

# IDENTIFICATION

PRODUCT CODE: MAINDEC-08-DHCRA-A-D  
FORMERLY: MAINDEC-8E-D2EB  
PRODUCT NAME: CR8E/CR8F CARD READER TEST  
DATE REVISED: MAY 22, 1972  
MAINTAINED: DIAGNOSTIC GROUP  
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1.

## ABSTRACT

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THE PROGRAM TESTS THE CARD READER FOR CORRECT ALPHANUMERIC AND BINARY OPERATIONS. IT ALSO TESTS CONTROL INTERRUPT AND TIMING.

2.

## REQUIREMENTS

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IF DF32 DISK IS PART OF THE SYSTEM, IT SHOULD BE IN THE OPERATE MODE. WHEN DF32 DISK IS IN MAINTENANCE MODE IT SHARES DEVICE CODES WITH THE CARD READER AND THEREFORE THE CARD READER DIAGNOSTIC CANNOT BE VALIDLY RUN. STATIC TESTS AND MANUAL INTERVENTION TESTS SHOULD OPERATE CORRECTLY BEFORE ATTEMPTING TO OPERATE ALL OTHER TESTS.

2.1

### EQUIPMENT

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PDP8-E WITH EITHER ONE OF THE FOLLOWING CARD READERS:

A, CR03 G.D.I 100 MS CARD READER (CR8E)

B, DOCUMENTATION M200 CARD READER (CR8F)

CR03 ALPHANUMERIC CARD DECK

CR03 BINARY CARD DECK

3.

### LOADING PROCEDURE

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THE PROGRAM TAPE IS IN BINARY FORMAT. LOAD THE PROGRAM INTO CORE BY FOLLOWING THE INSTRUCTIONS PUBLISHED FOR THE PARTICULAR BINARY FORMAT BEING USED.

4.

### STARTING PROCEDURE

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4.1

#### CONTROL SWITCH SETTINGS

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SW0=0 TEST ALPHANUMERIC DECK

SW0=1 TEST BINARY DECK

SW1=0 PRINT DATA ERROR

SW1=1 SUPPRESS PRINT DATA ERROR

SW2=0 HALT AFTER DATA ERROR

SW2=1 SUPPRESS HALT AFTER DATA ERROR

SW3=0 HALT AT END OF TEST DECK

SW3=1 CONTINUE TO NEXT TEST DECK WITHOUT HALT.

4.2

#### STARTING ADDRESSES OF CARD READER TESTS

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0200 = ALPHA AND BINARY DATA RELIABILITY TESTS

0202 = STATIC IOT TESTS

0204 = MANUAL INTERVENTION TESTS

0206 = COMPRESSED CODE DATA RELIABILITY TESTS

0210 = VALIDITY BIT DATA RELIABILITY TESTS

2300 = SCOPE LOOP

4.3 PROGRAM AND/OR OPERATOR ACTION

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THE TESTS PROVIDED IN THIS DIAGNOSTIC SHOULD BE RUN IN THE  
FOLLOWING SEQUENCE,

- A. REFERENCE 4.4 FOR CR03 G.D.I CARD READER
- B. REFERENCE 4.4A FOR DOCUMENTATION M200 CARD READER

4.4 CR03 G.D.I (CR8E) PROGRAM AND/OR OPERATOR ACTION

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STATIC IOT TESTS FOR CR8E CARD READER

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- A. PLACE A CARD DECK INTO INPUT HOPPER
- B. TURN ON CARD READER POWER AND THEN DEPRESS MOTOR START
- C. AT THIS POINT THE ONLY RED LIGHT TO BE ON SHOULD BE READ STOP. REFERENCE G.D.I. MANUAL TO REMEDY OTHER RED LIGHT ERROR CONDITIONS.
- D. LOAD ADDRESS 0202
- E. DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- F. PROGRAM WILL PRINT "IOTS OK" IF TEST RUNS. PROGRAM WILL HALT IF TEST FAILS. REFERENCE SYMBOLIC LISTING AND COMMENTS FOR APPROPRIATE ERROR DESCRIPTION.

