                        JSR     %7,INIT         ;INITIALIZE CSR TO ZERO
2444  011056  012710  011126                        MOV     #TNINT,@ADINT   ;SETUP RETURN ADDRESS
2445  011062  052767  000340  166706                BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
2446  011070  016760  166702  000002                MOV     PSR,2(ADINT)    ;STORE PROCESSOR STATUS
2447  011076  005067  166674                        CLR     PSR             ;SET PROCESSOR TO LEVEL 0
2448  011102  012713  000100                        MOV     #100,@CRS       ;ENABLE INTERRUPTS
2449  011106  005227  000000                        INC     #0              ;WAIT AWHILE
2450  011112  001375                              BNE     .-4
2451  011114  016067  000002  166654                MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO LEVEL 7
2452  011122  005013                              CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
2453  011124  000403                              BR      CONT21
2454  011126  104000                        TNINT:  HLT                     ;AN INTERRUPT OCCURRED
2455  011130  022626                              CMP     (SP)+,(SP)+     ;RESTORE STACK
2456  011132  005013                              CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
2457  011134  005037  000232                CONT21: CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
2458  011140  012710  000232                        MOV     #232,@ADINT     ;CAUSE A HALT IF AN INTERRUPT OCCURS
2459
2460  011144  104001                        TEST22: SCOPE
2461                                        ;CHECK FOR SIMULTANEOUS INTERRUPTS ON MORE THAN ONE LEVEL
2462  011146  004767  004532                        JSR     %7,INIT         ;INITIALIZE CSR TO ZERO
2463  011152  012710  011210                        MOV     #T2INT,@ADINT   ;SETUP RETURN ADDRESS
2464  011156  052767  000340  166612                BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
2465  011164  016760  166606  000002                MOV     PSR,2(ADINT)    ;STORE PROCESSOR STATUS
2466  011172  042767  000340  166576                BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
2467  011200  012713  000103                        MOV     #103,@CRS       ;SET INTERRUPT ENABLE AND EJECT A CARD
2468  011204  000001                              WAIT                    ;WAIT FOR INTERRUPT
2469  011206  000776                              BR      .-2             ;SIT IF TRACE BIT IS SET
2470  011210  022626                        T2INT:  CMP     (6)+,(6)+       ;RESTORE STACK POINTER
2471  011212  012710  011234                        MOV     #T2INTA,@ADINT  ;CHANGE RETRUN ADDRESS
2472  011216  005067  166554                        CLR     PSR             ;SET PROCESSOR TO LEVEL 0
2473  011222  000240                              NOP                     ;WAIT
2474  011224  016067  000002  166544                MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO LEVEL 7
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                                        BR      CONT22
T2INTA: CMP     (6)+,(6)+               ;RESTORE STACK
        HLT                             ;THE INTERRUPT OCCURRED AT 2 LEVELS
CONT22: CLR     @CRS                    ;DISABLE INTERRUPTS
        CLR     @#232                   ;CHANGE INTERRUPT RETURN ADDRESS TO
        MOV     #232,@RDINT             ;CAUSE A HALT IF AN INTERRUPT OCCURS

TEST23: SCOPE
;ALL MODES OF ADDRESSING KCRB1 OR KCRB2 (DATO,DATOB,DATI) SHOULD CLEAR
;COLUMN READY
        JSR     %7,INIT                 ;INITIALIZE
        INC     @CRS                    ;START READING A CARD
        TSTB    @CRS                    ;WAIT FOR COLUMN READY
        BPL     .-2
        CLR     @CRB1                   ;DATO TO CRB1
        TSTB    @CRS                    ;CHECK COLUMN READY
        BPL     CNT23A                  ;BRANCH IF CLEARED
        HLT                             ;DATO TO CRB1 DIDN'T CLEAR READY
        BR      TEST24                  ;GO TO NEXT TEST
CNT23A: TSTB    @CRS                    ;WAIT FOR COLUMN READY
        BPL     .-2
        CLRB    @CRB1                   ;DATOB TO LOW BYTE OF CRB1
        TSTB    @CRS                    ;CHECK COLUMN READY
        BPL     CNT23B                  ;BRANCH IF CLEARED
        HLT                             ;DATOB TO CRB1 LOW BYTE DIDN'T CLEAR READY
        BR      TEST24                  ;GO TO NEXT TEST
CNT23B: TSTB    @CRS                    ;WAIT FOR COLUMN READY
        BPL     .-2
        CLRB    1(CRB1)                 ;DATOB TO HIGH BYTE OF CRB1
        TSTB    @CRS                    ;CHECK COLUMN READY
        BPL     CNT23C                  ;BRANCH IF CLEARED
        HLT                             ;DATOB TO CRB1 HIGH BYTE DIDN'T CLEAR READY
        BR      TEST24                  ;GO TO NEXT TEST
CNT23C: TSTB    @CRS                    ;WAIT FOR COLUMN READY
        BPL     .-2
        TST     @CRB1                   ;DATI TO CRB1
        TSTB    @CRS                    ;CHECK COLUMN READY
        BPL     CNT23D                  ;BRANCH IF CLEARED
        HLT                             ;DATI TO CRB1 DIDN'T CLEAR READY
        BR      TEST24                  ;GO TO NEXT TEST
CNT23D: TSTB    @CRS                    ;WAIT FOR COLUMN READY
        BPL     .-2
        CLR     @KCRB2                  ;DATO TO CRB2
        TSTB    @CRS                    ;CHECK COLUMN READY
        BPL     CNT23E                  ;BRANCH IF CLEARED
        HLT                             ;DATO TO KCRB2 DIDN'T CLEAR READY
        BR      TEST24                  ;GO TO NEXT TEST
CNT23E: TSTB    @CRS                    ;WAIT FOR COLUMN READY
        BPL     .-2
        CLRB    @KCRB2                  ;DATOB TO LOW BYTE OF CRB2
        TSTB    @CRS                    ;CHECK COLUMN READY
        BPL     CNT23F                  ;BRANCH IF CLEARED
        HLT                             ;DATOB TO CRB2 LOW BYTE DIDN'T CLEAR READY
        BR      TEST24                  ;GO TO NEXT TEST
CNT23F: TSTB    @CRS                    ;WAIT FOR COLUMN READY
        BPL     .-2
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2531  011420  012702  177164                MOV     #177164,R2              ;LOAD POINTER
2532  011424  105062  000001                CLRB    1(R2)           ;DATOB TO HIGH BYTE OF CRB2
2533  011430  105713                        TSTB    @CRS            ;CHECK COLUMN READY
2534  011432  100002                        BPL     CNT23G          ;BRANCH IF CLEARED
2535  011434  104000                        HLT                     ;DATOB TO CRB2 HIGH BYTE DIDN'T CLEAR READY
2536  011436  000407                        BR      TEST24          ;GO TO NEXT TEST
2537
2538  011440  105713                CNT23G: TSTB    @CRS            ;WAIT FOR COLUMN READY
2539  011442  100376                        BPL     .-2
2540  011444  005777  167444                TST     @#CRB2          ;DATI TO CRB2
2541  011450  105713                        TSTB    @CRS            ;CHECK COLUMN READY
2542  011452  100001                        BPL     TEST24          ;BRANCH IF CLEARED
2543  011454  104000                        HLT                     ;DATI TO CRB2 DIDN'T CLEAR READY
2544
2545  011456  104001                TEST24: SCOPE
2546                                ;SETTING EJECT AFTER A COLUMN READY WITHOUT CLEARING THE COLUMN READY
2547                                ;SHOULD SET TIMING ERROR (WHICH IN TURN SHOULD CLEAR COLUMN READY)
2548  011460  004767  004220                JSR     %7,INIT         ;INITIALIZE
2549  011464  005213                        INC     @CRS            ;START READING A CARD
2550  011466  105713                        TSTB    @CRS            ;CHECK COLUMN READY - WAIT
2551  011470  100376                        BPL     .-2
2552  011472  052713  000002                BIS     #2,@CRS         ;SET EJECT
2553  011476  105713                        TSTB    @CRS            ;CHECK COLUMN READY
2554  011500  100402                        BMI     CNT24A          ;BRANCH IF STILL SET
2555  011502  104000                        HLT                     ;SETTING EJECT CLEARED COLUMN READY
2556  011504  000421                        BR      END24           ;BRANCH TO WAIT FOR DONE AFTER ERROR
2557  011506  032713  004000        CNT24A: BIT     #4000,@CRS      ;CHECK TIMING ERROR
2558  011512  001013                        BNE     TIM24           ;BRANCH IF SET
2559  011514  032713  040400                BIT     #40400,@CRS     ;CHECK CARD DONE AND OFF-LINE
2560  011520  001772                        BEQ     CNT24A          ;LOOP IF NONE SET
2561  011522  032713  040000                BIT     #40000,@CRS     ;CARD DONE SET
2562  011526  001003                        BNE     CNT24B          ;YES - BRANCH TO ERROR PRINTOUT
2563  011530  004767  004222                JSR     %7,CKBIT8       ;NO - BIT 8 WAS SET SO OUTPUT MESSAGE
2564  011534  000415                        BR      ENDCK           ;BRANCH AFTER COMING BACK ON-LINE
2565  011536  104000                CNT24B: HLT                     ;CARD DONE SET BUT TIMING ERROR DIDN'T
2566  011540  000413                        BR      ENDCK           ;BRANCH TO NEXT SECTION
2567  011542  105713                TIM24:  TSTB    @CRS            ;CHECK COLUMN READY
2568  011544  100001                        BPL     .+4             ;BRANCH IF NOT SET
2569  011546  104000                        HLT                     ;TIMING ERROR DIDN'T CLEAR READY
2570  011550  032713  040400        END24:  BIT     #40400,@CRS     ;WAIT FOR CARD DONE OR OFF-LINE
2571  011554  001775                        BEQ     END24
2572  011556  032713  000400                BIT     #400,@CRS       ;CHECK OFF LINE
2573  011562  001402                        BEQ     ENDCK           ;BRANCH IF NOT SET
2574  011564  004767  004166                JSR     %7,CKBIT8       ;OUTPUT ERROR MESSAGE
2575
2576                                ;CHECK SW7 AND RETURN TO TEST1 IF SET, AFTER RINGING BELL
2577                                ;OTHERWISE GO INTO THE DATA TEST
2578  011570  104001                ENDCK:  SCOPE
2579  011572  032777  000200  167322        BIT     #200,@SWR
2580  011600  001406                        BEQ     DATST
2581  011602  004767  004124                JSR     %7,BELL
2582  011606  005167  167336                COM     TRFLG           ;TOGGLE TRACE FLAG
2583  011612  000167  173314                JMP     RESTRT
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                                        ;*****************************************************************
                                        ;                DATA RELIABILITY TEST FOR CR11
                                        ;*****************************************************************

                                        ;CHECK SR FOR TYPE OF DECK BEING TESTED, AND INITIALIZE POINTERS
011616  012767  000056  001264  DATST:  MOV     #55,CDCNT       ;SETUP CARD COUNT TO ENTER TABLE CORRESPONDING TO NEXT C
011624  000410                  DATST1: BR      DATST2          ;SKIP NEXT INSTRUCTION
011626  022767  000176  167266          CMP     #SWREG,SWR
011634  001002                          BNE     1$
011636  104002                          CNTLU
011640  104006                          CKU
011642  005067  001242          1$:     CLR     CDCNT           ;SETUP CARD COUNT TO ENTER DATA TABLE AT BEGINNING
011646  005067  167302          DATST2: CLR     ERFLG           ;FLAG SET PREVENTS PRINTING OUT ERROR HEADING
011652  032777  000010  167242          BIT     #10,@SWR                ;CHECK FOR TYPE OF DECK-MARK SENSE
011660  001412                          BEQ     DATST3
011662  012767  021200  001214          MOV     #MRKCD,TSTART
011670  012767  021702  001210          MOV     #MRKEND,TEND
011676  012767  023307  001176          MOV     #MSG15,DECK
011704  000442                          BR      CONTD
011706  032777  000020  167206  DATST3: BIT     #20,@SWR                ;CHECK BIT 4 OF @SRPTR FOR TYPE OF DECK
011714  001425                          BEQ     ALP1            ;BRANCH IF NOT SET TO LOAD ALPHANUMERIC POINTERS
011716  032777  000004  167176          BIT     #4,@SWR         ;TEST FOR TYPE OFF DECK-BINARY FIXED PATTERN
011724  001407                          BEQ     1$              ;NO-BRANCH TO ROTATING  PATTERN
011726  012767  020500  001150          MOV     #BIMCD,TSTART   ;LOAD TABLE POINTER
011734  012767  021176  001144          MOV     #BIMEND,TEND    ;END OF TABLE
011742  000406                          BR      2$              ;CONT.
011744  012767  020000  001132  1%:     MOV     #BINCD,TSTART   ;BIT 2 SET, LOAD BINARY TABLE POINTERS
011752  012767  020476  001126          MOV     #BINEND,TEND
011760  012767  023307  001114  2%:     MOV     #MSG15,DECK
011766  000411                          BR      CONTD           ;BRANCH AROUND ALPHANUMERIC POINTERS
011770  012767  017300  001106  ALP1:   MOV     #ALPCD,TSTART   ;LOAD ALPHANUMERIC TABLE POINTERS
011776  012767  017776  001102          MOV     #ALPEND,TEND
012004  012767  023276  001070          MOV     #MSG14,DECK
012012  005767  167132          CONTD:  TST     TRFLG           ;CHECK TRACE TRAP FLAG
012016  001004                          BNE     TRP1            ;BRANCH IF FLAG WAS SET
012020  012767  000340  165750  NOTRP1: MOV     #340,PSR        ;CLEAR TRACE BIT
012026  000407                          BR      DCNT1
012030  032777  010000  167064  TRP1:   BIT     #10000,@SWR     ;CHECK SW12 TO INHIBIT TRACE TRAPPING
012036  001370                          BNE     NOTRP1          ;BRANCH IF SET
012040  012767  000360  165730          MOV     #360,PSR        ;SET TRACE BIT
012046  004767  003632          DCNT1:  JSR     %7,INIT         ;INITIALIZE CARD READER STATUS REGISTER
                                        ;SET UP INTERRUPT SERVICING, AND START READING
012052  012710  012106                  MOV     #SRVC,@ADINT    ;SETUP RETURN POINTER
012056  042767  000340  165712          BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
012064  016760  165706  000002          MOV     PSR,2(ADINT)    ;STORE CURRENT STATUS
012072  004767  000674                  JSR     %7,KXCRD        ;ADJUST POINTER AND START READING
012076  052713  000101                  BIS     #101,@CRS       ;ENABLE INTERRUPTS
012102  000001                          WAIT                    ;WAIT FOR INTERRUPTS
012104  000776                          BR      .-2

