CR11

DIAGNOSTIC TEST

MD-11-DZCRA-B

EP DZCRA B DL

JAN 1978

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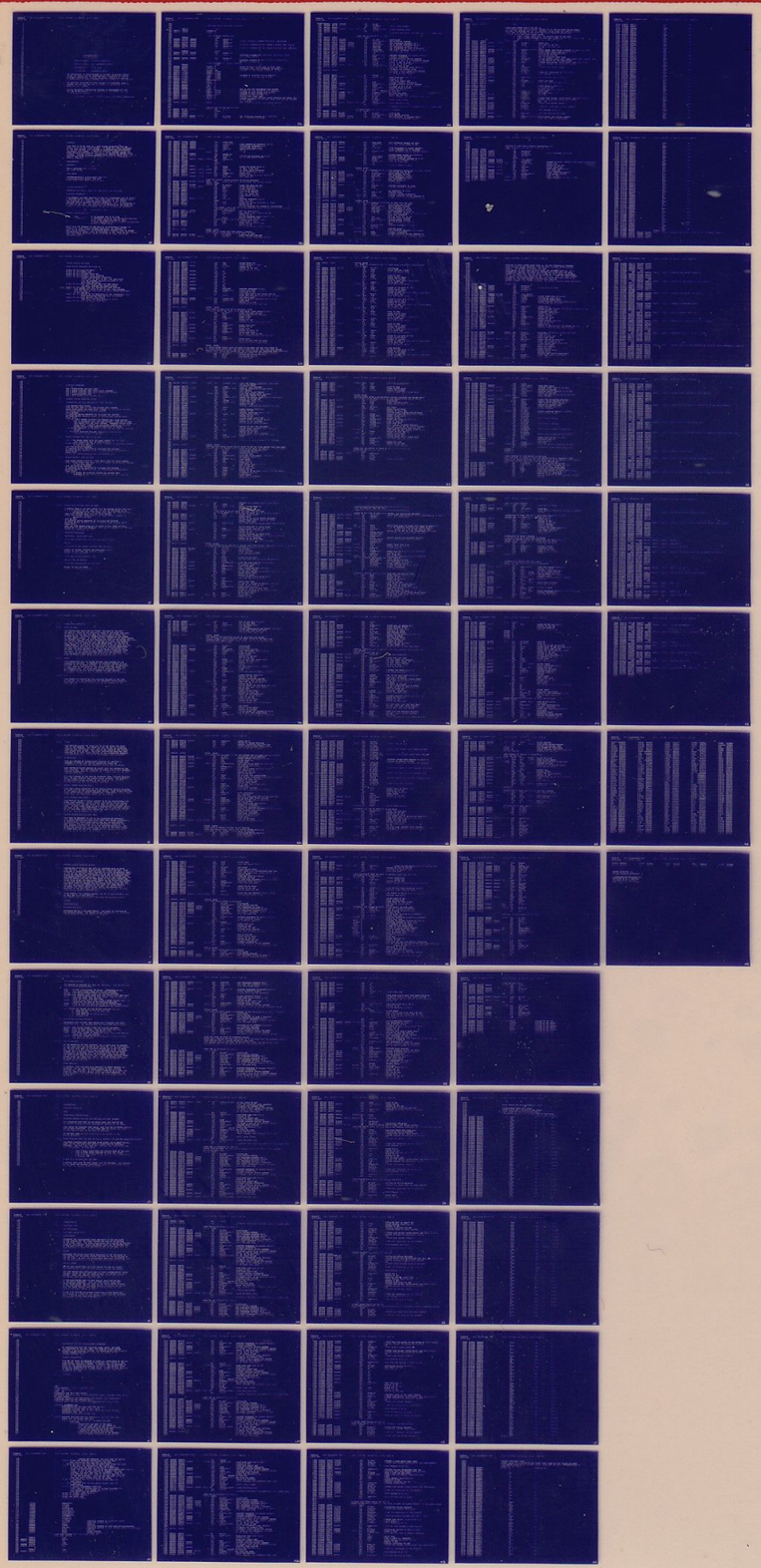
MADE IN USA



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                                IDENTIFICATION
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                        PRODUCT CODE:   MAINDEC-11-DZCRA-B-D

                        PRODUCT NAME:   CR11 DIAGNOSTIC TEST

                        PROGRAM DATE:   MAY 1976

                        MAINTAINER:     DIAGNOSTIC GROUP

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                        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 C.D.I. OR DOCUMATION READER TO BE
                                CHECKED.  ANOTHER STARTING ADDRESS TESTS SPECIAL DECKS WHICH HAVE ALL
                                COLUMNS AND CARDS PUNCHED IDENTICALLY, TO AID IN DIAGNOSING
                                SPECIAL PROBLEMS.

                        2.      REQUIREMENTS

                        2.1     EQUIPMENT

                                PDP-11 COMPUTER WITH 4K MEMORY
                                CR11 CARD READER

                        2.2     TEST DECKS

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



                        3.      LOADING PROCEDURE

                                PROCEDURE FOR NORMAL ABSOLUTE TAPES SHOULD BE FOLLOWED.

                        4.      STARTING PROCEDURE

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

                                        (IE)    SWR=XXXXXX  NEW=

                                POSSIBLE RESPONSES ARE:

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

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

                                BASIC SWITCH REGISTER SETTINGS ARE:

                                SW15=1 OR UP---HALT ON ERROR
                                SW14=1 OR UP---SCOPE LOOP
                                SW13=1 OR UP---INHIBIT PRINT OUT
                                SW12=1 OR UP---INHIBIT TRACE TRAPPING
                                SW11=1 OR UP---INHIBIT SUB-PROGRAM ITERATION
                                               (NOTE THAT IF SW11 IS SET, THE CARD COUNT
                                               WILL BE ALTERED, CAUSING FAILURES IN THE
                                               DATA TEST SECTION.)
                                SW10=1 OR UP---CR11 CONTROLLER USES THE M829 MODULE
                                               (IF DOWN, ASSUMES THE M8290 MODULE)
                                SW07=1 OR UP---LOOP THRU THE INSTRUCTION TEST PORTION
                                NOTE:   DATA ERRORS MAY OCCUR IF SW7 IS SET, THEN CLEARED.
                                        ALSO THE TEST MAY HANG WHEN THE INPUT HOPPER GOES EMPTY
                                        IF SW7 WAS SET.
                                SW06=1 OR UP---RETURN TO THE BEGINNING OF THE INSTRUCTION TEST
                                               WHEN CONTINUING FROM ONE DECK TO ANOTHER
                                SW05=1 OR UP---HALT BETWEEN TEST DECKS
                                               (SEE 5.2.1 FOR EXPLANATION OF SW5=0)
                                SW04=1 OR UP---RUN THE BINARY TEST DECK
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                        4.2     STARTING ADDRESSES

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

                        4.3     PROGRAM AND/OR OPERATOR ACTION

                        4.3.1   INSTRUCTION AND DATA RELIABILITY TEST (SA 200)

                                LOAD PROGRAM INTO MEMORY.
                                LOAD ONE TEST DECK IN THE CARD READER INPUT HOPPER.
                                PRESS MOTOR START AND READ START ("RESET" ON DOCUMATION READER).
                                SET SWITCH REGISTER TO STARTING ADDRESS.
                                LOAD ADDRESS.
                                IF HARDWARE SWITCH REGISTER IS AVAILABLE SET SWITCHE
                                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 210 OR 220)

                                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 SWITCHE
                                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 240)

                                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 SWITCHE
                                SETTINGS BEFORE PRESSING START. IF SWITCH-LESS MACHINE SIMPLY
                                PRESS START.
                                WHEN ASKED,ENTER THE STARTING ADDRESS OF DESIRED TEST
                                        (ADDRESS OF THE TESTXX TAG, WHERE XX MAY BE 1 THRU 24
                                        OR A THRU G).
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                                4.3.4   SINGLE DATA PATTERN TEST (SA 250)

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

                                5.      OPERATING PROCEDURE

                                5.1     OPERATIONAL SWITCH SETTINGS

                                5.1.1   AT SA 200 (INSTRUCTION AND DATA RELIABILITY TEST)

                                        SEE 4.1

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

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

                                5.1.3   AT SA 240 (SINGLE SUBTEST LOOP)

                                        SEE 4.1 FOR SR OPTIONS

                                5.1.4   AT SA 250 (SINGLE DATA PATTERN TEST)

                                        SW15=1 TO HALT ON ERROR
                                        SW13=1 TO INHIBIT PRINTOUTS
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                        5.2     SUBROUTINE ABSTRACTS

                        5.2.1   BEGIN SA 200

                                THE INSTRUCTION TESTS ARE RUN FIRST, FOLLOWED BY THE DATA
                                RELIABILITY TESTS ON THE REMAINING CARDS IN THE FIRST TEST DECK.
                                AT THE END OF THE DECK THE BELL WILL RING, AND IF SW5=1 THE
                                PROGRAM HALTS.  IF SW5=0, PROGRAM ACTION DEPENDS ON THE NUMBER
                                OF TEST DECKS LOADED.  IF THERE ARE STILL CARDS IN THE INPUT HOPPER,
                                THE PROGRAM WILL RUN THE DATA RELIABILITY TEST ON THE ENTIRE NEXT DECK.
                                IF THE INPUT HOPPER IS EMPTY AT THE END OF A DECK, THE PROGRAM
                                WILL RUN A SET OF TESTS OF OFF-LINE OPERATIONS.  AT THE END OF
                                THESE TESTS, IT WAITS FOR THE CARD READER TO BE PUT BACK ON-LINE.
                                FURTHER CHECKS ARE MADE OF THE OFF-LINE TO ON-LINE OPERATIONS,
                                AND THEN THE DATA RELIABILITY TEST IS RUN ON THE ENTIRE DECK.
                                IF SW5=1, HITTING CONTINUE WILL RESUME PROGRAM OPERATION AFTER
                                THE HALT.  IF ALL OTHER SWITCHES WERE DOWN, FOR EXAMPLE, THE
                                DATA RELIABILITY TEST WOULD THEN BE RUN ON THE NEXT DECK.  THE
                                OTHER SWITCHES AFFECT PROGRAM FLOW AS NOTED IN 4.1.

                        5.2.2   SCOPE

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

                        5.2.3   HLT

                                THIS SUBROUTINE PRINTS OUT THE LOCATION COUNTER AT THE TIME
                                OF FAILURE, AND THE CONTENTS OF THE PROCESSOR STATUS REGISTER.
                                NOTE THAT THE LOCATION COUNTER WILL BE THE ADDRESS OF THE
                                HLT PLUS TWO.
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259
260                             5.2.4   TTRAP
261
262                                     THIS ROUTINE ALLOWS THE TRACE BIT TO BE SET AFTER THE FIRST
263                                     LOOP OF THE PROGRAM.  THE TRACE BIT WILL BE SET ON ALTERNATE
264                                     LOOPS OF THE INSTRUCTION TEST, AND ON ALL LOOPS OF THE CHANNEL
265                                     TEST UNLESS SW12 IS SET.  THE FIRST INSTRUCTION EXECUTED UPON
266                                     TRAPPING IS AN "RTI" WHICH RETURNS TO THE INTERRUPTED SEQUENCE.
267                                     THIS CONTINUES UNTIL THE END OF THE PROGRAM LOOP IS REACHED.
268
269                             5.2.5   TRAPCATCHER
270
271                                     THIS IS A SERIES OF INSTRUCTIONS STARTING AT LOCATION 0
272                                     DESIGNED TO DETECT AND ISOLATE UNEXPECTED TRAPS AND
273                                     INTERRUPTS TO THE TRAP AND INTERRUPT VECTOR AREA OF MEMORY.
274
275                                     EACH VECTOR ENTRANCE ADDRESS IS LOADED WITH THE ADDRESS OF THE
276                                     NEXT LOCATION.  THE NEXT LOCATION IS LOADED WITH A HALT (000000).
277                                     THUS AN ILLEGAL TRAP OR INTERRUPT WILL CAUSE A HALT AT THE TRAP
278                                     LOCATION PLUS TWO.
279
280                                     IF A HALT OCCURS IN THE TRAP OR INTERRUPT AREA, EXAMINE REGISTER
281                                     SIX.  IT WILL CONTAIN THE CURRENT STACK ADDRESS.  THE CONTENTS
282                                     OF THE CURRENT STACK ADDRESS IS THE VALUE OF THE LOACATION
283                                     COUNTER WHEN THE TRAP OR INTERRUPT OCCURRED.
284
285                             5.2.6   ERCR11 (ERROR FUNCTION TEST)
286
287                                     THIS TEST CHECKS OPERATION OF THE VARIOUS ERROR SENSING FEATURES
288                                     OF THE G.D.I. OR THE DOCUMATION CARD READER.  CARD READER OFF-LINE.
289                                     INPUT HOPPER EMPTY, OUTPUT STACKER FULL, FEED ERROR, MOTION ERROR,
290                                     STACK FAIL, AND DARK-LIGHT ERROR ARE ALL CHECKED.
291
292                             5.2.7   TESTX (SINGLE TEST LOOP)
293
294                                     THIS ROUTINE ALLOWS A SINGLE SUBTEST TO BE RUN CONTINUOUSLY FOR
295                                     SCOPE LOOP PURPOSES.  WHILE A SCOPE LOOP SWITCH OPTION EXISTS,
296                                     IT REQUIRES THAT YOU ARE WITHIN THE TEST IN WHICH YOU WISH TO
297                                     LOOP.  IN SOME CASES (SUCH AS WITH INTERMITTENT FAILURES) THAT'S
298                                     NOT EASY TO DO.  THIS SUBROUTINE ALLOWS YOU TO LOAD THE ADDRESS
299                                     OF ANY TEST FROM TEST0 THRU TEST24 AND TEST4 THRU TEST6 AT THE
300                                     HALT AND THEN GO DIRECTLY TO THAT TEST.
301
302                             5.2.8   CKSAME (SINGLE DATA PATTERN TEST)
303
304                                     THIS TEST IS DESIGNED TO AID IN THE DIAGNOSIS OF DIFFICULT
305                                     DATA ERROR PROBLEMS AND FACILITATE SOME CARD READER ADJUSTMENTS.
306                                     IT CONTINUOUSLY READS CARDS WHICH HAVE ALL COLUMNS PUNCHED
307                                     IDENTICALLY (AND ALL CARDS MUST BE IDENTICAL), CHECKING THE
308                                     DATA AGAINST A PATTERN SET UP ON THE SWITCHES INITIALLY.  ANY
309                                     ERRORS ARE PRINTED OUT, ALONG WITH A COUNT OF THE TOTAL NUMBER
310                                     OF CARDS READ AND THE TOTAL NUMBER OF DATA ERRORS WHICH HAVE
311                                     OCCURRED SINCE THE TEST WAS STARTED.
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                        5.3     PROGRAM AND/OR OPERATOR ACTION

                        5.3.1   LOADING AND STARTING AT 200 WITH ALL SWITCHES DOWN IS WORST
                                CASE TESTING.  A SINGLE ALPHANUMERIC DECK SHOULD BE RUN.  THIS
                                EXECUTES AN INSTRUCTION TEST FOLLOWED BY A DATA RELIABILITY TEST.
                                AT THE END OF THE DECK CHECKS ARE MADE OF THE FLAG SETTINGS WHICH
                                SHOULD BE AFFECTED, AND THE PROGRAM WAITS FOR AN INTERRUPT FROM
                                THE READER COMING BACK ON-LINE.  AT THE END OF THE FIRST DECK THE
                                OPERATOR SHOULD LOAD ONE OR MORE DECKS IN THE INPUT HOPPER AND
                                PRESS MOTOR START AND READ START (RESET ON THE DOCUMATION READER).
                                IF THE CARD READER IS WORKING PROPERLY, THE BELL WILL RING ONCE
                                WHEN READ START IS PRESSED AND THE ENTIRE DECK WILL BE RUN THRU
                                THE DATA RELIABILITY PORTION OF THE TEST. IF, AFTER READING
                                80 CARDS, THE INPUT HOPPER IS NOT EMPTY, THE PROGRAM WILL
                                CONTINUE TO THE NEXT DECK. SWITCH OPTIONS MAY BE USED TO ALTER
                                THIS FLOW AS NOTED IN SECTION 4.1.

                        5.3.2   TO GO DIRECTLY TO A SINGLE SUBTEST AND RUN IT CONTINUOUSLY, USE
                                SA 240. SEE 4.3.3 FOR DETAILS.
                                THE PROGRAM WILL CONTINUOUSLY LOOP THRU THE DESIRED SUBTEST.

                        6.      ERRORS

                        6.1     ERROR PRINTOUT

                        6.1.1   STANDARD PRINTOUT

                                PRINTOUTS ARE IN A TWO-WORD FORMAT.  THE FIRST IS THE PC+2 OF
                                THE DETECTED ERROR.  THE SECOND IS THE CONTENTS OF THE PROCESSOR
                                STATUS REGISTER WHEN THE ERROR WAS DETECTED.
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                        6.1.2   DATA ERROR PRINTOUT

                                THE HEADING IS PRINTED OUT ONCE PER TEST DECK.  THE COLUMNS HAVE
                                THE FOLLOWING SIGNIFICANCE:

                                DECK    -EITHER ALPHANUMERIC OR BINARY , DEPENDING ON SW4
                                CARD    -THE CARD NUMBER WHERE THE FAILURE OCCURRED
                                COLUMN  -THE COLUMN NUMBER WHERE THE FAILURE OCCURRED
                                PATTERN -THE CORRECT CARD IMAGE DATA THAT SHOULD HAVE BEEN READ
                                READ1   -THE CARD IMAGE DATA IS READ TWICE.  THIS IS WHAT WAS
                                 READ THE FIRST TIME FROM CRB1
                                READ2   -THIS IS WHAT WAS IN CRB1 AFTER A BRIEF TIMING LOOP.  IT
                                 SHOULD BE THE SAME AS THE PREVIOUS READING.
                                CODED   -THIS IS WHAT THE DATA SHOULD BE IN ENCODED FORM
                                READ    -THIS IS WHAT WAS READ BY ADDRESSING THE ENCODED BUFFER

                                DATA ERRORS NOT TRACED TO CARD READER HARDWARE INCLUDE:
                                        A.  SW04 NOT SET TO TYPE OF DECK USED
                                        B.  CARD MISSING
                                        C.  CARD DECK OUT OF PROPER SEQUENCE
                                        D.  DAMAGED CARD

                        6.1.3   SINGLE DATA PATTERN PRINTOUT

                                THE SINGLE DATA PATTERN TEST PRINTS OUT A HEADING WITH EACH
                                ERROR PRINTOUT.  THE COLUMNS HAVE THE FOLLOWING SIGNIFICANCE:

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

                        6.1.4   "BIT 8 WAS SET"

                                AT THE BEGINNING OF MOST SUBTESTS, BIT 8 (OFF-LINE) IS CHECKED
                                TO MAKE SURE THAT THE READER IS NOT OFF-LINE. IT IS ALSO CHECKED
                                IN THE DATA TEST WHEN AN INTERRUPT OCCURS DUE TO BIT 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.
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401
402
403                             7.      RESTRICTIONS
404
405                             7.1     STARTING PROCEDURE
406
407                                     NONE
408
409                             7.2     OPERATIONAL RESTRICTIONS
410
411                             7.2.1   COMBINED INSTRUCTION AND DATA RELIABILITY TEST (SA286)
412
413                                     IF A STANDARD TEST DECK IS NOT BEING USED, SW7 MUST BE SET
414                                     TO INHIBIT RUNNING THE DATA RELIABILITY PORTION OF THE TEST.
415
416                                     WHEN USING THE STANDARD TEST DECKS, THEY MUST BE IN PROPER SEQUENCE
417                                     AND IN GOOD CONDITION.  IT IS A GOOD IDEA TO NUMBER THE CARDS
418                                     IN EACH DECK AS SOON AS THE DECK IS RECEIVED.
419
420                                     IF THE CR11 USES AN M829 MODULE SW10 MUST BE SET IN THE
421                                     SWITCH REGISTER.
422
423                             7.2.2   ERROR FUNCTION TEST (SA 210 FOR G.D.I. READER - SA.220 FOR DOCUMATION READER)
424
425                                     THE ERROR FUNCTION TEST REQUIRES SPARE CARDS, AS IT BENDS SEVERAL.
426                                     ALSO, TO RUN THE DARK-LIGHT CHECK 2 CARDS MUST BE SPECIALLY
427                                     PREPARED.  THE TEST WILL TYPE OUT A REQUEST FOR THESE CARDS WHEN
428                                     THEY ARE NEEDED.  TO MAKE THEM:
429
430                                             1.  TEAR A SMALL PIECE FROM THE LEADING EDGE OF ONE CARD.
431                                             2.  TAPE 2 OTHER CARDS TOGETHER TO MAKE ONE "LONG"
432                                                 CARD - IT ONLY NEEDS TO BE ABOUT 1/2 INCH LONGER THAN
433                                                 A REGULAR CARD
434
435                             7.2.3   SINGLE DATA PATTERN TEST (SA 258)
436
437                                     A SPECIAL DECK (ONE OR MORE CARDS) MUST BE PREPARED.  ALL COLUMNS
438                                     OF ALL CARDS ARE PUNCHED IDENTICALLY, USING A DATA PATTERN WHICH
439                                     WILL TEST THE PROBLEM BEING DIAGNOSED.
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                        8.      MISCELLANEOUS

                        8.1     EXECUTION TIME

                                NOT APPLICABLE

                        8.2     CARD DECK DESCRIPTION

                        8.2.1   ALPHANUMERIC

                                REFERENCE THE ALPHANUMERIC TABLE BEGINNING AT THE TAG ALPCD
                                IN THE LISTING FOR THE CODES PUNCHED FOR EACH OF 80 COLUMNS
                                OF THE FIRST CARD.  THE FIRST VALUE GIVEN FOR A COLUMN IS THE CARD
                                IMAGE OF THAT COLUMN, WHILE THE SECOND VALUE IS THE ENCODED FORM
                                OF THE SAME PATTERN.  EACH SUCCESSIVE CARD IN THE DECK USES THE
                                SAME SEQUENCE OF CODES ROTATED ONE COLUMN TO THE LEFT.

                        8.2.2   BINARY

                                REFERENCE THE BINARY DATA TABLE BEGINNING AT THE TAG BINCD IN
                                THE LISTING FOR THE CODES PUNCHED FOR EACH OF THE 80 COLUMNS OF
                                THE 1ST CARD.  AS WITH THE ALPHANUMERIC DECK EACH SUCCESSIVE CARD
                                HAS THE SAME SEQUENCE OF CODES ROTATED ONE COLUMN TO THE LEFT.

                        8.3     SPECIAL NOTES

                                IF THE CARD READER GOES OFF-LINE BEFORE THE END OF A CARD,
                                BUSY REMAINS SET UNTIL THE CARD ACTUALLY CLEARS THE READER.

                                THE CARD READER GOES OFF-LINE DUE TO "INPUT HOPPER EMPTY" AFTER
                                THE 80TH COLUMN OF THE LAST CARD IS READ, BUT BEFORE CARD DONE
                                OCCURS.  THUS, THE SPECIAL CONDITION BIT IN THE CSR WILL BE
                                SET BEFORE CARD DONE ON THE LAST CARD.

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

                                IF BIT 0 OF THE CRS IS CLEARED IMMEDIATELY AFTER BEING SET,
                                THE READING OF A CARD MAY NOT OCCUR.  SINCE THIS BIT IS WRITE
                                ONLY, A BIS OR BIC DONE AFTER SETTING BIT 0 MAY CLEAR THE BIT
                                AND PREVENT THE READ FROM OCCURRING.
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                        8.4     TESTING CR11'S WITH NON-STANDARD ADDRESSES

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

                        9.      PROGRAM DESCRIPTION

                                THIS SET OF TESTS IS DESIGNED TO CHECK ALL OPERATIONS OF THE CR11
                                CARD READER, WITH THE NECESSARY EXCEPTION THAT TIMING IN MOST
                                CASES IS ONLY PARTIALLY TESTED.  A SPECIAL TEST IS INCLUDED TO
                                CHECK OUT THE ERROR FUNCTIONS OF THE G.D.I. 100 READER, WHICH
                                PRINTS OUT DIRECTIONS AS IT GOES ALONG.  A TEST IS ALSO INCLUDED
                                TO ISOLATE DIFFICULT DATA ERRORS USING A SPECIAL TEST DECK
                                PUNCHED BY THE USER.