MANUAL INTERVENTION TESTS FOR CR8E CARD READER

-----

- A. PLACE ALPHANUMERIC OR BINARY TEST DECK IN LOWER HOPPER.
- B. TURN ON CARD READER POWER
- C. DEPRESS MOTOR START AND THEN DEPRESS READ START  
AT THIS POINT ALL RED LIGHTS SHOULD BE OFF.
- D. LOAD ADDRESS 0204
- E. SELECT APPROPRIATE SWITCH CONTROL (REFERENCE 4.1),
- F. DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- G. AT THIS POINT PROGRAM WILL ATTEMPT TO READ FOUR CARDS AND THEN ISSUE MESSAGE "OPERATOR MUST NOW PRESS READ STOP."
- H. AFTER READ STOP IS PRESSED PROGRAM WILL THEN ISSUE MESSAGE "OPERATOR MUST NOW PRESS READ START."
- I. PROGRAM WILL PRINT "MANUAL TESTS OK" IF TEST RUNS. PROGRAM WILL HALT IF TEST FAILS. REFERENCE SYMBOLIC LISTING AND COMMENTS FOR APPROPRIATE ERROR DESCRIPTION.

VALIDITY BIT DATA RELIABILITY TESTS FOR CR8E CARD READER  
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STATIC IOT TESTS MUST OPERATE CORRECTLY BEFORE ATTEMPTING THIS TEST.

- A, PLACE BINARY TEST DECK IN LOWER HOPPER
- B, TURN ON CARD READER POWER
- C, DEPRESS MOTOR START AND THEN DEPRESS READ START  
AT THIS POINT ALL READ LIGHTS SHOULD BE OFF,
- D, LOAD ADDRESS 0210
- E, SELECT APPROPRIATE SWITCH CONTROL (REFERENCE 4,1)
- F, DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- G, PROGRAM WILL RING BELL AND PRINT "\*" WHEN FINISHED WITH AN 80 CARD TEST DECK,
- H, IF MORE THAN 1 TEST DECK HAS BEEN LOADED, REPEAT STEP E AND PRESS CONTINUE.

COMPRESSED CODE DATA RELIABILITY TESTS FOR CR8E CARD READER  
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STATIC IOT TEST MUST OPERATE CORRECTLY BEFORE ATTEMPTING THIS TEST.

- A, PLACE ALPHANUMERIC TEST DECK IN LOWER HOPPER,
- B, TURN ON CARD READER POWER,
- C, DEPRESS MOTOR START AND THEN DEPRESS READ START  
AT THIS POINT ALL RED LIGHTS SHOULD BE OFF,
- D, LOAD ADDRESS 0206
- E, SELECT APPROPRIATE SWITCH CONTROL (REFERENCE 4,1)
- F, DEPRESS CLEAR THEN DEPRESS CONTINUE
- G, PROGRAM WILL RING BELL AND PRINT "\*" WHEN FINISHED WITH AN 80 CARD TEST DECK,
- H, IF MORE THAN 1 TEST DECK HAS BEEN LOADED, REPEAT STEP E AND PRESS CONTINUE.

ALPHANUMERIC AND BINARY DATA RELIABILITY TESTS FOR CR8E CARD READER  
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STATIC TEST MUST OPERATE CORRECTLY BEFORE ATTEMPTING THIS TEST;

- A, PLACE ALPHANUMERIC OR BINARY TEST DECK IN LOWER HOPPER;
- B, TURN ON CARD READER POWER
- C, DEPRESS MOTOR START AND THEN DEPRESS READ START  
AT THIS POINT ALL RED LIGHTS SHOULD BE OFF,
- D, LOAD ADDRESS 0200
- E, SELECT APPROPRIATE SWITCH CONTROL (REFERENCE 4,1),
- F, DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- G, PROGRAM WILL RING BELL AND PRINT "\*" WHEN FINISHED WITH AN  
80 CARD DECK TEST,
- H, IF MORE THAN 1 TEST DECK HAS BEEN LOADED, REPEAT STEP E AND  
PRESS CONTINUE.