                                        ;INTERRUPT SERVICE ROUTINE WHICH RUNS DATA RELIABILITY TEST
012106  005713          SRVC:   TST     @CRS            ;CHECK SPECIAL CONDITION (BIT 15)
012110  100460                  BMI     ERSET           ;BRANCH IF SET
012112  105713                  TSTB    @CRS            ;CHECK COLUMN READY
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2640  012114  100402                          BMI     .+6             ;BRANCH IF SET
2641  012116  000167  000542                  JMP     NOTCOL          ;JUMP IF NOT SET
2642  012122  005267  000764                  INC     CLCNT           ;KEEP TRACK OF COLUMN NUMBER
2643  012126  011467  000762                  MOV     @CRB1,DAT1      ;STORE DATA OF FIRST READ
2644  012132  105713                          TSTB    @CRS            ;MAKE SURE COLUMN READY CLEARED
2645  012134  100006                          BPL     SCONT1          ;BRANCH IF IT DID
2646  012136  052767  000340  165632          BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
2647  012144  104000                          HLT                     ;READING DATA DIDN'T CLEAR COLUMN READY
2648  012146  000167  000532                  JMP     LASTCK          ;GO TO NEXT CARD AFTER ERROR PRINTOUT
2649  012152  017767  166736  000740  SCONT1: MOV     @KCRB2,DATENC   ;STORE ENCODED DATA
2650  012160  012701  000010                  MOV     #10,COUNT       ;WAIT AWHILE
2651  012164  005301                          DEC     COUNT
2652  012166  001376                          BNE     .-2
2653  012170  011467  000722                  MOV     @CRB1,DAT2      ;STORE DATA OF SECOND READ
2654  012174  005067  000722                  CLR     PTOFF           ;CLEAR POINTER OFFSET
2655  012200  026715  000710                  CMP     DAT1,@RS        ;CHECK FIRST DATA READ
2656  012204  001053                          BNE     FAIL            ;PRINTOUT IF WRONG
2657  012206  012767  000002  000706          MOV     #2,PTOFF        ;SET POINTER OFFSET
2658  012214  026725  000676                  CMP     DAT2,(RS)+      ;CHECK SECOND READING OF SAME DATA
2659  012220  001045                          BNE     FAIL            ;BRANCH IF WRONG
2660  012222  012767  000004  000672          MOV     #4,PTOFF        ;SET POINTER OFFSET
2661  012230  026725  000664                  CMP     DATENC,(RS)+    ;CHECK ENCODED DATA
2662  012234  001037                          BNE     FAIL            ;BRANCH IF WRONG
2663  012236  020567  000644                  CMP     RS,TEND         ;CHECK FOR END OF TABLE
2664  012242  100402                          BMI     .+6             ;IF NOT THERE, RTI
2665  012244  016705  000634                  MOV     TSTART,RS       ;MOVE POINTER TO LOOP THRU TABLE
2666  012250  000002                          RTI
2667                                  ;SPECIAL CONDITION BIT 15 WAS SET WHEN THE INTERRUPT SERVICE ROUTINE
2668                                  ;WAS ENTERED
2669                                  ;OUTPUT A MESSAGE AND HALT
2670  012252  052767  000340  165516  ERSET:  BIS     #340,PSR        ;LOCK OUT INTERRUPTS
2671  012260  104003                          KBINTT
2672  012262  022767  000120  000620          CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
2673  012270  001006                          BNE     ER1             ;IF NOT, PRINT OUT MESSAGE
2674  012272  022767  000120  000612          CMP     #80.,CLCNT      ;IF LAST CARD, CHECK FOR LAST COLUMN
2675  012300  001002                          BNE     ER1             ;IF NOT, PRINT MESSAGE
2676  012302  000167  000616                  JMP     ALLDON          ;IF END OF DECK, JUMP
2677  012306  012702  023320          ER1:    MOV     #MSG16,R2       ;"BIT 15 WAS SET."
2678  012312  004767  004110                  JSR     %7,TOUT
2679  012316  012702  023341                  MOV     #MSG17,R2       ;"REMEDY THE ERROR CONDITION
2680  012322  004767  004100                  JSR     %7,TOUT         ;AND PRESS CONTINUE"
2681  012326  000000                          HALT
2682  012330  000167  000350                  JMP     LASTCK          ;SET UP FOR NEXT CARD AND GO ON
2683  012334  052767  000340  165434  FAIL:   BIS     #340,PSR        ;LOCK OUT INTERRUPTS
2684  012342  052713  000002                  BIS     #2,@CRS         ;SET EJECT TO PREVENT TIMING ERROR
2685  012346  005714                          TST     @CRB1           ;MAKE SURE COLUMN READY IS CLEARED
2686  012350  032777  020000  166544          BIT     #20000,@SWR     ;CK SW13
2687  012356  001431                          BEQ     FAILCN          ;CONTINUE IF NOT SET
2688  012360  005777  166536                  TST     @SWR            ;IF SET, CHECK FOR HALT ON ERROR
2689  012364  100003                          BPL     FAILC           ;BRANCH IF HALT ON ERROR NOT SET
2690  012366  000000                          HALT                    ;HALT ON ERROR SET
2691  012370  000167  000310                  JMP     LASTCK          ;CONTINUE AFTER HALT
2692  012374  032713  040000          FAILC:  BIT     #40000, @CRS    ;CHECK FOR CARD DONE
2693  012400  001402                          BEQ     .+6
2694  012402  000167  000276                  JMP     LASTCK          ;INHIBIT PRINTOUT AFTER CARD DONE SET
2695  012406  032713  000400                  BIT     #400,@CRS       ;CHECK FOR OFF-LINE
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2696  012412  001770                        BEQ     FAILC           ;BRANCH IF NOT
2697  012414  022767  000120  000466        CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
2698  012422  001002                        BNE     .+6
2699  012424  000167  000474                JMP     ALLDON          ;IF LAST CARD, WAIT FOR NEXT DECK
2700  012430  004767  003322                JSR     %7,CKBIT8       ;IF NOT LAST CARD, PRINT MESSAGE
2701  012434  004767  000332                JSR     %7,NXCRD        ;START NEXT CARD THRU READER
2702  012440  000002                        RTI
2703  012442  005767  166506        FAILCN: TST     ERFLG           ;TEST FLAG FOR PREVIOUS PRINTOUT
2704  012446  001006                        BNE     NOHD            ;IF SET, DON'T OUTPUT HEADING
2705  012450  005267  166500                INC     ERFLG           ;SET FLAG
2706  012454  012702  023206                MOV     #MSG13,R2       ;OUTPUT HEADING FOR DATA ERROR PRINTOUT
2707  012460  004767  003742                JSR     %7,TOUT
2708  012464  016702  000412        NOHD:   MOV     DECK,R2         ;OUTPUT TYPE OF DECK
2709  012470  004767  003732                JSR     %7,TOUT
2710  012474  004767  003312                JSR     %7,SPACE
2711  012500  016702  000404                MOV     CDCNT,R2        ;OUTPUT CARD NUMBER WHERE ERROR OCCURRED
2712  012504  004767  003500                JSR     %7,PROCT
2713  012510  004767  003276                JSR     %7,SPACE
2714  012514  016702  000372                MOV     CLCNT,R2        ;OUTPUT COLUMN NUMBER WHERE ERROR OCCURRED
2715  012520  004767  003464                JSR     %7,PROCT
2716  012524  004767  003262                JSR     %7,SPACE
2717  012530  166705  000366                SUB     PTOFF,R5        ;SUBTRACT OFFSET FROM POINTER TO POINT TO
2718                                                                ;ADDRESS OF DESIRED PATTERN
2719  012534  012502                        MOV     (R5)+,R2        ;OUTPUT CORRECT DATA PATTERN (NOT ENCODED)
2720  012536  004767  003446                JSR     %7,PROCT
2721  012542  004767  003244                JSR     %7,SPACE
2722  012546  016702  000342                MOV     DAT1,R2         ;OUTPUT DATA READ ON FIRST READING OF BUFFER
2723  012552  004767  003432                JSR     %7,PROCT
2724  012556  004767  003230                JSR     %7,SPACE
2725  012562  016702  000330                MOV     DAT2,R2         ;OUTPUT DATA READ ONE MILLISECOND LATER
2726  012566  004767  003416                JSR     %7,PROCT
2727  012572  004767  003214                JSR     %7,SPACE
2728  012576  011502                        MOV     @R5,R2          ;OUTPUT CORRECT DATA PATTERN (ENCODED FORM)
2729  012600  004767  003404                JSR     %7,PROCT
2730  012604  004767  003202                JSR     %7,SPACE
2731  012610  016702  000304                MOV     DATENC,R2       ;OUTPUT DATA READ (ENCODED)
2732  012614  004767  003370                JSR     %7,PROCT
2733  012620  104003                        KBINTT
2734  012622  005777  166274                TST     @SWR            ;CHECK "HALT ON ERROR" SWITCH
2735  012626  100001                        BPL     .+4             ;BRANCH IF NOT SET
2736  012630  000000                        HALT                    ;HALT AFTER AN ERROR
2737  012632  005713                        TST     @CRS            ;CHECK ERROR
2738  012634  100023                        BPL     LASTCK          ;BRANCH IF NOT SET
2739  012636  022767  000120  000244        CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
2740  012644  001005                        BNE     FAILC1
2741  012646  032713  000400                BIT     #400,@CRS
2742  012652  001423                        BEQ     LASTCD
2743  012654  000167  000244                JMP     ALLDON
2744  012660  000167  177366        FAILC1: JMP     ERSET           ;OUTPUT ERROR MESSAGE
2745
2746                                ;INTERRUPT NOT DUE TO ERROR OR COLUMN READY
2747  012664  032713  040000        NOTCOL: BIT     #40000,@CRS     ;CHECK FOR CARD DONE
2748  012670  001470                        BEQ     NOTCD           ;BRANCH IF NOT SET
2749  012672  022767  000120  000212        CMP     #80.,CLCNT      ;CHECK COLUMN COUNT
2750  012700  001401                        BEQ     .+4             ;SKIP ERROR HALT IF 80 COLUMNS WERE READ
2751  012702  104000                        HLT                     ;LESS THAN EIGHTY COLUMNS WERE READ
```

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2752  012704  022767  000120  000176  LASTCK: CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
2753  012712  001403                          BEQ     LASTCD          ;BRANCH IF LAST CARD
2754  012714  004767  000052                  JSR     %7,NXCRD        ;IF NOT LAST CARD
2755  012720  000002                          RTI                     ;GO ON
2756  012722  022626                  LASTCD: CMP     (SP)+,(SP)+     ;IF LAST CARD, RESTORE STACK POINTER
2757  012724  004767  003002                  JSR     %7,BELL         ;RING BELL TO SIGNIFY "PASS COMPLETE"
2758  012730  032777  000040  166164  END:    BIT     #40,@SWR        ;CHECK @SRPTR FOR CONTINUATION TO ANOTHER DECK
2759  012736  001002                          BNE     .+6             ;BRANCH TO HALT IF SW5 SET
2760  012740  000167  000002                  JMP     DECKCK          ;CONTINUE TO ANOTHER DECK
2761  012744  000000                          HALT                    ;DATA TEST DONE
2762
2763                                          ;WHEN CONTINUING FROM ONE DECK TO ANOTHER, CHECK SW6 FOR TYPE
2764                                          ;OF TESTING TO BE PERFORMED
2765  012746  005167  166176          DECKCK: COM     TRFLG           ;TOGGLE TRACE FLAG
2766  012752  032777  000100  166142          BIT     #100,@SWR       ;CHECK SW6
2767  012760  001402                          BEQ     .+6             ;BRANCH IF NOT SET
2768  012762  000167  172144                  JMP     RESTRT          ;RERUN COMBINED INSTRUCTION AND DATA TEST
2769  012766  000167  176634                  JMP     DATST1
2770
2771  012772  016705  000106          NXCRD:  MOV     TSTART,R5       ;LOAD R5 WITH TABLE STARTING ADDRESS
2772  012776  032777  000014  166116          BIT     #14,@SWR                ;
2773  013004  001012                          BNE     1$              ;
2774  013006  006367  000076                  ASL     CDCNT           ;MULTIPLY CARD COUNT BY FOUR
2775  013012  006367  000072                  ASL     CDCNT
2776  013016  066705  000066                  ADD     CDCNT,R5        ;ADD OFFSET TO R5 TO POINT TO NEXT DATUM
2777  013022  006267  000062                  ASR     CDCNT           ;RESTORE CARD COUNT
2778  013026  006267  000056                  ASR     CDCNT
2779  013032  042713  000002          1$:     BIC     #2,@CRS         ;CLEAR EJECT IF SET
2780  013036  005213                          INC     @CRS            ;READ ANOTHER CARD
2781  013040  005267  000044                  INC     CDCNT           ;KEEP TRACK OF CARD.NUMBER
2782  013044  005067  000042                  CLR     CLCNT           ;INITIALIZE COLUMN COUNT
2783  013050  000207                          RTS     %7              ;RETURN
2784                                          ;INTERRUPT NOT CAUSED BY ERROR COLUMN READY OR CARD DONE
2785  013052  052767  000340  164716  NOTCD:  BIS     #340,PSR        ;LOCK OUT FURTHER INTERRUPTS
2786  013060  032713  002000                  BIT     #2000,@CRS      ;TEST ON-LINE TRANSITION BIT
2787  013064  001003                          BNE     NOTCD1          ;BRANCH IF SET
2788  013066  104000                          HLT                     ;NO BITS SET TO CAUSE AN INTERRUPT
2789  013070  000167  177610                  JMP     LASTCK          ;START NEXT CARD
2790  013074  104000                  NOTCD1: HLT                     ;ON-LINE TRANSITION CAUSED AN INTERRUPT
2791  013076  000167  177602                  JMP     LASTCK          ;START NEXT CARD
2792  013102  000000                  DECK:   0                       ;POINTER TO LITERAL "ALPHA" OR "BINARY"
2793  013104  000000                  TSTART: 0                       ;STARTING ADDRESS OF DATA TABLE
2794  013106  000000                  TEND:   0                       ;END ADDRESS OF DATA TABLE
2795  013110  000000                  CDCNT:  0                       ;NUMBER OF CARD BEING READ
2796  013112  000000                  CLCNT:  0                       ;NUMBER OF COLUMN BEING CHECKED
2797  013114  000000                  DAT1:   0                       ;DATA ON FIRST READ FROM CRB1
2798  013116  000000                  DAT2:   0                       ;DATA ON SECOND READ OF CRB1
2799  013120  000000                  DATENC: 0                       ;DATA READ FROM CRB2
2800  013122  000000                  PTOFF:  0                       ;OFFSET TO POINTER FOR DATA PRINTOUT
2801  013124  004767  002602          ALLDON: JSR     %7,BELL         ;RING BELL
2802  013130  032713  000400                  BIT     #400,@CRS       ;CHECK OFF-LINE BIT
2803  013134  001001                          BNE     .+4             ;BRANCH IF SET
2804  013136  104000                          HLT                     ;OFF-LINE NOT SET, BUT SPECIAL CONDITION
2805                                          ;WAS SET AFTER 80 COLUMNS OF THE 80TH CARD WERE READ
2806  013140  032777  000040  165754          BIT     #40,@SW.        ;CHECK @SRPTR FOR HALT AT END OF DECK
2807  013146  001403                          BEQ     ALCNT           ;CONTINUE IF NOT SET
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                                        HALT                    ;END OF DECK,SWS SET
                                        JMP     DECKCK          ;CHECK FOR TYPE OF TESTING
                                ALCNT:  BIT     #2000,@SWR      ;DOES THIS CR11 USE THE M829 MODULE
                                        BNE     ALCNT1          ;YES- BRANCH
                                        CLR     #0              ;NO-STALL TO ALLOW CARD DONE TO SET
                                        DEC     .-2
                                        BNE     .-4
                                        DEC     #0
                                        BNE     .-4
                                        DEC     #0
                                        BNE     .-4
                                        BIT     #40000, @CRS    ;CHECK CARD DONE
                                        BNE     .+4
                                        HLT                     ;CARD DONE DIDN'T SET- THIS ERROR COULD BE
                                        CLR     @CRS            ;CAUSED BY RUNNING A CR11 WHICH HAS THE
                                                                ;M829 MODULE AND NOT SETTING SWITCH REGISTER
                                                                ;SWITCH 10

                                        BIT     #157377,@CRS    ;ONLY BIT 8 & 13 MAY STILL BE SET
                                        BEQ     .+4             ;BRANCH IF OK
                                        HLT                     ;STATUS REGISTER INCORRECT
                                        BR      ALCNT2
                                ALCNT1: CLR     @CRS            ;CLEAR ERROR
                                        BIT     #156377,@CRS    ;ONLY BITS 8 AND 9 & 13 MAY STILL BE SET
                                                                ;BIT 9 MAY BE SET SINCE CARD MAY NOT
                                                                ;YET HAVE CLEARED THE READER TO CAUSE
                                                                ;CARD DONE
                                        BEQ     .+4
                                        HLT                     ;STATUS REGISTER INCORRECT
                                ALCNT2: BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
                                        MOV     PSR,2(ADINT)    ;SETUP RETURN STATUS
                                        INCB    @CRS            ;ATTEMPT TO READ- SHOULD RESET ERROR
                                        TST     @CRS            ;CHECK BIT 15
                                        BMI     ALLOK           ;BRANCH IF OK
                                        HLT                     ;SETTING READ DIDN'T RESET ERROR
                                        BR      ALWAIT          ;BRANCH TO WAIT FOR ON-LINE
                                ALLOK:  MOV     #SRVC1,@ADINT   ;LOAD INTERRUPT RETURN ADDRESS
                                        CLR     PSR             ;SET PROCESSOR TO LEVEL 0
                                        MOV     #101,@CRS       ;ENABLE INTERRUPTS, KEEP ERROR SET BY SETTING READ
                                        NOP                     ;CLOCK IN INTERRUPT
                                        MOV     2(ADINT),PSR    ;SET PROCESSOR TO LEVEL 7
                                        CLR     @CRS            ;CLEAR INTERRUPT ENABLE AND ERROR
                                        HLT                     ;BIT 15 DIDN'T CAUSE AN INTERRUPT
                                        BR      .+6
                                SRVC1:  CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
                                ALWAIT: CLR     @CRS            ;CLEAR INTERRUPT ENABLE AND ERROR
                                        MOV     #SRVC2,@ADINT   ;CHANGE INTERRUPT RETURN ADDRESS
                                        MOVB    #100,@CRS       ;ENABLE INTERRUPTS
                                        BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
                                        BIT     #400,@CRS       ;CHECK OFF-LINE BIT
                                        BNE     .-4             ;LOOP UNTIL CLEAR
                                        MOV     2(ADINT),PSR    ;SET PROCESSOR TO LEVEL 7
                                        HLT                     ;NO INTERRUPT OCCURRED
                                        BR      SRVC2A          ;BRANCH AROUND
                                SRVC2:  JSR     %7,BELL         ;RING BELL
                                        CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
```