                        10.     LISTING%


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

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

                        ;SWITCH REGISTER SETTINGS FOR THE INSTRUCTION AND DATA TEST ARE:
                        ;       SW04=1 FOR THE BINARY TEST DECK
                        ;       SW05=1 TO HALT AT THE END OF A STANDARD 80 CARD
                        ;              TEST DECK.
                        ;              =0 TO CONTINUE FROM ONE DECK TO THE NEXT.
                        ;                     AFTER THE LAST DECK IN THE HOPPER IS
                        ;                     RUN, THE PROGRAM WAITS FOR THE CARD READER
                        ;                     TO COME BACK ON-LINE,AND RUNS THRU
                        ;                     A SERIES OF CHECKS OF OFF-LINE AND
                        ;                     COMING ON-LINE OPERATIONS OF THE READER.
                        ;                     WHEN THE READER IS BACK ON-LINE AND THE
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                        ;                 CHECKS ARE COMPLETE, THE DATA TEST IS RESUMED.
                        ;       SW06=1 TO RUN THE COMBINED INSTRUCTION AND DATA TEST
                        ;              WHEN CONTINUING FROM ONE DECK TO THE NEXT
                        ;           =0 TO RUN ONLY THE DATA TEST ON EVERY DECK AFTER THE FIRST
                        ;       SW07=1 TO RUN ONLY THE INSTRUCTION TEST CONTINUALLY
                        ;              SETTING SW06 AND SW07 AT THE END OF A DECK WILL
                        ;              CAUSE THE INSTRUCTION TEST TO BE RUN CONINUOUSLY FROM THEN ON
                        ;              NOTE:  IF SW7 IS SET, CHECKED BY PROGRAM, AND THEN
                        ;              CLEARED, THE DATA TEST WILL BE INCORRECT.  THIS IS
                        ;              TRUE BECAUSE THE FIRST CARD IN THE DATA TEST WILL NOT
                        ;              BE THE ONE EXPECTED.  WITH SW7 SET THE TEST MAY HANG
                        ;              WHEN THE INPUT HOPPER RUNS OUT OF CARDS.
                        ;       SW10=1 TO INDICATE THAT THE CR11 BEING TESTED USES THE
                        ;              M829 MODULE
                        ;           =0 TO INDICATE THAT THE CR11 BEING TESTED USES THE
                        ;              M8290 MODULE
                        ;       SW11=1 TO INHIBIT SUBPROGRAM ITERATION
                        ;              (NOTE THAT IF PROGRAM FLOW IS ALLOWED TO ENTER THE
                        ;              DATA SUBTEST, DATA ERRORS WILL OCCUR SINCE THE
                        ;              CARD COUNT WILL BE INCORRECT.)
                        ;       SW12=1 TO INHIBIT TRACE TRAPPING
                        ;       SW13=1 TO INHIBIT PRINTOUT
                        ;       SW14=1 FOR SCOPE LOOP
                        ;       SW15=1 TO HALT ON ERROR

            177776                      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 READ STATUS REGISTER
            000004                      CRB1=%4                 ;CONTAINS ADDRESS OF CARD READER BUFFER (12 BIT DATA)
            000005                      R5=%5                   ;SCRATCH
            000006                      SP=%6                   ;STACK POINTER
            000007                      PC=%7                   ;PROGRAM COUNTER
                                ;LOAD TRAP CATCHER INTO LOCATIONS 0 THRU 377
                                ;LOAD TRAP VECTORS
            000014                      .=14
000014      000642                      TRTRAP
000016      000340                      340
            000030                      .=30
000030      012752                      EMTSRV
000032      000340                      340

            000046                      .=46
000046      006466                      LOGIC
```

m1

```
                                ;SOFTWARE SWITCH REGISTER LOCATIONS
                                
                        000174          .=174
000174  000000         DISPREG:0
000176  000000         SWREG:  0
                                
                                ;LOAD STARTING ADDRESS AREA
                        000200          .=200
000200  012706  000600          MOV     #STACK,SP
000204  000137  000726          JMP     BEGIN           ;NORMAL STARTING ADDRESS FOR G.D.I. 100 READER
000210  012706  000600          MOV     #STACK,SP
000214  000137  007200          JMP     ERCR11          ;STARTING ADDRESS FOR CR11 ERROR FUNCTION TEST (G.D.I)
000220  012706  000600          MOV     #STACK,SP
000224  000137  007206          JMP     ERCM11          ;STARTING ADDRESS FOR CR11 ERROR FUNCTION TEST (DOCUMATI
                                
                        000240          .=240
000240  012706  000600          MOV     #STACK,SP
000244  000137  010676          JMP     TESTX           ;STARTING ADDRESS FOR LOOP WHICH CONTINUALLY RUNS
                                                        ;ANY SINGLE SUBTEST
000250  012706  000600          MOV     #STACK,SP
000254  000137  011014          JMP     CKSAME          ;STARTING ADDRESS OF TEST TO READ A SINGLE DATA
                                                        ;PATTERN CONTINUOUSLY
                                ;LOAD POINTERS AND GENERAL STORAGE
                        000600          .=600
000600  000000         STACK:  0                       ;STACK POINTER INITIALIZED TO POINT HERE
000602  000000         INTFLG: 0                       ;CONTAINS LEVEL THAT INTERRUPT IS FOUND AT
000604  000230         INTVC:  230                     ;ADDRESS OF CARD READER INTERRUPT VECTOR
000606  177560         KBCSR:  177560
000610  177562         KBDBR:  177562
000612  177564         TCSR:   177564                  ;ADDRESS OF TELETYPE STATUS REGISTER
000614  177566         TDBR:   177566                  ;ADDRESS OF TELETYPE DATA BUFFER
000616  177570         SWR:    177570
000620  177570         DISPLAY:177570
000622  000000         TMP1:   0
000624  177777         TIFLG:  -1
000626  000000         TIB:    0
000630  000000         CSNT:   0
000632  000000         FLAG:   0                       ;SET TO ONE FOR MARK-SENSE CARD READER
000634  177160         KCRS:   177160                  ;ADDRESS OF CARD READER STATUS REGISTER
000636  177162         KCRB1:  177162                  ;ADDRESS OF CARD READER DATA BUFFER
000640  177164         CRB2:   177164                  ;ADDRESS TO READ ENCODED DATA
000642  000002         TRTRAP: RTI                     ;RETURN FROM TRACE LOOP
000644  000000         TRFLG:  0                       ;TOGGLED TO SWITCH BETWEEN TRACE TRAPPING AND NORMAL FLO
000646  000000         PROC:   0                       ;STORES PROCESSOR STATUS WHEN TRACE TRAP MUST BE CLEARED
                                                        ;IN A SUBTEST
000650  000000         ERFLG:  0                       ;SET TO ZERO TO OUTPUT DATA ERROR HEADING
                                
                                ;INITIALIZE CSR AND DBR POINTERS
000652  004737  012152  SETUP:  JSR     %7,TOUT
000656  104005                  SUSWRR
000660  104002                  CNTLU
000662  104006                  CKU
000664  012737  000001  012144  MOV     #1,ITMAX        ;SET ITERATION MAXIMUM TO 1 ITERATION
000672  013703  000634          MOV     KCRS,CRS        ;SET UP REGISTER POINTERS
```

A2

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654  000676  013704  000636                  MOV     KCRB1,CRB1
655  000702  013700  000604                  MOV     INTVC,#DINT     ;LOAD ADDRESS OF INTERRUPT VECTOR
656  000706  005037  000602                  CLR     INTFLG          ;INITIALIZE INTERRUPT FLAG
657  000712  005037  000644                  CLR     TRFLG           ;INITIALIZE TRACE FLAG
658  000716  012737  000340  177776          MOV     #340,PSR        ;SETUP PROCESSOR STATUS
659  000724  000207                          RTS     %7              ;RETURN
660  000726  104007                  BEGIN:  TIT
661  000730  012702  016214                  MOV     #SUBT1,R2
662  000734  004737  000652                  JSR     %7,SETUP        ;INITIALIZE POINTERS AND FLAGS
663  000740  000424                          BR      TEST            ;GO TO INSTRUCTION TESTS
664  000742  022737  000176  000616  RESTRT: CMP     #SWREG,SWR
665  000750  001002                          BNE     1$
666  000752  104002                          CNTLU
667  000754  104006                          CKU
668  000756  005737  000644          1$:     TST     TRFLG           ;CHECK FOR TRACE TRAPPING
669  000762  001004                          BNE     TRAPX           ;IF SET, TRACE TRAP
670  000764  012737  000340  177776  NOTRP:  MOV     #340,PSR        ;IF ZERO, CLEAR TRACE BIT
671  000772  000407                          BR      TEST            ;GO TO INSTRUCTION TESTS
672  000774  032777  010000  177614  TRAPX:  BIT     #10000,@SWR     ;CHECK SW12
673  001002  001370                          BNE     NOTRP           ;BRANCH IF SET TO CLEAR TRACE BIT
674  001004  012737  000360  177776          MOV     #360,PSR        ;SET TRACE BIT
675
676                                  ;TEST FOR CORRECT INITIALIZATION OF STATUS REGISTER
677  001012  012737  001022  012150  TEST:   MOV     #TEST1A,RETURN  ;SETUP SCOPE LOOP RETURN ADDRESS
678  001020  104001                  TEST1:  SCOPE
679  001022  004737  011506          TEST1A: JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
680  001026  013737  177776  000646          MOV     PSR,PROC        ;STORE PROCESSOR STATUS
681  001034  005037  177776                  CLR     PSR             ;CLEAR TRACE BIT
682  001040  005001                          CLR     COUNT           ;INITIALIZE COUNTER
683  001042  005201                          INC     COUNT           ;WAIT TO BE CERTAIN
684  001044  001376                          BNE     .-2             ;THAT ALL CARDS ARE
685  001046  005201                          INC     COUNT           ;THRU BEFORE ISSUING
686  001050  001376                          BNE     .-2             ;INIT
687  001052  013737  000646  177776          MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
688  001060  000005                          RESET                   ;SEND OUT INIT
689  001062  005713                          TST     @CSR            ;CHECK FOR STATUS REGISTER ALL ZERO
690  001064  001401                          BEQ     .+4             ;BRANCH IF OK
691  001066  104000                          HLT                     ;STATUS REGISTER NOT CORRECTLY INITIALIZED
692                                  ;ONLY BITS 1 AND 6 OF THE STATUS REGISTER SHOULD BE ABLE TO BE SET TO ONE
693                                  ;AND READ BACK AS ONE
694  001070  052713  177776                  BIS     #177776,@CSR    ;SET ALL BITS BUT 0
695  001074  022713  000102                  CMP     #102,@CSR       ;ONLY BITS 1 AND 6 SHOULD BE SET
696  001100  001402                          BEQ     .+6             ;BRANCH IF OK
697  001102  104000                          HLT                     ;STATUS REGISTER DIDN'T CONTAIN 102
698  001104  000404                          BR      TEST2           ;BRANCH AFTER FAILURE
699                                  ;CLEARING STATUS REGISTER SHOULD CLEAR BITS 1 AND 6
700  001106  005013                          CLR     @CSR            ;CLEAR BITS 1 AND 6
701  001110  005713                          TST     @CSR            ;CHECK FOR ALL BITS CLEAR
702  001112  001401                          BEQ     .+4             ;BRANCH IF OK
703  001114  104000                          HLT                     ;BIT 1 AND/OR BIT 6 DIDN'T CLEAR
704
705  001116  104001                  TEST2:  SCOPE
706                                  ;START SHOULD CAUSE CARD DONE WITHIN 1 SECOND
707                                  ;BIT 8 SHOULD ALWAYS READ AS BEING EQUAL TO ZERO
708  001120  004737  011506                  JSR     %7,CKBIT8       ;CHECK FOR OFF-LINE SET
709  001124  013737  177776  000646          MOV     PSR,PROC        ;STORE CURRENT PROCESSOR STATUS
```

```
  710  001132  005037  177776            CLR     PSR             ;CLEAR TRACE BIT
  711  001136  005213                    INC     @CRS            ;START READING A CARD
  712  001140  032713  000001            BIT     #1,@CRS         ;CHECK BIT 0
  713  001144  001401                    BEQ     .+4             ;BRANCH IF NOT SET
  714  001146  104000                    HLT                     ;BIT 0 READ AS A ONE
  715  001150  005227  000000            INC     #0              ;WAIT
  716  001154  001375                    BNE     .-4
  717  001156  005227  000000            INC     #0
  718  001162  001375                    BNE     .-4
  719  001164  005227  000000            INC     #0
  720  001170  001375                    BNE     .-4
  721  001172  005227  000000            INC     #0
  722  001176  001375                    BNE     .-4
  723  001200  005227  000000            INC     #0
  724  001204  001375                    BNE     .-4
  725  001206  013737  000646  177776    MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
  726  001214  032713  040000            BIT     #40000,@CRS     ;CHECK CARD DONE
  727  001220  001002                    BNE     CONT2           ;CONTINUE IF SET
  728  001222  104000                    HLT                     ;CARD DONE DIDN'T SET WITHIN 400 MS
  729  001224  000406                    BR      TEST3           ;NOTE THAT FAILURE COULD BE DUE TO READ
  730                                                            ;NOT BEING RESET
  731  001226  052713  040000  CONT2:    BIS     #40000,@CRS     ;DATO TO STATUS REGISTER SHOULD CLEAR
  732  001232  032713  040000            BIT     #40000,@CRS     ;CARD DONE
  733  001236  001401                    BEQ     .+4             ;BRANCH IF IT DID
  734  001240  104000                    HLT                     ;DATO DIDN'T CLEAR CARD DONE
  735
  736  001242  104001            TEST3:  SCOPE
  737                                    ;BUSY (BIT 9) SHOULD BE SET BY READING A CARD
  738                                    ;IT SHOULD REMAIN SET UNTIL CARD DONE SETS, WHICH SHOULD CLEAR IT
  739  001244  004737  011506            JSR     %7,CKAIT8       ;CHECK FOR OFF-LINE SET
  740  001250  005013                    CLR     @CRS            ;INITIALIZE STATUS REGISTER
  741  001252  005213                    INC     @CRS            ;READ A CARD
  742  001254  032713  001000            BIT     #1000,@CRS      ;CHECK BUSY
  743  001260  001002                    BNE     LOOP3           ;BRANCH IF SET
  744  001262  104000                    HLT                     ;READING A CARD DIDN'T SET BUSY
  745  001264  000417                    BR      TEST4
  746  001266  032713  040000  LOOP3:    BIT     #40000,@CRS     ;CHECK CARD DONE
  747  001272  001010                    BNE     DONE3           ;BRANCH IF SET
  748  001274  032713  001000            BIT     #1000,@CRS      ;CHECK BUSY
  749  001300  001372                    BNE     LOOP3           ;BRANCH IF STILL SET
  750  001302  032713  040000            BIT     #40000,@CRS     ;CHECK CARD DONE
  751  001306  001006                    BNE     TEST4           ;GO TO NEXT TEST IF SET
  752  001310  104000                    HLT                     ;BUSY CLEARED BEFORE CARD DONE SET
  753  001312  000404                    BR      TEST4
  754  001314  032713  001000  DONE3:    BIT     #1000,@CRS      ;CHECK BUSY
  755  001320  001401                    BEQ     TEST4           ;GO ON TO NEXT TEST IF CLEAR
  756  001322  104000                    HLT                     ;CARD DONE DIDN'T CLEAR BUSY
  757
  758  001324  104001            TEST4:  SCOPE
  759                                    ;A TIMING ERROR SHOULD OCCUR IF DATA IS NOT READ AND NEW DATA COMES IN
  760                                    ;A TIMING ERROR SHOULD SET THE SPECIAL CONDITION BIT WHEN CARD DONE OCCURS
  761                                    ;COLUMN READY SHOULD BE CLEARED BY THE TIMING ERROR AND PREVENTED FROM RESETTING
  762                                    ;BITS 11,14, AND 15 SHOULD BE CLEARED BY A DATO TO THE STATUS REGISTER
  763  001326  004737  011434            JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
  764  001332  005001                    CLR     COUNT           ;INITIALIZE COUNTER
  765  001334  005213                    INC     @CRS            ;INITIATE READ
```