SCOPE LOOP FOR CR8E CARD READER  
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- A, LOAD CARD DECK (ANY TYPE OF CARD FORMAT)
- B, TURN ON CARD READER POWER
- C, DEPRESS CARD READER START
- D, LOAD ADDRESS 2300
- E, DEPRESS CLEAR THEN DEPRESS CONTINUE
- F, NORMAL HALT WHEN INPUT HOPPER EMPTY

ERROR DESCRIPTION  
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REFERENCE 6,0

4. DOCUMENTATION M200 (CR8F) PROGRAM AND/OR OPERATOR ACTION  
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STATIC IOT TESTS FOR CR8F CARD READER  
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- A. PLACE A CARD DECK INTO UPPER HOPPER
- B. TURN ON CARD READER POWER AND ON REAR PANEL SET MODE TO REMOTE, SHUTDOWN TO AUTO.
- C. AT THIS POINT THE ONLY LIGHT TO BE ON SHOULD BE STOP, REFERENCE DOCUMENTATION MANUAL TO REMEDY OTHER LIGHT ERROR CONDITIONS.
- D. ON REAR PANEL OF READER PRESS LAMP TEST VERIFY THAT ALL LIGHTS DO LIGHT.
- E. LOAD ADDRESS 0202
- F. DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- G. PROGRAM WILL PRINT "IOTS OK" IF TEST RUNS, PROGRAM WILL HALT IF TEST FAILS, REFERENCE SYMBOLIC LISTING AND COMMENTS FOR APPROPRIATE ERROR DESCRIPTION.

MANUAL INTERVENTION TESTS FOR CR8F CARD READER  
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- A. PLACE ALPHANUMERIC OR BINARY TEST DECK IN UPPER HOPPER.
- B. TURN ON CARD READER POWER
- C. DEPRESS RESET, AFTER 3 SEC, MAX, THE RESET LIGHT AND THE POWER LIGHT SHOULD BE THE ONLY LIGHTS ON.
- D. LOAD ADDRESS 0204
- E. SELECT APPROPRIATE SWITCH CONTROL (REFERENCE 4,1).
- F. DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- G. AT THIS POINT PROGRAM WILL ATTEMPT TO READ FOUR CARDS AND THEN ISSUE MESSAGE "OPERATOR MUST NOW PRESS STOP."
- H. AFTER STOP IS PRESSED PROGRAM WILL THEN ISSUE MESSAGE "OPERATOR MUST NOW PRESS RESET."
- I. PROGRAM WILL PRINT "MANUAL TESTS OK" IF TEST RUNS, PROGRAM WILL HALT IF TEST FAILS, REFERENCE SYMBOLIC LISTING AND COMMENTS FOR APPROPRIATE ERROR DESCRIPTION.

## VALIDITY BIT DATA RELIABILITY TESTS FOR CRBF CARD READER

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STATIC IOT TESTS MUST OPERATE CORRECTLY BEFORE ATTEMPTING THIS TEST.

- A, PLACE BINARY TEST DECK IN UPPER HOPPER
- B, TURN ON CARD READER POWER
- C, DEPRESS RESET, AFTER 3 SEC MAX, THE RESET LIGHT AND THE POWER LIGHT SHOULD BE ONLY LIGHTS ON,
- D, LOAD ADDRESS 0210
- E, SELECT APPROPRIATE SWITCH CONTROL (REFERENCE 4,1)
- F, DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- G, PROGRAM WILL RING BELL AND PRINT "\*" WHEN FINISHED WITH AN 80 CARD TEST DECK,
- H, IF MORE THAN 1 TEST DECK HAS BEEN LOADED, REPEAT STEP E AND PRESS CONTINUE.

## COMPRESSED CODE DATA RELIABILITY TESTS FOR CRBF CARD READER

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STATIC IOT TEST MUST OPERATE CORRECTLY BEFORE ATTEMPTING THIS TEST.

- A, PLACE ALPHANUMERIC TEST DECK IN UPPER HOPPER,
- B, TURN ON CARD READER POWER,
- C, DEPRESS RESET, AFTER 3 SEC MAX THE RESET LIGHT AND THE POWER LIGHT SHOULD BE THE ONLY LIGHTS ON,
- D, LOAD ADDRESS 0206
- E, SELECT APPROPRIATE SWITCH CONTROL (REFERENCE 4,1)
- F, DEPRESS CLEAR THEN DEPRESS CONTINUE
- G, PROGRAM WILL RING BELL AND PRINT "\*" WHEN FINISHED WITH AN 80 CARD TEST DECK,
- H, IF MORE THAN 1 TEST DECK HAS BEEN LOADED, REPEAT STEP E AND PRESS CONTINUE.