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 2864  013402  032713  002000          SRVC2A: BIT     #2000,@CRS      ;CHECK BIT 10
 2865  013406  001001                          BNE     .+4             ;BRANCH IF SET
 2866  013410  104000                          HLT                     ;BIT 10 NOT SET
 2867  013412  032713  000400                  BIT     #400,@CRS       ;CHECK BIT 8
 2868  013416  001401                          BEQ     .+4             ;BRANCH IF NOT SET
 2869  013420  104000                          HLT                     ;BIT 8 WAS SET
 2870  013422  005013                          CLR     @CRS            ;DATO TO CRS
 2871  013424  032713  002000                  BIT     #2000,@CRS      ;CHECK BIT 10
 2872  013430  001401                          BEQ     .+4             ;BRANCH IF NOT SET
 2873  013432  104000                          HLT                     ;DATO DIDN'T CLEAR ON-LINE BIT
 2874  013434  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK FROM INITIAL INTERRUPT
 2875  013436  000167  177304                  JMP     DECKCK          ;RESTART
 2876
 2877  013442  005067  165476          ERCR11: CLR     FLAG
 2878  013446  000403                          BR      TSTA
 2879  013450  012767  000001  165466  ERCM11: MOV     #1,FLAG
 2880  013456  012702  024203          TSTA:   MOV     #SUBT2,R2
 2881  013462  004767  002740                  JSR     PC,TOUT
 2882  013466  004767  171370                  JSR     %7,SETUP        ;INITIALIZE REGISTERS
 2883  013472  012767  013502  002724          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS
 2884                          ;THE CARD READER GOING OFF-LINE SHOULD SET SPECIAL CONDITION (BIT 15) AND OFF-LINE (BIT
 2885  013500  104001          TESTA:  SCOPE
 2886  013502  005067  002712                  CLR     ITMAX           ;RUN EACH ERROR TEST ONCE ONLY
 2887  013506  004767  002172                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 2888  013512  012702  022070                  MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
 2889  013516  005767  165422                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
 2890  013522  001402                          BEQ     .+6             ;NO
 2891  013524  012702  022130                  MOV     #MSG3A,R2       ;"PRESS CARD READER 'STOP'"
 2892  013530  004767  002672                  JSR     %7,TOUT
 2893  013534  012702  022023                  MOV     #MSG2,R2
 2894  013540  004767  002662                  JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 2895  013544  004767  003000                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 2896  013550  000000                          HALT
 2897  013552  032713  000400                  BIT     #400,@CRS       ;CHECK BIT 8
 2898  013556  001001                          BNE     .+4             ;BRANCH IF SET
 2899  013560  104000                          HLT                     ;OFF-LINE (BIT 8) WASN'T SET
 2900  013562  005713                          TST     @CRS            ;CHECK BIT 15
 2901  013564  100401                          BMI     .+4             ;BRANCH IF SET
 2902  013566  104000                          HLT                     ;BIT 15 WASN'T SET
 2903  013570  012702  021704                  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'";
 2904  013574  005767  165344                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
 2905  013600  001402                          BEQ     .+6             ;NO
 2906  013602  012702  021767                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
 2907  013606  004767  002614                  JSR     %7,TOUT
 2908  013612  012702  022023                  MOV     #MSG2,R2
 2909  013616  004767  002604                  JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 2910  013622  004767  002722                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 2911  013626  000000                          HALT
 2912  013630  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
 2913  013634  001375                          BNE     .-4
 2914
 2915                          ;INPUT HOPPER EMPTY SHOULD SET SPECIAL CONDITION
 2916  013636  104001          TESTB:  SCOPE
 2917  013640  004767  002040                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 2918  013644  012702  022216                  MOV     #MSG5,R2        ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
 2919  013650  004767  002552                  JSR     %7,TOUT
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2920  013654  012702  022023          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2921  013660  004767  002542          JSR     %7,TOUT
2922  013664  004767  002660          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2923  013670  000000                  HALT
2924  013672  032713  000400          BIT     #400,@CRS       ;CHECK BIT8
2925  013676  001001                  BNE     .+4             ;BRANCH IF SET
2926  013700  104000                  HLT                     ;OFF-LINE (BIT 8) WASN'T SET
2927  013702  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
2928  013704  100401                  BMI     .+4             ;BRANCH IF SET
2929  013706  104000                  HLT                     ;SPECIAL CONDITION NOT SET
2930  013710  012702  022267          MOV     #MSG6,R2        ;"RESTORE CARDS IN INPUT HOPPER"
2931  013714  004767  002506          JSR     %7,TOUT
2932  013720  012702  021704          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
2933  013724  005767  165214          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
2934  013730  001402                  BEQ     .+6             ;NO
2935  013732  012702  021767          MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
2936  013736  004767  002464          JSR     %7,TOUT
2937  013742  012702  022023          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2938  013746  004767  002454          JSR     %7,TOUT
2939  013752  004767  002572          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2940  013756  000000                  HALT
2941  013760  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
2942  013764  001375                  BNE     .-4
2943
2944                                  ;OUTPUT STACKER FULL SHOULD SET BIT 15
2945  013766  104001          TESTC:  SCOPE
2946  013770  004767  001710          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
2947  013774  012702  022333          MOV     #MSG7,R2        ;"RAISE OUTPUT STACKER PRESSURE ARM ABOVE HORIZONTAL THE
2948  014000  005767  165140          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
2949  014004  001402                  BEQ     .+6             ;NO
2950  014006  012702  022451          MOV     #MSG7A,R2       ;"LOWER OUTPUT STACKER PLATE TO BOTTOM"
2951  014012  004767  002410          JSR     %7,TOUT
2952  014016  012702  022023          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2953  014022  004767  002400          JSR     %7,TOUT
2954  014026  004767  002516          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2955  014032  000000                  HALT
2956  014034  032713  000400          BIT     #400,@CRS       ;CHECK BIT 8
2957  014040  001001                  BNE     .+4             ;BRANCH IF SET
2958  014042  104000                  HLT                     ;OFF-LINE (BIT 8) WASN'T SET
2959  014044  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
2960  014046  100401                  BMI     .+4             ;BRANCH IF SET
2961  014050  104000                  HLT                     ;SPECIAL CONDITION NOT SET
2962  014052  012702  021704          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
2963  014056  005767  165062          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
2964  014062  001402                  BEQ     .+6             ;NO
2965  014064  012702  021767          MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
2966  014070  004767  002332          JSR     %7,TOUT
2967  014074  012702  022023          MOV     #MSG2,R2
2968  014100  004767  002322          JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2969  014104  004767  002440          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2970  014110  000000                  HALT
2971  014112  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
2972  014116  001375                  BNE     .-4
2973
2974                                  ;A FEED ERROR SHOULD SET BIT 15
2975                                  ;THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO THE READ STATION
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014120  104001                  TESTD:  SCOPE
014122  004767  001556                  JSR     %7,INIT
014126  012702  022216                  MOV     #MSG5,R2        ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
014132  004767  002270                  JSR     %7,TOUT
014136  012702  022023                  MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
014142  004767  002260                  JSR     %7,TOUT
014146  012702  022520                  MOV     #MSG8,R2        ;"HOLD DOWN THE SWITCH AT THE BOTTOM OF INPUT HOPPER
014152  005767  164766                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
014156  001402                          BEQ     .+6             ;NO
014160  012702  022611                  MOV     #MSG8A,R2       ;"LIFT SWITCH UNDER RIFFLE CAP
014164  004767  002236                  JSR     %7,TOUT
014170  012702  021704                  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'
014174  005767  164744                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
014200  001402                          BEQ     .+6             ;NO
014202  012702  021767                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
014206  004767  002214                  JSR     %7,TOUT
014212  004767  002332                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
014216  000700                          HALT
014220  032713  002000                  BIT     #2000,@CRS      ;WAIT FOR CARD READER TO COME ON-LINE
014224  001775                          BEQ     .-4
014226  004767  001452                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
014232  012713  000003                  MOV     #3,@CRS         ;SET EJECT AND READ
014236  005227  000000                  INC     #0              ;WAIT AWHILE
014242  001375                          BNE     .-4
014244  005227  000000                  INC     #0
014250  001375                          BNE     .-4
014252  005227  000000                  INC     #0
014256  001375                          BNE     .-4
014260  005227  000000                  INC     #0
014264  001375                          BNE     .-4
014266  032713  000400                  BIT     #400,@CRS       ;TEST OFF-LINE BIT
014272  001001                          BNE     .+4             ;BRANCH IF SET
014274  104000                          HLT                     ;BIT 8 WAS NOT SET
014276  005713                          TST     @CRS            ;CHECK BIT 15
014300  100401                          BMI     .+4             ;BRANCH IF SET
014302  104000                          HLT                     ;BIT 15 WAS NOT SET
014304  012702  022267                  MOV     #MSG6,R2
014310  004767  002112                  JSR     %7,TOUT         ;"RESTORE CARDS IN THE INPUT HOPPER"
014314  012702  021704                  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
014320  005767  164620                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
014324  001402                          BEQ     .+6             ;NO
014326  012702  021767                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
014332  004767  002070                  JSR     %7,TOUT
014336  012702  022023                  MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
014342  004767  002060                  JSR     %7,TOUT
014346  004767  002176                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
014352  000000                          HALT
014354  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
014360  001375                          BNE     .-4
014362  005767  164556                  TST     FLAG            ;SKIP NEXT TEST IF DOCUMATION READER
014366  001402                          BEQ     .+6
014370  000167  000314                  JMP     TESTG