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 766  001336  032713  140200          LOOP4:  BIT     #140200, @CRS   ;WAIT FOR SPECIAL CONDITION, CARD DONE,
 767                                                                  ;OR COLUMN READY
 768  001342  001775                          BEQ     LOOP4           ;LOOP IF NONE OCCURRED
 769  001344  032713  140000                  BIT     #140000, @CRS   ;SPECIAL CONDITION OR CARD DONE?
 770  001350  001007                          BNE     CK4             ;YES, BRANCH
 771  001352  005201                          INC     COUNT           ;NO, COUNT COLUMN READYS
 772  001354  105713                  LOOP4B: TSTB    @CRS            ;WAIT FOR COLUMN READY TO CLEAR
 773  001356  100367                          BPL     LOOP4           ;IF CLEAR, RETURN TO LOOP4
 774  001360  032713  140000                  BIT     #140000, @CRS   ;CHECK FOR SPECIAL CONDITION OR CARD DONE
 775  001364  001001                          BNE     CK4             ;BRANCH IF EITHER SET
 776  001366  000772                          BR      LOOP4B          ;OTHERWISE, CHECK AGAIN
 777  001370  032713  040000          CK4:    BIT     #40000, @CRS    ;CHECK CARD DONE
 778  001374  001002                          BNE     .+6             ;BRANCH IF SET
 779  001376  104000                          HLT                     ;SPECIAL CONDITION SET BEFORE CARD DONE
 780  001400  000403                          BR      CONT4
 781  001402  005713                          TST     @CRS            ;CHECK SPECIAL CONDITION
 782  001404  100401                          BMI     .+4             ;BRANCH IF SET
 783  001406  104000                          HLT                     ;SPECIAL CONDITION WASN'T  SET
 784  001410  032713  004000          CONT4:  BIT     #4000,  @CRS    ;CHECK TIMING ERROR
 785  001414  001001                          BNE     .+4             ;BRANCH IF SET
 786  001416  104000                          HLT                     ;TIMING ERROR WASN'T SET
 787  001420  005301                          DEC     COUNT           ;CHECK NUMBER OF COLUMN READYS
 788  001422  100002                          BPL     .+6             ;BRANCH IF ANY OCCURRED
 789  001424  104000                          HLT                     ;COLUMN READY NEVER OCCURRED
 790  001426  000402                          BR      .+6
 791  001430  001401                          BEQ     .+4             ;BRANCH IF ONLY ONE OCCURRED
 792  001432  104000                          HLT                     ;COLUMN READY OCCURRED MORE THAN ONCE
 793  001434  105713                          TSTB    @CRS            ;CHECK COLUMN READY
 794  001436  100001                          BPL     .+4             ;BRANCH IF NOT SET
 795  001440  104000                          HLT                     ;COLUMN READY WASN'T CLEARED
 796  001442  005013                          CLR     @CRS            ;CLEAR BITS 11,14, AND 15 VIA DATO
 797  001444  032713  144000                  BIT     #144000, @CRS   ;CHECK
 798  001450  001401                          BEQ     .+4
 799  001452  104000                          HLT                     ;BITS 11,14, AND 15 WEREN'T ALL CLEARED
 800
 801
 802  001454  104001          TEST5:  SCOPE
 803                          ;SETTING READ SHOULD CAUSE COLUMN READY TO SET 88 TIMES BEFORE CARD DONE SETS
 804                          ;READING THE DATA BUFFER SHOULD CLEAR COLUMN READY AND PREVENT A TIMING ERROR
 805  001456  004737  011434          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 806  001462  005001                  CLR     COUNT           ;INITIALIZE COUNTER
 807  001464  005213                  INC     @CRS            ;INITIATE READ
 808  001466  032713  140200  LOOP5:  BIT     #140200,@CRS    ;WAIT FOR COLUMN READY, CARD DONE
 809  001472  001775                  BEQ     .-4             ;OR SPECIAL CONDITION
 810  001474  032713  040000          BIT     #40000, @CRS    ;CARD DONE?
 811  001500  001015                  BNE     CK5             ;YES, BRANCH
 812  001502  005713                  TST     @CRS            ;CHECK BIT 15
 813  001504  100002                  BPL     .+6             ;SKIP ERROR HALT IF NOT SET
 814  001506  104000                  HLT                     ;BIT 15 WAS SET
 815  001510  000437                  BR      TEST6           ;GO TO NEXT TEST
 816  001512  020127  000117          CMP     COUNT,  #79.    ;CHECK FOR 88
 817  001516  100363                  BPL     LOOP5           ;BRANCH IF 88 OR MORE WITHOUT CLEARING READY
 818  001520  005201                  INC     COUNT           ;INCREMENT COUNTER
 819  001522  005714                  TST     @CRB1           ;CLEAR READY
 820  001524  105713                  TSTB    @CRS            ;MAKE SURE IT CLEARED
 821  001526  100001                  BPL     .+4             ;BRANCH IF IT DID
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 822  001530  104000                        HLT                     ;READING DATA BUFFER DIDN'T CLEAR READY
 823  001532  000755                        BR      LOOP5           ;LOOP
 824  001534  032713  004000      CK5:      BIT     #4000,  @CRS    ;CHECK TIMING ERROR BIT
 825  001540  001401                        BEQ     .+4             ;BRANCH IF NOT SET
 826  001542  104000                        HLT                     ;TIMING ERROR WAS SET
 827                                        ;NOTE THAT IF COLUMN READY SET MORE THAN 80 TIMES
 828                                        ;A TIMING ERROR WILL OCCUR AND THE COUNT WILL BE 79 (=117 OCTAL)
 829  001544  000421                        BR      TEST6           ;BRANCH AFTER ERROR
 830  001546  020127  000117                CMP     COUNT,  #79.    ;CHECK COUNT
 831  001552  001401                        BEQ     .+4             ;BRANCH IF 80 COLUMN READYS OCCURRED
 832  001554  104000                        HLT                     ;COLUMN READY DIDN'T OCCUR 80 TIMES
 833                                                                ;BEFORE CARD DONE
 834  001556  021327  040200                CMP     @CRS,#40200     ;ONLY CARD DONE AND COLUMN READY SHOULD BE SET
 835  001562  001401                        BEQ     .+4
 836  001564  104000                        HLT                     ;STATUS REGISTER IN WRONG STATE
 837  001566  005013                        CLR     @CRS            ;SHOULD CLEAR DONE BUT NOT READY
 838  001570  021327  000200                CMP     @CRS,#200       ;CHECK FOR ONLY READY SET
 839  001574  001401                        BEQ     .+4             ;BRANCH IF OK
 840  001576  104000                        HLT                     ;STATUS REGISTER IN WRONG STATE
 841  001600  005714                        TST     @CRB1           ;READING DATA BUFFER SHOULD CLEAR COLUMN READY
 842  001602  005713                        TST     @CRS            ;CHECK STATUS REGISTER
 843  001604  001401                        BEQ     .+4             ;BRANCH IF ALL BITS ZERO
 844  001606  104000                        HLT                     ;STATUS REGISTER NOT EQUAL TO ZERO
 845
 846  001610  104001            TEST6:      SCOPE
 847                                        ;A TIMING ERROR SHOULD SET BIT 11 BEFORE CARD DONE OCCURS, EVEN IF IT OCCURS AT COLUMN 0
 848                                        ;A DATOB TO THE LOW BYTE OF THE CRS SHOULD CLEAR BITS 15,14, AND 11
 849  001612  004737  011434                JSR     %7,INIT         ;INITIALIZE
 850  001616  012701  000115                MOV     #77.,COUNT      ;SETUP COUNTER
 851  001622  005213                        INC     @CRS            ;START READING A CARD
 852  001624  105713            LOOP6:      TSTB    @CRS            ;WAIT FOR COLUMN READY
 853  001626  100376                        BPL     .-2
 854  001630  005714                        TST     @CRB1           ;CLEAR COLUMN READY
 855  001632  005301                        DEC     COUNT           ;GO THRU LOOP FOR 1ST 78 COLUMN READY'S
 856  001634  100373                        BPL     LOOP6
 857  001636  032713  144000                BIT     #144000,@CRS    ;WAIT FOR CARD DONE OR TIMING ERROR
 858  001642  001775                        BEQ     .-4             ;OR SPECIAL CONDITION
 859  001644  032713  040000                BIT     #40000,@CRS     ;CARD DONE SET?
 860  001650  001026                        BNE     ERR6            ;YES, 2 POSSIBLE TEST FAILURES
 861  001652  032713  004000                BIT     #4000,@CRS      ;CHECK TIMING ERROR
 862  001656  001416                        BEQ     OFF6            ;IF NOT SET, READER IS PROBABLY OFF-LINE
 863  001660  105713                        TSTB    @CRS            ;CHECK COLUMN READY
 864  001662  100001                        BPL     .+4             ;BRANCH IF CLEAR
 865  001664  104000                        HLT                     ;TIMING ERROR DIDN'T CLEAR READY
 866  001666  005713                        TST     @CRS            ;WAIT FOR SPECIAL CONDITION
 867  001670  100376                        BPL     .-2
 868  001672  032713  040000                BIT     #40000,@CRS     ;CHECK CARD DONE
 869  001676  001406                        BEQ     OFF6            ;IF NOT SET, READER IS PROBABLY OFF-LINE
 870  001700  105013                        CLRB    @CRS            ;DATOB TO LOW BYTE OF CRS
 871  001702  032713  144000                BIT     #144000,@CRS    ;CHECK BITS 15,14,11
 872  001706  001415                        BEQ     TEST7           ;BRANCH IF CLEAR TO NEXT TEST
 873  001710  104000                        HLT                     ;DATOB TO LOW BYTE OF CRS DIDN'T CLEAR
 874                                                                ;BITS 15,14 AND/OR 11
 875  001712  000413                        BR      TEST7           ;GO TO NEXT TEST
 876  001714  032713  000400      OFF6:     BIT     #400,@CRS       ;CHECK BIT 8
 877  001720  001010                        BNE     TEST7           ;BRANCH IF SET
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878  001722  104000                        HLT                     ;BIT 15 WAS SET, 8 WASN'T
879  001724  000406                        BR      TEST7           ;GO TO NEXT TEST
880  001726  032713  004000        ERR6:   BIT     #4000,@CRS      ;TIMING ERROR SET?
881  001732  001402                        BEQ     .+6             ;NO, BRANCH
882  001734  104000                        HLT                     ;TIMING ERROR DION'T SET BEFORE CARD DONE
883  001736  000401                        BR      TEST7           ;GO TO NEXT TEST AFTER ERROR
884  001740  104000                        HLT                     ;TIMING ERROR WASN'T SET
885
886  001742  104001                TEST7:  SCOPE
887                                        ;NOT READING THE EIGHTIETH COLUMN OF DATA FROM THE BUFFER
888                                        ;SHOULD CAUSE A TIMING ERROR ON THE FIRST COLUMN OF THE NEXT CARD
889                                        ;SETTING EJECT SHOULD CLEAR TIMING ERROR, AND BIT 15 SHOULDN'T SET
890                                        ;INCB SHOULD START A READ
891
892  001744  004737  011434                JSR     %7,INIT         ;INITIALIZE
893  001750  005213                        INC     @CRS            ;START READ
894  001752  012701  000120                MOV     #80.,,COUNT     ;INITIALIZE COUNTER
895  001756  032713  140200        LOOP7:  BIT     #140200,@CRS    ;TEST FOR ERROR, DONE OR READY
896  001762  001775                        BEQ     LOOP7           ;LOOP IF NONE SET
897  001764  005713                        TST     @CRS            ;CHECK ERROR
898  001766  100002                        BPL     .+6             ;BRANCH IF NOT SET
899  001770  104000                        HLT                     ;BIT 15 WAS SET
900  001772  000455                        BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
901  001774  032713  040000                BIT     #40000,@CRS     ;CHECK FOR CARD DONE
902  002000  001013                        BNE     DONE7           ;BRANCH IF SET
903  002002  005301                        DEC     COUNT           ;COUNT
904  002004  001402                        BEQ     .+6             ;IF 80TH COLUMN READY, BRANCH
905  002006  005714                        TST     @CRB1           ;CLEAR DONE
906  002010  000762                        BR      LOOP7           ;LOOP
907  002012  032713  140000                BIT     #140000,@CRS    ;WAIT FOR DONE OR SPECIAL CONDITION
908  002016  001775                        BEQ     .-4
909  002020  005713                        TST     @CRS            ;CHECK SPECIAL CONDITION
910  002022  100002                        BPL     DONE7           ;BRANCH IF NOT SET
911  002024  104000                        HLT                     ;SPECIAL CONDITION WAS SET
912  002026  000437                        BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
913  002030  005701                DONE7:  TST     COUNT           ;TEST FOR 80 COLUMN READY'S
914  002032  001402                        BEQ     .+6             ;BRANCH IF OK
915  002034  104000                        HLT                     ;COLUMN READY DID NOT OCCUR 80 TIMES
916  002036  000433                        BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
917  002040  105213                        INCB    @CRS            ;START READ
918  002042  105713                        TSTB    @CRS            ;CHECK COLUMN READY
919  002044  100401                        BMI     .+4             ;BRANCH IF STILL SET
920  002046  104000                        HLT                     ;READY DID NOT REMAIN SET
921  002050  032713  004000                BIT     #4000,@CRS      ;TEST FOR TIMING ERROR
922  002054  001775                        BEQ     .-4             ;LOOP IF NOT SET
923  002056  105713                        TSTB    @CRS            ;CHECK COLUMN READY
924  002060  100002                        BPL     .+6             ;BRANCH IF NOT SET
925  002062  104000                        HLT                     ;TIMING ERROR DIDN'T CLEAR READY
926  002064  000420                        BR      TEST8
927  002066  112713  000002                MOVB    #2,@CRS         ;SET EJECT
928  002072  032713  004000                BIT     #4000,@CRS      ;CHECK TIMING ERROR
929  002076  001402                        BEQ     .+6             ;BRANCH IF CLEARED
930  002100  104000                        HLT                     ;TIMING ERROR NOT CLEARED BY DATOB
931  002102  000411                        BR      TEST8           ;GO TO NEXT TEST AFTER ERROR
932  002104  032713  140000                BIT     #140000,@CRS    ;WAIT FOR DONE OR SPECIAL CONDITION
933  002110  001775                        BEQ     .-4
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934  002112  032713  000400              BIT     #400,@CRS       ;CHECK BIT 8
935  002116  001003                      BNE     TEST8           ;BRANCH IF READER OFF-LINE
936  002120  005713                      TST     @CRS            ;SPECIAL CONDITION SHOULDN'T SET
937  002122  100001                      BPL     .+4             ;SINCE DATO8 CLEARED TIMING ERROR
938  002124  104000                      HLT                     ;BIT 15 WAS SET, 8 WASN'T
939
940
941  002126  104001              TEST8:  SCOPE
942                              ;DATA SHOULD BE AVAILABLE IN THE DATA BUFFER FOR AT LEAST 1.0 MILLISECOND
943  002130  004737  011434              JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
944  002134  013737  177776  000646      MOV     PSR,PROC        ;STORE CURRENT PROCESSOR STATUS
945  002142  005037  177776              CLR     PSR             ;CLEAR TRACE BIT
946  002146  005213                      INC     @CRS            ;START READ
947  002150  032713  140200      LOOP8:  BIT     #140200,@CRS    ;WAIT FOR COLUMN READY OR CARD DONE
948  002154  001775                      BEQ     .-4             ;OR SPECIAL CONDITION
949  002156  032713  040000              BIT     #40000,@CRS     ;CARD DONE?
950  002162  001023                      BNE     DBRCK8          ;YES, GO TO CHECK STROBING OF DBR
951  002164  005713                      TST     @CRS            ;NO, CHECK BIT 15
952  002166  100002                      BPL     .+6             ;BRANCH IF NOT SET
953  002170  104000                      HLT                     ;BIT 15 WAS SET
954  002172  000441                      BR      TEST9           ;GO TO NEXT TEST AFTER ERROR
955  002174  005013                      CLR     @CRS            ;DATO TO CRS - SHOULDN'T CLEAR BUSY OR READY
956  002176  022713  001200              CMP     #1200,@CRS      ;CHECK FOR BUSY AND READY
957  002202  001402                      BEQ     .+6             ;BRANCH IF STILL SET
958  002204  104000                      HLT                     ;CRS IN WRONG STATE
959  002206  000433                      BR      TEST9           ;GO TO NEXT TEST AFTER ERROR
960  002210  011405                      MOV     @CRB1,R5        ;STORE DATA
961  002212  012701  000300              MOV     #300,COUNT      ;INITIALIZE COUNTER
962  002216  005301                      DEC     COUNT           ;WAIT FOR 1 MILLISECOND (APPROX.)
963  002220  001376                      BNE     .-2
964  002222  021405                      CMP     @CRB1,R5        ;DATA UNCHANGED?
965  002224  001751                      BEQ     LOOP8           ;OK, CONTINUE
966  002226  104000                      HLT                     ;DATA NOT AVAILABLE FOR 1.0 MILLISECONDS
967  002230  000422                      BR      TEST9           ;GO TO NEXT TEST AFTER FAILURE
968  002232  017702  176402      DBRCK8: MOV     @CRB2,R2        ;STORE ENCODED DATA IN REGISTER 2
969  002236  012701  000100              MOV     #100,COUNT      ;SET UP COUNTER
970  002242  021405              CONT8:  CMP     @CRB1,R5        ;READ CARD-IMAGE DATA BUFFER
971  002244  001402                      BEQ     .+6             ;BRANCH IF UNCHANGED
972  002246  104000                      HLT                     ;CRB1 READ INCORRECTLY
973  002250  000407                      BR      REST8           ;BRANCH TO RESTORE PROCESSOR STATUS AND EXIT
974  002252  027702  176362              CMP     @CRB2,R2        ;READ ENCODED DATA BUFFER
975  002256  001402                      BEQ     .+6             ;BRANCH IF UNCHANGED
976  002260  104000                      HLT                     ;CRB2 READ INCORRECTLY
977  002262  000402                      BR      REST8           ;BRANCH AFTER FAILURE
978  002264  005301                      DEC     COUNT           ;COUNT DOWN
979  002266  001365                      BNE     CONT8           ;LOOP IF NOT DONE
980  002270  013737  000646  177776      MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
981
982
983  002276  104001              TEST9:  SCOPE
984                              ;EJECT SHOULD PREVENT FURTHER COLUMN READY'S
985                              ;CARD DONE SHOULD STILL OCCUR, AND TIMING ERRORS SHOULD BE
986                              ;PREVENTED IF THE CURRENT COLUMN READY IS CLEARED
987  002300  004737  011434              JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
988  002304  013737  177776  000646      MOV     PSR,PROC        ;SAVE PROCESSOR STATUS
989  002312  005037  177776              CLR     PSR             ;CLEAR TRACE BIT
```

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  990  002316  005213                        INC     @CRS            ;START READ
  991  002320  105713                        TSTB    @CRS            ;WAIT FOR COLUMN READY
  992  002322  001776                        BEQ     .-2
  993  002324  052713  000002                BIS     #2,@CRS         ;SET EJECT
  994  002330  005714                        TST     @CRB1           ;CLEAR COLUMN READY
  995  002332  005001                        CLR     COUNT           ;LOOP TAKES 11.4 MICROSECONDS ONCE THRU
  996  002334  032713  044200        WAIT9:  BIT     #44200,@CRS     ;WAIT FOR CARD DONE, TIMING ERROR, OR
  997  002340  001004                        BNE     CK9             ;COLUMN READY
  998  002342  005201                        INC     COUNT           ;TIME FOR ABOUT 3/4 SECOND
  999  002344  001373                        BNE     WAIT9           ;CONTINUE WAITING
 1000  002346  104000                        HLT                     ;NO CARD DONE OCCURRED WITHIN 3/4 SECOND
 1001  002350  000411                        BR      REST9           ;CONTINUE AFTER FAILURE
 1002  002352  032713  040000        CK9:    BIT     #40000,@CRS     ;CHECK FOR CARD DONE
 1003  002356  001006                        BNE     REST9
 1004  002360  032713  000200                BIT     #200,@CRS       ;CHECK COLUMN READY
 1005  002364  001402                        BEQ     .+6             ;BRANCH IF NOT SET
 1006  002366  104000                        HLT                     ;COLUMN READY WAS SET
 1007  002370  000401                        BR      REST9
 1008  002372  104000                        HLT                     ;EJECT DID NOT PREVENT A TIMING ERROR
 1009  002374  013737  000646  177776 REST9:  MOV     PROC,PSR        ;RESTORE PROCESSOR STATUS
 1010
 1011
 1012  002402  104001                TEST10: SCOPE
 1013                                ;CARD DONE SHOULD CAUSE AN INTERRUPT
 1014  002404  004737  011434                JSR     %7,INIT         ;INITIALIZE
 1015  002410  012710  002464                MOV     #TINT10,@ADINT  ;LOAD RETURN POINTER
 1016  002414  052737  000340  177776        BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
 1017  002422  013760  177776  000002        MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
 1018  002430  042737  000340  177776        BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
 1019  002436  012713  000103                MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
 1020  002442  032713  040000                BIT     #40000,@CRS     ;WAIT FOR CARD DONE
 1021  002446  001775                        BEQ     .-4
 1022  002450  016037  000002  177776        MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
 1023  002456  105013                        CLRB    @CRS            ;CLEAR INTERRUPT ENABLE
 1024  002460  104000                        HLT                     ;NO INTERRUPT OCCURRED
 1025  002462  000414                        BR      CONT10
 1026  002464  032713  040000        TINT10: BIT     #40000,@CRS     ;CHECK CARD DONE
 1027  002470  001001                        BNE     .+4             ;BRANCH IF SET
 1028  002472  104000                        HLT                     ;CARD DONE NOT SET
 1029  002474  022626                        CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
 1030  002476  005713                        TST     @CRS            ;MAKE SURE NO ERROR OCCURRED
 1031  002500  100001                        BPL     .+4
 1032  002502  104000                        HLT                     ;BIT 15 WAS SET
 1033  002504  105713                        TSTB    @CRS            ;CHECK COLUMN READY
 1034  002506  100001                        BPL     .+4             ;BRANCH IF NOT SET
 1035  002510  104000                        HLT                     ;COLUMN READY WAS SET
 1036  002512  005013                        CLR     @CRS            ;DISABLE INTERRUPTS
 1037  002514  012710  000232        CONT10: MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
 1038  002520  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
 1039
 1040  002524  104001                TEST11: SCOPE
 1041                                ;COLUMN READY SHOULD CAUSE AN INTERRUPT
 1042  002526  004737  011434                JSR     %7,INIT         ;INITIALIZE
 1043  002532  012710  002604                MOV     #TINT11,@ADINT  ;LOAD RETURN POINTER
 1044  002536  052737  000340  177776        BIS     #340,PSR        ;SET PROCESSOR STATUS TO LEVEL 7
 1045  002544  013760  177776  000002        MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
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1046  002552  042737  000340  177776          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1047  002560  012713  000101                  MOV     #101,@CRS       ;SET READ AND INTERRUPT ENABLE
1048  002564  105713                          TSTB    @CRS            ;WAIT FOR COLUMN READY
1049  002566  100376                          BPL     .-2
1050  002570  016037  000002  177776          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1051  002576  005013                          CLR     @CRS            ;CLEAR INTERRUPT ENABLE
1052  002600  104000                          HLT                     ;COLUMN READY DID NOT INTERRUPT
1053  002602  000405                          BR      CONT11
1054  002604  005013                  TINT11: CLR     @CRS            ;CLEAR INTERRUPT ENABLE
1055  002606  105713                          TSTB    @CRS            ;MAKE SURE COLUMN READY IS SET
1056  002610  100401                          BMI     .+4             ;BRANCH IF SET
1057  002612  104000                          HLT                     ;COLUMN READY WASN'T SET
1058  002614  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1059  002616  012710  000232          CONT11: MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1060  002622  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF ANOTHER INTERRUPT OCCURS
1061
1062  002626  104001                  TEST12: SCOPE
1063                                  ;CARD DONE SHOULDN'T CAUSE AN INTERRUPT IF THE PROCESSOR IS AT LEVEL 7 PRIORITY
1064  002630  004737  011434                  JSR     %7,INIT         ;INITIALIZE
1065  002634  012710  002670                  MOV     #TINT12,@ADINT  ;SETUP RETURN
1066  002640  052737  000340  177776          BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7 PRIORITY
1067  002646  013760  177776  000002          MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
1068  002654  012713  000103                  MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
1069  002660  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1070  002664  001775                          BEQ     .-4
1071  002666  000402                          BR      .+6             ;CONTINUE IF NO INTERRUPT OCCURRED
1072  002670  104000                  TINT12: HLT                     ;AN INTERRUPT OCCURRED
1073  002672  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1074  002674  005013                          CLR     @CRS            ;CLEAR INTERRUPT ENABLE AND EJECT
1075  002676  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1076  002702  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1077
1078                                  ;FIND THE LEVEL AT WHICH AN INTERRUPT OCCURS
1079                                  ;PRINT OUT A MESSAGE STATING THIS LEVEL IF IT IS OTHER THAN THE STANDARD (LEVEL 6)
1080                                  ;MAKE CERTAIN THAT IT ALWAYS OCCURS AT THIS LEVEL
1081                                  ;THE MESSAGE STATING THE LEVEL IS PRINTED ONLY ONCE, AND THE PROGRAM MUST
1082                                  ;BE STARTED OVER AT LOCATION 200 FOR IT TO BE PRINTED AGAIN
1083
1084
1085                                  ;TEST FOR AN INTERRUPT ON LEVEL 7
1086  002706  104001                  TEST13: SCOPE
1087  002710  004737  011434                  JSR     %7,INIT         ;INITIALIZE
1088  002714  012710  003024                  MOV     #TINT13,@ADINT  ;SETUP RETURN ADDRESS
1089  002720  052737  000340  177776          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1090  002726  013760  177776  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1091  002734  042737  000340  177776          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1092  002742  052737  000300  177776          BIS     #300,PSR        ;SET PROCESSOR TO LEVEL 6 PRIORITY
1093  002750  012713  000103                  MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
1094  002754  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1095  002760  001775                          BEQ     .-4
1096  002762  016037  000002  177776          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1097  002770  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
1098  002772  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1099  002776  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1100  003002  005737  000602                  TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1101  003006  100044                          BPL     TEST14          ;IF NO, GO TO NEXT TEST
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1102  003010  023727  000602  100007          CMP     INTFLG,#100007  ;IF SO, CHECK TO SEE
1103  003016  100440                          BMI     TEST14          ;THAT THE INTERRUPT LEVEL RECORDED
1104                                                                  ;IS BELOW THE CURRENT LEVEL
1105  003020  104000                          HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1106                                                                  ;AT LEVEL 7, BUT PREVIOUSLY OCCURRED
1107                                                                  ;AT OR ABOVE THIS LEVEL
1108  003022  000436                          BR      TEST14
1109  003024  032713  040000          TINT13: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1110  003030  001001                          BNE     .+4             ;BRANCH IF SET
1111  003032  104000                          HLT                     ;CARD DONE WASN'T SET
1112  003034  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1113  003036  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1114  003042  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1115  003046  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1116  003050  005737  000602                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1117  003054  100414                          BMI     SET7    ;BRANCH IF FLAG SET
1118  003056  012737  100007  000602          MOV     #100007,INTFLG ;SET FLAG AND LEVEL
1119  003064  012702  014503                  MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1120  003070  004737  012152                  JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1121  003074  012702  000007                  MOV     #7,R2
1122  003100  004737  011734                  JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1123  003104  000405                          BR      TEST14
1124  003106  023727  000602  100007  SET7: CMP     INTFLG,#100007  ;CHECK PREVIOUS LEVEL
1125  003114  100001                          BPL     TEST14
1126  003116  104000                          HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1127
1128                                  ;TEST FOR AN INTERRUPT ON LEVEL 6
1129                                  ;SINCE THIS IS WHERE THE CARD READER NORMALLY IS, DON'T PRINT OUT A MESSAGE
1130                                  ;IF IT IS FOUND HERE
1131  003120  104001                  TEST14: SCOPE
1132  003122  004737  011434                  JSR     %7,INIT         ;INITIALIZE
1133  003126  012710  003216                  MOV     #TINT14,@ADINT  ;SETUP RETURN ADDRESS
1134  003132  052737  000340  177776          BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1135  003140  013760  177776  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1136  003146  042737  000340  177776          BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1137  003154  052737  000240  177776          BIS     #240,PSR        ;SET PROCESSOR TO LEVEL 5 PRIORITY
1138  003162  012713  000103                  MOV     #103,@CRS       ;SET EJECT, INTERRUPT ENABLE, AND READ
1139  003166  032713  040000                  BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1140  003172  001775                          BEQ     .-4
1141  003174  016037  000002  177776          MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1142  003202  005013                          CLR     @CRS            ;DISABLE INTERRUPTS
1143  003204  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1144  003210  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1145  003214  000426                          BR      TEST15
1146  003216  032713  040000          TINT14: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1147  003222  001001                          BNE     .+4             ;BRANCH IF SET
1148  003224  104000                          HLT                     ;CARD DONE WASN'T SET
1149  003226  005013                          CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1150  003230  012710  000232                  MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1151  003234  005037  000232                  CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1152  003240  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1153  003242  005737  000602                  TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1154  003246  100404                          BMI     SET14           ;BRANCH IF FLAG SET
1155  003250  012737  100006  000602          MOV     #100006,INTFLG  ;SET FLAG AND LEVEL
1156  003256  000405                          BR      TEST15
1157  003260  023727  000602  100006  SET14: CMP     INTFLG,#100006  ;CHECK PREVIOUS LEVEL
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1158  003266  100001                          BPL     TEST15
1159  003270  104000                          HLT                             ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1160
1161                                  ;TEST FOR AN INTERRUPT ON LEVEL 5
1162  003272  104001                  TEST15: SCOPE
1163  003274  004737  011434                  JSR     %7,INIT                 ;INITIALIZE
1164  003300  012710  003410                  MOV     #TINT15,@ADINT          ;SETUP RETURN ADDRESS
1165  003304  052737  000340  177776          BIS     #340,PSR                ;SET PROCESSOR PRIORITY TO 7
1166  003312  013760  177776  000002          MOV     PSR,2(ADINT)            ;SETUP RETURN PROCESSOR STATUS
1167  003320  042737  000340  177776          BIC     #340,PSR                ;SET PROCESSOR PRIORITY TO 0
1168  003326  052737  000200  177776          BIS     #200,PSR                ;SET PROCESSOR TO LEVEL 4 PRIORITY
1169  003334  012713  000103                  MOV     #103,@CRS               ;SET EJECT INTERRUPT ENABLE, AND READ
1170  003340  032713  040000                  BIT     #40000,@CRS             ;WAIT FOR CARD DONE
1171  003344  001775                          BEQ     .-4
1172  003346  016737  000002  177776          MOV     2(ADINT),PSR            ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1173  003354  005013                          CLR     @CRS                    ;DISABLE INTERRUPTS
1174  003356  012710  000232                  MOV     #232,@ADINT             ;CHANGE INTERRUPT RETURN ADDRESS
1175  003362  005037  000232                  CLR     @#232                   ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1176  003366  005737  000602                  TST     INTFLG                  ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1177  003372  100044                          BPL     TEST16                  ;IF NO, GO TO NEXT TEST
1178  003374  023727  000602  100005          CMP     INTFLG,#100005          ;IF SO, CHECK TO SEE
1179  003402  100440                          BMI     TEST16                  ;THAT THE INTERRUPT LEVEL RECORDED
1180                                                                          ;IS BELOW THE CURRENT LEVEL
1181  003404  104000                          HLT                             ;INTERRUPT DIDN'T OCCUR WITH STATUS
1182                                                                          ;AT LEVEL 5, BUT PREVIOUSLY OCCURRED
1183                                                                          ;AT OR ABOVE THIS LEVEL
1184  003406  000436                          BR      TEST16
1185  003410  032713  040000          TINT15: BIT     #40000,@CRS             ;MAKE SURE CARD DONE IS SET
1186  003414  001001                          BNE     .+4                     ;BRANCH IF SET
1187  003416  104000                          HLT                             ;CARD DONE WASN'T SET
1188  003420  005013                          CLR     @CRS                    ;DISABLE FURTHER INTERRUPTS
1189  003422  012710  000232                  MOV     #232,@ADINT             ;CHANGE INTERRUPT RETURN ADDRESS
1190  003426  005037  000232                  CLR     @#232                   ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1191  003432  022626                          CMP     (SP)+,(SP)+             ;RESTORE STACK POINTER
1192  003434  005737  000602                  TST     INTFLG                  ;CHECK FOR PREVIOUS FLAG
1193  003440  100414                          BMI     SETS    ;BRANCH IF FLAG SET
1194  003442  012737  100005  000602          MOV     #100005,INTFLG ;SET FLAG AND LEVEL
1195  003450  012702  014503                  MOV     #MSG4,R2                ;SETUP FOR PRINTOUT
1196  003454  004737  012152                  JSR     %7,TOUT                 ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1197  003460  012702  000005                  MOV     #5,R2
1198  003464  004737  011734                  JSR     %7,PROCT                ;PRINT LEVEL NUMBER
1199  003470  000405                          BR      TEST16
1200  003472  023727  000602  100005  SETS: CMP     INTFLG,#100005          ;CHECK PREVIOUS LEVEL
1201  003500  100001                          BPL     TEST16
1202  003502  104000                          HLT                             ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1203
1204                                  ;TEST FOR AN INTERRUPT ON LEVEL 4
1205  003504  104001                  TEST16: SCOPE
1206  003506  004737  011434                  JSR     %7,INIT                 ;INITIALIZE
1207  003512  012710  003622                  MOV     #TINT16,@ADINT          ;SETUP RETURN ADDRESS
1208  003516  052737  000340  177776          BIS     #340,PSR                ;SET PROCESSOR PRIORITY TO 7
1209  003524  013760  177776  000002          MOV     PSR,2(ADINT)            ;SETUP RETURN PROCESSOR STATUS
1210  003532  042737  000340  177776          BIC     #340,PSR                ;SET PROCESSOR PRIORITY TO 0
1211  003540  052737  000140  177776          BIS     #140,PSR                ;SET PROCESSOR TO LEVEL 3 PRIORITY
1212  003546  012713  000103                  MOV     #103,@CRS               ;SET EJECT INTERRUPT ENABLE, AND READ
1213  003552  032713  040000                  BIT     #40000,@CRS             ;WAIT FOR CARD DONE
```