# ALPHANUMERIC AND BINARY DATA RELIABILITY TESTS FOR CR8F CARD READER

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STATIC TEST MUST OPERATE CORRECTLY BEFORE ATTEMPTING THIS TEST;

- A, PLACE ALPHANUMERIC OR BINARY TEST DECK IN UPPER HOPPER;
- B, TURN ON CARD READER POWER
- C, DEPRESS RESET, AFTER 3 SEC MAX, THE RESET LIGHT AND THE POWER LIGHT SHOULD BE ONLY LIGHTS ON,
- D, LOAD ADDRESS 0200
- E, SELECT APPROPRIATE SWITCH CONTROL (REFERENCE 4,1),
- F, DEPRESS CLEAR AND THEN DEPRESS CONTINUE
- G, PROGRAM WILL RING BELL AND PRINT "\*" WHEN FINISHED WITH AN 80 CARD DECK TEST,
- H, IF MORE THAN 1 TEST DECK HAS BEEN LOADED, REPEAT STEP E AND PRESS CONTINUE,

## SCOPE LOOP FOR CR8F CARD READER

- 
- A, LOAD CARD DECK (ANY TYPE OF CARD FORMAT)
  - B, TURN ON CARD READER POWER
  - C, DEPRESS RESET
  - D, LOAD ADDRESS 2300
  - E, DEPRESS CLEAR THEN DEPRESS CONTINUE
  - F, NORMAL HALT WHEN INPUT HOPPER EMPTY

## ERROR DESCRIPTION

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REFERENCE 6.0

# 5. OPERATING PROCEDURE -----

REFERENCE 4,3

## 6.0 ERRORS -----

ERROR HALTS AND DESCRIPTIONS

## 6.1 STATIC IOT TESTS -----

| TAG | ADDRESS | REASON                                          |
|-----|---------|-------------------------------------------------|
| E1  | 0304    | RCSE SKIPPED WITH READER NOT READY              |
| E2  | 0310    | RCSI SHOULDN'T HAVE SKIPPED                     |
| E3  | 0315    | DATA FLAG SHOULD NOT BE SET OR RCSE FAILED      |
| E4  | 0321    | CARD DONE FLAG SHOULD NOT BE SET OR RCSD FAILED |
| E5  | 0335    | ILLEGAL PROGRAM INTERRUPT OCCURRED              |

RCNI INSTRUCTION STATUS BIT ERRORS DURING STATIC IOT TEST

|     |      |                                                      |
|-----|------|------------------------------------------------------|
| E25 | 1007 | READY TRUE STATUS BIT (AC3) SHOULD BE ZERO           |
| E26 | 1014 | TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO |
| E27 | 1021 | CARD DONE STATUS BIT (AC1) SHOULD BE A ZERO          |
| E28 | 1026 | DATA READY STATUS BIT (AC0) SHOULD BE A ZERO         |