                                ;A MOTION ERROR SHOULD SET BIT 15
                                ;THIS ERROR OCCURS WHEN A CARD JAM OCCURS AT THE READ STATION
014374  104001                  TESTE:  SCOPE
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 3032  014376  004767  001302          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 3033  014402  012702  022070          MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
 3034  014406  004767  002014          JSR     %7,TOUT
 3035  014412  012702  022023          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 3036  014416  004767  002004          JSR     %7,TOUT
 3037  014422  012702  022650          MOV     #MSG9,R2        ;"BLOCK THE CARD READER STATION TO
 3038  014426  004767  001774          JSR     %7,TOUT         ;PREVENT A CARD GOING THRU, AND"
 3039  014432  012702  021704          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
 3040  014436  004767  001764          JSR     %7,TOUT
 3041  014442  004767  002102          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 3042  014446  000000                  HALT
 3043  014450  032713  002000          BIT     #2000,@CRS      ;MONITOR ON-LINE TRANSITION (BIT 10)
 3044  014454  001775                  BEQ     .-4             ;CONTINUE WHEN CARD READER COMES ON-LINE
 3045  014456  012713  000003          MOV     #3,@CRS         ;READ A CARD AND SET EJECT
 3046  014462  032713  140000          BIT     #140000,@CRS    ;CHECK DONE AND SPECIAL CONDITION BITS
 3047  014466  001775                  BEQ     .-4             ;WAIT
 3048  014470  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
 3049  014472  100401                  BMI     .+4             ;CONTINUE IF SET
 3050  014474  104000                  HLT                     ;SPECIAL CONDITION NOT SET
 3051  014476  012702  022752          MOV     #MSG10,R2       ;"REMOVE JAMMED CARD"
 3052  014502  004767  001720          JSR     %7,TOUT
 3053  014506  012702  021704          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
 3054  014512  004767  001710          JSR     %7,TOUT
 3055  014516  012702  022023          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 3056  014522  004767  001700          JSR     %7,TOUT
 3057  014526  004767  002016          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 3058  014532  000000                  HALT
 3059  014534  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
 3060  014540  001375                  BNE     .-4
 3061
 3062                                  ;A STACK FAIL ERROR SHOULD SET BIT 15
 3063                                  ;ERROR OCCURS WHEN 3 CARDS IN A ROW HAVE NOT BEEN DELIVERED PROPERLY TO THE OUTPUT STACK
 3064  014542  104001          TESTF:  SCOPE
 3065  014544  004767  001134          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 3066  014550  012702  022070          MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
 3067  014554  004767  001646          JSR     %7,TOUT
 3068  014560  012702  022023          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 3069  014564  004767  001636          JSR     %7,TOUT
 3070  014570  012702  022777          MOV     #MSG11,R2       ;"HOLD THE OUTPUT STACKER GATE OPEN.  THEN"
 3071  014574  004767  001626          JSR     %7,TOUT
 3072  014600  012702  021704          MOV     #MSG1,R2        ;"PPESS CARD READER 'MOTOR START' AND
 3073  014604  004767  001616          JSR     %7,TOUT         ;'READ START.'"
 3074  014610  004767  001734          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 3075  014614  000000                  HALT
 3076  014616  032713  002000          BIT     #2000,@CRS      ;WAIT FOR CARD READER TO COME ON-LINE
 3077  014622  001775                  BEQ     .-4
 3078  014624  012701  000003          MOV     #3,COUNT        ;INITIALIZE COUNTER TO READ 3 CARDS
 3079  014630  012713  000003  LOOPF:  MOV     #3,@CRS         ;EJECT A CARD
 3080  014634  032713  140000          BIT     #140000,@CRS    ;WAIT FOR CARD DONE OR SPECIAL CONDITION
 3081  014640  001775                  BEQ     .-4
 3082  014642  005301                  DEC     COUNT           ;COUNT DOWN
 3083  014644  001371                  BNE     LOOPF           ;READ 3 CARDS ALL TOGETHER
 3084  014646  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT 15
 3085  014650  100401                  BMI     .+4             ;BRANCH IF SET
 3086  014652  104000                  HLT                     ;SPECIAL CONDITION NOT SET
 3087  014654  012702  021704          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
```

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3098  014660  004767  001542                JSR     %7,TOUT
3099  014664  012702  022023                MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
3100  014670  004767  001532                JSR     %7,TOUT
3101  014674  004767  001650                JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
3102  014700  000000                        HALT
3103  014702  032713  000400                BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
3104  014706  001375                        BNE     .-4
3105
3106                                  ;DARK-LIGHT ERROR SHOULD SET BIT 15
3107                                  ;THIS OCCURS WHEN DATA IS SENSED BEFORE COLUMN ONE OR AFTER COLUMN EIGHTY
3108                                  ;OR WHEN THE SENSORS ARE NOT ALL SENSING A HOLE AFTER THE CARD HAS PASSED
3109                                  ;THIS TEST IS SKIPPED IF BIT 0 OF THE SWITCH REGISTER EQUALS ONE
3110                                  ;TO MAKE THE 2 DARK-LIGHT CHECK CARDS:
3111                                  ;       1.  TEAR A SMALL PIECE FROM THE LEADING EDGE OF ONE CARD
3112                                  ;       2.  TAPE 2 CARDS TOGETHER TO MAKE ONE "LONG" CARD-IT ONLY NEEDS TO BE
3113                                  ;           ABOUT 1/2 INCH LONGER THAN A REGULAR CARD
3114  014710  104001                  TESTG:  SCOPE
3115  014712  032777  000001  164202          BIT     #1,@SWR         ;CHECK SW0
3116  014720  001410                        BEQ     CONTG           ;RUN TEST IF NOT SET
3117  014722  004767  001004                JSR     %7,BELL         ;IF SET, RING BELL AND
3118  014726  000000                        HALT                    ;HALT
3119  014730  012767  013502  001466        MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS TO LOOP THRU TESTS
3120  014736  000167  176536                JMP     TESTA           ;START ERROR TESTS OVER ON CONTINUING
3121  014742  004767  000736          CONTG:  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
3122  014746  005001                        CLR     COUNT           ;INITIALIZE COUNTER
3123  014750  005201                        INC     COUNT           ;SET TO INDICATE FIRST PASS
3124  014752  012702  023051                MOV     #MSG12,R2       ;"PLACE SPECIAL DARK-LIGHT CHECK CARDS (SEE LISTING, TES
3125  014756  004767  001444                JSR     %7,TOUT         ;AT THE BOTTOM OF THE INPUT STACK"
3126  014762  012702  021704          LOOPG:  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
3127  014766  005767  164152                TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
3128  014772  001402                        BEQ     .+6             ;NO
3129  014774  012702  021767                MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
3130  015000  004767  001422                JSR     %7,TOUT
3131  015004  012702  022023                MOV     #MSG2,R2
3132  015010  004767  001412                JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
3133  015014  004767  001530                JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
3134  015020  000000                        HALT
3135  015022  032713  000400                BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
3136  015026  001375                        BNE     .-4
3137  015030  012713  000003                MOV     #3,@CRS         ;EJECT THE CARD
3138  015034  032713  140000                BIT     #140000,@CRS    ;WAIT FOR ERROR OR CARD DONE
3139  015040  001775                        BEQ     .-4
3140  015042  005713                        TST     @CRS            ;CHECK SPECIAL CONDITION
3141  015044  100401                        BMI     .+4             ;CONTINUE IF SET
3142  015046  104000                        HLT                     ;SPECIAL CONDITION NOT SET
3143  015050  005301                        DEC     COUNT           ;COUNT DOWN
3144  015052  001743                        BEQ     LOOPG           ;IF FIRST PASS, LOOP
3145  015054  004767  000652                JSR     %7,BELL         ;RING BELL
3146  015060  000000                        HALT
3147  015062  012702  021704                MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
3148  015066  005767  164052                TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER
3149  015072  001402                        BEQ     .+6             ;NO
3150  015074  012702  021767                MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET' "
3151  015100  004767  001322                JSR     %7,TOUT
3152  015104  012702  022023                MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
3153  015110  004767  001312                JSR     %7,TOUT
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3144  015114  004767  001430                  JSR     X7,CRLF4        ;MOVE MESSAGE UP ON TTY
3145  015120  000000                          HALT
3146  015122  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
3147  015126  001375                          BNE     .-4
3148  015130  012767  013502  001266          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS
3149  015136  000167  176336                  JMP     TESTA           ;LOOP THRU TEST ON CONTINUING
3150
3151
3152                                  ;ROUTINE TO LOOP THRU A SINGLE INSTRUCTION TEST
3153                                  ;NOTE THAT SW11 MUST BE DOWN AFTER 2ND HALT
3154  015142  012702  024236          TESTX:  MOV     #SUBT4,R2
3155  015146  004767  001254                  JSR     PC,TOUT
3156  015152  004767  167704                  JSR     X7,SETUP                ;SETUP POINTERS AND FLAGS
3157  015156  012702  024077                  MOV     #STADD,R2
3158  015162  004767  001240                  JSR     PC,TOUT
3159  015166  104004                          READC
3160  015170  016767  163740  000062          MOV     TMP1,RETRNX
3161  015176  062767  000002  000054          ADD     #2,RETRNX               ;CHANGE TO FIRST ADDRESS AFTER SCOPE INSTRUCTION
3162  015204  032777  010000  163710  2$:     BIT     #10000,@SWR             ;CHECK SW12
3163  015212  001404                          BEQ     .+12                    ;BRANCH IF NOT SET
3164  015214  042767  000020  162554          BIC     #20,PSR                 ;CLEAR TRACE BIT
3165  015222  000403                          BR      .+10                    ;SKIP NEXT INSTRUCTION
3166  015224  052767  000020  162544          BIS     #20,PSR                 ;SET TRACE BIT
3167  015232  005067  001164                  CLR     ITCNT                   ;CLEAR ITERATION COUNTER
3168  015236  012767  015250  001160          MOV     #XLOOP,RETURN           ;LOAD RETURN ADDRESS
3169  015244  000177  000010                  JMP     @RETRNX                 ;JUMP TO TEST
3170  015250  005067  001146          XLOOP:  CLR     ITCNT                   ;KEEP ITERATION COUNTER AT ZERO
3171  015254  000177  000000                  JMP     @RETRNX                 ;JUMP TO TEST
3172  015260  000000                  RETRNX: 0
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3173
3174
3175                                    ;ROUTINE TO CHECK CARDS WHICH HAVE ALL COLUMNS IDENTICALLY PUNCHED.
3176                                    ;THIS ROUTINE ALLOWS SPECIFIC TYPES OF DATA FAILURES TO BE STUDIED
3177                                    ;EASILY.  THE PATTERN IS STORED, AND THEN
3178                                    ;EACH COLUMN OF EACH CARD IS READ TWICE AND COMPARED WITH IT.  IF A
3179                                    ;DISCREPANCY OCCURS, THE ERROR IS PRINTED OUT ALONG WITH THE TOTAL
3180                                    ;NUMBER OF CARDS READ AND THE TOTAL NUMBER OF DATA ERRORS DISCOVERED
3181                                    ;UP TO THAT POINT (ALL PRINTOUTS ARE IN OCTAL).  WHEN THE INPUT HOPPER
3182                                    ;IS EMPTY, THE ROUTINE RINGS THE BELL AND WAITS FOR MORE CARDS TO BE
3183                                    ;LOADED AND THE CARD READER TO BE PUT BACK ON-LINE.
3184                                    ;SW15=1 CAUSES A HALT AFTER AN ERROR, AND SW13=1 INHIBITS ERROR PRINTOUTS.
3185
3186  015262  012702  024261           CKSAME: MOV     #SUBT5,R2
3187  015266  004767  001134                   JSR     PC,TOUT
3188  015272  004767  167564                   JSR     %7,SETUP        ;INITIALIZE POINTERS
3189  015276  012702  024050                   MOV     #CIMPAT,R2
3190  015302  004767  001120                   JSR     PC,TOUT
3191  015306  104004                           PERDC
3192  015310  016767  163620  000364          MOV     TMP1,CARDIM
3193  015316  042767  170000  000356          BIC     #170000,CARDIM  ;CLEAR UPPER BITS OF PATTERN
3194  015324  005067  000350                   CLR     TOTCRD          ;INITIALIZE CARD COUNT
3195  015330  005067  000342                   CLR     TOTERR          ;INITIALIZE ERROR COUNT
3196  015334  005067  163614                   CLR     ERFLG           ;CLEAR FLAG FOR PRINTING ERROR HEADING
3197  015340  005067  175546           CKLOOP: CLR     CLCNT           ;INITIALIZE COLUMN COUNT
3198  015344  104003                           KBINTT
3199  015346  032713  000400                   BIT     #400,@CRS       ;CHECK BIT 8
3200  015352  001017                           BNE     CKSIT           ;BRANCH IF SET TO WAIT FOR READER TO COME ON-LINE.
3201  015354  005213                           INC     @CRS            ;START READING CARD
3202  015356  005267  002316                   INC     TOTCRD          ;INCREMENT CARD COUNT
3203  015362  105713           CKLP1:  TSTB    @CRS            ;CHECK COLUMN READY
3204  015364  100426                           BMI     CKCOL           ;BRANCH IF SET
3205  015366  032713  040000                   BIT     #40000,@CRS     ;CHECK CARD DONE
3206  015372  001015                           BNE     CKCRD           ;BRANCH IF SET
3207  015374  005713                           TST     @CRS            ;CHECK SPECIAL CONDITION
3208  015376  100371                           BPL     CKLP1           ;LOOP IF NOT SET
3209  015400  032713  000400                   BIT     #400,@CRS       ;CHECK BIT 8
3210  015404  001002                           BNE     CKSIT           ;BRANCH IF SET TO WAIT FOR READER ON-LINE.
3211  015406  104000                           HLT                     ;SPECIAL CONDITION SET, BIT 8 CLEAR
3212  015410  000753                           BR      CKLOOP
3213
3214  015412  004767  000314           CKSIT:  JSR     %7,BELL         ;RING BELL TO SIGNIFY READER OFF-LINE
3215  015416  032713  000400           CKSIT1: BIT     #400,@CRS       ;CHECK BIT 8
3216  015422  001375                           BNE     CKSIT1          ;LOOP IF STILL SET
3217  015424  000745                           BR      CKLOOP          ;START NEXT CARD
3218  015426  022767  000120  175456   CKCRD:  CMP     #80.,CLCNT      ;CHECK FOR 80 COLUMNS READ
3219  015434  001741                           BEQ     CKLOOP          ;START NEXT CARD IF OK
3220  015436  104000                           HLT                     ;FINAL COLUMN COUNT WASN'T 80
3221  015440  000737                           BR      CKLOOP          ;START NEXT CARD
3222  015442  011467  175446           CKCOL:  MOV     @CRB1,DAT1      ;READ DATA BUFFER
3223  015446  005267  175440                   INC     CLCNT           ;COUNT COLUMNS
3224  015452  105713                           TSTB    @CRS            ;CHECK COLUMN READY
3225  015454  100002                           BPL     .+6             ;BRANCH IF OK
3226  015456  104000                           HLT                     ;READING DBR DIDN'T CLEAR READY
3227  015460  000727                           BR      CKLOOP          ;START NEXT CARD AFTER ERROR
3228  015462  012701  000200                   MOV     #200,COUNT      ;WAIT AWHILE
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  3229  015466  005301                  CKLP2:  DEC     COUNT
  3230  015470  001376                          BNE     CKLP2
  3231  015472  011467  175420                  MOV     @CRB1,DAT2      ;READ CRB1 AGAIN
  3232  015476  026767  175412  000176          CMP     DAT1,CARDIM     ;COMPARE FIRST DATA TO PATTERN
  3233  015504  001005                          BNE     CKFAIL          ;BRANCH IF FAILURE
  3234  015506  026767  175404  000166          CMP     DAT2,CARDIM     ;COMPARE SECOND READING TO PATTERN
  3235  015514  001001                          BNE     CKFAIL          ;BRANCH IF FAILURE
  3236  015516  000721                          BR      CKLP1           ;WAIT FOR NEXT COLUMN OR END OF CARD
  3237  015520  005267  000152          CKFAIL: INC     TOTERR          ;COUNT ERRORS
  3238  015524  104003                          KBINTT
  3239  015526  032777  020000  163366          BIT     #20000,@SWR     ;CHECK FOR INHIBITING PRINTOUT
  3240  015534  001047                          BNE     CKHLT           ;BRANCH AROUND PRINTOUT IF SET
  3241  015536  005767  163412                  TST     ERFLG           ;TEST FLAG TO PRINT HEADING
  3242  015542  001006                          BNE     CKNOHD          ;BRANCH IF ALREADY DONE
  3243  015544  005267  163404                  INC     ERFLG           ;PRINT HEADING ONCE ONLY
  3244  015550  012702  023444                  MOV     #MSG19,R2       ;OUTPUT HEADING
  3245  015554  004767  000646                  JSR     %7,TOUT
  3246  015560  004767  000732          CKNOHD: JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
  3247  015564  016702  175322                  MOV     CLCNT,R2        ;PRINT COLUMN NUMBER
  3248  015570  004767  000414                  JSR     %7,PROCT
  3249  015574  004767  000212                  JSR     %7,SPACE
  3250  015600  016702  175310                  MOV     DAT1,R2         ;PRINT FIRST READING
  3251  015604  004767  000400                  JSR     %7,PROCT
  3252  015610  004767  000176                  JSR     %7,SPACE
  3253  015614  016702  175276                  MOV     DAT2,R2         ;PRINT SECOND READING
  3254  015620  004767  000364                  JSR     %7,PROCT
  3255  015624  004767  000162                  JSR     %7,SPACE
  3256  015630  016702  000044                  MOV     TOTCRD,R2       ;PRINT TOTAL NUMBER OF CARDS READ
  3257  015634  004767  000350                  JSR     %7,PROCT
  3258  015640  004767  000146                  JSR     %7,SPACE
  3259  015644  016702  000026                  MOV     TOTERR,R2       ;PRINT TOTAL NUMBER OF DATA ERRORS
  3260  015650  004767  000334                  JSR     %7,PROCT
  3261  015654  005777  163242          CKHLT:  TST     @SWR            ;CHECK SW15 TO HALT ON ERROR
  3262  015660  100002                          BPL     CKDONE          ;BRANCH IF NOT SET
  3263  015662  000000                          HALT                    ;HALT ON ERROR
  3264  015664  000625                          BR      CKLOOP          ;CONTINUE
  3265  015666  032713  140000          CKDONE: BIT     #140000,@CRS    ;WAIT FOR SPECIAL CONDITION OR DONE
  3266  015672  001775                          BEQ     CKDONE
  3267  015674  000621                          BR      CKLOOP          ;START NEXT CARD AFTER CHECKING BIT 8
  3268  015676  000000                  TOTERR: 0
  3269  015700  000000                  TOTCRD: 0
  3270  015702  000000                  CARDIM: 0
  3271
  3272
  3273                                  ;ISSUE MESSAGE IF CARD READER IS OFF-LINE
  3274                                  ;WAIT FOR BUSY TO CLEAR IN CASE CARD READER IS STILL READING A CARD
  3275                                  ;INITIALIZE STATUS REGISTER AND USE ERROR HALT IF IT DOESN'T CLEAR PROPERLY
  3276                                  ;NOTE THAT PROGRAM WILL HANG HERE IF BUSY REMAINS SET
  3277  015704  004767  000046          INIT:   JSR     %7,CKBIT8       ;SEE IF OFF-LINE BIT IS SET
  3278  015710  032713  001000                  BIT     #1000,@CRS      ;WAIT FOR BUSY TO CLEAR, IN CASE
  3279  015714  001375                          BNE     .-4             ;A CARD IS STILL BEING READ
  3280  015716  005013                          CLR     @CRS            ;INITIALIZE STATUS REGISTER
  3281  015720  005714                          TST     @CRB1           ;READ DATA BUFFER TO CLEAR COLUMN READY
  3282  015722  005713                          TST     @CRS            ;MAKE SURE INITIALIZATION OK
  3283  015724  001401                          BEQ     .+4             ;BRANCH IF ALL BITS ZERO
  3284  015726  104000                          HLT                     ;NOT ALL BITS OF STATUS REGISTER ARE ZERO
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3285  015730  000207                          RTS     %7              ;RETURN
3286                  .
3287                                  ;BELL ON PASS COMPLETE
3288  015732  105777  163172          BELL:   TSTB    @TCSR           ;WAIT FOR TTY READY
3289  015736  100375                          BPL     .-4
3290  015740  012777  000207  163164        MOV     #207,@TDBR      ;RING BELL
3291  015746  012767  000001  000444        MOV     #1,ITMAX        ;MAKE CERTAIN ITERATION MAXIMUM IS CORRECT
3292  015754  000207                          RTS     %7              ;RETURN
3293
3294                                  ;SUBROUTINE TO CHECK FOR BIT 8 (OFF-LINE) BEING SET IN CARD
3295                                  ;READER CSR, AND PRINT OUT A MESSAGE IF IT IS
3296  015756  032713  000400          CKBIT8: BIT     #400,@CRS       ;CHECK BIT 8
3297  015762  001001                          BNE     .+4             ;BRANCH IF SET
3298  015764  000207                          RTS     %7              ;RETURN IF NOT SET
3299  015766  012702  023424                  MOV     #MSG18,R2       ;OUTPUT MESSAGE
3300  015772  004767  000430                  JSR     %7,TOUT         ;"BIT 8 WAS SET-
3301  015776  012702  023341                  MOV     #MSG17,R2       ;"REMEDY THE ERROR CONDITION
3302  016002  004767  000420                  JSR     %7,TOUT         ;AND PRESS 'CONTINUE'"
3303  016006  000000                          HALT                    ;WAIT FOR CONTINUE
3304  016010  000762                          BR      CKBIT8          ;CHECK AGAIN
3305
3306                                  ;SUBROUTINE TO ISSUE N SPACES
3307                                  ;N IS ONE PLUS VALUE CONTAINED IN SPACEX
3308                                  ;SPACEX IS CLEARED WITHIN THE SUBROUTINE, SO THAT A CALL ON
3309                                  ;SPACE WITHOUT LOADING SPACEX ISSUES ONLY ONE SPACE
3310  016012  105777  163112          SPACE:  TSTB    @TCSR           ;WAIT FOR TTY READY
3311  016016  100375                          BPL     .-4
3312  016020  012777  000240  163104        MOV     #240,@TDBR      ;OUTPUT A SPACE
3313  016026  005367  000010                  DEC     SPACEX          ;DECREMENT COUNT
3314  016032  100367                          BPL     SPACE           ;LOOP IF NOT DONE
3315  016034  005067  000002                  CLR     SPACEX          ;RESET COUNT TO ZERO
3316  016040  000207                          RTS     %7              ;RETURN
3317  016042  000000                  SPACEX: 0
3318
3319
3320
3321
3322                                  ;ENTERED WITH SYSTEM TRAP CALL (HLT)
3323                                  ;PRINT OUT THE ERROR PC AND STATUS REGISTER
3324  016044  104003                  PRINT:  KBINTT
3325  016046  037727  163050  020000        BIT     @SWR,   #20000  ;TEST FOR INHIBIT PRINT OUT
3326  016054  001401                          BEQ     .+4             ;BRANCH TO PRINT
3327  016056  000441                          BR      B.CK            ;INHIBIT, CHECK FOR HALT
3328  016060  012667  000120                  MOV     (6)+,   SAVPC   ;PC OF FAILING ROUTINE
3329  016064  012667  000116                  MOV     (6)+,   SAVPSR  ;PSR OR ERROR CONDITION
3330  016070  024646                          CMP     -(6),   -(6)    ;RESTORE STACK
3331  016072  004767  000420                  JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
3332  016076  010267  000074                  MOV     %2,     SAVR2   ;SAVE R2
3333  016102  016702  000076                  MOV     SAVPC,  %2
3334  016106  162702  000002                  SUB     #2,R2           ;UPDATE ADDRESS POINTER
3335  016112  004767  000072                  JSR     %7,     PROCT   ;PRINT PC IN OCTAL
3336  016116  105777  163006                  TSTB    @TCSR           ;WAIT FOR TTY READY
3337  016122  100375                          BPL     .-4
3338  016124  012777  000240  163000        MOV     #240,   @TDBR   ;OUTPUT A SPACE
3339  016132  016702  000050                  MOV     SAVPSR, %2
3340  016136  004767  000046                  JSR     %7,     PROCT   ;PRINT PROCESSOR STATUS AT TIME OF FAILURE
```

```
3341  016142  016702  000030                    MOV     SAVR2,  %2      ;RESTORE REGISTER 2
3342  016146  105777  162756                    TSTB    @TCSR           ;WAIT FOR TTY READY
3343  016152  100375                            BPL     .-4
3344  016154  012777  000240  162750            MOV     #240,@TDBR
3345  016162  005777  162734          B.CK:     TST     @SWR            ;CHECK @SRPTR FOR HALT SWITCH
3346  016166  100001                            BPL     .+4             ;BRANCH IF NOT SET
3347  016170  000000                            HALT                    ;HALT ON ERROR UP
3348  016172  104003                            KBINTT
3349  016174  000002                            RTI                     ;RETURN TO MAIN LINE
3350  016176  000000          SAVR2:  0
3351  016200  000000          SAVR3:  0
3352  016202  000000          SAVR4:  0
3353  016204  000000          SAVPC:  0
3354  016206  000000          SAVPSR: 0
3355
3356  016210  010367  177764          PROCT:  MOV     %3,SAVR3        ;SAVE R3
3357  016214  010467  177762                  MOV     %4,SAVR4        ;SAVE R4
3358  016220  005004                          CLR     %4              ;CLEAR R4 TO USE AS COUNTER
3359  016222  005001                          CLR     COUNT           ;CLEAR COUNT TO USE AS CARRY FLAG
3360  016224  012703  000260                  MOV     #260,   %3      ;SETUP ASCII ZERO IN R3
3361  016230  005702                          TST     %2              ;CHECK BIT 15 OF DESIRED NUMBER
3362  016232  100001                          BPL     .+4             ;BRANCH IF NOT SET
3363  016234  005203                          INC     %3              ;CHANGE TO ASCII ONE
3364  016236  006102                          ROL     %2              ;ROTATE INTO RIGHTMOST BIT
3365  015240  006102                          ROL     %2              ;TO PREPARE FOR LOOP
3366  016242  005501                          ADC     COUNT           ;STORE CARRY
3367  016244  105777  162660          C.WAIT: TSTB    @TCSR           ;WAIT FOR TTY READY
3368  016250  100375                          BPL     C.WAIT
3369  016252  010377  162654                  MOV     %3,     @TDBR   ;OUTPUT ASCII
3370  016256  005204                          INC     %4              ;COUNT CHARACTERS OUTPUT
3371  016260  020427  000006                  CMP     %4,     #6      ;CHECK FOR DONE
3372  016264  001005                          BNE     C.CONT          ;BRANCH IF NOT DONE
3373  016266  016703  177706                  MOV     SAVR3,%3        ;RESTORE REGISTER 3
3374  016272  016704  177704                  MOV     SAVR4,%4        ;RESTORE REGISTER 4
3375  016276  000207                          RTS     %7              ;RETURN
3376  016300  000241          C.CONT: CLC                             ;CLEAR CARRY
3377  016302  005701                          TST     COUNT           ;TEST CARRY FLAG
3378  016304  001402                          BEQ     .+6             ;BRANCH IF NOT SET
3379  016306  005001                          CLR     COUNT           ;CLEAR FLAG
3380  016310  000261                          SEC                     ;SET CARRY
3381  016312  006102                          ROL     %2              ;ROTATE NEXT 3 BITS INTO RIGHTMOST 3
3382  016314  006102                          ROL     %2
3383  016316  006102                          ROL     %2
3384  016320  005501                          ADC     COUNT           ;STORE CARRY
3385  016322  010203                          MOV     %2,     %3      ;MOVE DATA FOR OUTPUT
3386  016324  042703  177770                  BIC     #177770,%3      ;CLEAR ALL BUT RIGHTMOST 3 BITS
3387  016330  052703  000260                  BIS     #260,   %3      ;SET TO ASCII EQUIVALENT
3388  016334  000743                          BR      C.WAIT          ;LOOP
3389                          ;SCOPE AND/OR ITERATION LOOP FOR EACH TEST 2 TIMES
3390  016336  104003          SCOPEC: KRINTT
3391  016340  032777  040000  162554          BIT     #40000, @SWR    ;TEST @SRPTR FOR SCOPE
3392  016346  001012                          BNE     D.1             ;YES,SCOPE
3393  016350  032777  004000  162544          BIT     #4000,@SWR      ;NO- TEST FOR ITERATION
3394  016356  001013                          BNE     D.2             ;INHIBIT ITERATION
3395  016360  026767  000036  000032          CMP     ITCNT,ITMAX     ;CHECK FOR ITERATIONS COMPLETE
3396  016366  100007                          BPL     D.2             ;EXIT-DONE
```

```
3397  016370  005267  000026          INC     ITCNT           ;INCREMENT COUNT
3398  016374  022606                  CMP     (6)+,   %6      ;REPOSITION STACK POINTER
3399  016376  012667  161374          MOV     (6)+,   PSR     ;RESTORE PROCESSOR STATUS
3400  016402  000177  000016          JMP     @RETURN         ;RETURN TO RERUN TEST
3401  016406  005067  000010  D.2.    CLR     ITCNT           ;CLEAR COUNTER
3402  016412  011667  000006          MOV     @%6,    RETURN  ;SAVE SCOPE RETURN POINTER
3403  016416  000002                  RTI                     ;RETURN INLINE-NEXT TEST
3404  016420  000000          ITMAX:  0                       ;MAX NUMBER OF ITERATIONS
3405  016422  000000          ITCNT:  0                       ;COUNT LOCATION FOR ITERATION LOOP
3406  016424  005212          RETURN: TEST1+2                 ;ADDRESS OF LAST TEST
3407
3408                          ;MOV ADDRESS OF MESSAGE TO REGISTER 2
3409                          ;THEN JSR %7, TOUT
3410  016426  142777  000177  162474  TOUT:   BICB    #177,   @TCSR   ;CLEAR INT FLAG
3411  016434  111267  000054          MOVB    @%2,    L.EOMK  ;MOVE IN EOM MARKER
3412  016440  005202          L.INC:  INC     %2              ;MOVE DATA POINTER TO NEXT BYTE
3413  016442  121267  000046  L.TOUT: CMPB    @%2,    L.EOMK  ;COMPARE FOR EOM
3414  016446  001006                  BNE     L.CNT           ;BRANCH IF NOT END OF MESSAGE
3415  016450  105777  162454          TSTB    @TCSR           ;WAIT FOR TTY READY
3416  016454  100375                  BPL     .-4
3417  016456  005077  162450          CLR     @TDBR           ;OUTPUT NULL
3418  016462  000207                  RTS     %7              ;RETURN IF EOM
3419  016464  121227  000100  L.CNT:  CMPB    @%2,    #'@     ;CHECK FOR CR,LF REQUEST
3420  016470  001003                  BNE     .+10            ;BRANCH IF NOT
3421  016472  004767  000020          JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
3422  016476  000760                  BR      L.INC           ;LOOP
3423  016500  105777  162424          TSTB    @TCSR           ;WAIT FOR TTY
3424  016504  100375                  BPL     .-4
3425  016506  112277  162420          MOVB    (2)+,   @TDBR   ;OUTPUT NEXT CHARACTER
3426  016512  000753                  BR      L.TOUT          ;CONTINUE
3427  016514  000000          L.EOMK: 0
3428
3429                          ;SUBROUTINE TO ISSUE CARRIAGE RETURN AND LINEFEED
3430  016516  105777  162406  CRLF:   TSTB    @TCSR           ;WAIT FOR TTY READY
3431  016522  100375                  BPL     .-4
3432  016524  112777  000215  162400          MOVB    #215,   @TDBR   ;SEND CARRIAGE RETURN
3433  016532  105777  162372          TSTB    @TCSR           ;WAIT FOR TTY
3434  016536  100375                  BPL     .-4
3435  016540  112777  000212  162364          MOVB    #212,   @TDBR   ;SEND LINE FEED
3436  016546  000207                  RTS     %7              ;RETURN
3437
3438
3439                          ;DO 4 CRLF'S TO MOVE MESSAGES ON TELETYPE
3440  016550  004767  177742  CRLF4:  JSR     %7,CRLF
3441  016554  004767  177736          JSR     %7,CRLF
3442  016560  004767  177732          JSR     %7,CRLF
3443  016564  004767  177726          JSR     %7,CRLF
3444  016570  000207                  RTS     %7
3445
3446
3447  016572  022767  000176  162322  CNTLUU: CMP     #SWREG,SWR
3448  016600  001403                  BEQ     1$
3449  016602  062716  000002          ADD     #2,(SP)
3450  016606  000504                  BR      OUT
3451  016610  012702  024037  1$:     MOV     #SWREG,R2
3452  016614  004767  177606          JSR     PC,TOUT
```

```
3453  016620  016702  161352                  MOV     SWREG,R2
3454  016624  004767  177360                  JSR     PC,PROCT
3455  016630  012702  024022                  MOV     #NEWIS,R2
3456  016634  004767  177566                  JSR     PC,TOUT
3457  016640  005067  162270          AGN:    CLR     TMP1
3458  016644  012767  000007  162266          MOV     #7,CSNT
3459  016652  105777  162246          READ:   TSTB    @KBCSR
3460  016656  100375                          BPL     READ
3461  016660  117767  162242  162254          MOVB    @KBDBR,TIB
3462  016666  116777  162250  162236          MOVB    TIB,@TDBR
3463  016674  142767  000200  162240          BICB    #200,TIB
3464  016702  122767  000025  162232          CMPB    #25,TIB
3465  016710  001005                          BNE     2$
3466  016712  012702  024174                  MOV     #CTLU,R2
3467  016716  004767  177504                  JSR     PC,TOUT
3468  016722  000746                          BR      AGN
3469  016724  122767  000015  162210  2$:     CMPB    #15,TIB
3470  016732  001430                          BEQ     1$
3471  016734  122767  000060  162200          CMPB    #60,TIB
3472  016742  003027                          BGT     INERRR
3473  016744  122767  000067  162170          CMPB    #67,TIB
3474  016752  002423                          BLT     INERRR
3475  016754  142767  000060  162160          BICB    #60,TIB
3476  016762  006367  162146                  ASL     TMP1
3477  016766  006367  162142                  ASL     TMP1
3478  016772  006367  162136                  ASL     TMP1
3479  016776  156767  162140  162130          BISB    TIB,TMP1
3480  017004  005367  162130                  DEC     CSNT
3481  017010  001404                          BEQ     INERRR
3482  017012  000717                          BR      READ
3483  017014  004767  177476          1$:     JSR     %7,CRLF
3484  017020  000002                  OUT:    RTI
3485  017022  012702  024011          INERRR: MOV     #QEST,R2
3486  017026  004767  177374                  JSR     PC,TOUT
3487  017032  000702                          BR      AGN
3488
3489                                  ;ROUTINE TO CHECK EXISTANCE OF SWREG
3490
3491  017034  016746  160746          SUSWR:  MOV     6,-(SP)
3492  017040  016746  160740                  MOV     4,-(SP)
3493  017044  012767  017064  160732          MOV     #1$,4
3494  017052  022777  177777  162042          CMP     #-1,@SWR
3495  017060  001402                          BEQ     2$
3496  017062  000407                          BR      3$
3497  017064  022626                  1$:     CMP     (SP)+,(SP)+
3498  017066  012767  000176  162026  2$:     MOV     #SWREG,SWR
3499  017074  012767  000174  162016          MOV     #DISPREG,@DISPLAY
3500  017102  012667  160676          3$:     MOV     (SP)+,4
3501  017106  012667  160674                  MOV     (SP)+,6
3502  017112  000002                          RTI
3503
3504  017114  022767  000176  162000  KBINT:  CMP     #SWREG,SWR
3505  017122  001016                          BNE     1$
3506  017124  005067  162004                  CLR     TMP1
3507  017130  117767  161772  161776          MOVB    @KBDBR,TMP1
3508  017136  142767  000200  161770          BICB    #200,TMP1
```

```
3509  017144  122767  000007  161762          CMPB    #7,TMP1
3510  017152  001002                          BNE     1$
3511  017154  104002                          CNTLU
3512  017156  104006                          CKU
3513  017160  000002                  1$:     RTI
3514
3515  017162  011646                  EMTSRV: MOV     (SP),-(SP)
3516  017164  162716  000002                  SUB     #2,(SP)
3517  017170  017616  000000                  MOV     @(SP),(SP)
3518  017174  006316                          ASL     (SP)
3519  017176  042716  177001                  BIC     #177001,(SP)
3520  017202  062716  017214                  ADD     #EMTTAB,(SP)
3521  017206  017616  000000                  MOV     @(SP),(SP)
3522  017212  000136                          JMP     @(SP)+
3523
3524  017214  016044                  EMTTAB: PRINT                   ;CALLED BY EMT HLT
3525  017216  016336                          SCOPEC                  ;CALLED BY EMT SCOPE
3526  017220  016572                          CNTLUU                  ;CALLED BY EMT CNTLU
3527  017222  017114                          KBINT                   ;CALLED BY EMT KBINTT
3528  017224  016652                          READ                    ;CALLED BY EMT READC
3529  017226  017034                          SUSWR                   ;CALLED BY EMT SUSWRR
3530  017230  017234                          CKUU                    ;CALLED BY EMT CKU
3531  017232  017254                          TITTYP                  ;CALLED BY EMT TIT
3532
3533
3534  017234  122767  000007  161676  CKUU:   CMPB    #7,CSNT
3535  017242  001403                          BEQ     1$
3536  017244  016777  161664  161650          MOV     TMP1,@SWR
3537  017252  000002                  1$:     RTI
3538
3539
3540  017254  005767  161656          TITTYP: TST     TIFLG
3541  017260  001406                          BEQ     1$
3542  017262  012702  024125                  MOV     #TITL,R2
3543  017266  004767  177134                  JSR     %7,TOUT
3544  017272  005067  161640                  CLR     TIFLG
3545  017276  000002                  1$:     RTI
3546
3547
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                                ;DATA TABLES FOR DATA RELIABILITY TESTS

                                ;ALPHANUMERIC DECK DATA TABLE
                                ;FIRST VALUE FOR A COLUMN IS THE DIRECT
                                ;CARD IMAGE FOR THAT COLUMN ON CARD 1
                                ;THE SECOND VALUE IS THE ENCODED FORM OF THAT DATA
                                                                ;COLUMN CHAR HOLLERITH
017300  004000                  ALPCD:  4000                    ;1      &       12
017302  000200                          200
017304  004400                          4400                    ;2      A       12 1
017306  000201                          201
017310  004200                          4200                    ;3      B       12 2
017312  000202                          202
017314  004100                          4100                    ;4      C       12 3
017316  000203                          203
017320  004040                          4040                    ;5      D       12 4
017322  000204                          204
017324  004020                          4020                    ;6      E       12 5
017326  000205                          205
017330  004010                          4010                    ;7      F       12 6
017332  000206                          206
017334  004004                          4004                    ;8      G       12 7
017336  000207                          207
017340  004002                          4002                    ;9      H       12 8
017342  000210                          210
017344  004001                          4001                    ;10     I       12 9
017346  000220                          220
017350  004202                          4202                    ;11     CENT    12 8 2
017352  000212                          212
017354  004102                          4102                    ;12     .       12 8 3
017356  000213                          213
017360  004042                          4042                    ;13     <       12 8 4
017362  000214                          214
017364  004022                          4022                    ;14     (       12 8 5
017366  000215                          215
017370  004012                          4012                    ;15     +       12 8 6
017372  000216                          216
017374  004006                          4006                    ;16     !       12 8 7
017376  000217                          217
017400  002000                          2000                    ;17     -       11
017402  000100                          100
017404  002400                          2400                    ;18     J       11 1
017406  000101                          101
017410  002200                          2200                    ;19     K       11 2
017412  000102                          102
017414  002100                          2100                    ;20     L       11 3
017416  000103                          103
017420  002040                          2040                    ;21     M       11 4
017422  000104                          104
017424  002020                          2020                    ;22     N       11 5
017426  000105                          105
017430  002010                          2010                    ;23     O       11 6
017432  000106                          106
017434  002004                          2004                    ;24     P       11 7
017436  000107                          107
```

```
3604  017440  002002          2002                ;25   @       11 8
3605  017442  000110          110
3606  017444  002001          2001                ;26   R       11 9
3607  017446  000120          120
3608  017450  002202          2202                ;27   :       11 8 2
3609  017452  000112          112
3610  017454  002102          2102                ;28   $       11 8 3
3611  017456  000113          113
3612  017460  002042          2042                ;29   #       11 8 4
3613  017462  000114          114
3614  017464  002022          2022                ;30   )       11 8 5
3615  017466  000115          115
3616  017470  002012          2012                ;31   ;       11 8 6
3617  017472  000116          116
3618  017474  002006          2006                ;32   BLANK   11 8 7
3619  017476  000117          117
3620  017500  001000          1000                ;33   0       0
3621  017502  000040          40
3622  017504  001400          1400                ;34   /       0 1
3623  017506  000041          41
3624  017510  001200          1200                ;35   S       0 2
3625  017512  000042          42
3626  017514  001100          1100                ;36   T       0 3
3627  017516  000043          43
3628  017520  001040          1040                ;37   U       0 4
3629  017522  000044          44
3630  017524  001020          1020                ;38   V       0 5
3631  017526  000045          45
3632  017530  001010          1010                ;39   W       0 6
3633  017532  000046          46
3634  017534  001004          1004                ;40   X       0 7
3635  017536  000047          47
3636  017540  001002          1002                ;41   Y       0 8
3637  017542  000050          50
3638  017544  001001          1001                ;42   Z       0 9
3639  017546  000060          60
3640  017550  001202          1202                ;43           0 8 2
3641  017552  000052          52
3642  017554  001102          1102                ;44   ,       0 8 3
3643  017556  000053          53
3644  017560  001042          1042                ;45   %       0 8 4
3645  017562  000054          54
3646  017564  001022          1022                ;46   -       0 8 5
3647  017566  000055          55
3648  017570  001012          1012                ;47   >       0 8 6
3649  017572  000056          56
3650  017574  001006          1006                ;48           0 8 7
3651  017576  000057          57
3652  017600  000000          0000                ;49           BLANK
3653  017602  002000          0
3654  017604  000400          0400                ;50   1       1
3655  017606  000001          1
3656  017610  000200          0200                ;51   2       2
3657  017612  000002          2
3658  017614  000100          0100                ;52   3       3
3659  017616  000003          3
```

```
   0        0  000040          0040            ;53     4       4
   6       22  000004          4
          624  000020          0020            ;54     5       5
          626  000005          5
          630  000010          0010            ;55     6       6
         7632  000006          6
       017634  000004          0004            ;56     7       7
3667   017636  000007          7
3668   017640  000002          0002            ;57     8       8
3669   017642  000010          10
3670   017644  000001          0001            ;58     9       9
3671   017646  000020          20
3672   017650  000202          0202            ;59     :       8 2
3673   017652  000012          12
3674   017654  000102          0102            ;60     #       8 3
3675   017656  000013          13
3676   017660  000042          0042            ;61     A       8 4
3677   017662  000014          14
3678   017664  000022          0022            ;62     '       8 5
3679   017666  000015          15
3680   017670  000012          0012            ;63     =       8 6
3681   017672  000016          16
3682   017674  000006          0006            ;64     "       8 7
3683   017676  000017          17
3684   017700  004000          4000            ;65     &       12
3685   017702  000200          200
3686   017704  004400          4400            ;66     A       12 1
3687   017706  000201          201
3688   017710  004200          4200            ;67     B       12 2
3689   017712  000202          202
3690   017714  004100          4100            ;68     C       12 3
3691   017716  000203          203
3692   017720  004040          4040            ;69     D       12 4
3693   017722  000204          204
3694   017724  004020          4020            ;70     E       12 5
3695   017726  000205          205
3696   017730  004010          4010            ;71     F       12 6
3697   017732  000206          206
3698   017734  004004          4004            ;72     G       12 7
3699   017736  000207          207
3700   017740  004002          4002            ;73     H       12 8
3701   017742  000210          210
3702   017744  004001          4001            ;74     I       12 9
3703   017746  000220          220
3704   017750  004202          4202            ;75     CENT    12 8 2
3705   017752  000212          212
3706   017754  004102          4102            ;76     .       12 8 3
3707   017756  000213          213
3708   017760  004042          4042            ;77     <       12 8 4
3709   017762  000214          214
3710   017764  004022          4022            ;78     (       12 8 5
3711   017766  000215          215
3712   017770  004012          4012            ;79     +       12 8 6
3713   017772  000216          216
3714   017774  004006          4006            ;80     |       12 8 7
3715   017776  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
                                        ;MAINDEC-89-D2A2-C
 3726  020000  000000                   BINCD: 0                        ;CARD COLUMN 1
 3727  020002  000000                          0
 3728  020004  000001                          1                       ;2
 3729  020006  000020                          20
 3730  020010  000002                          2                       ;3
 3731  020012  000010                          10
 3732  020014  000004                          4                       ;4
 3733  020016  000007                          7
 3734  020020  000010                          10                      ;5
 3735  020022  000006                          6
 3736  020024  000020                          20                      ;6
 3737  020026  000005                          5
 3738  020030  000040                          40                      ;7
 3739  020032  000004                          4
 3740  020034  000100                          100                     ;8
 3741  020036  000003                          3
 3742  020040  000200                          200                     ;9
 3743  020042  000002                          2
 3744  020044  000400                          400                     ;10
 3745  020046  000001                          1
 3746  020050  001000                          1000                    ;11
 3747  020052  000040                          40
 3748  020054  002000                          2000                    ;12
 3749  020056  000100                          100
 3750  020060  004000                          4000                    ;13
 3751  020062  000200                          200
 3752  020064  001111                          1111                    ;14
 3753  020066  000067                          67
 3754  020070  002222                          2222                    ;15
 3755  020072  000117                          117
 3756  020074  003333                          3333                    ;16
 3757  020076  000177                          177
 3758  020100  004444                          4444                    ;17
 3759  020102  000207                          207
 3760  020104  005555                          5555                    ;18
 3761  020106  000267                          267
 3762  020110  006666                          6666                    ;19
 3763  020112  000317                          317
 3764  020114  007777                          7777                    ;20
 3765  020116  000377                          377
 3766  020120  001010                          1010                    ;21
 3767  020122  000046                          46
 3768  020124  001212                          1212                    ;22
 3769  020126  000056                          56
 3770  020130  001313                          1313                    ;23
 3771  020132  000077                          77
```