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1214  003556  001775                        BEQ     .-4
1215  003560  016037  000002  177776        MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1216  003566  005013                        CLR     @CRS            ;DISABLE INTERRUPTS
1217  003570  012710  000232                MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1218  003574  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1219  003600  005737  000602                TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1220  003604  100044                        BPL     TEST17          ;IF NO, GO TO NEXT TEST
1221  003606  023727  000602  100004        CMP     INTFLG,#100004  ;IF SO, CHECK TO SEE
1222  003614  100440                        BMI     TEST17          ;THAT THE INTERRUPT LEVEL RECORDED
1223                                                                ;IS BELOW THE CURRENT LEVEL
1224  003616  104000                        HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1225                                                                ;AT LEVEL 4, BUT PREVIOUSLY OCCURRED
1226                                                                ;AT OR ABOVE THIS LEVEL
1227  003620  000436                        BR      TEST17
1228  003622  032713  040000        TINT16: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1229  003626  001001                        BNE     .+4             ;BRANCH IF SET
1230  003630  104000                        HLT                     ;CARD DONE WASN'T SET
1231  003632  005013                        CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1232  003634  012710  000232                MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1233  003640  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1234  003644  022626                        CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1235  003646  005737  000602                TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1236  003652  100414                        BMI     SET4    ;BRANCH IF FLAG SET
1237  003654  012737  100004  000602        MOV     #100004,INTFLG ;SET FLAG AND LEVEL
1238  003662  012702  014503                MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1239  003666  004737  012152                JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1240  003672  012702  000004                MOV     #4,R2
1241  003676  004737  011734                JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1242  003702  000405                        BR      TEST17
1243  003704  023727  000602  100004  SET4: CMP     INTFLG,#100004  ;CHECK PREVIOUS LEVEL
1244  003712  100001                        BPL     TEST17
1245  003714  104000                        HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1246
1247                                  ;TEST FOR AN INTERRUPT ON LEVEL 3
1248  003716  104001                TEST17: SCOPE
1249  003720  004737  011434                JSR     %7,INIT         ;INITIALIZE
1250  003724  012710  004034                MOV     #TINT17,@ADINT  ;SETUP RETURN ADDRESS
1251  003730  052737  000340  177776        BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1252  003736  013760  177776  000002        MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1253  003744  042737  000340  177776        BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1254  003752  052737  000100  177776        BIS     #100,PSR        ;SET PROCESSOR TO LEVEL 2 PRIORITY
1255  003760  012713  000103                MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
1256  003764  032713  040000                BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1257  003770  001775                        BEQ     .-4
1258  003772  016037  000002  177776        MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHPST PRIORITY
1259  004000  005013                        CLR     @CRS            ;DISABLE INTERRUPTS
1260  004002  012710  000232                MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1261  004006  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1262  004012  005737  000602                TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1263  004016  100044                        BPL     TEST18          ;IF NO, GO TO NEXT TEST
1264  004020  023727  000602  100003        CMP     INTFLG,#100003  ;IF SO, CHECK TO SEE
1265  004026  100440                        BMI     TEST18          ;THAT THE INTERRUPT LEVEL RECORDED
1266                                                                ;IS BELOW THE CURRENT LEVEL
1267  004030  104000                        HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1268                                                                ;AT LEVEL 3, BUT PREVIOUSLY OCCURRED
1269                                                                ;AT OR ABOVE THIS LEVEL
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1270  004032  000436                        BR      TEST18
1271  004034  032713  040000        TINT17: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1272  004040  001001                        BNE     .+4             ;BRANCH IF SET
1273  004042  104000                        HLT                     ;CARD DONE WASN'T SET
1274  004044  005013                        CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1275  004046  012710  000232                MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1276  004052  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1277  004056  022626                        CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1278  004060  005737  000602                TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1279  004064  100414                        BMI     SET3    ;BRANCH IF FLAG SET
1280  004066  012737  100003  000602        MOV     #100003,INTFLG ;SET FLAG AND LEVEL
1281  004074  012702  014503                MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1282  004100  004737  012152                JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1283  004104  012702  000003                MOV     #3,R2
1284  004110  004737  011734                JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1285  004114  000405                        BR      TEST18
1286  004116  023727  000602  100003 SET3: CMP     INTFLG,#100003  ;CHECK PREVIOUS LEVEL
1287  004124  100001                        BPL     TEST18
1288  004126  104000                        HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1289
1290                                  ;TEST FOR AN INTERRUPT ON LEVEL 2
1291  004130  104001                TEST18: SCOPE
1292  004132  004737  011434                JSR     %7,INIT         ;INITIALIZE
1293  004136  012710  004246                MOV     #TINT18,@ADINT  ;SETUP RETURN ADDRESS
1294  004142  052737  000340  177776        BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1295  004150  013760  177776  000002        MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1296  004156  042737  000340  177776        BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1297  004164  052737  000040  177776        BIS     #040,PSR        ;SET PROCESSOR TO LEVEL 1 PRIORITY
1298  004172  012713  000103                MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
1299  004176  032713  040000                BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1300  004202  001775                        BEQ     .-4
1301  004204  016037  000002  177776        MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1302  004212  005013                        CLR     @CRS            ;DISABLE INTERRUPTS
1303  004214  012710  000232                MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1304  004220  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1305  004224  005737  000602                TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1306  004230  100044                        BPL     TEST19          ;IF NO, GO TO NEXT TEST
1307  004232  023727  000602  100002        CMP     INTFLG,#100002  ;IF SO, CHECK TO SEE
1308  004240  100440                        BMI     TEST19          ;THAT THE INTERRUPT LEVEL RECORDED
1309                                                                ;IS BELOW THE CURRENT LEVEL
1310  004242  104000                        HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1311                                                                ;AT LEVEL 2, BUT PREVIOUSLY OCCURRED
1312                                                                ;AT OR ABOVE THIS LEVEL
1313  004244  000436                        BR      TEST19
1314  004246  032713  040000        TINT18: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1315  004252  001001                        BNE     .+4             ;BRANCH IF SET
1316  004254  104000                        HLT                     ;CARD DONE WASN'T SET
1317  004256  005013                        CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1318  004260  012710  000232                MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1319  004264  005037  000232                CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1320  004270  022626                        CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1321  004272  005737  000602                TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1322  004276  100414                        BMI     SET2    ;BRANCH IF FLAG SET
1323  004300  012737  100002  000602        MOV     #100002,INTFLG ;SET FLAG AND LEVEL
1324  004306  012702  014503                MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1325  004312  004737  012152                JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
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m2

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1326  004316  012702  000002            MOV     #2,R2
1327  004322  004737  011734            JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1328  004326  000405                    BR      TEST19
1329  004330  023727  000602  100002 SET2: CMP   INTFLG,#100002 ;CHECK PREVIOUS LEVEL
1330  004336  100001                    BPL     TEST19
1331  004340  104000                    HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1332
1333                                    ;TEST FOR AN INTERRUPT ON LEVEL 1
1334  004342  104001                    TEST19: SCOPE
1335  004344  004737  011434            JSR     %7,INIT         ;INITIALIZE
1336  004350  012710  004460            MOV     #TINT19,@ADINT  ;SETUP RETURN ADDRESS
1337  004354  052737  000340  177776    BIS     #340,PSR        ;SET PROCESSOR PRIORITY TO 7
1338  004362  013760  177776  000[illegible] MOV     PSR,2(ADINT)    ;SETUP RETURN PROCESSOR STATUS
1339  004370  042737  000340  177776    BIC     #340,PSR        ;SET PROCESSOR PRIORITY TO 0
1340  004376  052737  000000  177776    BIS     #000,PSR        ;SET PROCESSOR TO LEVEL 0 PRIORITY
1341  004404  012713  000103            MOV     #103,@CRS       ;SET EJECT INTERRUPT ENABLE, AND READ
1342  004410  032713  040000            BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1343  004414  001775                    BEQ     .-4
1344  004416  016037  000002  177776    MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO HIGHEST PRIORITY
1345  004424  005013                    CLR     @CRS            ;DISABLE INTERRUPTS
1346  004426  012710  000232            MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1347  004432  005037  000232            CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1348  004436  005737  000602            TST     INTFLG          ;CHECK TO SEE IF LEVEL ALREADY RECORDED
1349  004442  100044                    BPL     TEST20          ;IF NO, GO TO NEXT TEST
1350  004444  023727  000602  100001    CMP     INTFLG,#100001  ;IF SO, CHECK TO SEE
1351  004452  100440                    BMI     TEST20          ;THAT THE INTERRUPT LEVEL RECORDED
1352                                                            ;IS BELOW THE CURRENT LEVEL
1353  004454  104000                    HLT                     ;INTERRUPT DIDN'T OCCUR WITH STATUS
1354                                                            ;AT LEVEL 1, BUT PREVIOUSLY OCCURRED
1355                                                            ;AT OR ABOVE THIS LEVEL
1356  004456  000436                    BR      TEST20
1357  004460  032713  040000  TINT19: BIT     #40000,@CRS     ;MAKE SURE CARD DONE IS SET
1358  004464  001001                    BNE     .+4             ;BRANCH IF SET
1359  004466  104000                    HLT                     ;CARD DONE WASN'T SET
1360  004470  005013                    CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1361  004472  012710  000232            MOV     #232,@ADINT     ;CHANGE INTERRUPT RETURN ADDRESS
1362  004476  005037  000232            CLR     @#232           ;TO CAUSE A HALT IF AN INTERRUPT OCCURS
1363  004502  022626                    CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1364  004504  005737  000602            TST     INTFLG          ;CHECK FOR PREVIOUS FLAG
1365  004510  100414                    BMI     SET1    ;BRANCH IF FLAG SET
1366  004512  012737  100001  000602    MOV     #100001,INTFLG ;SET FLAG AND LEVEL
1367  004520  012702  014503            MOV     #MSG4,R2        ;SETUP FOR PRINTOUT
1368  004524  004737  012152            JSR     %7,TOUT         ;PRINT MESSAGE "THE INTERRUPT LEVEL WAS"
1369  004530  012702  000001            MOV     #1,R2
1370  004534  004737  011734            JSR     %7,PROCT        ;PRINT LEVEL NUMBER
1371  004540  000405                    BR      TEST20
1372  004542  023727  000602  100001 SET1: CMP   INTFLG,#100001 ;CHECK PREVIOUS LEVEL
1373  004550  100001                    BPL     TEST20
1374  004552  104000                    HLT                     ;INTERRUPT PREVIOUSLY OCCURRED ONLY AT A LOWER LEVEL
1375
1376                                    ;A TIMING ERROR SHOULDN'T CAUSE AN INTERRUPT
1377  004554  104001                    TEST20: SCOPE
1378  004556  004737  011434            JSR     %7,INIT         ;INITIALIZE
1379  004562  012710  004634            MOV     #TINT20,@ADINT  ;LOAD RETURN POINTER
1380  004566  052737  000340  177776    BIS     #340,PSR        ;SET PROCESSOR TO HIGHEST PRIORITY
1381  004574  013760  177776  000002    MOV     PSR,2(ADINT)    ;LOAD RETURN PROCESSOR STATUS
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1382  004602  012713  000101              MOV     #101,@CRS       ;SET INTERRUPT ENABLE AND READ
1383  004606  032713  004000              BIT     #4000,@CRS      ;WAIT FOR TIMING ERROR TO SET
1384  004612  001775                      BEQ     .-4
1385  004614  042737  000340  177776      BIC     #340,PSR        ;MOVE PROCESSOR TO LOWEST PRIORITY
1386  004622  000240                      NOP                     ;CLOCK INTERRUPT IF IT OCCURRED
1387  004624  016037  000002  177776      MOV     2(ADINT),PSR    ;MOVE PROCESSOR BACK TO HIGHEST PRIORITY
1388  004632  000402                      BR      .+6
1389  004634  104000              TINT20: HLT                     ;TIMING ERROR CAUSED AN INTERRUPT
1390  004636  022626                      CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1391  004640  012710  000232              MOV     #232,@ADINT     ;CHANGE INTERRUPT ADDRESS TO CAUSE A
1392  004644  005037  000232              CLR     @#232           ;HALT IF AN INTERRUPT OCCURS
1393  004650  032713  040000              BIT     #40000,@CRS     ;WAIT FOR CARD DONE
1394  004654  001775                      BEQ     .-4
1395  004656  005013                      CLR     @CRS            ;CLEAR INTERRUPT ENABLE
1396
1397  004660  104001              TEST21: SCOPE
1398                                      ;TEST FOR NO INTERRUPT OCCURING WITH INTERRUPT ENABLE SET AND REST CLEARED
1399  004662  004737  011434              JSR     %7,INIT         ;INITIALIZE CSR TO ZERO
1400  004666  012710  004736              MOV     #TNINT,@ADINT   ;SETUP RETURN ADDRESS
1401  004672  052737  000340  177776      BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
1402  004700  013760  177776  000002      MOV     PSR,2(ADINT)    ;STORE PROCESSOR STATUS
1403  004706  005037  177776              CLR     PSR             ;SET PROCESSOR TO LEVEL 0
1404  004712  012713  000100              MOV     #100,@CRS       ;ENABLE INTERRUPTS
1405  004716  005227  000000              INC     #0              ;WAIT AWHILE
1406  004722  001375                      BNE     .-4
1407  004724  016037  000002  177776      MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO LEVEL 7
1408  004732  005013                      CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1409  004734  000403                      BR      CONT21
1410  004736  104000              TNINT:  HLT                     ;AN INTERRUPT OCCURRED
1411  004740  022626                      CMP     (SP)+,(SP)+     ;RESTORE STACK
1412  004742  005013                      CLR     @CRS            ;DISABLE FURTHER INTERRUPTS
1413  004744  005037  000232      CONT21: CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
1414  004750  012710  000232              MOV     #232,@ADINT     ;CAUSE A HALT IF AN INTERRUPT OCCURS
1415
1416  004754  104001              TEST22: SCOPE
1417                                      ;CHECK FOR SIMULTANEOUS INTERRUPTS ON MORE THAN ONE LEVEL
1418  004756  004737  011434              JSR     %7,INIT         ;INITIALIZE CSR TO ZERO
1419  004762  012710  005020              MOV     #T2INT,@ADINT   ;SETUP RETURN ADDRESS
1420  004766  052737  000340  177776      BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
1421  004774  013760  177776  000002      MOV     PSR,2(ADINT)    ;STORE PROCESSOR STATUS
1422  005002  042737  000340  177776      BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
1423  005010  012713  000103              MOV     #103,@CRS       ;SET INTERRUPT ENABLE AND EJECT A CARD
1424  005014  000001                      WAIT                    ;WAIT FOR INTERRUPT
1425  005016  000776                      BR      .-2             ;SIT IF TRACE BIT IS SET
1426  005020  022626              T2INT:  CMP     (6)+,(6)+       ;RESTORE STACK POINTER
1427  005022  012710  005044              MOV     #T2INTA,@ADINT  ;CHANGE RETRUN ADDRESS
1428  005026  005037  177776              CLR     PSR             ;SET PROCESSOR TO LEVEL 0
1429  005032  000240                      NOP                     ;WAIT
1430  005034  016037  000002  177776      MOV     2(ADINT),PSR    ;RESTORE PROCESSOR TO LEVEL 7
1431  005042  000402                      BR      CONT22
1432  005044  022626              T2INTA: CMP     (6)+,(6)+       ;RESTORE STACK
1433  005046  104000                      HLT                     ;THE INTERRUPT OCCURRED AT 2 LEVELS
1434  005050  005013              CONT22: CLR     @CRS            ;DISABLE INTERRUPTS
1435  005052  005037  000232              CLR     @#232           ;CHANGE INTERRUPT RETURN ADDRESS TO
1436  005056  012710  000232              MOV     #232,@ADINT     ;CAUSE A HALT IF AN INTERRUPT OCCURS
1437
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1438  005062  104001                  TEST23: SCOPE
1439                                  ;ALL MODES OF ADDRESSING CRB1 OR CRB2 (DATO,DATOB,DATI) SHOULD CLEAR
1440                                  ;COLUMN READY
1441  005064  004737  011434                  JSR     %7,INIT         ;INITIALIZE
1442  005070  005213                          INC     @CRS            ;START READING A CARD
1443  005072  105713                          TSTB    @CRS            ;WAIT FOR COLUMN READY
1444  005074  100376                          BPL     .-2
1445  005076  005014                          CLR     @CRB1           ;DATO TO CRB1
1446  005100  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1447  005102  100002                          BPL     CNT23A          ;BRANCH IF CLEARED
1448  005104  104000                          HLT                     ;DATO TO CRB1 DIDN'T CLEAR READY
1449  005106  000467                          BR      TEST24          ;GO TO NEXT TEST
1450  005110  105713                  CNT23A: TSTB    @CRS            ;WAIT FOR COLUMN READY
1451  005112  100376                          BPL     .-2
1452  005114  105014                          CLRB    @CRB1           ;DATOB TO LOW BYTE OF CRB1
1453  005116  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1454  005120  100002                          BPL     CNT23B          ;BRANCH IF CLEARED
1455  005122  104000                          HLT                     ;DATOB TO CRB1 LOW BYTE DIDN'T CLEAR READY
1456  005124  000460                          BR      TEST24          ;GO TO NEXT TEST
1457  005126  105713                  CNT23B: TSTB    @CRS            ;WAIT FOR COLUMN READY
1458  005130  100376                          BPL     .-2
1459  005132  105064  000001                CLRB    1(CRB1)         ;DATOB TO HIGH BYTE OF CRB1
1460  005136  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1461  005140  100002                          BPL     CNT23C          ;BRANCH IF CLEARED
1462  005142  104000                          HLT                     ;DATOB TO CRB1 HIGH BYTE DIDN'T CLEAR READY
1463  005144  000450                          BR      TEST24          ;GO TO NEXT TEST
1464  005146  105713                  CNT23C: TSTB    @CRS            ;WAIT FOR COLUMN READY
1465  005150  100376                          BPL     .-2
1466  005152  005714                          TST     @CRB1           ;DATI TO CRB1
1467  005154  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1468  005156  100002                          BPL     CNT23D          ;BRANCH IF CLEARED
1469  005160  104000                          HLT                     ;DATI TO CRB1 DIDN'T CLEAR READY
1470  005162  000441                          BR      TEST24          ;GO TO NEXT TEST
1471  005164  105713                  CNT23D: TSTB    @CRS            ;WAIT FOR COLUMN READY
1472  005166  100376                          BPL     .-2
1473  005170  005077  173444                 CLR     @CRB2           ;DATO TO CRB2
1474  005174  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1475  005176  100002                          BPL     CNT23E          ;BRANCH IF CLEARED
1476  005200  104000                          HLT                     ;DATO TO CRB2 DIDN'T CLEAR READY
1477  005202  000431                          BR      TEST24          ;GO TO NEXT TEST
1478  005204  105713                  CNT23E: TSTB    @CRS            ;WAIT FOR COLUMN READY
1479  005206  100376                          BPL     .-2
1480  005210  105077  173424                 CLRB    @CRB2           ;DATOB TO LOW BYTE OF CRB2
1481  005214  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1482  005216  100002                          BPL     CNT23F          ;BRANCH IF CLEARED
1483  005220  104000                          HLT                     ;DATOB TO CRB2 LOW BYTE DIDN'T CLEAR READY
1484  005222  000421                          BR      TEST24          ;GO TO NEXT TEST
1485  005224  105713                  CNT23F: TSTB    @CRS            ;WAIT FOR COLUMN READY
1486  005226  100376                          BPL     .-2
1487  005230  013702  000640                 MOV     CRB2,R2         ;LOAD POINTER
1488  005234  105062  000001                 CLRB    1(R2)           ;DATOB TO HIGH BYTE OF CRB2
1489  005240  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1490  005242  100002                          BPL     CNT23G          ;BRANCH IF CLEARED
1491  005244  104000                          HLT                     ;DATOB TO CRB2 HIGH BYTE DIDN'T CLEAR READY
1492  005246  000407                          BR      TEST24          ;GO TO NEXT TEST
1493
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1494  005250  105713                  CNT23G: TSTB    @CRS            ;WAIT FOR COLUMN READY
1495  005252  100376                          BPL     .-2
1496  005254  005777  173360                  TST     @CRB2           ;DATI TO CRB2
1497  005260  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1498  005262  100001                          BPL     TEST24          ;BRANCH IF CLEARED
1499  005264  104000                          HLT                     ;DATI TO CRB2 DIDN'T CLEAR READY
1500
1501  005266  104001                  TEST24: SCOPE
1502                                  ;SETTING EJECT AFTER A COLUMN READY WITHOUT CLEARING THE COLUMN READY
1503                                  ;SHOULD SET TIMING ERROR (WHICH IN TURN SHOULD CLEAR COLUMN READY)
1504  005270  004737  011434                  JSR     %7,INIT         ;INITIALIZE
1505  005274  005213                          INC     @CRS            ;START READING A CARD
1506  005276  105713                          TSTB    @CRS            ;CHECK COLUMN READY - WAIT
1507  005300  100376                          BPL     .-2
1508  005302  052713  000002                  BIS     #2,@CRS         ;SET EJECT
1509  005306  105713                          TSTB    @CRS            ;CHECK COLUMN READY
1510  005310  100402                          BMI     CNT24A          ;BRANCH IF STILL SET
1511  005312  104000                          HLT                     ;SETTING EJECT CLEARED COLUMN READY
1512  005314  000421                          BR      END24           ;BRANCH TO WAIT FOR DONE AFTER ERROR
1513  005316  032713  004000          CNT24A: BIT     #4000,@CRS      ;CHECK TIMING ERROR
1514  005322  001013                          BNE     TIM24           ;BRANCH IF SET
1515  005324  032713  040400                  BIT     #40400,@CRS     ;CHECK CARD DONE AND OFF-LINE
1516  005330  001772                          BEQ     CNT24A          ;LOOP IF NONE SET
1517  005332  032713  040000                  BIT     #40000,@CRS     ;CARD DONE SET?
1518  005336  001003                          BNE     CNT24B          ;YES - BRANCH TO ERROR PRINTOUT
1519  005340  004737  011506                  JSR     %7,CKBITA       ;NO - BIT 8 WAS SET SO OUTPUT MESSAGE
1520  005344  000415                          BR      ENDCK           ;BRANCH AFTER COMING BACK ON-LINE
1521  005346  104000          CNT24B: HLT                             ;CARD DONE SET BUT TIMING ERROR DIDN'T
1522  005350  000413                          BR      ENDCK           ;BRANCH TO NEXT SECTION
1523  005352  105713          TIM24:  TSTB    @CRS            ;CHECK COLUMN READY
1524  005354  100001                          BPL     .+4             ;BRANCH IF NOT SET
1525  005356  104000                          HLT                     ;TIMING ERROR DIDN'T CLEAR READY
1526  005360  032713  040400          END24:  BIT     #40400,@CRS     ;WAIT FOR CARD DONE OR OFF-LINE
1527  005364  001775                          BEQ     END24
1528  005366  032713  000400                  BIT     #400,@CRS       ;CHECK OFF LINE
1529  005372  001402                          BEQ     ENDCK           ;BRANCH IF NOT SET
1530  005374  004737  011506                  JSR     %7,CKBITA       ;OUTPUT ERROR MESSAGE
1531
1532                                  ;CHECK SW7 AND RETURN TO TEST1 IF SET, AFTER RINGING BELL
1533                                  ;OTHERWISE GO INTO THE DATA TEST
1534  005400  104001          ENDCK:  SCOPE
1535  005402  032777  000200  173206          BIT     #200,@SWR
1536  005410  001406                          BEQ     DATST
1537  005412  004737  011662                  JSR     %7,BELL
1538  005416  005137  000644                  COM     TRFLG           ;TOGGLE TRACE FLAG
1539  005422  000137  000742                  JMP     RESTRT
```