## 6.2 MANUAL INTERVENTION TESTS -----

| TAG | ADDRESS | REASON                                                                    |
|-----|---------|---------------------------------------------------------------------------|
| E6  | 0412    | RCSE FAILED OR READER NOT READY                                           |
| E7  | 0430    | RCSE FAILED OR READER NOT READY                                           |
| E8  | 0447    | RCSD FAILED OR CARD DONE FLAG DIDN'T SET                                  |
| E9  | 0454    | CAF DID NOT CLEAR CARD DONE FLAG                                          |
| E10 | 0466    | CAF SHOULD HAVE CLEARED DATA FLAG                                         |
| E11 | 0520    | RCNO DID NOT DISABLE DATA + CARD DONE INT, ENABLE                         |
| E12 | 0534    | CAF DID NOT ENABLE DATA + CARD DONE INT, ENABLE                           |
| E13 | 0627    | READ STOP (G,D,I) OR STOP (DOCUMENTATION) WAS NOT PRESSED, RESTART TEST   |
| E14 | 0633    | READY/TROUBLE FLAG DIDN'T CAUSE PROGRAM INTERRUPT                         |
| E15 | 0640    | RCNI-TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ONE                  |
| E16 | 0642    | RCSI SHOULD HAVE SKIPPED WITH TROUBLE FLAG ENABLED                        |
| E17 | 0657    | RCTF DID NOT CLEAR TRANSITION FLOP                                        |
| E18 | 0663    | RCNI-TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO                 |
| E19 | 0713    | READY/TROUBLE FLAG DIDN'T CAUSE PROGRAM INTERRUPT                         |
| E20 | 0717    | READ START (G,D,I) OR RESET (DOCUMENTATION) WAS NOT PRESSED, RESTART TEST |
| E21 | 0723    | RCSI SHOULD HAVE SKIPPED ON READY TRUE TRANSITION INTERRUPT               |
| E22 | 0727    | CAF DID NOT CLEAR TRANSITION FLOP                                         |
| E23 | 0740    | CAF DID NOT DISABLE TRANSITION INTERRUPT                                  |
| E24 | 0744    | RCNI-READY TRUE STATUS BIT (AC3) SHOULD BE A ZERO                         |

# RCNI INSTRUCTION STATUS BIT ERRORS DURING MANUAL INTERVENTION TEST -----

## RCNI ERRORS WITH CARD READER INITIALIZED -----

|     |      |                                                      |
|-----|------|------------------------------------------------------|
| E25 | 1007 | READY TRUE STATUS BIT (AC3) SHOULD BE A ZERO         |
| E26 | 1014 | TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO |
| E27 | 1021 | CARD DONE STATUS BIT (AC1) SHOULD BE A ZERO          |
| E28 | 1026 | DATA READY STATUS BIT (AC0) SHOULD BE A ZERO         |

## RCNI ERRORS WITH DATA FLAG ENABLED -----

|     |      |                                                      |
|-----|------|------------------------------------------------------|
| E29 | 1037 | READY TRUE STATUS BIT (AC3) SHOULD BE A ZERO         |
| E30 | 1044 | TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO |
| E31 | 1051 | CARD DONE STATUS BIT (AC1) SHOULD BE A ZERO          |
| E32 | 1056 | DATA READY STATUS BIT (AC0) SHOULD BE A ONE          |

## RCNI ERRORS WITH CARD DONE FLAG ENABLED -----

|     |      |                                                      |
|-----|------|------------------------------------------------------|
| E33 | 1070 | READY TRUE STATUS BIT (AC3) SHOULD BE A ZERO         |
| E34 | 1075 | TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO |
| E35 | 1102 | CARD DONE STATUS BIT (AC1) SHOULD BE A ONE           |
| E36 | 1107 | DATA READY STATUS BIT (AC0) SHOULD BE A ZERO         |

## RCNI ERRORS WITH READY TRUE TRANSITION ENABLED -----

|     |      |                                                      |
|-----|------|------------------------------------------------------|
| E37 | 1121 | READY TRUE STATUS BIT (AC3) SHOULD BE A ONE          |
| E38 | 1126 | TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO |
| E39 | 1133 | CARD DONE STATUS BIT (AC1) SHOULD BE A ZERO          |
| E40 | 1140 | DATA READY STATUS BIT (AC0) SHOULD BE A ZERO         |