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3772  020134  001414                1414                    ;24
3773  020136  000047                47
3774  020140  001515                1515                    ;25
3775  020142  000067                67
3776  020144  001616                1616                    ;26
3777  020146  000057                57
3778  020150  001717                1717                    ;27
3779  020152  000077                77
3780  020154  002020                2020                    ;28
3781  020156  000105                105
3782  020160  002121                2121                    ;29
3783  020162  000127                127
3784  020164  002323                2323                    ;30
3785  020166  000137                137
3786  020170  002424                2424                    ;31
3787  020172  000107                107
3788  020174  002525                2525                    ;32
3789  020176  000127                127
3790  020200  002626                2626                    ;33
3791  020202  000117                117
3792  020204  002727                2727                    ;34
3793  020206  000137                137
3794  020210  003030                3030                    ;35
3795  020212  000147                147
3796  020214  003131                3131                    ;36
3797  020216  000167                167
3798  020220  003232                3232                    ;37
3799  020222  000157                157
3800  020224  003434                3434                    ;38
3801  020226  000147                147
3802  020230  003535                3535                    ;39
3803  020232  000167                167
3804  020234  003636                3636                    ;40
3805  020236  000157                157
3806  020240  003737                3737                    ;41
3807  020242  000177                177
3808  020244  004040                4040                    ;42
3809  020246  000204                204
3810  020250  004141                4141                    ;43
3811  020252  000227                227
3812  020254  004242                4242                    ;44
3813  020256  000216                216
3814  020260  004343                4343                    ;45
3815  020262  000237                237
3816  020264  004545                4545                    ;46
3817  020266  000227                227
3818  020270  004646                4646                    ;47
3819  020272  000217                217
3820  020274  004747                4747                    ;48
3821  020276  000237                237
3822  020300  005050                5050                    ;49
3823  020302  000246                246
3824  020304  005151                5151                    ;50
3825  020306  000267                267
3826  020310  005252                5252                    ;51
3827  020312  000256                256
```

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3828  020314  005353          5353                    ;52
3829  020316  000277          277
3830  020320  005454          5454                    ;53
3831  020322  000247          247
3832  020324  005656          5656                    ;54
3833  020326  000257          257
3834  020330  005757          5757                    ;55
3835  020332  000277          277
3836  020334  006060          6060                    ;56
3837  020336  000305          305
3838  020340  006161          6161                    ;57
3839  020342  000327          327
3840  020344  006262          6262                    ;58
3841  020346  000317          317
3842  020350  006363          6363                    ;59
3843  020352  000337          337
3844  020354  006464          6464                    ;60
3845  020356  000307          307
3846  020360  006565          6565                    ;61
3847  020362  000327          327
3848  020364  006767          6767                    ;62
3849  020366  000337          337
3850  020370  007070          7070                    ;63
3851  020372  000347          347
3852  020374  007171          7171                    ;64
3853  020376  000367          367
3854  020400  007272          7272                    ;65
3855  020402  000357          357
3856  020404  007373          7373                    ;66
3857  020406  000377          377
3858  020410  007474          7474                    ;67
3859  020412  000347          347
3860  020414  007575          7575                    ;68
3861  020416  000367          367
3862  020420  007676          7676                    ;69
3863  020422  000357          357
3864  020424  000101          0101                    ;70
3865  020426  000023          23
3866  020430  000202          0202                    ;71
3867  020432  000012          12
3868  020434  000303          0303                    ;72
3869  020436  000033          33
3870  020440  000404          0404                    ;73
3871  020442  000007          7
3872  020444  000505          0505                    ;74
3873  020446  000027          27
3874  020450  000606          0606                    ;75
3875  020452  000017          17
3876  020454  000707          0707                    ;76
3877  020456  000037          37
3878  020460  003210          3210                    ;77
3879  020462  000146          146
3880  020464  000123          0123                    ;78
3881  020466  000037          37
3882  020470  007654          7654                    ;79
3883  020472  000347          347
```