```
1540
1541
1542                                    ;*************************************************************
1543                                    ;DATA RELIABILITY TEST FOR CR11
1544                                    ;*************************************************************
1545
1546                                    ;CHECK SR FOR TYPE OF DECK BEING TESTED, AND INITIALIZE POINTERS
1547  005426  012737  000056  006646  DATST1: MOV     #56,CDCNT       ;SETUP CARD COUNT TO ENTER TABLE CORRESPONDING TO NEXT C
1548  005434  000410                  BR      DATST2          ;SKIP NEXT INSTRUCTION
1549  005436  022737  000176  000616  DATST1: CMP     #SWREG,SWR
1550  005444  001002                  BNE     1$
1551  005446  104002                  CNTLU
1552  005450  104006                  CKU
1553  005452  005037  006646          1$:     CLR     CDCNT           ;SETUP CARD COUNT TO ENTER DATA TABLE AT BEGINNING
1554  005456  005037  000650          DATST2: CLR     ERFLG           ;FLAG SET PREVENTS PRINTING OUT ERROR HEADING
1555  005462  032777  000020  173126          BIT     #20,@SWR                ;CHECK BIT 4 OF SR FOR TYPE OF DECK
1556  005470  001412                  BEQ     ALP1            ;BRANCH IF NOT SET TO LOAD ALPHANUMERIC POINTERS
1557  005472  012737  013524  006642          MOV     #BINCD,TSTART   ;BIT 2 SET, LOAD BINARY TABLE POINTERS
1558  005500  012737  014222  006644          MOV     #BINEND,TEND
1559  005506  012737  015627  006640          MOV     #MSG15,DECK
1560  005514  000411                  BR      CONTD           ;BRANCH AROUND ALPHANUMERIC POINTERS
1561  005516  012737  013024  006642  ALP1:   MOV     #ALPCD,TSTART   ;LOAD ALPHANUMERIC TABLE POINTERS
1562  005524  012737  013522  006644          MOV     #ALPEND,TEND
1563  005532  012737  015616  006640          MOV     #MSG14,DECK
1564  005540  005737  000644          CONTD:  TST     TRFLG           ;CHECK TRACE TRAP FLAG
1565  005544  001004                  BNE     TRP1            ;BRANCH IF FLAG WAS SET
1566  005546  012737  000340  177776  NOTRP1: MOV     #340,PSR        ;CLEAR TRACE BIT
1567  005554  000407                  BR      DCNT1
1568  005556  032777  010000  173032  TRP1:   BIT     #10000,@SWR     ;CHECK SW12 TO INHIBIT TRACE TRAPPING
1569  005564  001370                  BNE     NOTRP1          ;BRANCH IF SET
1570  005566  012737  000360  177776          MOV     #360,PSR        ;SET TRACE BIT
1571  005574  004737  011434          DCNT1:  JSR     %7,INIT         ;INITIALIZE CARD READER STATUS REGISTER
1572                                    ;SET UP INTERRUPT SERVICING, AND START READING
1573  005600  012710  005634                  MOV     #SRVC,@ADINT    ;SETUP RETURN POINTER
1574  005604  042737  000340  177776          BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
1575  005612  013760  177776  000002          MOV     PSR,2(ADINT)    ;STORE CURRENT STATUS
1576  005620  004737  006540                  JSR     %7,NXCRD        ;ADJUST POINTER AND START READING
1577  005624  052713  000101                  BIS     #101,@CRS       ;ENABLE INTERRUPTS
1578  005630  000001                  WAIT                    ;WAIT FOR INTERRUPTS
1579  005632  000776                  BR      .-2
1580
1581                                    ;INTERRUPT SERVICE ROUTINE WHICH RUNS DATA RELIABILITY TEST
1582  005634  005713          SRVC:   TST     @CRS            ;CHECK SPECIAL CONDITION (BIT 15)
1583  005636  100460                  BMI     ERSET           ;BRANCH IF SET
1584  005640  105713                  TSTB    @CRS            ;CHECK COLUMN READY
1585  005642  100402                  BMI     .+6             ;BRANCH IF SET
1586  005644  000137  006412          JMP     NOTCOL          ;JUMP IF NOT SET
1587  005650  005237  006650          INC     CLCNT           ;KEEP TRACK OF COLUMN NUMBER
1588  005654  011437  006652          MOV     @CRB1,DAT1      ;STORE DATA OF FIRST READ
1589  005660  105713                  TSTB    @CRS            ;MAKE SURE COLUMN READY CLEARED
1590  005662  100006                  BPL     SCONT1          ;BRANCH IF IT DID
1591  005664  052737  000340  177776          BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
1592  005672  104000                  HLT                     ;READING DATA DIDN'T CLEAR COLUMN READY
1593  005674  000137  006432          JMP     LASTCK          ;GO TO NEXT CARD AFTER ERROR PRINTOUT
1594  005700  017737  172734  006656  SCONT1: MOV     @CRB2,DATENC    ;STORE ENCODED DATA
1595  005706  012701  000010          MOV     #10,COUNT       ;WAIT AWHILE
```

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1596  005712  005301                        DEC     COUNT
1597  005714  001376                        BNE     .-2
1598  005716  011437  006654                MOV     @CRB1,DAT2      ;STORE DATA OF SECOND READ
1599  005722  005037  006660                CLR     PTOFF           ;CLEAR POINTER OFFSET
1600  005726  023715  006652                CMP     DAT1,@R5        ;CHECK FIRST DATA READ
1601  005732  001053                        BNE     FAIL            ;PRINTOUT IF WRONG
1602  005734  012737  000002  006660        MOV     #2,PTOFF        ;SET POINTER OFFSET
1603  005742  023725  006654                CMP     DAT2,(R5)+      ;CHECK SECOND READING OF SAME DATA
1604  005746  001045                        BNE     FAIL            ;BRANCH IF WRONG
1605  005750  012737  000004  006660        MOV     #4,PTOFF        ;SET POINTER OFFSET
1606  005756  023725  006656                CMP     DATENC,(R5)+    ;CHECK ENCODED DATA
1607  005762  001037                        BNE     FAIL            ;BRANCH IF WRONG
1608  005764  020537  006644                CMP     R5,TEND         ;CHECK FOR END OF TABLE
1609  005770  100402                        BMI     .+6             ;IF NOT THERE, RTI
1610  005772  013705  006642                MOV     TSTART,R5       ;MOVE POINTER TO LOOP THRU TABLE
1611  005776  000002                        RTI
1612                                        ;SPECIAL CONDITION BIT 15 WAS SET WHEN THE INTERRUPT SERVICE ROUTINE
1613                                        ;WAS ENTERED
1614                                        ;OUTPUT A MESSAGE AND HALT
1615  006000  052737  000340  177776  ERSET:  BIS     #340,PSR        ;LOCK OUT INTERRUPTS
1616  006006  104003                        KBINTT
1617  006010  022737  000120  006646        CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
1618  006016  001006                        BNE     ER1             ;IF NOT, PRINT OUT MESSAGE
1619  006020  022737  000120  006650        CMP     #80.,CLCNT      ;IF LAST CARD, CHECK FOR LAST COLUMN
1620  006026  001002                        BNE     ER1             ;IF NOT, PRINT MESSAGE
1621  006030  000137  006662                JMP     ALLDON          ;IF END OF DECK, JUMP
1622  006034  012702  015640        ER1:    MOV     #MSG16,R2       ;"BIT 15 WAS SET."
1623  006040  004737  012152                JSR     %7,TOUT
1624  006044  012702  015661                MOV     #MSG17,R2       ;"REMEDY THE ERROR CONDITION
1625  006050  004737  012152                JSR     %7,TOUT         ;AND PRESS CONTINUE"
1626  006054  000000                        HALT
1627  006056  000137  006432                JMP     LASTCK          ;SET UP FOR NEXT CARD AND GO ON
1628  006062  052737  000340  177776  FAIL:   BIS     #340,PSR        ;LOCK OUT INTERRUPTS
1629  006070  052713  000002                BIS     #2,@CRS         ;SET EJECT TO PREVENT TIMING ERROR
1630  006074  005714                        TST     @CRB1           ;MAKE SURE COLUMN READY IS CLEARED
1631  006076  032777  020000  172512        BIT     #20000,@SWR     ;CK SW13
1632  006104  001431                        BEQ     FAILCN          ;CONTINUE IF NOT SET
1633  006106  005777  172504                TST     @SWR            ;IF SET, CHECK FOR HALT ON ERROR
1634  006112  100003                        BPL     FAILC           ;BRANCH IF HALT ON ERROR NOT SET
1635  006114  000000                        HALT                    ;HALT ON ERROR SET
1636  006116  000137  006432                JMP     LASTCK          ;CONTINUE  AFTER HALT
1637  006122  032713  040000        FAILC:  BIT     #40000, @CRS    ;CHECK FOR CARD DONE
1638  006126  001402                        BEQ     .+6
1639  006130  000137  006432                JMP     LASTCK          ;INHIBIT PRINTOUT AFTER CARD DONE SET
1640  006134  032713  000400                BIT     #400,@CRS       ;CHECK FOR OFF-LINE
1641  006140  001770                        BEQ     FAILC           ;BRANCH IF NOT
1642  006142  022737  000120  006646        CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
1643  006150  001002                        BNE     .+6
1644  006152  000137  006662                JMP     ALLDON          ;IF LAST CARD, WAIT FOR NEXT DECK
1645  006156  004737  011506                JSR     %7,CKBIT8       ;IF NOT LAST CARD, PRINT MESSAGE
1646  006162  004737  006540                JSR     %7,NXCRD        ;START NEXT CARD THRU READER
1647  006166  000002                        RTI
1648  006170  005737  006650        FAILCN: TST     ERFLG           ;TEST FLAG FOR PREVIOUS PRINTOUT
1649  006174  001006                        BNE     NOHD            ;IF SET,  DON'T OUTPUT HEADING
1650  006176  005237  006650                INC     ERFLG           ;SET FLAG
1651  006202  012702  015526                MOV     #MSG13,R2       ;OUTPUT HEADING FOR DATA ERROR PRINTOUT
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1652   006206  004737  012152          JSR     %7,TOUT
1653   006212  013702  006640  NOMD1:  MOV     DECK,R2         ;OUTPUT TYPE OF DECK
1654   006216  004737  012152          JSR     %7,TOUT
1655   006222  004737  011542          JSR     %7,SPACE
1656   006226  013702  006646          MOV     COCNT,R2        ;OUTPUT CARD NUMBER WHERE ERROR OCCURRED
1657   006232  004737  011734          JSR     %7,PROCT
1658   006236  004737  011542          JSR     %7,SPACE
1659   006242  013702  006650          MOV     CLCNT,R2        ;OUTPUT COLUMN NUMBER WHERE ERROR OCCURRED
1660   006246  004737  011734          JSR     %7,PROCT
1661   006252  004737  011542          JSR     %7,SPACE
1662   006256  163705  006660          SUB     PTOFF,R5        ;SUBTRACT OFFSET FROM POINTER TO POINT TO
1663                                                           ;ADDRESS OF DESIRED PATTERN
1664   006262  012502                  MOV     (R5)+,R2        ;OUTPUT CORRECT DATA PATTERN (NOT ENCODED)
1665   006264  004737  011734          JSR     %7,PROCT
1666   006270  004737  011542          JSR     %7,SPACE
1667   006274  013702  006652          MOV     DAT1,R2         ;OUTPUT DATA READ ON FIRST READING OF BUFFER
1668   006300  004737  011734          JSR     %7,PROCT
1669   006304  004737  011542          JSR     %7,SPACE
1670   006310  013702  006654          MOV     DAT2,R2         ;OUTPUT DATA READ ONE MILLISECOND LATER
1671   006314  004737  011734          JSR     %7,PROCT
1672   006320  004737  011542          JSR     %7,SPACE
1673   006324  011502                  MOV     @R5,R2          ;OUTPUT CORRECT DATA PATTERN (ENCODED FORM)
1674   006326  004737  011734          JSR     %7,PROCT
1675   006332  004737  011542          JSR     %7,SPACE
1676   006336  013702  006656          MOV     DATENC,R2       ;OUTPUT DATA READ (ENCODED)
1677   006342  004737  011734          JSR     %7,PROCT
1678   006346  104003                  KBINTT
1679   006350  005777  172242          TST     @SWR            ;CHECK "HALT ON ERROR" SWITCH
1680   006354  100001                  BPL     .+4             ;BRANCH IF NOT SET
1681   006356  000000                  HALT                    ;HALT AFTER AN ERROR
1682   006360  005713                  TST     @CRS            ;CHECK ERROR
1683   006362  100023                  BPL     LASTCK          ;BRANCH IF NOT SET
1684   006364  022737  000120  006646  CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
1685   006372  001005                  BNE     FAILC1
1686   006374  032713  000400          BIT     #400,@CRS
1687   006400  001423                  BEQ     LASTCD
1688   006402  000137  006662          JMP     ALLDON
1689   006406  000137  006700  FAILC1: JMP     ERSET           ;OUTPUT ERROR MESSAGE
1690
1691                                  ;INTERRUPT NOT DUE TO ERROR OR COLUMN READY
1692   006412  032713  040000  NOTCOL: BIT     #40000,@CRS     ;CHECK FOR CARD DONE
1693   006416  001474                  BEQ     NOTCD           ;BRANCH IF NOT SET
1694   006420  022737  000120  006650  CMP     #80.,CLCNT      ;CHECK COLUMN COUNT
1695   006426  001401                  BEQ     .+4             ;SKIP ERROR HALT IF 80 COLUMNS WERE READ
1696   006430  104000                  HLT                     ;LESS THAN EIGHTY COLUMNS WERE READ
1697   006432  022737  000120  006646  LASTCK: CMP     #80.,CDCNT      ;CHECK FOR LAST CARD
1698   006440  001403                  BEQ     LASTCD          ;BRANCH IF LAST CARD
1699   006442  004737  006540          JSR     %7,NXCRD        ;IF NOT LAST CARD
1700   006446  000002                  RTI                     ;GO ON
1701   006450  022626                  CMP     (SP)+,(SP)+     ;IF LAST CARD, RESTORE STACK POINTER
1702   006452  004737  011462          JSR     %7,BELL         ;RING BELL TO SIGNIFY "PASS COMPLETE"
1703   006456  013702  000042          MOV     @#42,R2         ;MONITOR HOOK
1704   006462  001405                  BEQ     END
1705   006464  000005                  RESET
1706   006466  004712          LOGIC:  JSR     %7,(R2)
1707   006470  000240                  NOP
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1708  006472  000240                        NOP
1709  006474  000240                        NOP
1710  006476  032777  000040  172112  END:  BIT     #40,@SWR          ;CHECK SR FOR CONTINUATION TO ANOTHER DECK
1711  006504  001002                        BNE     .+6               ;BRANCH TO HALT IF SW5 SET
1712  006506  000137  006514                JMP     DECKCK            ;CONTINUE TO ANOTHER DECK
1713  006512  000000                        HALT                      ;DATA TEST DONE
1714
1715                                  ;WHEN CONTINUING FROM ONE DECK TO ANOTHER, CHECK SW6 FOR TYPE
1716                                  ;OF TESTING TO BE PERFORMED
1717  006514  005137  000644        DECKCK: COM     TRFLG             ;TOGGLE TRACE FLAG
1718  006520  032777  000100  172070        BIT     #100,@SWR                 ;CHECK SW6
1719  006526  001402                        BEQ     .+6               ;BRANCH IF NOT SET
1720  006530  000137  000742                JMP     RESTRT            ;RERUN COMBINED INSTRUCTION AND DATA TEST
1721  006534  000137  005436                JMP     DATST1
1722
1723  006540  013705  006642        NXCRD:  MOV     TSTART,R5         ;LOAD R5 WITH TABLE STARTING ADDRESS
1724  006544  006337  006646                ASL     CDCNT             ;MULTIPLY CARD COUNT BY FOUR
1725  006550  006337  006646                ASL     CDCNT
1726  006554  063705  006646                ADD     CDCNT,R5          ;ADD OFFSET TO R5 TO POINT TO NEXT DATUM
1727  006560  006237  006646                ASR     CDCNT             ;RESTORE CARD COUNT
1728  006564  006237  006646                ASR     CDCNT
1729  006570  042713  000002                BIC     #2,@CRS           ;CLEAR EJECT IF SET
1730  006574  005213                        INC     @CRS              ;READ ANOTHER CARD
1731  006576  005237  006646                INC     CDCNT             ;KEEP TRACK OF CARD NUMBER
1732  006602  005037  006650                CLR     CLCNT             ;INITIALIZE COLUMN COUNT
1733  006606  000207                        RTS     %7                ;RETURN
1734                                  ;INTERRUPT NOT CAUSED BY ERROR, COLUMN READY, OR CARD DONE
1735  006610  052737  000340  177776  NOTCD:  BIS     #340,PSR          ;LOCK OUT FURTHER INTERRUPTS
1736  006616  032713  002000                BIT     #2000,@CRS        ;TEST ON-LINE TRANSITION BIT
1737  006622  001003                        BNE     NOTCD1            ;BRANCH IF SET
1738  006624  104000                        HLT                       ;NO BITS SET TO CAUSE AN INTERRUPT
1739  006626  000137  006432                JMP     LASTCK            ;START NEXT CARD
1740  006632  104000                NOTCD1: HLT                       ;ON-LINE TRANSITION CAUSED AN INTERRUPT
1741  006634  000137  006432                JMP     LASTCK            ;START NEXT CARD
1742  006640  000000                DECK:   0                         ;POINTER TO LITERAL "ALPHA" OR "BINARY"
1743  006642  000000                TSTART: 0                         ;STARTING ADDRESS OF DATA TABLE
1744  006644  000000                TEND:   0                         ;END ADDRESS OF DATA TABLE
1745  006646  000000                CDCNT:  0                         ;NUMBER OF CARD BEING READ
1746  006650  000000                CLCNT:  0                         ;NUMBER OF COLUMN BEING CHECKED
1747  006652  000000                DAT1:   0                         ;DATA ON FIRST READ FROM CRB1
1748  006654  000000                DAT2:   0                         ;DATA ON SECOND READ OF CRB1
1749  006656  000000                DATENC: 0                         ;DATA READ FROM CRB2
1750  006660  000000                PTOFF:  0                         ;OFFSET TO POINTER FOR DATA PRINTOUT
1751  006662  004737  011462        ALLDON: JSR     %7,BELL           ;RING BELL
1752  006666  032713  000400                BIT     #400,@CRS         ;CHECK OFF-LINE BIT
1753  006672  001001                        BNE     .+4               ;BRANCH IF SET
1754  006674  104000                        HLT                       ;OFF-LINE NOT SET, BUT SPECIAL CONDITION
1755                                                                  ;WAS SET AFTER 80 COLUMNS OF THE 80TH CARD WERE READ
1756  006676  032777  000040  171712                BIT     #40,@SWR          ;CHECK SR FOR HALT AT END OF DECK
1757  006704  001403                        BEQ     ALCNT             ;CONTINUE IF NOT SET
1758  006706  000000                        HALT                      ;END OF DECK,SW5 SET
1759  006710  000137  006514                JMP     DECKCK            ;CHECK FOR TYPE OF TESTING
1760  006714  032777  002000  171674  ALCNT: BIT     #2000,@SWR        ;DOES THIS CR11 USE THE M829 MODULE?
1761  006722  001025                        BNE     ALCNT1            ;YES- BRANCH
1762  006724  005027  000000                CLR     #0                ;NO-STALL TO ALLOW CARD DONE TO SET
1763  006730  005337  006726                DEC     .-2
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1764  006734  001375                          BNE     .-4
1765  006736  005327  000000                  DEC     #0
1766  006742  001375                          BNE     .-4
1767  006744  005327  000000                  DEC     #0
1768  006750  001375                          BNE     .-4
1769  006752  032713  040000                  BIT     #40000, @CRS    ;CHECK CARD DONE
1770  006756  001001                          BNE     .+4
1771  006760  104000                          HLT                     ;CARD DONE DIDN'T SET- THIS ERROR COULD BE
1772  006762  005013                          CLR     @CRS            ;CAUSED BY RUNNING A CR11 WHICH HAS THE
1773                                                                  ;M829 MODULE AND NOT SETTING SWITCH REGISTER
1774                                                                  ;SWITCH 10
1775
1776  006764  032713  157377                  BIT     #157377,@CRS    ;ONLY BIT 8 MAY STILL BE SET
1777  006770  001401                          BEQ     .+4             ;BRANCH IF OK
1778  006772  104000                          HLT                     ;STATUS REGISTER INCORRECT
1779  006774  000405                          BR ALCNT2
1780  006776  005013                  ALCNT1: CLR     @CRS            ;CLEAR ERROR
1781  007000  032713  156377                  BIT     #156377,@CRS    ;ONLY BITS 8 AND 9 MAY STILL BE SET
1782                                                                  ;BIT 9 MAY BE SET SINCE CARD MAY NOT
1783                                                                  ;YET HAVE CLEARED THE READER TO CAUSE
1784                                                                  ;CARD DONE
1785  007004  001401                          BEQ     .+4
1786  007006  104000                          HLT                     ;STATUS REGISTER INCORRECT
1787  007010  052737  000340  177776  ALCNT2: BIS     #340,PSR        ;SET PROCESSOR TO LEVEL 7
1788  007016  013760  177776  000002          MOV     PSR,2(ADINT)    ;SETUP RETURN STATUS
1789  007024  105213                          INCB    @CRS            ;ATTEMPT TO READ- SHOULD RESET ERROR
1790  007026  005713                          TST     @CRS            ;CHECK BIT 15
1791  007030  100402                          BMI     ALLOK           ;BRANCH IF OK
1792  007032  104000                          HLT                     ;SETTING READ DIDN'T RESET ERROR
1793  007034  000416                          BR      ALWAIT          ;BRANCH TO WAIT FOR ON-LINE
1794  007036  012710  007070          ALLOK:  MOV     #SRVC1,@ADINT   ;LOAD INTERRUPT RETURN ADDRESS
1795  007042  005037  177776                  CLR     PSR             ;SET PROCESSOR TO LEVEL 0
1796  007046  012713  000101                  MOV     #101,@CRS       ;ENABLE INTERRUPTS, KEEP ERROR SET BY SETTING READ
1797  007052  000240                          NOP                     ;CLOCK IN INTERRUPT
1798  007054  016037  000002  177776          MOV     2(ADINT),PSR    ;SET PROCESSOR TO LEVEL 7
1799  007062  005013                          CLR     @CRS            ;CLEAR INTERRUPT ENABLE AND ERROR
1800  007064  104000                          HLT                     ;BIT 15 DIDN'T CAUSE AN INTERRUPT
1801  007066  000402                          BR      .+6
1802  007070  022626                  SRVC1:  CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1803  007072  005013                  ALWAIT: CLR     @CRS            ;CLEAR INTERRUPT ENABLE AND ERROR
1804  007074  012710  007132                  MOV     #SRVC2,@ADINT   ;CHANGE INTERRUPT RETURN ADDRESS
1805  007100  112713  000100                  MOVB    #100,@CRS       ;ENABLE INTERRUPTS
1806  007104  042737  000340  177776          BIC     #340,PSR        ;SET PROCESSOR TO LEVEL 0
1807  007112  032713  000400                  BIT     #400,@CRS       ;CHECK OFF-LINE BIT
1808  007116  001375                          BNE     .-4             ;LOOP UNTIL CLEAR
1809  007120  016037  000002  177776          MOV     2(ADINT),PSR    ;SET PROCESSOR TO LEVEL 7
1810  007126  104000                          HLT                     ;NO INTERRUPT OCCURRED
1811  007130  000403                          BR      SRVC2A          ;BRANCH AROUND
1812  007132  004737  011462          SRVC2:  JSR     %7,BELL         ;RING BELL
1813  007136  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK POINTER
1814  007140  032713  002000          SRVC2A: BIT     #2000,@CRS      ;CHECK BIT 10
1815  007144  001001                          BNE     .+4             ;BRANCH IF SET
1816  007146  104000                          HLT                     ;BIT 10 NOT SET
1817  007150  032713  000400                  BIT     #400,@CRS       ;CHECK BIT 8
1818  007154  001401                          BEQ     .+4             ;BRANCH IF NOT SET
1819  007156  104000                          HLT                     ;BIT 8 WAS SET
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1820  007160  005013                          CLR     @CRS            ;DATO TO CRS
1821  007162  032713  002000                  BIT     #2000,@CRS      ;CHECK BIT 10
1822  007166  001401                          BEQ     .+4             ;BRANCH IF NOT SET
1823  007170  104000                          HLT                     ;DATO DIDN'T CLEAR ON-LINE BIT
1824  007172  022626                          CMP     (SP)+,(SP)+     ;RESTORE STACK FROM INITIAL INTERRUPT
1825  007174  000137  006514                  JMP     DECKCK          ;RESTART
1826
1827  007200  005037  000632          ERCR11: CLR     FLAG
1828  007204  000403                          BR      TSTA
1829  007206  012737  000001  000632  ERCM11: MOV     #1,FLAG
1830  007214  104007                  TSTA:   TIT
1831  007216  012702  016240                  MOV     #SUBT2,R2
1832  007222  004737  000652                  JSR     %7,SETUP        ;INITIALIZE REGISTERS
1833  007226  012737  007236  012150          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS
1834                          ;THE CARD READER GOING OFF-LINE SHOULD SET SPECIAL CONDITION (BIT 15) AND OFF-LINE (BIT
1835  007234  104001                  TESTA:  SCOPE
1836  007236  005037  012144                  CLR     ITMAX           ;RUN EACH ERROR TEST ONCE ONLY
1837  007242  004737  011434                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1838  007246  012702  014410                  MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
1839  007252  005737  000632                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1840  007256  001402                          BEQ     .+6             ;NO
1841  007260  012702  014450                  MOV     #MSG3A,R2       ;"PRESS CARD READER 'STOP'"
1842  007264  004737  012152                  JSR     %7,TOUT
1843  007270  012702  014343                  MOV     #MSG2,R2
1844  007274  004737  012152                  JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1845  007300  004737  012274                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1846  007304  000000                          HALT
1847  007306  032713  000400                  BIT     #400,@CRS       ;CHECK BIT 8
1848  007312  001001                          BNE     .+4             ;BRANCH IF SET
1849  007314  104000                          HLT                     ;OFF-LINE (BIT 8) WASN'T SET
1850  007316  005713                          TST     @CRS            ;CHECK BIT 15
1851  007320  100401                          BMI     .+4             ;BRANCH IF SET
1852  007322  104000                          HLT                     ;BIT 15 WASN'T SET
1853  007324  012702  014224                  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'";
1854  007330  005737  000632                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1855  007334  001402                          BEQ     .+6             ;NO
1856  007336  012702  014307                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
1857  007342  004737  012152                  JSR     %7,TOUT
1858  007346  012702  014343                  MOV     #MSG2,R2
1859  007352  004737  012152                  JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1860  007356  004737  012274                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1861  007362  000000                          HALT
1862  007364  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
1863  007370  001375                          BNE     .-4
1864
1865                          ;INPUT HOPPER EMPTY SHOULD SET SPECIAL CONDITION
1866  007372  104001                  TESTB:  SCOPE
1867  007374  004737  011434                  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1868  007400  012702  014536                  MOV     #MSG5,R2        ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
1869  007404  004737  012152                  JSR     %7,TOUT
1870  007410  012702  014343                  MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1871  007414  004737  012152                  JSR     %7,TOUT
1872  007420  004737  012274                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1873  007424  000000                          HALT
1874  007426  032713  000400                  BIT     #400,@CRS       ;CHECK BIT8
1875  007432  001001                          BNE     .+4             ;BRANCH IF SET
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1876  007434  104000                  HLT                     ;OFF-LINE (BIT 8) WASN'T SET
1877  007436  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
1878  007440  100401                  BMI     .+4             ;BRANCH IF SET
1879  007442  104000                  HLT                     ;SPECIAL CONDITION NOT SET
1880  007444  012702  014607          MOV     @MSG6,R2        ;"RESTORE CARDS IN INPUT HOPPER"
1881  007450  004737  012152          JSR     %7,TOUT
1882  007454  012702  014224          MOV     @MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
1883  007460  005737  000632          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1884  007464  001402                  BEQ     .+6             ;NO
1885  007466  012702  014307          MOV     @MSG1A,R2       ;"PRESS CARD READER 'RESET'"
1886  007472  004737  012152          JSR     %7,TOUT
1887  007476  012702  014343          MOV     @MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1888  007502  004737  012152          JSR     %7,TOUT
1889  007506  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1890  007512  000000                  HALT
1891  007514  032713  000400          BIT     @400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
1892  007520  001375                  BNE     .-4
1893
1894                          ;OUTPUT STACKER FULL SHOULD SET BIT 15
1895  007522  104001          TESTC:  SCOPE
1896  007524  004737  011434          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1897  007530  012702  014653          MOV     @MSG7,R2        ;"RAISE OUTPUT STACKER PRESSURE ARM ABOVE HORIZONTAL THE
1898  007534  005737  000632          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1899  007540  001402                  BEQ     .+6             ;NO
1900  007542  012702  014771          MOV     @MSG7A,R2       ;"LOWER OUTPUT STACKER PLATE TO BOTTOM"
1901  007546  004737  012152          JSR     %7,TOUT
1902  007552  012702  014343          MOV     @MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1903  007556  004737  012152          JSR     %7,TOUT