## DATA RELIABILITY TESTS -----

| TAG  | ADDRESS | REASON                                              |
|------|---------|-----------------------------------------------------|
| E41  | 1451    | RQSD FAILED OR CARD DONE FLAG PRESENT AT WRONG TIME |
| E42  | 1460    | RQSE FAILED OR READER NOT READY                     |
| E43  | 1476    | RQSF FAILED OR DATA READY FLAG DIDN'T SET           |
| E43A | 1502    | RCNI-DATA READY STATUS BIT (AC0) SHOULD BE A ONE    |
| E44  | 1513    | DATA FLAG DIDN'T CAUSE PROGRAM INTERRUPT            |
| E45  | 1603    | RCSI DIDN'T SKIP ON DATA READY INTERRUPT            |
| E46  | 1611    | RCNI-DATA READY STATUS BIT (AC0) DIDN'T CLEAR       |
| E48  | 1655    | RQSD FAILED OR CARD DONE FLAG DIDN'T SET            |
| E49  | 1661    | CARD DONE STATUS BIT (AC1) DID NOT SET              |
| E50  | 1673    | CARD DONE FLAG DIDN'T CAUSE PROGRAM INTERRUPT       |
| E51  | 1675    | RCSI DIDN'T SKIP ON CARD DONE INTERRUPT             |
| E52  | 1704    | RQRD DIDN'T CLEAR CARD DONE FLAG                    |
| E53  | 2011    | NOT AN ERROR, END OF TEST DECK                      |
| E54  | 2032    | DATA ERROR                                          |

A DATA READ ERROR OCCURS WHEN THE INCOMING DATA DOES NOT COMPARE FAVORABLY WITH THE STORED DATA PATTERN, THE FORMAT FOR A DATA ERROR TYPEOUT IS AS FOLLOWS:

|         |       |       |        |         |         |
|---------|-------|-------|--------|---------|---------|
| A,B,C,V | CD-XX | CL-XX | G-XXXX | R1-XXXX | R2-XXXX |
| A       | B     | C     | D      | E       | F       |

A, AN A,B,C,V TO SPECIFY WHAT DATA RELIABILITY TEST WAS SELECTED WHEN ERROR OCCURED,

A=ALPHA DATA RELIABILITY TEST  
 B=BINARY DATA RELIABILITY TEST  
 C=COMPRESSED DATA RELIABILITY TEST  
 V=VALIDITY BIT DATA RELIABILITY TEST

B, CARD NUMBER WHEN ERROR OCCURED

C, COLUMN NUMBER WHEN ERROR OCCURED

D, GOOD DATA PATTERN

E, DATA ACTUALLY READ (1ST READ)

F, DATA ACTUALLY READ (2ND READ)

EITHER OR BOTH OF THE DATA READS MAY BE BAD,

DATA ERRORS NOT TRACED TO CARD READER HARDWARE INCLUDE:

A, WRONG CARD DECK USED,

B, SWITCH 0 IN WRONG POSITION (REFERENCE 4,1)

C, CARD MISSING

D, CARD DECK OUT OF PROPER SEQUENCE,

E, DAMAGED CARD,

6 ERROR RECOVERY

- A, STATIC IOT TEST MUST BE RESTARTED AT ADDRESS 0202
- B, MANUAL INTERVENTION TESTS MUST BE RESTARTED AT ADDRESS 0204
- C, VALIDITY BIT TESTS MUST BE RESTARTED AT ADDRESS 0210
- D, COMPRESSED MODE DATA TESTS MUST BE RESTARTED AT ADDRESS 0206
- E, ALPHA AND BINARY MODE DATA TESTS MUST BE RESTARTED AT ADDRESS 0200
- F, DATA READ ERRORS; PRESS CONTINUE

7, RESTRICTIONS

-----

7.1 CARD DECKS

- A, MUST BE IN PROPER SEQUENCE
- B, MUST BE IN GOOD CONDITION

NOTE: ALPHA-NUMERIC AND BINARY CARD DECKS CONSISTING OF 80 CARDS EACH ARE AVAILABLE FROM THE PROGRAM LIBRARY. SINCE THESE DECKS MUST BE KEPT IN PROPER SEQUENCE, IT IS SUGGESTED THAT EACH DECK BE NUMBERED FROM 1 TO 80 AS SOON AS IT IS RECEIVED.

8. MISCELLANEOUS  
-----

8.1 CARD DECK DATA TABLE DESCRIPTION

ALPHANUMERIC DATA TABLE

REFERENCE THE ALPHANUMERIC DATA TABLE BEGINNING AT LOCATION 3400 IN THE SYMBOLIC LISTING FOR THE CODES PUNCHED FOR EACH OF 80 COLUMNS OF THE 1ST CARD, EACH SUCCESSIVE CARD IN THE DECK USES THE SAME SEQUENCE OF CODES ROTATED 1 COLUMN TO THE LEFT.