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020474  004567                  4567                    ;80
020476  000237          BINEND: 237





                        ;MAINDEC-00-DZCMA-A-CB
020500  002577          BINCD:  2577            ;1      CARD COLUMN
020502  000137                  137
020504  007252                  7252            ;2
020506  000356                  356
020510  005777                  5777            ;3
020512  000277                  277
020514  006777                  6777            ;4
020516  000337                  337
020520  000000                  0000            ;5
020522  000000                  0
020524  003777                  3777            ;6
020526  000177                  177
020530  005777                  5777            ;7
020532  000277                  277
020534  007737                  7737            ;8
020536  000377                  377
020540  007757                  7757            ;9
020542  000377                  377
020544  007767                  7767            ;10
020546  000377                  377
020550  003773                  3773            ;11
020552  000177                  177
020554  006775                  6775            ;12
020556  000327                  327
020560  007776                  7776            ;13
020562  000357                  357
020564  002001                  2001            ;14
020566  000120                  120
020570  003002                  3002            ;15
020572  000150                  150
020574  004404                  4404            ;16
020576  000207                  207
020600  004210                  4210            ;17
020602  000206                  206
020604  002120                  2120            ;18
020606  000107                  107
020610  002040                  2040            ;19
020612  000104                  104
020614  004120                  4120            ;20
020616  000207                  207
020620  004210                  4210            ;21
020622  000206                  206
020624  002404                  2404            ;22
020626  000107                  107
020630  003002                  3002            ;23
020632  000150                  150
020634  007777                  7777            ;24
020636  000377                  377
```

```
3940  020640  000000                    0000            ;25
3941  020642  000000                    0
3942  020644  000000                    0000            ;26
3943  020646  000300                    300
3944  020650  003001                    3001            ;27
3945  020652  000160                    160
3946  020654  004402                    4402            ;28
3947  020656  000211                    211
3948  020660  004204                    4204            ;29
3949  020662  000207                    207
3950  020664  002110                    2110            ;30
3951  020666  000107                    107
3952  020670  002060                    2060            ;31
3953  020672  000105                    105
3954  020674  004060                    4060            ;32
3955  020676  000205                    205
3956  020700  004110                    4110            ;33
3957  020702  000207                    207
3958  020704  002204                    2204            ;34
3959  020706  000107                    107
3960  020710  002402                    2402            ;35
3961  020712  000111                    111
3962  020714  005001                    5001            ;36
3963  020716  000260                    260
3964  020720  007777                    7777            ;37
3965  020722  000377                    377
3966  020724  007777                    7777            ;38
3967  020726  000377                    377
3968  020730  000000                    0000            ;39
3969  020732  000000                    0
3970  020734  000577                    0577            ;40
3971  020736  000037                    037
3972  020740  007252                    7252            ;41
3973  020742  000356                    356
3974  020744  000777                    0777            ;42
3975  020746  000037                    37
3976  020750  001000                    1000            ;43
3977  020752  000040                    40
3978  020754  006000                    6000            ;44
3979  020756  000300                    300
3980  020760  002477                    2477            ;45
3981  020762  000137                    137
3982  020764  001777                    1777            ;46
3983  020766  000077                    77
3984  020770  006537                    6537            ;47
3985  020772  000337                    337
3986  020774  005757                    5757            ;48
3987  020776  000277                    277
3988  021000  002767                    2767            ;49
3989  021002  000137                    137
3990  021004  005773                    5773            ;50
3991  021006  000277                    277
3992  021010  002775                    2775            ;51
3993  021012  000127                    127
3994  021014  005776                    5776            ;52
3995  021016  000257                    257
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3996  021020  002001                    2001            ;53
3997  021022  000120                    120
3998  021024  005002                    5002            ;54
3999  021026  000250                    250
4000  021030  002404                    2404            ;55
4001  021032  000107                    107
4002  021034  005210                    5210            ;56
4003  021036  000246                    246
4004  021040  002120                    2120            ;57
4005  021042  000107                    107
4006  021044  005040                    5040            ;58
4007  021046  000244                    244
4008  021050  002120                    2120            ;59
4009  021052  000107                    107
4010  021054  005210                    5210            ;60
4011  021056  000246                    246
4012  021060  002404                    2404            ;61
4013  021062  000107                    107
4014  021064  003002                    3002            ;62
4015  021066  000150                    150
4016  021070  007777                    7777            ;63
4017  021072  000377                    377
4018  021074  000000                    0000            ;64
4019  021076  000000                    0
4020  021100  006000                    6000            ;65
4021  021102  000300                    300
4022  021104  003001                    3001            ;66
4023  021106  000160                    160
4024  021110  004402                    4402            ;67
4025  021112  000211                    211
4026  021114  004204                    4204            ;68
4027  021116  000207                    207
4028  021120  002110                    2110            ;69
4029  021122  000107                    107
4030  021124  002060                    2060            ;70
4031  021126  000105                    105
4032  021130  004060                    4060            ;71
4033  021132  000205                    205
4034  021134  004110                    4110            ;72
4035  021136  000207                    207
4036  021140  002204                    2204            ;73
4037  021142  000107                    107
4038  021144  002402                    2402            ;74
4039  021146  000111                    111
4040  021150  005001                    5001            ;75
4041  021152  000260                    260
4042  021154  007777                    7777            ;76
4043  021156  000377                    377
4044  021160  007777                    7777            ;77
4045  021162  000377                    377
4046  021164  002525                    2525            ;78
4047  021166  000127                    127
4048  021170  005252                    5252            ;79
4049  021172  000256                    256
4050  021174  007777                    7777            ;80
4051  021176  000377          BIMEND:   377
```

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4052
4053
4054
4055
4056                                    ;MARK SENSE CARD TABLE
4057                                    ;MAINDEC-00-DZCMB-A-CD
4058  021200  007777                   MRKCD:  7777
4059  021202  000377                           377
4060  021204  007777                           7777
4061  021206  000377                           377
4062  021210  004000                           4000
4063  021212  000200                           200
4064  021214  002000                           2000
4065  021216  000100                           100
4066  021220  001000                           1000
4067  021222  000040                           40
4068  021224  000400                           400
4069  021226  000001                           1
4070  021230  000200                           200
4071  021232  000002                           2
4072  021234  000100                           100
4073  021236  000003                           3
4074  021240  000040                           40
4075  021242  000004                           4
4076  021244  000020                           20
4077  021246  000005                           5
4078  021250  000010                           10
4079  021252  000006                           6
4080  021254  000004                           4
4081  021256  000007                           7
4082  021260  000002                           2
4083  021262  000010                           10
4084  021264  000001                           1
4085  021266  000020                           20
4086  021270  003777                           3777
4087  021272  000177                           177
4088  021274  005777                           5777
4089  021276  000277                           277
4090  021300  006777                           6777
4091  021302  000337                           337
4092  021304  007377                           7377
4093  021306  000377                           377
4094  021310  007577                           7577
4095  021312  000377                           377
4096  021314  007677                           7677
4097  021316  000377                           377
4098  021320  007737                           7737
4099  021322  000377                           377
4100  021324  007757                           7757
4101  021326  000377                           377
4102  021330  007767                           7767
4103  021332  000377                           377
4104  021334  007773                           7773
4105  021336  000377                           377
4106  021340  007775                           7775
4107  021342  000367                           367
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 4108  021344  007776                    7776
 4109  021346  000357                    357
 4110  021350  005252                    5252
 4111  021352  000256                    256
 4112  021354  002525                    2525
 4113  021356  000127                    127
 4114  021360  005252                    5252
 4115  021362  000256                    256
 4116  021364  002525                    2525
 4117  021366  000127                    127
 4118  021370  005252                    5252
 4119  021372  000256                    256
 4120  021374  002525                    2525
 4121  021376  000127                    127
 4122  021400  005252                    5252
 4123  021402  000256                    256
 4124  021404  002525                    2525
 4125  021406  000127                    127
 4126  021410  005252                    5252
 4127  021412  000256                    256
 4128  021414  002525                    2525
 4129  021416  000127                    127
 4130  021420  005252                    5252
 4131  021422  000256                    256
 4132  021424  002525                    2525
 4133  021426  000127                    127
 4134  021430  005252                    5252
 4135  021432  000256                    256
 4136  021434  002525                    2525
 4137  021436  000127                    127
 4138  021440  007777                    7777
 4139  021442  000377                    377
 4140  021444  007777                    7777
 4141  021446  000377                    377
 4142  021450  004000                    4000
 4143  021452  000200                    200
 4144  021454  002000                    2000
 4145  021456  000100                    100
 4146  021460  001000                    1000
 4147  021462  000040                    40
 4148  021464  000400                    400
 4149  021466  000001                    1
 4150  021470  000200                    200
 4151  021472  000002                    2
 4152  021474  000100                    100
 4153  021476  000003                    3
 4154  021500  000040                    40
 4155  021502  000004                    4
 4156  021504  000020                    20
 4157  021506  000005                    5
 4158  021510  000010                    10
 4159  021512  000006                    6
 4160  021514  000004                    4
 4161  021516  000007                    7
 4162  021520  000002                    2
 4163  021522  000010                    10
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 4164  021524  000001                    1
 4165  021526  000020                    20
 4166  021530  003777                    3777
 4167  021532  000177                    177
 4168  021534  005777                    5777
 4169  021536  000277                    277
 4170  021540  006777                    6777
 4171  021542  000337                    337
 4172  021544  007377                    7377
 4173  021546  000377                    377
 4174  021550  007577                    7577
 4175  021552  000377                    377
 4176  021554  007677                    7677
 4177  021556  000377                    377
 4178  021560  007737                    7737
 4179  021562  000377                    377
 4180  021564  007757                    7757
 4181  021566  000377                    377
 4182  021570  007767                    7767
 4183  021572  000377                    377
 4184  021574  007773                    7773
 4185  021576  000377                    377
 4186  021600  007775                    7775
 4187  021602  000367                    367
 4188  021604  007776                    7776
 4189  021606  000357                    357
 4190  021610  005252                    5252
 4191  021612  000256                    256
 4192  021614  002525                    2525
 4193  021616  000127                    127
 4194  021620  005252                    5252
 4195  021622  000256                    256
 4196  021624  002525                    2525
 4197  021626  000127                    127
 4198  021630  005252                    5252
 4199  021632  000256                    256
 4200  021634  002525                    2525
 4201  021636  000127                    127
 4202  021640  005252                    5252
 4203  021642  000256                    256
 4204  021644  002525                    2525
 4205  021646  000127                    127
 4206  021650  005252                    5252
 4207  021652  000256                    256
 4208  021654  002525                    2525
 4209  021656  000127                    127
 4210  021660  005252                    5252
 4211  021662  000256                    256
 4212  021664  002525                    2525
 4213  021666  000127                    127
 4214  021670  005252                    5252
 4215  021672  000256                    256
 4216  021674  002525                    2525
 4217  021676  000127                    127
 4218  021700  000000                    0          ;END MARK SENSE DIAG TABLE
 4219  021702  000000            MRKEND: 0
```

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4220
4221
4222  021704  040057  051120  051505  MSG1:   .ASCII ;/@PRESS CARD READER 'MOTOR START' AND 'READ START'/;
4223  021712  020123  040503  042122
4224  021720  051040  040505  042504
4225  021726  020122  046447  052117
4226  021734  051117  051440  040524
4227  021742  052122  020047  047101
4228  021750  020104  051047  040505
4229  021756  020104  052123  051101
4230  021764  023524      057
4231  021767      057  050100  042522  MSG1A:  .ASCII  ;/@PRESS CARD READER 'RESET'/;
4232  021774  051523  041440  051101
4233  022002  020104  042522  042101
4234  022010  051105  023440  042522
4235  022016  042523  023524      057
4236  022023      057  052100  042510  MSG2:   .ASCII  ;/@THEN HIT 'CONTINUE' ON THE CONSOLE/;
4237  022030  020116  044510  020124
4238  022036  041447  047117  044524
4239  022044  052516  023505  047440
4240  022052  020116  044124  020105
4241  022060  047503  051516  046117
4242  022066  027505
4243  022070  040057  051120  051505  MSG3:   .ASCII  ;/@PRESS CARD READER 'READ STOP'/;
4244  022076  020123  040503  042122
4245  022104  051040  040505  042504
4246  022112  020122  051047  040505
4247  022120  020104  052123  050117
4248  022126  027447
4249  022130  040057  051120  051505  MSG3A:  .ASCII  ;/@PRESS CARD READER 'STOP'/;
4250  022136  020123  040503  042122
4251  022144  051040  040505  042504
4252  022152  020122  051447  047524
4253  022160  023520      057
4254  022163      057  052100  042510  MSG4:   .ASCII  ;/@THE INTERRUPT LEVEL WAS /;
4255  022170  044440  052116  051105
4256  022176  052523  052120  046040
4257  022204  053105  046105  053440
4258  022212  051501  027440
4259  022216  040057  042522  047515  MSG5:   .ASCII  ;/@REMOVE ALL CARDS FROM THE INPUT HOPPER/;
4260  022224  042526  040440  046114
4261  022232  041440  051101  051504
4262  022240  043040  047522  020115
4263  022246  044124  020105  047111
4264  022254  052520  020124  047510
4265  022262  050120  051105      057
4266  022267      057  051100  051505  MSG6:   .ASCII  ;/@RESTORE CARDS IN THE INPUT HOPPER/;
4267  022274  047524  042522  041440
4268  022302  051101  051504  044440
4269  022310  020116  044124  020105
4270  022316  047111  052520  020124
4271  022324  047510  050120  051105
4272  022332      057
4273  022333      057  051100  044501  MSG7:   .ASCII  ;/@RAISE OUTPUT STACKER PRESSURE ARM SLIGHTLY ABOVE HORIZONTAL @ THEN LO
4274  022340  042523  047440  052125
4275  022346  052520  020124  052123
```

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4276  022354  041501  042513  020122
4277  022362  051120  051505  052523
4278  022370  042522  040440  046522
4279  022376  051440  044514  044107
4280  023404  046124  020131  041101
4281  022412  053117  020105  047510
4282  022420  044522  047532  052116
4283  022426  046101  040040  052040
4284  022434  042510  020116  047514
4285  022442  042527  020122  052111
4286  022450      057
4287  022451      057 046100  053517  MSG7A:  .ASCII  ;/@LOWER OUTPUT STACKER PLATE TO BOTTOM/;
4288  022456  051105  047440  052125
4289  022464  052520  020124  052123
4290  022472  041501  042513  020122
4291  022500  046120  052101  020105
4292  022506  047524  041040  052117
4293  022514  047524  027515
4294  022520  040057  047510  042114  MSG8:   .ASCII  ;/@HOLD DOWN THE SWITCH AT THE BOTTOM OF THE INPUT HOPPER/;
4295  022526  042040  053517  020116
4296  022534  044124  020105  053523
4297  022542  052111  044103  040440
4298  022550  020124  044124  020105
4299  022556  047502  052124  046517
4300  022564  047440  020106  044124
4301  022572  020105  047111  052520
4302  022600  020124  047510  050120
4303  022606  051105      057
4304  022611      057 046100  043111  MSG8A:  .ASCII  ;/@LIFT SWITCH UNDER RIFFLE CAP/;
4305  022616  020124  053523  052111
4306  022624  044103  052440  042116
4307  022632  051105  051040  043111
4308  022640  046106  020105  040503
4309  022646  027520
4310  022650  040057  046102  041517  MSG9:   .ASCII  ;/@BLOCK THE CARD READER STATION TO PREVENT A CARD GOING THRU, AND/;
4311  022656  020113  044124  020105
4312  022664  040503  042122  051040
4313  022672  040505  042504  020122
4314  022700  052123  052101  047511
4315  022706  020116  047524  050040
4316  022714  042522  042526  052116
4317  022722  040440  041440  051101
4318  022730  020104  047507  047111
4319  022736  020107  044124  052522
4320  022744  020054  047101  027504
4321  022752  040057  042522  047515  MSG10:  .ASCII  ;/@REMOVE JAMMED CARD/;
4322  022760  042526  045040  046501
4323  022766  042515  020104  040503
4324  022774  042122      057
4325  022777      057 044100  046117  MSG11:  .ASCII  ;/@HOLD THE OUTPUT STACKER GATE OPEN. THEN/;
4326  023004  020104  044124  020105
4327  023012  052517  050124  052126
4328  023020  051440  040524  045503
4329  023026  051105  043440  052101
4330  023034  020105  050117  047105
4331  023042  020056  044124  047105
```

```
4332  023050     057
4333  023051     057  050100  040514  MSG12:  .ASCII  ;/@PLACE SPECIAL DARK-LIGHT CHECK CARDS (SEE LISTING, TESTG);
4334  023056  042503  051440  042520
4335  023064  044503  046101  042040
4336  023072  051101  026513  044514
4337  023100  044107  020124  044103
4338  023106  041505  020113  040503
4339  023114  042122  020123  051450
4340  023122  042505  046040  051511
4341  023130  044524  043516  020054
4342  023136  042524  052123  024507
4343  023144  040500  020124  044124          .ASCII  ;@AT THE BOTTOM OF THE INPUT STACK/;
4344  023152  020105  047502  052124
4345  023160  046517  047440  020106
4346  023166  044124  020105  047111
4347  023174  052520  020124  052123
4348  023202  041501  027513
4349  023206  040057  042504  045503  MSG13:  .ASCII  ;/@DECK    CARD  COLUMN PATTERN READ1 READ2  CODED  READ/;
4350  023214  020040  020040  040503
4351  023222  042122  020040  047503
4352  023230  052514  047115  050040
4353  023236  052101  042524  047122
4354  023244  051040  040505  030504
4355  023252  051040  040505  031104
4356  023260  020040  047503  042504
4357  023266  020104  051040  040505
4358  023274  027504
4359  023276  040057  046101  044120  MSG14:  .ASCII  ;/@ALPHA /;
4360  023304  020101     057
4361  023307     057  041100  047111  MSG15:  .ASCII  ;/@BINARY/;
4362  023314  051101  027531
4363  023320  040057  044502  020124  MSG16:  .ASCII  ;/@BIT 15 WAS SET/;
4364  023326  032461  053440  051501
4365  023334  051440  052105     057
4366  023341     057  051100  046505  MSG17:  .ASCII  ;/@REMEDY THE ERROR CONDITION AND PRESS 'CONTINUE'@/;
4367  023346  042105  020131  044124
4368  023355  020105  051105  047522
4369  023362  020122  047503  042116
4370  023370  052111  047511  020116
4371  023376  047101  020104  051120
4372  023404  051505  020123  041447
4373  023412  047117  044524  052516
4374  023420  027505  027500
4375  023426  040057  044502  020124  MSG18:  .ASCII  ;/@BIT 8 WAS SET/;
4376  023434  020070  040527  020123
4377  023442  042523  027524
4378  023450  040057  047503  052514  MSG19:  .ASCII  ;/@COLUMN READ1 READ2 CARDS ERRORS/;
4379  023456  047115  051040  040505
4380  023464  030504  051040  040505
4381  023472  031104  041440  051101
4382  023500  051504  042440  051122
4383  023506  051117  027523
4384  023512  040057  046101  020114  MSG20:  .ASCII  ;/@ALL OF THE CR11 CONTROL BOARD HAS;
4385  023520  043117  052040  042510
4386  023526  041440  030522  020061
4387  023534  047503  052116  047522
```

```
4388  023536  020114  047502  051101
4389  023544  020104  040510     123
4390  023551     100  042502  047105          .ASCII  ;@BEEN CHECKED OUT THRU THE MAINTENANCE;
4391  023556  041440  042510  045503
4392  023564  042105  047440  053124
4393  023572  042040  051116  020125
4394  023600  044124  020105  040515
4395  023606  047111  042524  040516
4396  023614  041516     105
4397  023617     100  042522  044507          .ASCII  ;@REGISTER. PROBLEMS NOW WILL BE IN;
4398  023624  052123  051105  020056
4399  023632  051120  041117  042514
4400  023640  051515  047040  053517
4401  023646  053440  046111  020114
4402  023654  042502  044440     116
4403  023661     100  051104  053111          .ASCII  ;@DRIVERS, RECEIVERS & CABLE BETWEEN;
4404  023666  051105  026123  051040
4405  023674  041505  044505  042526
4406  023702  051522  023040  041440
4407  023710  041101  042514  041040
4408  023716  052105  042527  047105
4409  023724  041500  047117  051124          .ASCII  ;@CONTROL & DRIVE OR THE DRIVE ITSELF/;
4410  023732  046117  023040  042040
4411  023740  044522  042526  047440
4412  023746  020122  044124  020105
4413  023754  051104  053111  020105
4414  023762  052111  042523  043114
4415  023770     057
4416
4417  023771     057  041500  042510  MSG21:  .ASCII  ;/@CHECKER BOARD/;
4418  023776  045503  051105  041040
4419  024004  040517  042122     057
4420  024011     057  037500  020040  QEST:   .ASCII  ;/@?  = @/;
4421  024016  020075  027500
4422  024022  020057  020040  020040  NEWIS:  .ASCII  ;/     NEW = /;
4423  024030  042516  020127  020075
4424  024036     057
4425  024037     057  051500  051127  SWREG:  .ASCII  ;/@SWR = /;
4426  024044  036440  027440
4427  024050  040057  040503  042122  CIMPAT: .ASCII  ;/@CARD IMAGE PATTERN= /;
4428  024056  044440  040515  042507
4429  024064  051040  052101  042524
4430  024072  047122  020075     057
4431  024077     057  051500  040524  STADD:  .ASCII  ;/@STARTING ADDRESS = /;
4432  024104  052122  047111  020107
4433  024112  042101  051104  051505
4434  024120  020123  020075     057
4435  024126     057  040100  055104  TITL:   .ASCII  ;/@@DZCRB-C  CR11-CM11F DIAGNOSTIC TEST/;
4436  024134  051103  026502  020103
4437  024142  041440  030522  026461
4438  024150  046503  030461  020106
4439  024156  044504  043501  047516
4440  024162  052123  041511  052040
4441  024170  051505  027524
4442  024174  057057  040125  020075  CTLU:   .ASCII  ;/%U@= /;
4443  024202     057
```

```
 4444  024203     057  041500  030522  SUBT2:  .ASCII  ;/@CR11 ERROR FUNCTION TEST/;
 4445  024210  020061  051105  047522
 4446  024216  020122  052506  041516
 4447  024224  044524  047117  052040
 4448  024232  051505  027524
 4449  024236  040057  044523  043516  SUBT4:  .ASCII  ;/@SINGLE TEST LOOP/;
 4450  024244  042514  052040  051505
 4451  024252  020124  047514  050117
 4452  024260     057
 4453  024261     057  051500  047111  SUBT5:  .ASCII  ;/@SINGLE DATA PATTERN TEST/;
 4454  024266  046107  020105  040504
 4455  024274  040524  050040  052101
 4456  024302  042524  047122  052040
 4457  024310  051505  027524
 4458          000001                          .END
```

```
ADINT =X000000          698#  1698*  2057*  2059*  2064   2079*  2085*  2087*  2092   2101*  2107*  2109*  2117*
                       2130*  2132*  2138   2140*  2155*  2177*  2179*  2185   2187*  2194*  2208*  2210*  2216
                       2218*  2233*  2251*  2253*  2259   2261*  2276*  2294*  2296*  2302   2304*  2319*  2337*
                       2339*  2345   2347*  2362*  2380*  2382*  2388   2390*  2405*  2423*  2425*  2431   2435*
                       2444*  2446*  2451   2458*  2463*  2465*  2471*  2474   2480*  2628*  2630*  2838*  2844*
                       2948   2854*  2859
AGN     016640         3457#  3468   3487
ALCNT   013156         2807   2810#
ALCNT1  013240         2811   2830#
ALCNT2  013252         2829   2837#
ALLDON  013124         2676   2699   2743   2801#
ALLOK   013300         2841   2844#
ALPCD   017300         1225   1246   1619   2616   3556#
ALPEND  017776         1226   1247   2617   3715#
ALPI    011770         2606   2616#
ALWAIT  013334         2843   2853#
BEGIN   005124         1024   1704#
BELL    015732         2581   2757   2801   2862   3107   3135   3214   3288#
BIMCD   020500         2609   3892#
BIMEND  021176         2610   4051#
BINCD   020000         2612   3726#
BINEND  020476         1620   2613   3895#
BOARD   001252         1023   1027   1031   1035   1039   1044#  1053
B.CK    016162         3327   3345#
CARDIM  015702         3192*  3193*  3232   3234   3270#
CDCNT   013110         2591*  2597*  2672   2697   2711   2739   2752   2774*  2775*  2776   2777*  2778*  2781#
                       2795#
CIMPAT  024050         3189   4427#
CKBITB  015756         1721   1750   1781   2563   2574   2700   3277   3296#  3304
CKCOL   015442         3204   3222#
CKCRD   015426         3206   3218#
CKDONE  015466         3262   3265#  3266
CKFAIL  015520         3233   3235   3237#
CKHLT   015654         3240   3261#
CKLOOP  015340         3197#  3212   3217   3219   3221   3227   3264   3267
CKLP1   015362         3203#  3208   3236
CKLP2   015466         3229#  3230
CKNOHD  015560         3242   3246#
CKSAME  015062         1040   3186#
CKSIT   015412         3200   3210   3214#
CKSIT1  015416         3215#  3216
CKU     = 104006        696#  1075   1709   2596   3512
CKUU    017234         3530   3534#
CK4     005560         1812   1817   1819#
CK5     005724         1853   1866#
CK9     006542         2039   2044#
CLCNT   013112         2642*  2674   2714   2749   2782*  2796#  3197*  3218   3223*  3247
CNTLU   = 104002        692#  1074   1708   2595   3511
CNTLUU  016572         3447#  3526
CNT23A  011300         2491   2494#
CNT23B  011316         2498   2501#
CNT23C  011336         2505   2508#
CNT23D  011354         2512   2515#
CNT23E  011374         2519   2522#
CNT23F  011414         2526   2529#
CNT23G  011440         2534   2538#
```