1904  007562  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1905  007566  000000                  HALT
1906  007570  032713  000400          BIT     @400,@CRS       ;CHECK BIT 8
1907  007574  001001                  BNE     .+4             ;BRANCH IF SET
1908  007576  104000                  HLT                     ;OFF-LINE (BIT 8) WASN'T SET
1909  007600  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
1910  007602  100401                  BMI     .+4             ;BRANCH IF SET
1911  007604  104000                  HLT                     ;SPECIAL CONDITION NOT SET
1912  007606  012702  014224          MOV     @MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
1913  007612  005737  000632          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1914  007616  001402                  BEQ     .+6             ;NO
1915  007620  012702  014307          MOV     @MSG1A,R2       ;"PRESS CARD READER 'RESET'"
1916  007624  004737  012152          JSR     %7,TOUT
1917  007630  012702  014343          MOV     @MSG2,R2
1918  007634  004737  012152          JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1919  007640  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1920  007644  000000                  HALT
1921  007646  032713  000400          BIT     @400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
1922  007652  001375                  BNE     .-4
1923
1924                          ;A FEED ERROR SHOULD SET BIT 15
1925                          ;THIS ERROR OCCURS WHEN THE FEED MECHANISM FAILS TO DELIVER A CARD TO THE READ STATION
1926  007654  104001          TESTD:  SCOPE
1927  007656  004737  011434          JSR     %7,INIT
1928  007662  012702  014536          MOV     @MSG5,R2        ;"REMOVE ALL CARDS FROM THE INPUT HOPPER"
1929  007666  004737  012152          JSR     %7,TOUT
1930  007672  012702  014343          MOV     @MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1931  007676  004737  012152          JSR     %7,TOUT
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1932  007702  012702  015040          MOV     #MSG8,R2        ;"HOLD DOWN THE SWITCH AT THE BOTTOM OF INPUT HOPPER
1933  007706  005737  000632          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1934  007712  001402                  BEQ     .+6             ;NO
1935  007714  012702  015131          MOV     #MSG8A,R2       ;"LIFT SWITCH UNDER RIFFLE CAP
1936  007720  004737  012152          JSR     %7,TOUT
1937  007724  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'
1938  007730  005737  000632          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1939  007734  001402                  BEQ     .+6             ;NO
1940  007736  012702  014307          MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
1941  007742  004737  012152          JSR     %7,TOUT
1942  007746  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1943  007752  000000                  HALT
1944  007754  032713  002000          BIT     #2000,@CRS      ;WAIT FOR CARD READER TO COME ON-LINE
1945  007760  001775                  BEQ     .-4
1946  007762  004737  011434          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1947  007766  012713  000003          MOV     #3,@CRS         ;SET EJECT AND READ
1948  007772  005227  000000          INC     #0              ;WAIT AWHILE
1949  007776  001375                  BNE     .-4
1950  010000  005227  000000          INC     #0
1951  010004  001375                  BNE     .-4
1952  010006  005227  000000          INC     #0
1953  010012  001375                  BNE     .-4
1954  010014  005227  000000          INC     #0
1955  010020  001375                  BNE     .-4
1956  010022  032713  000400          BIT     #400,@CRS       ;TEST OFF-LINE BIT
1957  010026  001001                  BNE     .+4             ;BRANCH IF SET
1958  010030  104000                  HLT                     ;BIT 8 WAS NOT SET
1959  010032  005713                  TST     @CRS            ;CHECK BIT 15
1960  010034  100401                  BMI     .+4             ;BRANCH IF SET
1961  010036  104000                  HLT                     ;BIT 15 WAS NOT SET
1962  010040  012702  014607          MOV     #MSG6,R2
1963  010044  004737  012152          JSR     %7,TOUT         ;"RESTORE CARDS IN THE INPUT HOPPER"
1964  010050  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
1965  010054  005737  000632          TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
1966  010060  001402                  BEQ     .+6             ;NO
1967  010062  012702  014307          MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
1968  010066  004737  012152          JSR     %7,TOUT
1969  010072  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1970  010076  004737  012152          JSR     %7,TOUT
1971  010102  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1972  010106  000000                  HALT
1973  010110  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
1974  010114  001375                  BNE     .-4
1975  010116  005737  000632          TST     FLAG            ;SKIP NEXT TEST IF DOCUMATION READER
1976  010122  001402                  BEQ     .+6
1977  010124  000137  010444          JMP     TESTG
1978
1979                          ;A MOTION ERROR SHOULD SET BIT 15
1980                          ;THIS ERROR OCCURS WHEN A CARD JAM OCCURS AT THE READ STATION
1981  010130  104001          TESTE:  SCOPE
1982  010132  004737  011434          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
1983  010136  012702  014410          MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
1984  010142  004737  012152          JSR     %7,TOUT
1985  010146  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
1986  010152  004737  012152          JSR     %7,TOUT
1987  010156  012702  015170          MOV     #MSG9,R2        ;"BLOCK THE CARD READER STATION TO
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1988  010162  004737  012152          JSR     %7,TOUT         ;PREVENT A CARD GOING THRU, AND"
1989  010166  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
1990  010172  004737  012152          JSR     %7,TOUT
1991  010176  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
1992  010202  000000                  HALT
1993  010204  032713  002000          BIT     #2000,@CRS      ;MONITOR ON-LINE TRANSITION (BIT 10)
1994  010210  001775                  BEQ     .-4             ;CONTINUE WHEN CARD READER COMES ON-LINE
1995  010212  012713  000003          MOV     #3,@CRS         ;READ A CARD AND SET EJECT
1996  010216  032713  140000          BIT     #140000,@CRS    ;CHECK DONE AND SPECIAL CONDITION BITS
1997  010222  001775                  BEQ     .-4             ;WAIT
1998  010224  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT
1999  010226  100401                  BMI     .+4             ;CONTINUE IF SET
2000  010230  104000                  HLT                     ;SPECIAL CONDITION NOT SET
2001  010232  012702  015272          MOV     #MSG10,R2       ;"REMOVE JAMMED CARD"
2002  010236  004737  012152          JSR     %7,TOUT
2003  010242  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
2004  010246  004737  012152          JSR     %7,TOUT
2005  010252  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2006  010256  004737  012152          JSR     %7,TOUT
2007  010262  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2008  010266  000000                  HALT
2009  010270  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
2010  010274  001375                  BNE     .-4
2011
2012                                  ;A STACK FAIL ERROR SHOULD SET BIT 15
2013                                  ;ERROR OCCURS WHEN 3 CARDS IN A ROW HAVE NOT BEEN DELIVERED PROPERLY TO THE OUTPUT STACK
2014  010276  104001          TESTF:  SCOPE
2015  010300  004737  011434          JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
2016  010304  012702  014410          MOV     #MSG3,R2        ;"PRESS CARD READER 'READ STOP'"
2017  010310  004737  012152          JSR     %7,TOUT
2018  010314  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2019  010320  004737  012152          JSR     %7,TOUT
2020  010324  012702  015317          MOV     #MSG11,R2       ;"HOLD THE OUTPUT STACKER GATE OPEN.  THEN"
2021  010330  004737  012152          JSR     %7,TOUT
2022  010334  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND
2023  010340  004737  012152          JSR     %7,TOUT         ;'READ START.'"
2024  010344  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2025  010350  000000                  HALT
2026  010352  032713  002000          BIT     #2000,@CRS      ;WAIT FOR CARD READER TO COME ON-LINE
2027  010356  001775                  BEQ     .-4
2028  010360  012701  000003          MOV     #3,COUNT        ;INITIALIZE COUNTER TO READ 3 CARDS
2029  010364  012713  000003  LOOPF:  MOV     #3,@CRS         ;EJECT A CARD
2030  010370  032713  140000          BIT     #140000,@CRS    ;WAIT FOR CARD DONE OR SPECIAL CONDITION
2031  010374  001775                  BEQ     .-4
2032  010376  005301                  DEC     COUNT           ;COUNT DOWN
2033  010400  001371                  BNE     LOOPF           ;READ 3 CARDS ALL TOGETHER
2034  010402  005713                  TST     @CRS            ;CHECK SPECIAL CONDITION BIT 15
2035  010404  100401                  BMI     .+4             ;BRANCH IF SET
2036  010406  104000                  HLT                     ;SPECIAL CONDITION NOT SET
2037  010410  012702  014224          MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
2038  010414  004737  012152          JSR     %7,TOUT
2039  010420  012702  014343          MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
2040  010424  004737  012152          JSR     %7,TOUT
2041  010430  004737  012274          JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
2042  010434  000000                  HALT
2043  010436  032713  000400          BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
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 2044  010442  001375                        BNE     .-4
 2045
 2046                                  ;DARK-LIGHT ERROR SHOULD SET BIT 15
 2047                                  ;THIS OCCURS WHEN DATA IS SENSED BEFORE COLUMN ONE OR AFTER COLUMN EIGHTY
 2048                                  ;OR WHEN THE SENSORS ARE NOT ALL SENSING A HOLE AFTER THE CARD HAS PASSED
 2049                                  ;THIS TEST IS SKIPPED IF BIT 0 OF THE SWITCH REGISTER EQUALS ONE
 2050                                  ;TO MAKE THE 2 DARK-LIGHT CHECK CARDS:
 2051                                  ;       1.  TEAR A SMALL PIECE FROM THE LEADING EDGE OF ONE CARD
 2052                                  ;       2.  TAPE 2 CARDS TOGETHER TO MAKE ONE "LONG" CARD-IT ONLY NEEDS TO BE
 2053                                  ;           ABOUT 1/2 INCH LONGER THAN A REGULAR CARD
 2054  010444  104001                  TESTG:  SCOPE
 2055  010446  032777  000001  170142          BIT     #1,@SWR         ;CHECK SWR
 2056  010454  001410                          BEQ     CONTG           ;RUN TEST IF NOT SET
 2057  010456  004737  011462                  JSR     %7,BELL         ;IF SET, RING BELL AND
 2058  010462  000000                          HALT                    ;HALT
 2059  010464  012737  007236  012150          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS TO LOOP THRU TESTS
 2060  010472  000137  007234                  JMP     TESTA           ;START ERROR TESTS OVER ON CONTINUING
 2061  010476  004737  011434          CONTG:  JSR     %7,INIT         ;INITIALIZE STATUS REGISTER
 2062  010502  005001                          CLR     COUNT           ;INITIALIZE COUNTER
 2063  010504  005201                          INC     COUNT           ;SET TO INDICATE FIRST PASS
 2064  010506  012702  015371                  MOV     #MSG12,R2       ;"PLACE SPECIAL DARK-LIGHT CHECK CARDS (SEE LISTING, TES
 2065  010512  004737  012152                  JSR     %7,TOUT         ;AT THE BOTTOM OF THE INPUT STACK"
 2066  010516  012702  014224          LOOPG:  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
 2067  010522  005737  000632                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
 2068  010526  001402                          BEQ     .+6             ;NO
 2069  010530  012702  014307                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET'"
 2070  010534  004737  012152                  JSR     %7,TOUT
 2071  010540  012702  014343                  MOV     #MSG2,R2
 2072  010544  004737  012152                  JSR     %7,TOUT         ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 2073  010550  004737  012274                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 2074  010554  000000                          HALT
 2075  010556  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
 2076  010562  001375                          BNE     .-4
 2077  010564  012713  000003                  MOV     #3,@CRS         ;EJECT THE CARD
 2078  010570  032713  140000                  BIT     #140000,@CRS    ;WAIT FOR ERROR OR CARD DONE
 2079  010574  001775                          BEQ     .-4
 2080  010576  005713                          TST     @CRS            ;CHECK SPECIAL CONDITION
 2081  010600  100401                          BMI     .+4             ;CONTINUE IF SET
 2082  010602  104000                          HLT                     ;SPECIAL CONDITION NOT SET
 2083  010604  005301                          DEC     COUNT           ;COUNT DOWN
 2084  010606  001743                          BEQ     LOOPG           ;IF FIRST PASS, LOOP
 2085  010610  004737  011462                  JSR     %7,BELL         ;RING BELL
 2086  010614  000000                          HALT
 2087  010616  012702  014224                  MOV     #MSG1,R2        ;"PRESS CARD READER 'MOTOR START' AND 'READ START'"
 2088  010622  005737  000632                  TST     FLAG            ;CHANGE MESSAGE FOR DOCUMATION READER?
 2089  010626  001402                          BEQ     .+6             ;NO
 2090  010630  012702  014307                  MOV     #MSG1A,R2       ;"PRESS CARD READER 'RESET' "
 2091  010634  004737  012152                  JSR     %7,TOUT
 2092  010640  012702  014343                  MOV     #MSG2,R2        ;"THEN HIT 'CONTINUE' ON THE CONSOLE"
 2093  010644  004737  012152                  JSR     %7,TOUT
 2094  010650  004737  012274                  JSR     %7,CRLF4        ;MOVE MESSAGE UP ON TTY
 2095  010654  000000                          HALT
 2096  010656  032713  000400                  BIT     #400,@CRS       ;WAIT FOR OFF-LINE TO CLEAR
 2097  010662  001375                          BNE     .-4
 2098  010664  012737  007236  012150          MOV     #TESTA+2,RETURN ;SETUP SCOPE LOOP RETURN ADDRESS
 2099  010672  000137  007234                  JMP     TESTA           ;LOOP THRU TEST ON CONTINUING
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2100
2101
2102                                    ;ROUTINE TO LOOP THRU A SINGLE INSTRUCTION TEST
2103                                    ;NOTE THAT SW11 MUST BE DOWN AFTER 2ND HALT
2104  010676  104007                   TESTX:  TIT
2105  010700  012702  016273                   MOV     #SUBT4,R2
2106  010704  004737  000652                   JSR     %7,SETUP                ;SETUP POINTERS AND FLAGS
2107  010710  012702  016115                   MOV     #STADD,R2
2108  010714  004737  012152                   JSR     PC,TOUT
2109  010720  104004                           READC
2110  010722  013737  000622  011012           MOV     TMP1,RETRNX
2111  010730  062737  000002  011012           ADD     #2,RETRNX               ;CHANGE TO FIRST ADDRESS AFTER SCOPE INSTRUCTION
2112  010736  032777  010000  167652  2$:      BIT     #10000,@SWR             ;CHECK SW12
2113  010744  001404                           BEQ     .+12                    ;BRANCH IF NOT SET
2114  010746  042737  000020  177776           BIC     #20,PSR                 ;CLEAR TRACE BIT
2115  010754  000403                           BR      .+10                    ;SKIP NEXT INSTRUCTION
2116  010756  052737  000020  177776           BIS     #20,PSR                 ;SET TRACE BIT
2117  010764  005037  012146                   CLR     ITCNT                   ;CLEAR ITERATION COUNTER
2118  010770  012737  011002  012150           MOV     #XLOOP,RETURN           ;LOAD RETURN ADDRESS
2119  010776  000177  000010                   JMP     @RETRNX                 ;JUMP TO TEST
2120  011002  005037  012146           XLOOP:  CLR     ITCNT                   ;KEEP ITERATION COUNTER AT ZERO
2121  011006  000177  000000                   JMP     @RETRNX                 ;JUMP TO TEST
2122  011012  000000                   RETRNX: 0
2123
```

```
2124
2125                                    ;ROUTINE TO CHECK CARDS WHICH HAVE ALL COLUMNS IDENTICALLY PUNCHED.
2126                                    ;THIS ROUTINE ALLOWS SPECIFIC TYPES OF DATA FAILURES TO BE STUDIED
2127                                    ;EASILY  THE PATTERN IS STORED, AND THEN
2128                                    ;EACH COLUMN OF EACH CARD IS READ TWICE AND COMPARED WITH IT.  IF A
2129                                    ;DISCREPANCY OCCURS, THE ERROR IS PRINTED OUT ALONG WITH THE TOTAL
2130                                    ;NUMBER OF CARDS READ AND THE TOTAL NUMBER OF DATA ERRORS DISCOVERED
2131                                    ;UP TO THAT POINT (ALL PRINTOUTS ARE IN OCTAL).  WHEN THE INPUT HOPPER
2132                                    ;IS EMPTY, THE ROUTINE RINGS THE BELL AND WAITS FOR MORE CARDS TO BE
2133                                    ;LOADED AND THE CARD READER TO BE PUT BACK ON-LINE.
2134                                    ;SW15=1 CAUSES A HALT AFTER AN ERROR, AND SW13=1 INHIBITS ERROR PRINTOUTS.
2135
2136  011014  104007                CKSAME: TIT
2137  011016  012702  016316                MOV     #SUBTS,R2
2138  011022  004737  008652                JSR     %7,SETUP        ;INITIALIZE POINTERS
2139  011026  012702  016066                MOV     #CIMPAT,R2
2140  011032  004737  012152                JSR     PC,TOUT
2141  011036  104004                        READC
2142  011040  013737  008622  011432        MOV     TMP1,CARDIM
2143  011046  042737  170000  011432        BIC     #170000,CARDIM  ;CLEAR UPPER BITS OF PATTERN
2144  011054  005037  011430                CLR     TOTCRD          ;INITIALIZE CARD COUNT
2145  011060  005037  011426                CLR     TOTERR          ;INITIALIZE ERROR COUNT
2146  011064  005037  008650                CLR     ERFLG           ;CLEAR FLAG FOR PRINTING ERROR HEADING
2147  011070  005037  008650        CKLOOP: CLR     CLCNT           ;INITIALIZE COLUMN COUNT
2148  011074  104003                        KBINTT
2149  011076  032713  000400                BIT     #400,@CRS       ;CHECK BIT 8
2150  011102  001017                        BNE     CKSIT           ;BRANCH IF SET TO WAIT FOR READER TO COME ON-LINE.
2151  011104  005213                        INC     @CRS            ;START READING CARD
2152  011106  005237  011430                INC     TOTCRD          ;INCREMENT CARD COUNT
2153  011112  105713                CKLP1:  TSTB    @CRS            ;CHECK COLUMN READY
2154  011114  100426                        BMI     CKCOL           ;BRANCH IF SET
2155  011116  032713  040000                BIT     #40000,@CRS     ;CHECK CARD DONE
2156  011122  001015                        BNE     CKCRD           ;BRANCH IF SET
2157  011124  005713                        TST     @CRS            ;CHECK SPECIAL CONDITION
2158  011126  100371                        BPL     CKLP1           ;LOOP IF NOT SET
2159  011130  032713  000400                BIT     #400,@CRS       ;CHECK BIT 8
2160  011134  001002                        BNE     CKSIT           ;BRANCH IF SET TO WAIT FOR READER ON-LINE.
2161  011136  104000                        HLT                     ;SPECIAL CONDITION SET, BIT 8 CLEAR
2162  011140  000753                        BR      CKLOOP
2163
2164  011142  004737  011462        CKSIT:  JSR     %7,BELL         ;RING BELL TO SIGNIFY READER OFF-LINE
2165  011146  032713  000400        CKSIT1: BIT     #400,@CRS       ;CHECK BIT 8
2166  011152  001375                        BNE     CKSIT1          ;LOOP IF STILL SET
2167  011154  000745                        BR      CKLOOP          ;START NEXT CARD
2168  011156  022737  000120  008650 CKCRD:  CMP     #80.,CLCNT      ;CHECK FOR 80 COLUMNS READ
2169  011164  001741                        BEQ     CKLOOP          ;START NEXT CARD IF OK
2170  011166  104000                        HLT                     ;FINAL COLUMN COUNT WASN'T 80
2171  011170  000737                        BR      CKLOOP          ;START NEXT CARD
2172  011172  011437  008652        CKCOL:  MOV     @CRB1,DAT1      ;READ DATA BUFFER
2173  011176  005237  008650                INC     CLCNT           ;COUNT COLUMNS
2174  011202  105713                        TSTB    @CRS            ;CHECK COLUMN READY
2175  011204  100002                        BPL     .+6             ;BRANCH IF OK
2176  011206  104000                        HLT                     ;READING DBR DIDN'T CLEAR READY
2177  011210  000727                        BR      CKLOOP          ;START NEXT CARD AFTER ERROR
2178  011212  012701  000200                MOV     #200,COUNT      ;WAIT AWHILE
2179  011216  005301                CKLP2:  DEC     COUNT
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2180  011220  001376                        BNE     CKLP2
2181  011222  011437  006654                MOV     @CRB1,DAT2      ;READ CRB1 AGAIN
2182  011226  023737  006652  011432        CMP     DAT1,CARDIM     ;COMPARE FIRST DATA TO PATTERN
2183  011234  001005                        BNE     CKFAIL          ;BRANCH IF FAILURE
2184  011236  023737  006654  011432        CMP     DAT2,CARDIM     ;COMPARE SECOND READING TO PATTERN
2185  011244  001001                        BNE     CKFAIL          ;BRANCH IF FAILURE
2186  011246  000721                        BR      CKLP1           ;WAIT FOR NEXT COLUMN OR END OF CARD
2187  011250  005237  011426        CKFAIL: INC     TOTERR          ;COUNT ERRORS
2188  011254  104003                        KBINTT
2189  011256  032777  020000  167332        BIT     #20000,@SWR     ;CHECK FOR INHIBITING PRINTOUT
2190  011264  001047                        BNE     CKHLT           ;BRANCH AROUND PRINTOUT IF SET
2191  011266  005737  006650                TST     ERFLG           ;TEST FLAG TO PRINT HEADING
2192  011272  001006                        BNE     CKNOHD          ;BRANCH IF ALREADY DONE
2193  011274  005237  006650                INC     ERFLG           ;PRINT HEADING ONCE ONLY
2194  011300  012702  015764                MOV     #MSG19,R2       ;OUTPUT HEADING
2195  011304  004737  012152                JSR     %7,TOUT
2196  011310  004737  012242        CKNOHD: JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
2197  011314  013702  006650                MOV     CLCNT,R2        ;PRINT COLUMN NUMBER
2198  011320  004737  011734                JSR     %7,PROCT
2199  011324  004737  011542                JSR     %7,SPACE
2200  011330  013702  006652                MOV     DAT1,R2         ;PRINT FIRST READING
2201  011334  004737  011734                JSR     %7,PROCT
2202  011340  004737  011542                JSR     %7,SPACE
2203  011344  013702  006654                MOV     DAT2,R2         ;PRINT SECOND READING
2204  011350  004737  011734                JSR     %7,PROCT
2205  011354  004737  011542                JSR     %7,SPACE
2206  011360  013702  011430                MOV     TOTCRD,R2       ;PRINT TOTAL NUMBER OF CARDS READ
2207  011364  004737  011734                JSR     %7,PROCT
2208  011370  004737  011542                JSR     %7,SPACE
2209  011374  013702  011426                MOV     TOTERR,R2       ;PRINT TOTAL NUMBER OF DATA ERRORS
2210  011400  004737  011734                JSR     %7,PROCT
2211  011404  005777  167206        CKHLT:  TST     @SWR            ;CHECK SW15 TO HALT ON ERROR
2212  011410  100002                        BPL     CKDONE          ;BRANCH IF NOT SET
2213  011412  000000                        HALT                    ;HALT ON ERROR
2214  011414  000625                        BR      CKLOOP          ;CONTINUE
2215  011416  032713  140000        CKDONE: BIT     #140000,@CRS    ;WAIT FOR SPECIAL CONDITION OR DONE
2216  011422  001775                        BEQ     CKDONE
2217  011424  000621                        BR      CKLOOP          ;START NEXT CARD AFTER CHECKING BIT 8
2218  011426  000000        TOTERR: 0
2219  011430  000000        TOTCRD: 0
2220  011432  000000        CARDIM: 0
2221
2222                                ;ISSUE MESSAGE IF CARD READER IS OFF-LINE
2223                                ;WAIT FOR BUSY TO CLEAR IN CASE CARD READER IS STILL READING A CARD
2224                                ;INITIALIZE STATUS REGISTER AND USE ERROR HALT IF IT DOESN'T CLEAR PROPERLY
2225                                ;NOTE THAT PROGRAM WILL HANG HERE IF BUSY REMAINS SET
2226  011434  004737  011506        INIT:   JSR     %7,CKBIT8       ;SEE IF OFF-LINE BIT IS SET
2227  011440  032713  001000                BIT     #1000,@CRS      ;WAIT FOR BUSY TO CLEAR, IN CASE
2228  011444  001375                        BNE     .-4             ;A CARD IS STILL BEING READ
2229  011446  005013                        CLR     @CRS            ;INITIALIZE STATUS REGISTER
2230  011450  005714                        TST     @CRB1           ;READ DATA BUFFER TO CLEAR COLUMN READY
2231  011452  005713                        TST     @CRS            ;MAKE SURE INITIALIZATION OK
2232  011454  001401                        BEQ     .+4             ;BRANCH IF ALL BITS ZERO
2233  011456  104000                        HLT                     ;NOT ALL BITS OF STATUS REGISTER ARE ZERO
2234  011460  000207                        RTS     %7              ;RETURN
2235
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2236
2237  011462  105777  167124          ;BELL ON PASS COMPLETE
                                BELL:   TSTB    @TCSR           ;WAIT FOR TTY READY
2238  011466  100375                   BPL     .-4
2239  011470  012777  000207  167116   MOV     #207,@TDBR      ;RING BELL
2240  011476  012737  000001  012144   MOV     #1,ITMAX        ;MAKE CERTAIN ITERATION MAXIMUM IS CORRECT
2241  011504  000207                   RTS     %7              ;RETURN
2242
2243                                  ;SUBROUTINE TO CHECK FOR BIT 8 (OFF-LINE) BEING SET IN CARD
2244                                  ;READER CSR, AND PRINT OUT A MESSAGE IF IT IS
2245  011506  032713  000400          CKBIT8: BIT     #400,@CRS       ;CHECK BIT 8
2246  011512  001001                   BNE     .+4             ;BRANCH IF SET
2247  011514  000207                   RTS     %7              ;RETURN IF NOT SET
2248  011516  012702  015744           MOV     #MSG18,R2       ;OUTPUT MESSAGE
2249  011522  004737  012152           JSR     %7,TOUT         ;"BIT 8 WAS SET"
2250  011526  012702  015661           MOV     #MSG17,R2       ;"REMEDY THE ERROR CONDITION
2251  011532  004737  012152           JSR     %7,TOUT         ;AND PRESS 'CONTINUE'"
2252  011536  000000                   HALT                    ;WAIT FOR CONTINUE
2253  011540  000762                   BR      CKBIT8          ;CHECK AGAIN
2254
2255                                  ;SUBROUTINE TO ISSUE N SPACES
2256                                  ;N IS ONE PLUS VALUE CONTAINED IN SPACEX
2257                                  ;SPACEX IS CLEARED WITHIN THE SUBROUTINE, SO THAT A CALL ON
2258                                  ;SPACE WITHOUT LOADING SPACEX ISSUES ONLY ONE SPACE
2259  011542  105777  167044          SPACE:  TSTB    @TCSR           ;WAIT FOR TTY READY
2260  011546  100375                   BPL     .-4
2261  011550  012777  000240  167036   MOV     #240,@TDBR      ;OUTPUT A SPACE
2262  011556  005337  011572           DEC     SPACEX          ;DECREMENT COUNT
2263  011562  100367                   BPL     SPACE           ;LOOP IF NOT DONE
2264  011564  005037  011572           CLR     SPACEX          ;RESET COUNT TO ZERO
2265  011570  000207                   RTS     %7              ;RETURN
2266  011572  000000          SPACEX: 0
2267
2268
2269
2270                                  ;ENTERED WITH SYSTEM TRAP CALL (HLT)
2271                                  ;PRINT OUT THE ERROR PC AND STATUS REGISTER
2272  011574  104003          PRINT:  KBINTT
2273  011576  037727  167014  020000   BIT     @SWR,#20000     ;TEST FOR INHIBIT PRINT OUT
2274  011604  001401                   BEQ     .+4             ;BRANCH TO PRINT
2275  011606  000437                   BR      B.CK            ;INHIBIT, CHECK FOR HALT
2276  011610  012637  011730           MOV     (6)+,   SAVPC   ;PC OF FAILING ROUTINE
2277  011614  012637  011732           MOV     (6)+,   SAVPSR  ;PSR OR ERROR CONDITION
2278  011620  024646                   CMP     -(6),   -(6)    ;RESTORE STACK
2279  011622  004737  012242           JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
2280  011626  010237  011722           MOV     %2,     SAVR2   ;SAVE R2
2281  011632  013702  011730           MOV     SAVPC,  %2
2282  011636  004737  011734           JSR     %7,     PROCT   ;PRINT PC+2 IN OCTAL
2283  011642  105777  166744           TSTB    @TCSR           ;WAIT FOR TTY READY
2284  011646  100375                   BPL     .-4
2285  011650  012777  000240  166736   MOV     #240,   @TDBR   ;OUTPUT A SPACE
2286  011656  013702  011732           MOV     SAVPSR, %2
2287  011662  004737  011734           JSR     %7,     PROCT   ;PRINT PROCESSOR STATUS AT TIME OF FAILURE
2288  011666  013702  011722           MOV     SAVR2,  %2      ;RESTORE REGISTER 2
2289  011672  105777  166714           TSTB    @TCSR           ;WAIT FOR TTY READY
2290  011676  100375                   BPL     .-4
2291  011700  012777  000240  166706   MOV     #240,@TDBR
```