H07

DZCRB.SRC CROSS REFERENCE TABLE -- USER SYMBOLS

```
CNT24A  011506          2554    2557#   2560
CNT24B  011536          2562    2565#
CONT    005016          1652    1661#
CONTD   012012          2604    2615    2619#
CONTG   014742          3106    3111#
CONT10  006704          2067    2079#
CONT11  007006          2095    2101#
CONT2   005416          1769    1773#
CONT21  011134          2453    2457#
CONT22  011240          2475    2478#
CONT4   005600          1822    1826#
CONT8   006432          2012#   2021
COUNT  =X000001          693#   1724*   1725*   1727*   1806*   1813*   1829*   1848*   1858    1860*   1872    1892*   1897*
                        1936*   1945*   1955    2003*   2004*   2011*   2020*   2037*   2040*   2650*   2651*   3078*   3082*
                        3112*   3113*   3133*   3228*   3229*   3359*   3366*   3377    3379*   3384*
CR81   =X000004          702#   1697*   1861    1883    1896    1947    2002    2006    2012    2036    2489*   2496*   2503*
                        2510    2643    2653    2685    3222    3231    3281
CRLF    016516          3246    3331    3421    3430#   3440    3441    3442    3443    3483
CRLF4   016550          1663    2695    2910    2922    2939    2954    2969    2992    3021    3041    3057    3074    3091
                        3123    3144    3440#
CRS    =X000003          701#   1679*   1695*   1731    1736*   1737    1742*   1743    1753*   1754    1768    1773*   1774
                        1782*   1783*   1784    1788    1790    1792    1796    1807*   1809    1811    1814    1816    1819
                        1823    1826    1835    1838*   1839    1849*   1850    1852    1864    1862    1866    1876    1879*
                        1880    1884    1893*   1894    1899    1901    1903    1905    1908    1910    1912*   1913    1916
                        1922    1935*   1937    1939    1943    1949    1951    1959*   1960    1963    1965    1969*   1970
                        1974    1976    1978    1988*   1989    1991    1993    1997*   1998    2032*   2033    2035*   2038
                        2044    2046    2061*   2062    2065*   2068    2072    2075    2078*   2081*   2090    2093*   2096*
                        2097    2110*   2111    2116*   2135*   2136    2139*   2151    2154*   2162*   2183    2186*   2190
                        2193*   2213*   2214    2217*   2229    2232*   2256*   2257    2260*   2272    2275*   2299*   2300
                        2303*   2315    2318*   2342*   2343    2346*   2358    2361*   2365*   2376    2389*   2401    2404*
                        2426*   2427    2437    2439*   2448*   2452*   2456*   2467*   2478*   2486*   2487    2490    2494
                        2497    2501    2504    2508    2511    2515    2518    2522    2525    2529    2533    2538    2541
                        2549*   2550    2552*   2553    2557    2559    2561    2567    2570    2572    2632*   2637    2639
                        2644    2684*   2692    2695    2737    2741    2747    2779*   2780*   2786    2812    2819    2822*
                        2826    2830*   2831    2839*   2840    2846*   2849*   2853*   2855*   2857    2864    2867    2870*
                        2871    2897    2900    2912    2924    2927    2941    2956    2959    2971    2994    2997*   3006
                        3009    3023    3043    3045*   3046    3048    3059    3076    3079*   3080    3084    3093    3125
                        3127*   3128    3130    3146    3199    3201*   3203    3205    3207    3209    3215    3224    3265
                        3278    3290*   3282    3296
CSNT    001140          1009#   3478*   3480*   3534
CTLU    024174          3466    4442#
C.CONT  016300          3372    3376#
C.WAIT  016244          3367#   3368    3383
DATENC  013120          2649*   2661    2731    2799#
DATST   011616          2580    2591#
DATST1  011626          2593#   2769
DATST2  011646          2592    2598#
DATST3  011706          2600    2605#
DAT1    013114          2643*   2655    2722    2797#   3222*   3232    3250
DAT2    013116          2653*   2658    2725    2798#   3231*   3234    3253
DBRCKB  006422          1992    2010#
DCNT1   012046          2622    2626#
DECK    013102          2603*   2614*   2618*   2708    2792#
DECYCK  012746          2760    2765#   2809    2875
DISPLA  001120          1001#   3499*
DISPRE  000174           979#   3499
```

DZCRB-C CR11/CM11F DIAGNOSTIC TEST MACY11 27(732) 02-NOV-76 15:51 PAGE 88
DZCRB.SRC CROSS REFERENCE TABLE -- USER SYMBOLS

```
DONE3   005504          1789    1796#
DONE7   006220          1944    1952    1955#
D.1     016374          3392    3398#
D.2     016406          3394    3396    3401#
EMTSRV  017162           969    3515#
EMTTAB  017214          3520    3524#
END     012730          2758#
ENDCK   011570          2564    2566    2573    2578#
END24   011550          2556    2570#   2571
ERCM11  013450          1032    2879#
ERCR11  013442          1028    2877#
ERFLG   001154          1016#   2598*   2703    2705*   3196*   3241    3243*
ERR6    006116          1902    1922#
ERSET   012252          2638    2670#   2744
ER1     012306          2673    2675    2677#
FAIL    012334          2656    2659    2662    2683#
FAILC   012374          2689    2692#   2696
FAILCN  012442          2687    2703#
FAILC1  012660          2740    2744#
FLAG    001144          1011#   2877*   2879*   2889    2904    2933    2948    2963    2983    2988    3015    3025    3117
                        3138
HLT   = 104000           690#   1052    1061    1070    1105    1120    1124    1129    1140    1144    1154    1159    1170
                        1175    1179    1183    1195    1200    1211    1216    1233    1254    1271    1275    1288    1291
                        1295    1298    1312    1316    1327    1331    1335    1339    1343    1347    1358    1361    1365
                        1368    1372    1375    1380    1383    1387    1390    1394    1413    1437    1462    1485    1510
                        1529    1533    1538    1542    1546    1553    1559    1563    1567    1571    1574    1577    1580
                        1583    1586    1598    1601    1605    1608    1634    1639    1642    1733    1739    1745    1756
                        1770    1776    1786    1794    1798    1821    1825    1828    1831    1834    1837    1841    1856
                        1864    1868    1874    1878    1882    1886    1907    1915    1920    1924    1926    1941    1953
                        1957    1962    1967    1972    1980    1995    2000    2008    2014    2018    2042    2048    2050
                        2066    2070    2074    2077    2094    2099    2114    2147    2153    2168    2192    2203    2225
                        2231    2246    2268    2274    2289    2311    2317    2332    2354    2360    2375    2397    2403
                        2418    2433    2454    2477    2492    2499    2506    2513    2520    2527    2535    2543    2555
                        2565    2569    2647    2751    2788    2790    2804    2821    2828    2836    2842    2850    2960
                        2866    2869    2873    2899    2902    2926    2929    2958    2961    3008    3011    3050    3086
                        3132    3211    3220    3226    3284
INERRR  017022          3472    3474    3481    3485#
INIT    015704          1805    1847    1891    1934    1985    2029    2056    2084    2106    2129    2176    2207    2250
                        2293    2336    2379    2422    2443    2462    2485    2548    2626    2887    2917    2946    2977
                        2996    3032    3065    3111    3277#
INPRI   001106           996#   1116*   1408*   1432*   1457*   1480*   1502*   1623    1625*   1648*
INTFLG  001102           994#   1699#   2142    2144    2158    2160*   2166    2197    2199*   2201    2220    2222    2236
                        2238*   2244    2263    2265    2279    2281*   2287    2306    2308    2322    2324*   2330    2349
                        2351    2365    2367*   2373    2392    2394    2408    2410*   2416
INTVC   001104           995#   1113    1114*   1125*   1128*   1406    1407*   1416*   1430    1431*   1440*   1455    1456*
                        1465*   1478    1479*   1489*   1500    1501*   1513*   1622    1624*   1647*   1698
ITCNT   016422          3167*   3170*   3395    3397*   3401*   3405#
ITMAX   016420          1695*   2036*   3291*   3395    3404#
KBCSR   001124          1003#   3459
KBDBR   001126          1004#   3461    3507
KBINT   017114          3504#   3527
KBINTT= 104003           693#   2671    2733    3198    3238    3324    3348    3390
KCRB1   001112           998#   1056    1231    1328    1637    1678    1697
KCRB2   001114           999#   1065    1252    1336    1640    2010    2016    2517#   2524#   2540    2649
KCRM    001116          1000#   1100    1151*   1156*   1160*   1167*   1172*   1176*   1184*   1192*   1197*   1201*   1208*
                        1213*   1217*   1230*   1237*   1251*   1257*   1266*   1267*   1276*   1283*   1284*   1299*   1306*
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                    1308*  1317*  1324*  1332*  1340*  1348*  1355*  1362*  1369*  1377*  1384*  1395*  1404*
                    1420*  1427*  1429*  1444*  1451*  1454*  1469*  1477*  1492*  1503*  1505*  1517*  1526*
                    1530*  1534*  1535*  1539*  1543*  1547*  1549*  1554*  1555*  1587*  1595*  1599   1602*
                    1609*  1629*  1645*  1677*
KCRS    000110       997*  1047   1117*  1118   1121*  1122   1137*  1138   1141*  1142   1152   1155*  1157
                    1168   1171*  1173   1177   1181   1193   1196*  1198   1209   1212*  1214   1269   1272*
                    1273   1286   1289   1292*  1293   1296   1310   1313*  1314   1325   1329   1333   1337
                    1341   1345   1356   1359   1363   1366   1370   1373   1376*  1378   1381   1385   1388
                    1391*  1392   1403*  1415*  1428*  1439*  1452*  1464*  1476*  1487*  1504*  1512*  1527
                    1531   1536   1540   1544   1551   1557   1560*  1561   1564*  1565   1569   1572   1575
                    1578   1581   1584   1596   1603   1606   1628*  1646*  1696
LASTCD  012722      2742   2753   2756*
LASTCK  012704      2648   2682   2691   2694   2738   2752*  2789   2791
LOGICA  004776       972   1654*
LOOPF   014630      3079*  3083
LOOPG   014762      3116*  3134
LOOP3   005456      1785   1788*  1791
LOOP4   005526      1808*  1810   1815
LOOP4B  005544      1814*  1818
LOOP5   005656      1850*  1859   1865
LOOP6   006014      1894*  1898
LOOP7   006146      1937*  1938   1948
LOOP8   006340      1989*  2007
L.CNT   016464      3414   3419*
L.EOMK  016514      3411*  3413   3427*
L.INC   016440      3412*  3422
L.TOLT  016442      3413*  3426
MAINTL  005006      1650   1658*
MBRD    001406      1067   1073*
MCNT    005052      1622*  1647   1683*
MFLG    005056      1083*  1083   1685*
MINIT   005034      1150   1166   1191   1207   1224   1245   1265   1282   1305   1323   1354   1401   1425
                    1449   1474   1498   1525   1594   1617   1677*
MRKCD   021200      2601   4058*
MRKEND  021702      2602   4219*
MSG1    021704      2903   2932   2962   2987   3014   3039   3053   3072   3087   3116   3137   4222*
MSG1A   021767      2906   2935   2965   2990   3017   3119   3140   4231*
MSG10   022752      3051   4321*
MSG11   022777      3070   4325*
MSG12   023051      3114   4333*
MSG13   023206      2706   4349*
MSG14   023276      2618   4359*
MSG15   023307      2603   2614   4361*
MSG16   023320      2677   4363*
MSG17   023341      2679   3301   4366*
MSG18   023424      3299   4375*
MSG19   023444      3244   4378*
MSG2    022023      2893   2908   2920   2937   2952   2967   2980   3019   3035   3055   3068   3089   3121
                    3142   4236*
MSG20   023506      1661   4384*
MSG21   023771      4417*
MSG3    022070      2888   3033   3066   4243*
MSG3A   022130      2891   4249*
MSG4    022163      2161   2239   2282   2325   2368   2411   4254*
MSG5    022216      2918   2978   4259*
MSG6    022267      2930   3012   4266*
```

```
MSG7    022333          2947    4273#
MSG7A   022451          2950    4287#
MSG8    022520          2982    4294#
MSG8A   022611          2985    4304#
MSG9    022650          3037    4310#
MTST    005054          1623#   1648    1684#
NEWIS   024022          3455    4422#
NOHD    012464          2704    2708#
NOP     = 000240         689#
NOTCD   013052          2748    2785#
NOTCD1  013074          2787    2790#
NOTCOL  012664          2641    2747#
NOTRP   005154          1712#   1715
NOTRP1  013020          2621#   2624
NXCPD   012772          2631    2701    2754    2771#
OFF6    006104          1904    1911    1918#
OUT     017020          3450    3484#
PC      =%000007         706#   1023#   1027#   1031#   1035#   1039#   1078#   1081#   1085#   1087#   1150#   1166#   1191#
                        1207#   1224#   1245#   1265#   1282#   1305#   1323#   1354#   1401#   1425#   1449#   1474#   1498#
                        1525#   1594#   1617#   1654#   1662#   1663#   1669#   1680#   2881#   3155#   3158#   3187#   3190#
                        3452#   3454#   3456#   3467#   3486#
PRINT   016044          3324#   3524
PROC    001152          1014#   1722#   1729    1751#   1767    1986#   2022    2030#   2051
PROCT   016210          2164    2242    2285    2328    2371    2414    2712    2715    2720    2723    2726    2729    2732
                        3248    3251    3254    3257    3260    3335    3340    3356#   3454
PSR     = 177776         688#   1112#   1402#   1409#   1414#   1426#   1433#   1438#   1450#   1458#   1463#   1475#   1481#
                        1486#   1499#   1506#   1511#   1618#   1630#   1701#   1712#   1716#   1722    1723#   1729#   1751
                        1752#   1767#   1965    1987#   2022#   2030    2031#   2051#   2058#   2059    2060#   2064#   2086#
                        2087    2089#   2092#   2108#   2109    2131#   2132    2133#   2134#   2138#   2178#   2179    2180#
                        2181#   2185#   2209#   2210    2211#   2212#   2216#   2252#   2253    2254#   2255#   2259#   2295#
                        2296    2297#   2301#   2302#   2338#   2339    2340#   2341#   2345#   2381#   2382    2383#   2384#
                        2388#   2424#   2425    2429#   2431#   2445#   2446    2447#   2451#   2464#   2465    2466#   2472#
                        2474#   2621#   2625#   2629#   2630    2646#   2670#   2683#   2785#   2837#   2838    2845#   2848#
                        2856#   2859#   3164#   3166#   3399#
PTOFF   013122          2654#   2657#   2660#   2717    2800#
QEST    024011          3485    4420#
READ    016652          3459#   3460    3482    3528
READC   = 104004         694#   3159    3191
RESTRT  005132          1706#   2583    2718
REST8   006460          2015    2019    2022#
REST9   006564          2043    2045    2049    2051#
RETRNX  015260          3160#   3161#   3169    3171    3172#
RETURN  016424          1086#   1719#   2883#   3109#   3148#   3168#   3400    3402#   3406#
R2      =%000002         700#   1225#   1229    1231    1234    1235    1246#   1250    1252    1255    1406#   1416    1430#
                        1440    1455#   1465    1478#   1488    1500#   1513    1619#   1627    1637    1640    1643    1651#
                        1654    1661#   2010#   2016    2161#   2163#   2239#   2241#   2282#   2284#   2325#   2327#   2368#
                        2370#   2411#   2413#   2531#   2532#   2677#   2679#   2706#   2708#   2711#   2714#   2719#   2722#
                        2725#   2727#   2731#   2830#   2833#   2891#   2893#   2903#   2906#   2908#   2918#   2920#   2930#
                        2932#   2935#   2937#   2947#   2950#   2952#   2962#   2965#   2967#   2978#   2980#   2982#   2985#
                        2987#   2990#   3012#   3014#   3017#   3019#   3033#   3035#   3037#   3039#   3051#   3053#   3055#
                        3066#   3068#   3070#   3072#   3087#   3089#   3114#   3116#   3119#   3121#   3137#   3140#   3142#
                        3154#   3157#   3186#   3189#   3244#   3247#   3250#   3253#   3256#   3259#   3299#   3301#   3334#
                        3451#   3453#   3455#   3466#   3485#   3542#
R5      =%000005         703#   1113#   1125    1128    1226#   1227#   1235    1247#   1248#   1255    1620#   1621#   1643
                        2002#   2006    2012    2655    2658    2661    2663    2665#   2717#   2719    2728    2771#   2776#
R6      =%000006         704#   1127    1418    1442    1467    1490    1515    1635
```

DZCRB.SRC CROSS REFERENCE TABLE -- USER SYMBOLS

```
SAVPC   016204          3328*   3333    3353#
SAVPSR  016206          3329*   3339    3354#
SAVR2   016176          3332*   3341    3350#
SAVR3   016200          3351#   3356*   3373
SAVR4   016202          3352#   3357*   3374
SCONT1  012152          2645    2649#
SCOPE = 104001           691#   1094    1107    1132    1146    1163    1186    1203    1219    1240    1259    1278    1301
                        1319    1350    1398    1422    1446    1471    1494    1520    1590    1612    1720    1747    1778
                        1800    1844    1888    1928    1983    2025    2054    2082    2104    2128    2175    2206    2249
                        2292    2335    2378    2421    2441    2460    2482    2545    2578    2885    2916    2945    2976
                        3031    3064    3104
SCOPEC  016336          3390#   3525
SETUP   005062          1087    1695#   1704    2882    3156    3188
SET1    010732          2409    2416#
SET14   007450          2198    2201#
SET2    010520          2366    2373#
SET3    010306          2323    2330#
SET4    010074          2280    2287#
SET5    007662          2237    2244#
SET7    007276          2159    2166#
SP     =%000006          705#   1022*   1026*   1030*   1034*   1038*   1045*   1048    1050    1051    1054*   1057    1059
                        1060    1063*   1066    1068    1069    1097*   1101    1103    1104    1658    2071    2100    2115
                        2157    2196    2235    2278    2321    2364    2407    2434    2455    2756    2952    2963    2874
                        3449*   3491*   3492*   3497    3500    3501    3515*   3516*   3517*   3518*   3519*   3520*   3521*
                        3522
SPACE   016012          2710    2713    2716    2721    2724    2727    2730    3249    3252    3255    3258    3310#   3314
SPACEX  016042          3313*   3315*   3317#
SRVC    012106          2628    2637#
SRVC1   013332          2844    2852#
SRVC2   013374          2854    2862#
SRVC2A  013402          2861    2864#
STACK   001100           993#   1022    1026    1030    1034    1038
STADD   024077          3157    4431#
START1  001156           984    1022#   1660
START2  001172           985    1026#
START3  001206           986    1030#
START4  001222           987    1034#
START5  001236           988    1038#
SUBT2   024203          2880    4444#
SUBT4   024236          3154    4449#
SUBT5   024261          3186    4453#
SUSWR   017034          3491#   3529
SUSWRR= 104005           695#   1073
SWR     001122          1002#   1076    1079    1649    1706    1714    2579    2593    2599    2605    2607    2623    2686
                        2688    2734    2758    2766    2772    2806    2810    3105    3162    3239    3261    3325    3345
                        3391    3393    3447    3494    3498*   3504    3536*
SWREG   000176           980#   1706    2593    3447    3453    3498    3504
SWREQ   024037          3451    4425#
TCSR    001130          1005#   3288    3310    3336    3342    3367    3410*   3415    3423    3430    3433
TDBR    001132          1006#   3290*   3312*   3338*   3344*   3369*   3417*   3425*   3432*   3435*   3462*
TEND    013106          2602*   2610*   2613*   2617*   2663    2794#
TEST    005202          1705    1713    1719#
TESTA   013500          2883    2885#   3109    3110    3148    3149
TESTB   013636          2916#
TESTC   013766          2945#
TESTD   014120          2976#
```

```
TESTE   014374          3031#
TESTF   014542          3064#
TESTG   014710          3027    3104#
TESTX   015142          1035    3154#
TEST1   005210          1720#   3406
TEST1A  005212          1719    1721#
TEST10  006572          2054#
TEST11  006714          2062#
TEST12  007016          2104#
TEST13  007076          2138#
TEST14  007310          2143    2145    2150    2165    2167    2175#
TEST15  007462          2189    2200    2202    2206#
TEST16  007674          2221    2223    2228    2243    2245    2249#
TEST17  010106          2264    2266    2271    2286    2288    2292#
TEST18  010320          2307    2309    2314    2329    2331    2335#
TEST19  010532          2350    2352    2357    2372    2374    2378#
TEST2   005306          1740    1747#
TEST20  010744          2393    2395    2400    2415    2417    2421#
TEST21  011050          2441#
TEST22  011144          2460#
TEST23  011252          2482#
TEST24  011456          2493    2500    2507    2514    2521    2528    2536    2542    2545#
TEST3   005432          1771    1778#
TEST4   005514          1787    1793    1795    1797    1800#
TEST5   005644          1844#
TEST6   006000          1857    1871    1888#
TEST7   006132          1914    1917    1919    1921    1925    1928#
TEST8   006316          1942    1954    1958    1968    1973    1977    1983#
TEST9   006466          1996    2001    2009    2025#
TIB     001142          1010#   3461#   3462    3463#   3464    3469    3471    3473    3475#   3479
TIFLG   001136          1008#   3540    3544#
TIM24   011542          2558    2567#
TINT10  006654          2057    2068#
TINT11  006774          2085    2096#
TINT12  007060          2107    2114#
TINT13  007214          2130    2151#
TINT14  007406          2177    2190#
TINT15  007600          2208    2229#
TINT16  010012          2251    2272#
TINT17  010224          2294    2315#
TINT18  010436          2337    2358#
TINT19  010650          2380    2401#
TINT20  011024          2423    2433#
TIT   = 104007           697#   1044
TITL    024125          3542    4435#
TITTYP  017254          3531    3540#
TMP1    001134          1007#   3160    3192    3457#   3476#   3477#   3478#   3479#   3506#   3507#   3508#   3509    3536
TNINT   011126          2444    2454#
TOTCRO  015700          3194#   3202#   3256    3269#
TOTERR  015676          3195#   3237#   3259    3268#
TOUT    016426          1662    2162    2240    2283    2326    2369    2412    2678    2680    2707    2709    2881    2892
                        2894    2907    2909    2919    2921    2931    2936    2938    2951    2953    2966    2968    2979
                        2981    2986    2991    3013    3018    3020    3034    3036    3038    3040    3052    3054    3056
                        3067    3069    3071    3073    3088    3090    3115    3120    3122    3141    3143    3155    3158
                        3187    3190    3245    3300    3302    3410#   3452    3456    3467    3486    3543
TRAPX   005164          1711    1714#
```

DZCRB.SRC CROSS REFERENCE TABLE -- USER SYMBOLS

TRFLG	001150	1013#	1700*	1710	2582*	2619	2765*	
TRP1	012030	2620	2623#					
TRTRAP	001146	966	1012#					
TSTA	013456	2878	2880#					
TSTART	013104	2601*	2609*	2612*	2616*	2665	2771	2793#
TSTM01	001470	1094#						
TSTM02	001526	1102	1107#					
TSTM03	001634	1126	1132#					
TSTM04	001676	1143	1146#					
TSTM05	001756	1163#						
TSTM06	002072	1186#						
TSTM07	002152	1203#						
TSTM08	002232	1219#						
TSTM09	002316	1240#						
TSTM1A	001472	1086	1097#					
TSTM10	002400	1259#						
TSTM11	002462	1278#						
TSTM12	002570	1301#						
TSTM13	002654	1319#						
TSTM14	003022	1350#						
TSTM15	003262	1398#						
TSTM16	003376	1422#						
TSTM17	003520	1446#						
TSTM18	003644	1471#						
TSTM19	003760	1494#						
TSTM20	004102	1520#						
TSTM21	004462	1590#						
TSTM22	004560	1612#						
TSTW	005060	1228*	1229*	1230	1249*	1250*	1251	1328*
T2INT	011210	2463	2470#					
T2INTA	011234	2471	2476#					
WAIT9	006524	2038#	2041					
XLOOP	015250	3168	3170#					
. =	024314	708	710	712	714	716	718	720
		734	736	738	740	742	744	746
		760	762	764	766	768	770	772
		786	788	790	792	794	796	798
		812	814	816	818	820	822	824
		838	840	842	844	846	848	850
		864	866	868	870	872	874	876
		890	892	894	896	898	900	902
		916	918	920	922	924	926	928
		942	944	946	948	950	952	954
		971#	978#	983#	992#	1726	1728	1732
		1764	1766	1775	1820	1824	1827	1830
		1863	1867	1873	1877	1881	1885	1895
		1950	1956	1961	1964	1966	1971	1975
		2017	2034	2047	2063	2069	2073	2076
		2184	2191	2215	2230	2258	2273	2301
		2432	2438	2450	2469	2488	2495	2502
		2568	2634	2640	2652	2664	2693	2698
		2814	2816	2818	2820	2827	2835	2851
		2901	2905	2913	2925	2928	2934	2942
		2989	2995	2999	3001	3003	3005	3007
		3049	3060	3077	3081	3085	3094	3118
		3165	3225	3279	3283	3289	3297	3311

1336*	1626*	1627*	1629	1686#			
722	724	726	728	730	732		
748	750	752	754	756	758		
774	776	778	780	782	784		
800	802	804	806	808.	810		
826	828	830	832	834	836		
852	854	856	858	860	862		
878	880	882	884	886	888		
904	906	908	910	912	914		
930	932	934	936	938	940		
956	958	960	962	965#	968#		
1738	1744	1755	1758	1760	1762		
1832	1833	1836	1840	1851	1855		
1900	1906	1909	1923	1940	1946		
1979	1990	1994	1999	2005	2013		
2091	2098	2112	2113	2137	2152		
2316	2344	2359	2387	2402	2428		
2509	2516	2523	2530	2539	2551		
2735	2750	2759	2767	2803	2813*		
2858	2865	2868	2872	2890	2898		
2949	2957	2960	2964	2972	2984		
3010	3016	3024	3026	3044	3047		
3126	3129	3131	3139	3147	3163		
3326	3337	3343	3346	3362	3378		

341F 3420 3424 3431 3434

```
COMMEN       1#
ENDCOM       1#
ESCAPE       1#
GETPRI       1#
GETSWR       1#
INT       2126#   2127    2205    2248    2291    2334    2377
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#
.$CMTA       1#
.$DB2O       1#
.$DG2O       1#
.$DIV        1#
.$EOP        1#
.$EPRO       1#
.$ERRT       1#
.$MULT       1#
.$POWE       1#
.$PWRU       1#
.$RUDE       1#
.$RUOC       1#
.$READ       1#
.$RSAZ       1#
.$SAVE       1#
.$SR2O       1#
.$SB2O       1#
.$SCOP       1#
```

```
. SIZE       1#
.$SUPR       1#
.$TRAP       1#
.$TYPB       1#
.$TYPD       1#
.$TYPE       1#
.$TYPO       1#
.$40CA       1#
.1170        1#
```

ADC	3366	3384													
ADD	1248	1621	2776	3161	3449	3520									
ASL	2774	2775	3476	3477	3478	3518									
ASR	2777	2778													
BEQ	1077	1080	1123	1143	1158	1174	1182	1199	1215	1232	1253	1274	1294	1315	1330
	1338	1346	1360	1364	1371	1379	1382	1393	1570	1573	1576	1579	1582	1585	1600
	1604	1607	1638	1641	1652	1732	1738	1744	1755	1775	1797	1810	1833	1840	1851
	1867	1873	1877	1881	1885	1900	1904	1911	1914	1923	1938	1946	1950	1956	1964
	1971	1975	1990	1999	2007	2013	2017	2034	2047	2063	2112	2137	2184	2215	2258
	2301	2344	2387	2428	2438	2560	2571	2573	2580	2600	2606	2608	2687	2693	2696
	2742	2748	2750	2753	2767	2807	2827	2835	2868	2872	2890	2905	2934	2949	2964
	2974	2989	2995	3016	3026	3044	3047	3077	3081	3106	3118	3129	3134	3139	3163
	3219	3266	3283	3326	3378	3448	3470	3481	3495	3535	3541				
BGT	3472														
BIC	1121	1141	1549	1555	2060	2088	2133	2180	2211	2254	2297	2340	2383	2429	2466
	2629	2779	2856	3164	3193	3386	3519								
BICB	3410	3463	3475	3508											
BIS	1151	1167	1176	1192	1208	1229	1250	1267	1283	1306	1324	1332	1340	1355	1362
	1369	1376	1377	1404	1427	1451	1477	1503	1505	1526	1530	1534	1535	1539	1543
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	1970	1974	1976	1989	1991	2038	2044	2046	2052	2068	2111	2136	2151	2183	2190
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BLT	3474														
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	2409	2554	2638	2640	2664	2841	2901	2928	2960	3010	3049	[illegible]	3131	3204	
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	1769	1785	1789	1791	1797	1812	1817	1820	1827	1853	1902	1919	1944	1977	1992
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	2562	2594	2620	2644	2652	2656	2659	2662	2673	2675	2698	2704	2740	2759	2773
	2787	2803	2811	2814	2816	2818	2820	[illegible]	[illegible]	2838	2913	2925	2942	2957	2972
	2999	3001	3003	3005	3007	3024	3060	[illegible]	[illegible]	3126	3147	3200	3206	3210	3216
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	2539	2542	2551	2568	2645	2689	2735	2738	3208	3225	3262	3289	3311	3314	3337
	3343	3346	3362	3368	3395	3416	3424	3431	3434	3460					
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DZCRB.SRC CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

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         769   771   773   775   777   779   781   783   785   787   789   791   793   795   797
         799   801   803   805   807   809   811   813   815   817   819   821   823   825   827
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.MACR   2126
.MACRO     1
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H08


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.NLIST      1     974    2126
.REM        1
.RE°T     708
.TITLE    685



 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

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 RUN-TIME RATIO: 260/82=3.1
 CORE USED:  33K  (65 PAGES)
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