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2292  011706  104003                  B.CK:   KBINTT
2293  011710  005777  166702                  TST     @SWR            ;CHECK SR FOR HALT SWITCH
2294  011714  100001                          BPL     .+4             ;BRANCH IF NOT SET
2295  011716  000000                          HALT                    ;HALT ON ERROR UP
2296  011720  000002                          RTI                     ;RETURN TO MAIN LINE
2297  011722  000000                  SAVR2:  0
2298  011724  000000                  SAVR3:  0
2299  011726  000000                  SAVR4:  0
2300  011730  000000                  SAVPC:  0
2301  011732  000000                  SAVPSR: 0
2302
2303  011734  010337  011724          PROCT:  MOV     %3,SAVR3        ;SAVE R3
2304  011740  010437  011726                  MOV     %4,SAVR4        ;SAVE R4
2305  011744  005004                          CLR     %4              ;CLEAR R4 TO USE AS COUNTER
2306  011746  005001                          CLR     COUNT           ;CLEAR COUNT TO USE AS CARRY FLAG
2307  011750  012703  000260                  MOV     #260,   %3      ;SETUP ASCII ZERO IN R3
2308  011754  005702                          TST     %2              ;CHECK BIT 15 OF DESIRED NUMBER
2309  011756  100001                          BPL     .+4             ;BRANCH IF NOT SET
2310  011760  005203                          INC     %3              ;CHANGE TO ASCII ONE
2311  011762  006102                          ROL     %2              ;ROTATE INTO RIGHTMOST BIT
2312  011764  006102                          ROL     %2              ;TO PREPARE FOR LOOP
2313  011766  005501                          ADC     COUNT           ;STORE CARRY
2314  011770  105777  166616          C.WAIT: TSTB    @TCSR           ;WAIT FOR TTY READY
2315  011774  100375                          BPL     C.WAIT
2316  011776  010377  166612                  MOV     %3,     @TDBR   ;OUTPUT ASCII
2317  012002  005204                          INC     %4              ;COUNT CHARACTERS OUTPUT
2318  012004  020427  000006                  CMP     %4,     #6      ;CHECK FOR DONE
2319  012010  001005                          BNE     C.CONT          ;BRANCH IF NOT DONE
2320  012012  013703  011724                  MOV     SAVR3,%3        ;RESTORE REGISTER 3
2321  012016  013704  011726                  MOV     SAVR4,%4        ;RESTORE REGISTER 4
2322  012022  000207                          RTS     %7              ;RETURN
2323  012024  000241                  C.CONT: CLC                     ;CLEAR CARRY
2324  012026  005701                          TST     COUNT           ;TEST CARRY FLAG
2325  012030  001402                          BEQ     .+6             ;BRANCH IF NOT SET
2326  012032  005001                          CLR     COUNT           ;CLEAR FLAG
2327  012034  000261                          SEC                     ;SET CARRY
2328  012036  006102                          ROL     %2              ;ROTATE NEXT 3 BITS INTO RIGHTMOST 3
2329  012040  006102                          ROL     %2
2330  012042  006102                          ROL     %2
2331  012044  005501                          ADC     COUNT           ;STORE CARRY
2332  012046  010203                          MOV     %2,     %3      ;MOVE DATA FOR OUTPUT
2333  012050  042703  177770                  BIC     #177770,%3      ;CLEAR ALL BUT RIGHTMOST 3 BITS
2334  012054  052703  000260                  BIS     #260,   %3      ;SET TO ASCII EQUIVALENT
2335  012060  000743                          BR      C.WAIT          ;LOOP
2336                                  ;SCOPE AND/OR ITERATION LOOP FOR EACH TEST 2 TIMES
2337  012062  104003                  SCOPEC: KBINTT
2338  012064  032777  040000  166524          BIT     #40000, @SWR    ;TEST SR FOR SCOPE
2339  012072  001012                          BNE     D.1             ;YES,SCOPE
2340  012074  032777  004000  166514          BIT     #4000,@SWR      ;NO- TEST FOR ITERATION
2341  012102  001013                          BNE     D.2             ;INHIBIT ITERATION
2342  012104  023737  012146  012144          CMP     ITCNT,ITMAX     ;CHECK FOR ITERATIONS COMPLETE
2343  012112  100007                          BPL     D.2             ;EXIT-DONE
2344  012114  005237  012146                  INC     ITCNT           ;INCREMENT COUNT
2345  012120  022606                  D.1:    CMP     (6)+,   %6      ;REPOSITION STACK POINTER
2346  012122  012637  177776                  MOV     (6)+,   PSR     ;RESTORE PROCESSOR STATUS
2347  012126  000177  000016                  JMP     @RETURN         ;RETURN TO RERUN TEST
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2348  012132  005037  012146          D.2:    CLR     ITCNT           ;CLEAR COUNTER
2349  012136  011637  012150                  MOV     @#6,    RETURN  ;SAVE SCOPE RETURN POINTER
2350  012142  000002                          RTT                     ;RETURN INLINE-NEXT TEST
2351  012144  000001                  ITMAX:  1                       ;MAX NUMBER OF ITERATIONS
2352  012146  000000                  ITCNT:  0                       ;COUNT LOCATION FOR ITERATION LOOP
2353  012150  001022                  RETURN: TEST1+2                 ;ADDRESS OF LAST TEST
2354
2355                                  ;MOV ADDRESS OF MESSAGE TO REGISTER 2
2356                                  ;THEN JSR %7, TOUT
2357  012152  142777  000177  166432  TOUT:   BICB    #177,   @TCSR   ;CLEAR INT FLAG
2358  012160  111237  012240                  MOVB    @#2,    L.EOMK  ;MOVE IN EOM MARKER
2359  012164  005202                  L.INC:  INC     %2              ;MOVE DATA POINTER TO NEXT BYTE
2360  012166  121237  012240          L.TOUT: CMPB    @#2,    L.EOMK  ;COMPARE FOR EOM
2361  012172  001006                          BNE     L.CNT           ;BRANCH IF NOT END OF MESSAGE
2362  012174  105777  166412                  TSTB    @TCSR           ;WAIT FOR TTY READY
2363  012200  100375                          BPL     .-4
2364  012202  005077  166406                  CLR     @TDBR           ;OUTPUT NULL
2365  012206  000207                          RTS     %7              ;RETURN IF EOM
2366  012210  121227  000100          L.CNT:  CMPB    @#2,    #'@     ;CHECK FOR CR,LF REQUEST
2367  012214  001003                          BNE     .+10            ;BRANCH IF NOT
2368  012216  004737  012242                  JSR     %7,CRLF         ;OUTPUT CARRIAGE RETURN, LINEFEED
2369  012222  000760                          BR      L.INC           ;LOOP
2370  012224  105777  166362                  TSTB    @TCSR           ;WAIT FOR TTY
2371  012230  100375                          BPL     .-4
2372  012232  112277  166356                  MOVB    (2)+,   @TDBR   ;OUTPUT NEXT CHARACTER
2373  012236  000753                          BR      L.TOUT          ;CONTINUE
2374  012240  000000                  L.EOMK: 0
2375
2376                                  ;SUBROUTINE TO ISSUE CARRIAGE RETURN AND LINEFEED
2377  012242  105777  166344          CRLF:   TSTB    @TCSR           ;WAIT FOR TTY READY
2378  012246  100375                          BPL     .-4
2379  012250  112777  000215  166336          MOVB    #215,   @TDBR   ;SEND CARRIAGE RETURN
2380  012256  105777  166330                  TSTB    @TCSR           ;WAIT FOR TTY
2381  012262  100375                          BPL     .-4
2382  012264  112777  000212  166322          MOVB    #212,   @TDBR   ;SEND LINE FEED
2383  012272  000207                          RTS     %7              ;RETURN
2384
2385                                  ;DO 4 CRLF'S TO MOVE MESSAGES ON TELETYPE
2386  012274  004737  012242          CRLF4:  JSR     %7,CRLF
2387  012300  004737  012242                  JSR     %7,CRLF
2388  012304  004737  012242                  JSR     %7,CRLF
2389  012310  004737  012242                  JSR     %7,CRLF
2390  012314  000207                          RTS     %7
2391
2392  012316  022737  000176  000616  CNTLUU: CMP     @#SWREG,SWR
2393  012324  001403                          BEQ     1$
2394  012326  062716  000002                  ADD     #2,(SP)
2395  012332  000504                          BR      OUT
2396  012334  012702  016055          1$:     MOV     #SWREG,R2
2397  012340  004737  012152                  JSR     PC,TOUT
2398  012344  013702  000176                  MOV     SWREG,R2
2399  012350  004737  011734                  JSR     PC,PROCT
2400  012354  012702  016040                  MOV     #NEWIS,R2
2401  012360  004737  012152                  JSR     PC,TOUT
2402  012364  005037  000622          AGN:    CLR     TMP1
2403  012370  012737  000007  000630          MOV     #7,CSNT
```

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2404  012376  105777  166204          READ:   TSTB    @#KACSR
2405  012402  100375                          BPL     READ
2406  012404  117737  166200  000626          MOVB    @#KBDBR,TIB
2407  012412  113777  000626  166174          MOVB    TIB,@#TDBR
2408  012420  142737  000200  000626          BICB    #200,TIB
2409  012426  122737  000025  000626          CMPB    #25,TIB
2410  012434  001005                          BNE     2$
2411  012436  012702  016205                  MOV     #CTLU,R2
2412  012442  004737  012152                  JSR     PC,TOUT
2413  012446  000746                          BR      AGN
2414  012450  122737  000015  000626  2$:     CMPB    #15,TIB
2415  012456  001430                          BEQ     1$
2416  012460  122737  000060  000626          CMPB    #60,TIB
2417  012466  003027                          BGT     INERRR
2418  012470  122737  000067  000626          CMPB    #67,TIB
2419  012476  002423                          BLT     INERRR
2420  012500  142737  000060  000626          BICB    #60,TIB
2421  012506  006337  000622                  ASL     TMP1
2422  012512  006337  000622                  ASL     TMP1
2423  012516  006337  000622                  ASL     TMP1
2424  012522  153737  000626  000622          BISB    TIB,TMP1
2425  012530  005337  000630                  DEC     CSNT
2426  012534  001404                          BEQ     INERRR
2427  012536  000717                          BR      READ
2428  012540  004737  012242          1$:     JSR     %7,CRLF
2429  012544  000002                  OUT:    RTI
2430  012546  012702  016027          INERRR: MOV     #OEST,R2
2431  012552  004737  012152                  JSR     PC,TOUT
2432  012556  000702                          BR      AGN
2433
2434                                  ;ROUTINE TO CHECK EXISTANCE OF SWREG
2435
2436  012560  013746  000006          SUSWR:  MOV     6,-(SP)
2437  012564  013746  000004                  MOV     4,-(SP)
2438  012570  012737  012610  000004          MOV     #1$,4
2439  012576  022777  177777  166012          CMP     #-1,@#SWR
2440  012604  001402                          BEQ     2$
2441  012606  000407                          BR      3$
2442  012610  022626                  1$:     CMP     (SP)+,(SP)+
2443  012612  012737  000176  000616  2$:     MOV     #SWREG,SWR
2444  012620  012737  000174  000620          MOV     #DISPREG,DISPLAY
2445  012626  012637  000004          3$:     MOV     (SP)+,4
2446  012632  012637  000006                  MOV     (SP)+,6
2447  012636  000002                          RTI
2448
2449  012640  022737  000176  000616  KBINT:  CMP     @#SWREG,SWR
2450  012646  001016                          BNE     1$
2451  012650  005037  000622                  CLR     TMP1
2452  012654  117737  165730  000622          MOVB    @#KADBR,TMP1
2453  012662  142737  000200  000622          BICB    #200,TMP1
2454  012670  122737  000007  000622          CMPB    #7,TMP1
2455  012676  001002                          BNE     1$
2456  012700  104002                          CNTLU
2457  012702  104006                          CKU
2458  012704  000002                  1$:     RTI
2459
```

```
                                        ;TYPE THE MAIN TITLE
012706  005737  000624        TITTYP: TST     TIFLG
012712  001406                        BEQ     1$
012714  012702  016143                MOV     #TITL,R2
012720  004737  012152                JSR     %7,TOUT
012724  005037  000624                CLR     TIFLG
012730  000002                1$:     RTI

012732  122737  000007  000630  CKUU:   CMPB    #7,CSNT
012740  001403                        BEQ     1$
012742  013777  000622  165646        MOV     TMP1,@SWR
012750  000002                1$:     RTI

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

013004  011574  EMTTAB: PRINT                   ;CALLED BY EMT HLT
013006  012062          SCOPEC                  ;CALLED BY EMT SCOPE
013010  012316          CNTLUU                  ;CALLED BY EMT CNTLU
013012  012640          KBINT                   ;CALLED BY EMT KBINTT
013014  012376          READ                    ;CALLED BY EMT READC
013016  012560          SUSWR                   ;CALLED BY EMT SUSWRR
013020  012732          CKUU                    ;CALLED BY EMT CKU
013022  012706          TITTYP                  ;CALLED BY EMT TIT
```

```
                                ;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
013024  004000  ALPCD:  4000      201       ;1      &       12
013026  000200          200
013030  004400          4400      202       ;2      A       12 1
013032  000201          201
013034  004200          4200      203       ;3      B       12 2
013036  000202          202
013040  004100          4100      204       ;4      C       12 3
013042  000203          203
013044  004040          4040      205       ;5      D       12 4
013046  000204          204
013050  004020          4020      206       ;6      E       12 5
013052  000205          205
013054  004010          4010      207       ;7      F       12 6
013056  000206          206
013060  004004          4004      210       ;8      G       12 7
013062  000207          207
013064  004002          4002      211       ;9      H       12 8
013066  000210          210
013070  004001          4001      212       ;10     I       12 9
013072  000220          220
013074  004202          4202      213       ;11     CENT    12 8 2
013076  000212          212
013100  004102          4102      214       ;12     .       12 8 3
013102  000213          213
013104  004042          4042      215       ;13     <       12 8 4
013106  000214          214
013110  004022          4022      216       ;14     (       12 8 5
013112  000215          215
013114  004012          4012      217       ;15     +       12 8 6
013116  000216          216
013120  004006          4006      220       ;16     |       12 8 7
013122  000217          217
013124  002000          2000      100       ;17     -       11
013126  000100          100
013130  002400          2400      101       ;18     J       11 1
013132  000101          101
013134  002200          2200      102       ;19     K       11 2
013136  000102          102
013140  002100          2100      103       ;20     L       11 3
013142  000103          103
013144  002040          2040      104       ;21     M       11 4
013146  000104          104
013150  002020          2020      105       ;22     N       11 5
013152  000105          105
013154  002010          2010      106       ;23     O       11 6
013156  000106          106
013160  002004          2004      107       ;24     P       11 7
013162  000107          107
```

```
2548  013164  002002          2002                    '25     Q       11 8
2549  013166  000110          110
2550  013170  002001          2001                    '26     R       11 9
2551  013172  000120          120
2552  013174  002202          2202                    '27     S       11 0 2
2553  013176  000112          112
2554  013200  002102          2102                    '28     T       11 0 3
2555  013202  000113          113
2556  013204  002042          2042                    '29     U       11 0 4
2557  013206  000114          114
2558  013210  002022          2022                    '30     V       11 0 5
2559  013212  000115          115
2560  013214  002012          2012                    '31     W       11 0 6
2561  013216  000116          116
2562  013220  002006          2006                    '32     BLANK   11 0 7
2563  013222  000117          117
2564  013224  001000          1000                    '33     0       0
2565  013226  000040          40
2566  013230  001400          1400                    '34     1       0 1
2567  013232  000041          41
2568  013234  001200          1200                    '35     2       0 2
2569  013236  000042          42
2570  013240  001100          1100                    '36     3       0 3
2571  013242  000043          43
2572  013244  001040          1040                    '37     4       0 4
2573  013246  000044          44
2574  013250  001020          1020                    '38     5       0 5
2575  013252  000045          45
2576  013254  001010          1010                    '39     6       0 6
2577  013256  000046          46
2578  013260  001004          1004                    '40     7       0 7
2579  013262  000047          47
2580  013264  001002          1002                    '41     8       0 8
2581  013266  000050          50
2582  013270  001001          1001                    '42     9       0 9
2583  013272  000060          60
2584  013274  001202          1202                    '43             0 8 2
2585  013276  000052          52
2586  013300  001102          1102                    '44     ,       0 8 3
2587  013302  000053          53
2588  013304  001042          1042                    '45     -       0 8 4
2589  013306  000054          54
2590  013310  001022          1022                    '46     .       0 8 5
2591  013312  000055          55
2592  013314  001012          1012                    '47     /       0 8 6
2593  013316  000056          56
2594  013320  001006          1006                    '48     0       0 8 7
2595  013322  000057          57
2596  013324  000000          0000                    '49             BLANK
2597  013326  000000          0
2598  013330  000400          0400                    '50     1       1
2599  013332  000001          1
2600  013334  000200          0200                    '51     2       2
2601  013336  000002          2
2602  013340  000100          0100                    '52     3       3
2603  013342  000003          3
```

KH

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2604  013344  000040                  0040                    /53     +       4
2605  013346  000004                  4
2606  013350  000020                  0020                    /54     5       5
2607  013352  000005                  5
2608  013354  000010                  0010                    /55     6       6
2609  013356  000006                  6
2610  013360  000004                  0004                    /56     7       7
2611  013362  000007                  7
2612  013364  000002                  0002                    /57     8       8
2613  013366  000010                  10
2614  013370  000001                  0001                    /58     9       9
2615  013372  000020                  20
2616  013374  000202                  0202                    /59     :       8 2
2617  013376  000012                  12
2618  013400  000102                  0102                    /60     ;       8 3
2619  013402  000013                  13
2620  013404  000042                  0042                    /61     <       8 4
2621  013406  000014                  14
2622  013410  000022                  0022                    /62     =       8 5
2623  013412  000015                  15
2624  013414  000012                  0012                    /63     >       8 6
2625  013416  000016                  16
2626  013420  000006                  0006                    /64     ?       8 7
2627  013422  000017                  17
2628  013424  004000                  4000                    /65     @       12
2629  013426  000200                  200
2630  013430  004400                  4400                    /66     A       12 1
2631  013432  000201                  201
2632  013434  004200                  4200                    /67     B       12 2
2633  013436  000202                  202
2634  013440  004100                  4100                    /68     C       12 3
2635  013442  000203                  203
2636  013444  004040                  4040                    /69     D       12 4
2637  013446  000204                  204
2638  013450  004020                  4020                    /70     E       12 5
2639  013452  000205                  205
2640  013454  004010                  4010                    /71     F       12 6
2641  013456  000206                  206
2642  013460  004004                  4004                    /72     G       12 7
2643  013462  000207                  207
2644  013464  004002                  4002                    /73     H       12 8
2645  013466  000210                  210
2646  013470  004001                  4001                    /74     I       12 9
2647  013472  000220                  220
2648  013474  004202                  4202                    /75     CENT    12 8 2
2649  013476  000212                  212
2650  013500  004102                  4102                    /76     .       12 8 3
2651  013502  000213                  213
2652  013504  004042                  4042                    /77     <       12 8 4
2653  013506  000214                  214
2654  013510  004022                  4022                    /78     (       12 8 5
2655  013512  000215                  215
2656  013514  004012                  4012                    /79     +       12 8 6
2657  013516  000216                  216
2658  013520  004006                  4006                    /80     1       12 8 7
2659  013522  000217        ALPEND:   217
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                                ;BINARY DECK DATA TABLE
                                ;FIRST VALUE FOR A COLUMN IS THE DIRECT CARD IMAGE OF THAT COLUMN ON CARD;
                                ;THE SECOND VALUE IS THE ENCODED VALUE, WHICH ORS THE OCTAL REPRESENTATION OF
                                ;ROWS ONE THRU SEVEN
013524  000000  BINCD:  0                    ;CARD COLUMN 1
013526  000000           0
013530  000001           1                   ;2
013532  000020           20
013534  000002           2                   ;3
013536  000010           10
013540  000004           4                   ;4
013542  000007           7
013544  000010           10                  ;5
013546  000006           6
013550  000020           20                  ;6
013552  000005           5
013554  000040           40                  ;7
013556  000004           4
013560  000100           100                 ;8
013562  000003           3
013564  000200           200                 ;9
013566  000002           2
013570  000400           400                 ;10
013572  000001           1
013574  001000           1000                ;11
013576  000040           40
013600  002000           2000                ;12
013602  000100           100
013604  004000           4000                ;13
013606  000200           200
013610  001111           1111                ;14
013612  000067           67
013614  002222           2222                ;15
013616  000117           117
013620  003333           3333                ;16
013622  000177           177
013624  004444           4444                ;17
013626  000207           207
013630  005555           5555                ;18
013632  000267           267
013634  006666           6666                ;19
013636  000317           317
013640  007777           7777                ;20
013642  000377           377
013644  001010           1010                ;21
013646  000046           46
013650  001212           1212                ;22
013652  000056           56
013654  001313           1313                ;23
013656  000077           77
013660  001414           1414                ;24
013662  000047           47
013664  001515           1515                ;25
013666  000067           67
013670  001616           1616                ;26
013672  000057           57
```

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2716  013674  001717                  1717                    ;27
2717  013676  000077                  77
2718  013700  002020                  2020                    ;28
2719  013702  000105                  105
2720  013704  002121                  2121                    ;29
2721  013706  000127                  127
2722  013710  002323                  2323                    ;30
2723  013712  000137                  137
2724  013714  002424                  2424                    ;31
2725  013716  000107                  107
2726  013720  002525                  2525                    ;32
2727  013722  000127                  127
2728  013724  002626                  2626                    ;33
2729  013726  000117                  117
2730  013730  002727                  2727                    ;34
2731  013732  000137                  137
2732  013734  003030                  3030                    ;35
2733  013736  000147                  147
2734  013740  003131                  3131                    ;36
2735  013742  000167                  167
2736  013744  003232                  3232                    ;37
2737  013746  000157                  157
2738  013750  003434                  3434                    ;38
2739  013752  000147                  147
2740  013754  003535                  3535                    ;39
2741  013756  000167                  167
2742  013760  003636                  3636                    ;40
2743  013762  000157                  157
2744  013764  003737                  3737                    ;41
2745  013766  000177                  177
2746  013770  004040                  4040                    ;42
2747  013772  000204                  204
2748  013774  004141                  4141                    ;43
2749  013776  000227                  227
2750  014000  004242                  4242                    ;44
2751  014002  000216                  216
2752  014004  004343                  4343                    ;45
2753  014006  000237                  237
2754  014010  004545                  4545                    ;46
2755  014012  000227                  227
2756  014014  004646                  4646                    ;47
2757  014016  000217                  217
2758  014020  004747                  4747                    ;48
2759  014022  000237                  237
2760  014024  005050                  5050                    ;49
2761  014026  000246                  246
2762  014030  005151                  5151                    ;50
2763  014032  000267                  267
2764  014034  005252                  5252                    ;51
2765  014036  000256                  256
2766  014040  005353                  5353                    ;52
2767  014042  000277                  277
2768  014044  005454                  5454                    ;53
2769  014046  000247                  247
2770  014050  005656                  5656                    ;54
2771  014052  000257                  257
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2772  014054  005757                          5757                    ;55
2773  014056  000277                          277
2774  014060  006060                          6060                    ;56
2775  014062  000305                          305
2776  014064  006161                          6161                    ;57
2777  014066  000327                          327
2778  014070  006262                          6262                    ;58
2779  014072  000317                          317
2780  014074  006363                          6363                    ;59
2781  014076  000337                          337
2782  014100  006464                          6464                    ;60
2783  014102  000307                          307
2784  014104  006565                          6565                    ;61
2785  014106  000327                          327
2786  014110  006767                          6767                    ;62
2787  014112  000337                          337
2788  014114  007070                          7070                    ;63
2789  014116  000347                          347
2790  014120  007171                          7171                    ;64
2791  014122  000367                          367
2792  014124  007272                          7272                    ;65
2793  014126  000357                          357
2794  014130  007373                          7373                    ;66
2795  014132  000377                          377
2796  014134  007474                          7474                    ;67
2797  014136  000347                          347
2798  014140  007575                          7575                    ;68
2799  014142  000367                          367
2800  014144  007676                          7676                    ;69
2801  014146  000357                          357
2802  014150  000101                          0101                    ;70
2803  014152  000023                          23
2804  014154  000202                          0202                    ;71
2805  014156  000012                          12
2806  014160  000303                          0303                    ;72
2807  014162  000033                          33
2808  014164  000404                          0404                    ;73
2809  014166  000007                          7
2810  014170  000505                          0505                    ;74
2811  014172  000027                          27
2812  014174  000606                          0606                    ;75
2813  014176  000017                          17
2814  014200  000707                          0707                    ;76
2815  014202  000037                          37
2816  014204  003210                          3210                    ;77
2817  014206  000146                          146
2818  014210  000123                          0123                    ;78
2819  014212  000037                          37
2820  014214  007654                          7654                    ;79
2821  014216  000347                          347
2822  014220  004567                          4567                    ;80
2823  014222  000237                  BINEND: 237
2824  014224  040057  051120  051505  MSG1:   .ASCII /?PRESS CARD READER 'MOTOR START' AND 'READ START'?/
2825  014232  020123  040503  042122
2826  014240  051040  040505  042504
2827  014246  020122  046447  052117
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2828  014254  051117  051440  040524
2829  014262  052122  020047  047101
2830  014270  020104  051047  040505
2831  014276  020104  052123  051101
2832  014304  023524     057
2833  014307     057  050100  042522  MSG1A:  .ASCII  /?@PRESS CARD READER 'RESET'?/
2834  014314  051523  041440  051101
2835  014322  020104  042522  042101
2836  014330  051105  023440  042522
2837  014336  042523  023524     057
2838  014343     057  052100  042510  MSG2:   .ASCII  /?@THEN HIT 'CONTINUE' ON THE CONSOLE?/
2839  014350  020116  044510  020124
2840  014356  041447  047117  044524
2841  014364  052516  023505  047440
2842  014372  020116  044124  020105
2843  014400  047503  051516  046117
2844  014406  027505
2845  014410  040057  051120  051505  MSG3:   .ASCII  /?@PRESS CARD READER 'READ STOP'?/
2846  014416  020123  040503  042122
2847  014424  051040  040505  042504
2848  014432  020122  051047  040505
2849  014440  020104  052123  050117
2850  014446  027447
2851  014450  040057  051120  051505  MSG3A:  .ASCII  /?@PRESS CARD READER 'STOP'?/
2852  014456  020123  040503  042122
2853  014464  051040  040505  042504
2854  014472  020122  051447  047524
2855  014500  023520     057
2856  014503     057  052100  042510  MSG4:   .ASCII  /?@THE INTERRUPT LEVEL WAS /?
2857  014510  044440  052116  051105
2858  014516  052522  052120  046040
2859  014524  053105  046105  053440
2860  014532  051501  027440
2861  014536  040057  042522  047515  MSG5:   .ASCII  /?@REMOVE ALL CARDS FROM THE INPUT HOPPER/?
2862  014544  042526  040440  046114
2863  014552  041440  051101  051504
2864  014560  043040  047522  020115
2865  014566  044124  020105  047111
2866  014574  052520  020124  047510
2867  014602  050120  051105     057
2868  014607     057  051100  051505  MSG6:   .ASCII  /?@RESTORE CARDS IN THE INPUT HOPPER/?
2869  014614  047524  042522  041440
2870  014622  051101  051504  044440
2871  014630  020116  044124  020105
2872  014636  047111  052520  020124
2873  014644  047510  050120  051105
2874  014652     057
2875  014653     057  051100  044501  MSG7:   .ASCII  /?@RAISE OUTPUT STACKER PRESSURE ARM SLIGHTLY ABOVE HORIZONTAL @ THEN LO
2876  014660  042523  047440  052125
2877  014666  052520  020124  052123
2878  014674  041501  042513  020122
2879  014702  051120  051505  052523
2880  014710  042522  040440  046522
2881  014716  051440  044514  044107
2882  014724  046124  020131  041101
2883  014732  053117  020105  047510
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 2884  014740  044522  047532  052116
 2885  014746  046101  040040  052040
 2886  014754  042510  020116  047514
 2887  014762  042527  020122  052111
 2888  014770     057
 2889  014771     057  046100  053517  MSG7A:  .ASCII  /?@LOWER OUTPUT STACKER PLATE TO BOTTOM?/
 2890  014776  051105  047440  052125
 2891  015004  052520  020124  052123
 2892  015012  041501  042513  020122
 2893  015020  046120  052101  020105
 2894  015026  047524  041040  052117
 2895  015034  047524  027515
 2896  015040  040057  047510  042114  MSG8:   .ASCII  /?@HOLD DOWN THE SWITCH AT THE BOTTOM OF THE INPUT HOPPER?/
 2897  015046  042040  053517  020116
 2898  015054  044124  020105  053523
 2899  015062  052111  044103  040440
 2900  015070  020124  044124  020105
 2901  015076  047502  052124  046517
 2902  015104  047440  020106  044124
 2903  015112  020105  047111  052520
 2904  015120  020124  047510  050120
 2905  015126  051105     057
 2906  015131     057  046100  043111  MSG8A:  .ASCII  /?@LIFT SWITCH UNDER RIFFLE CAP?/
 2907  015136  020124  053523  052111
 2908  015144  044103  052440  042116
 2909  015152  051105  051040  043111
 2910  015160  046106  020105  040503
 2911  015166  027520
 2912  015170  040057  046102  041517  MSG9:   .ASCII  /?@BLOCK THE CARD READER STATION TO PREVENT A CARD GOING THRU, AND?/
 2913  015176  020113  044124  020105
 2914  015204  040503  042122  051040
 2915  015212  040505  042504  020122
 2916  015220  052123  052101  047511
 2917  015226  020116  047524  050040
 2918  015234  042522  042526  052116
 2919  015242  040440  041440  051101
 2920  015250  020104  047507  047111
 2921  015256  020107  044124  052522
 2922  015264  020054  047101  027504
 2923  015272  040057  042522  047515  MSG10:  .ASCII  /?@REMOVE JAMMED CARD?/
 2924  015300  042526  045040  046501
 2925  015306  042515  020104  040503
 2926  015314  042122     057
 2927  015317     057  044100  046117  MSG11:  .ASCII  /?@HOLD THE OUTPUT STACKER GATE OPEN. THEN?/
 2928  015324  020104  044124  020105
 2929  015332  052517  050124  052125
 2930  015340  051440  040524  045503
 2931  015346  051105  043440  052101
 2932  015354  020105  050117  047105
 2933  015362  020056  044124  047105
 2934  015370     057
 2935  015371     057  050100  040514  MSG12:  .ASCII  /?@PLACE SPECIAL DARK-LIGHT CHECK CARDS (SEE LISTING, TESTG)?/
 2936  015376  042503  051440  042520
 2937  015404  044503  046101  042040
 2938  015412  051101  026513  044514
 2939  015420  044107  020124  044103
```

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2940  015426  041505  020113  040503
2941  015434  042122  020123  051450
2942  015442  042505  046040  051511
2943  015450  044524  043516  020054
2944  015456  042524  052123  024507
2945  015464  040500  020124  044124          .ASCII  !@AT THE BOTTOM OF THE INPUT STACK/!
2946  015472  020105  047502  052124
2947  015500  046517  047440  020106
2948  015506  044124  020105  047111
2949  015514  052520  020124  052123
2950  015522  041501  027513
2951  015526  040057  042504  045503  MSG13:  .ASCII  !/@DECK    CARD  COLUMN PATTERN READ1 READ2  CODED  READ/!
2952  015534  020040  020040  040503
2953  015542  042122  020040  047503
2954  015550  052514  047115  050040
2955  015556  052101  042524  047122
2956  015564  051040  040505  030504
2957  015572  051040  040505  031104
2958  015600  020040  047503  042504
2959  015606  020104  051040  040505
2960  015614  027504
2961  015616  040057  046101  044120  MSG14:  .ASCII  !/@ALPHA /!
2962  015624  020101     057
2963  015627     057  041100  047111  MSG15:  .ASCII  !/@BINARY/!
2964  015634  051101  027531
2965  015640  040057  044502  020124  MSG16:  .ASCII  !/@BIT 15 WAS SET/!
2966  015646  032461  053440  051501
2967  015654  051440  052105     057
2968  015661     057  051100  046505  MSG17:  .ASCII  !/@REMEDY THE ERROR CONDITION AND PRESS 'CONTINUE'@/!
2969  015666  042105  020131  044124
2970  015674  020105  051105  047522
2971  015702  020122  047503  042116
2972  015710  052111  047511  020116
2973  015716  047101  020104  051120
2974  015724  051505  020123  041447
2975  015732  047117  044524  052516
2976  015740  023505  027500
2977  015744  040057  044502  020124  MSG18:  .ASCII  !/@BIT A WAS SET/!
2978  015752  020070  040527  020123
2979  015760  042523  027524
2980  015764  040057  047503  052514  MSG19:  .ASCII  !/@COLUMN READ1 READ2  CARDS ERRORS/!
2981  015772  047115  051040  040505
2982  016000  030504  051040  040505
2983  016006  031104  020040  040503
2984  016014  042122  020123  051105
2985  016022  047522  051522     057
2986  016027     057  037500  020100  QEST:   .ASCII  !/@?@  @ /!
2987  016034  036440  027440
2988  016040  020057  020040  020040  NEWIS:  .ASCII  !/     NEW @ /!
2989  016046  042516  020127  020075
2990  016054     057
2991  016055     057  051500  051127  SWREQ:  .ASCII  !/@SWR @ /!
2992  016062  036440  027440
2993  016066  040057  040503  042122  CIMPAT: .ASCII  !/@CARD IMAGE PATTERN@ /!
2994  016074  044440  040515  042507
2995  016102  050040  052101  042524
```

```
 2996  016110  047122  020075     057
 2997  016115     057  051500  040524  STADD:  .ASCII  /:@STARTING ADDRESS = /
 2998  016122  052122  047111  020107
 2999  016130  042101  051104  051505
 3000  016136  020123  020075     057
 3001  016143     057  040100  055104  TITL:   .ASCII  /:@@DZCRA-D   CR11 DIAGNOSTIC TEST/
 3002  016150  051103  026501  020104
 3003  016156  020040  051103  030461
 3004  016164  042040  040511  047107
 3005  016172  051517  044524  020103
 3006  016200  042524  052123     057
 3007  016205     057  052536  036500  CYLU:   .ASCII  /:^U@= /
 3008  016212  027440
 3009  016214  040057  047111  052123  SUBT1:  .ASCII  /:@INSTR + DATA TEST/
 3010  016222  020122  020053  040504
 3011  016230  040524  052040  051505
 3012  016236  027524
 3013  016240  040057  051103  030461  SUBT2:  .ASCII  /:@CR11 ERROR FUNCTION TEST/
 3014  016246  042440  051122  051117
 3015  016254  043040  047125  052103
 3016  016262  047511  020116  042524
 3017  016270  052123     057
 3018  016273     057  051500  047111  SUBT4:  .ASCII  /:@SINGLE TEST LOOP/
 3019  016300  046107  020105  042524
 3020  016306  052123  046040  047517
 3021  016314  027520
 3022  016316  040057  044523  043516  SUBT5:  .ASCII  /:@SINGLE DATA PATTERN TEST/
 3023  016324  042514  042040  052101
 3024  016332  020101  040520  052124
 3025  016340  051105  020116  042524
 3026  016346  052123     057
 3027          000001                          .END
```

```
ADINT =%000080
AGN     012364
ALCNT   006714
ALCNT1  006776
ALCNT2  007010
ALLDON  006662
ALLOK   007036
ALPCD   013024
ALPEND  013522
ALP1    005516
ALWAIT  007072
BEGIN   000726
BELL    011462
BINCD   013524
BINEND  014222
B.CK    011706
CARDIM  011432
CDCNT   006646
CIMPAT  016066
CKBIT8  011506
CKCOL   011172
CKCRD   011156
CKDONE  011416
CKFAIL  011250
CKHLT   011404
CKLOOP  011070
CKLP1   011112
CKLP2   011216
CKNOMD  011310
CKSAME  011014
CKSIT   011142
CKSIT1  011146
CKU   = 104006
CKUU    012732
CK4     001370
CK5     001534
CK9     002352
CLCNT   006650
CNTLU = 104002
CNTLUU  012316
CNT23A  005110
CNT23B  005126
CNT23C  005146
CNT23D  005164
CNT23E  005204
CNT23F  005224
CNT23G  005250
CNT24A  005316
CNT24B  005346
CONTD   005540
CONTG   010476
CONT10  002514
CONT11  002616
CONT2   001226
CONT21  004744
CONT22  005050
CONT4   001410
CONT8   002242
COUNT =%000001
CRB1  =%000004
CRB2    000640
CRLF    012242
CRLF4   012274
CR8   =%000003
CSNT    000630
CTLU    016205
C.CONT  012024
C.WAIT  011770
DATENC  006656
DATST   005426
DATST1  005436
DATST2  005456
DAT1    006652
DAT2    006654
DBRCK8  002232
DCNT1   005574
DECK    006640
DECKCK  006514
DISPLA  000620
DISPRE  000174
DONE3   001314
DONE7   002030
D.1     012120
D.2     012132
EMTSRV  012752
EMTTAB  013004
END     006476
ENDCK   005400
END24   005360
ERCM11  007206
ERCR11  007200
ERFLG   000650
ERR6    001726
ERSET   006000
ER1     006034
FAIL    006062
FAILC   006122
FAILCN  006170
FAILC1  006406
FLAG    000632
HLT   = 104000
INERRR  012546
INIT    011434
INTFLG  000602
INTVC   000604
ITCNT   012146
ITMAX   012144
KBCSR   000606
KBDBR   000610
KBINT   012640
KBINTT= 104003
KCRB1   000636
KCRS    000634
LASTCD  006450
LASTCK  006432
LOGIC   006466
LOOPF   010364
LOOPG   010516
LOOP3   001266
LOOP4   001336
LOOP4B  001354
LOOP5   001466
LOOP6   001624
LOOP7   001756
LOOP8   002150
L.CNT   012210
L.EOMK  012240
L.INC   012164
L.TOUT  012166
MSG1    014224
MSG1A   014307
MSG10   015272
MSG11   015317
MSG12   015371
MSG13   015526
MSG14   015616
MSG15   015627
MSG16   015640
MSG17   015661
MSG18   015744
MSG19   015764
MSG2    014343
MSG3    014410
MSG3A   014450
MSG4    014503
MSG5    014536
MSG6    014607
MSG7    014653
MSG7A   014771
MSG8    015040
MSG8A   015131
MSG9    015170
NEWIS   016040
NOMD    006212
NOP   = 000240
NOTCD   006610
NOTCD1  006632
NOTCOL  006412
NOTRP   000764
NOTRP1  005546
NXCRD   006540
OFF6    001714
OUT     012544
PC    =%000007
PRINT   011574
PROC    000646
PROCT   011734
PSR   = 177776
PTOFF   006660
QEST    016027
READ    012376
READC = 104004
RESTRT  000742
REST8   002270
REST9   002374
RETRNX  011012
RETURN  012150
R0    =%000000
R1    =%000001
R2    =%000002
R3    =%000003
R4    =%000004
R5    =%000005
SAVPC   011730
SAVPSR  011732
SAVR2   011722
SAVR3   011724
SAVR4   011726
SCONT1  005700
SCOPE = 104001
SCOPEC  012062
SETUP   000652
SET1    004542
SET14   003260
SET2    004330
SET3    004116
SET4    003704
SET5    003472
SET7    003106
SP    =%000006
SPACE   011542
SPACEX  011572
SRVC    005634
SRVC1   007070
SRVC2   007132
SRVC2A  007140
STACK   000600
STADD   016115
SUBT1   016214
SUBT2   016240
SUBT4   016273
SUBT5   016316
SUSWR   012560
SUSWRR= 104005
SWR     000616
SWREG   000176
SWREG   016055
TCSR    000612
TDBR    000614
TEND    006644
TEST    001012
TESTA   007234
TESTB   007372
TESTC   007522
TESTD   007654
TESTE   010130
TESTF   010276
TESTG   010444
TESTX   010676
TEST1   001020
TEST1A  001022
TEST10  002402
TEST11  002524
TEST12  002626
TEST13  002706
TEST14  003120
TEST15  003272
TEST16  003504
TEST17  003716
TEST18  004130
TEST19  004342
TEST2   001116
TEST20  004554
TEST21  004660
TEST22  004754
TEST23  005062
TEST24  005266
TEST3   001242
TEST4   001324
TEST5   001454
TEST6   001610
TEST7   001742
TEST8   002126
TEST9   002276
TIB     000626
TIFLG   000624
TIM24   005552
TINT10  002464
TINT11  002604
TINT12  002670
TINT13  003024
TINT14  003216
TINT15  003410
TINT16  003622
TINT17  004034
```

```
TINT18  004246          TITTYP  012706          TOUT    012152          TSTA    007214          XLOOP   011002
TINT19  004460          TMP1    000622          TRAPX   000774          TSTART  006642          .       016351
```

```
 ERRORS DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 *,DZCRA/SOL/EN:AMA=DZCRA.SRC
 RUN-TIME:  0 18  .7 SECONDS
 RUN-TIME RATIO:  86/27=3.1
 CORE USED:  6K  (11 PAGES)
```