BINARY DATA TABLE

REFERENCE THE BINARY DATA TABLE BEGINNING AT LOCATION 3200 IN THE SYMBOLIC 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 1 COLUMN TO THE LEFT.

COMPRESSED DATA TABLE

REFERENCE THE COMPRESSED DATA TABLE BEGINNING AT LOCATION 3600 IN THE SYMBOLIC LISTING FOR THE CODES PUNCHED FOR EACH OF THE 80 COLUMNS OF THE 1ST CARD,

VALIDITY BIT DATA TABLE

REFERENCE THE VALIDITY BIT DATA TABLE BEGINNING AT LOCATION 4000 IN THE SYMBOLIC LISTING FOR THE CODES PUNCHED FOR EACH OF THE 80 COLUMNS OF THE 1ST CARD,

9. PROGRAM DESCRIPTION  
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9.1 STATIC IOT TEST

THIS TEST CHECKS TO SEE THAT SKIP ON READER READY, SKIP ON DATA FLAG, SKIP IF INTERRUPT IS GENERATED, AND SKIP ON CARD DONE FLAG DO NOT SKIP WITH THOSE FLAGS CLEARED,

9.2 MANUAL INTERVENTION TESTS

THIS TEST CHECKS CAF INSTRUCTION TO INITIALIZE FLAGS AND ALSO CHECK READY/TROUBLE INTERRUPTS THROUGH OPERATOR INTERVENTION, CHECKS ARE MADE TO DETERMINE IF THE SKIP ON READER READY, SKIP ON DATA FLAG, SKIP ON CARD DONE, SKIP IF INTERRUPT IS GENERATED, CLEAR CARD DONE, CLEAR TRANSITION FLAGS IOT'S ARE WORKING PROPERLY, TESTS ARE ALSO PERFORMED ON READ CONDITIONS IN FROM CARD READER AND READ CONDITIONS OUT FROM CARD READER,

## 9.7 VALIDITY BIT DATA RELIABILITY TEST

THIS TEST CHECKS VALIDITY LOGIC CIRCUITRY TO DETECT DOUBLE PUNCHES IN ROWS 1 THROUGH 7. THIS IS PERFORMED BY READING IN THE BINARY DECK IN THE COMPRESSED MODE. WHEN A DOUBLE PUNCH IS READ IN THE COMPRESSED MODE THE VALIDITY CIRCUITRY WILL ASSERT A ONE IN AC0. A DATA ERROR WILL BE FOUND IF EITHER DATA READ DOES NOT COMPARE WITH THE EXPECTED PATTERN.

## 9.4 DATA RELIABILITY TESTS

THE TESTS DESCRIBED PERTAIN TO THE COMPRESSED DATA MODE, ALPHANUMERIC DATA MODE AND THE BINARY DATA MODE.

A TEST DECK OF 80 ALPHANUMERIC OR BINARY CODED CARDS IS READ. CHECKS ARE MADE TO DETERMINE IF THE SKIP ON READER READY, SKIP ON DATA FLAG, SKIP ON CARD DONE, CLEAR CARD DONE, READ COMPRESSED, READ ALPHA, READ BINARY, SKIP IF INTERRUPT IS GENERATED, READ CONDITIONS IN FROM CARD READER IOT'S ARE WORKING PROPERLY.

EACH COLUMN OF DATA WILL BE PRESENT IN THE READ BUFFER FOR 1.2 .1 MILLISEC. THE DATA TEST READS EACH COLUMN TWICE. THE FIRST READ IS DONE AS SOON AS THE DATA FLAG INDICATES THAT DATA IS PRESENT. THE SECOND READ IS DONE 1.0 MILLISECOND LATER TO ASSURE THAT THE DATA BUFFER HAS NOT CHANGED. A DATA ERROR WILL BE FOUND IF EITHER DATA READ DOES NOT COMPARE WITH THE EXPECTED PATTERN.

THE PROGRAM INTERRUPT IS CHECKED TO MAKE SURE THAT THE DATA AND CARD DONE FLAGS WILL CAUSE INTERRUPTS. CARD DONE LOGIC IS TESTED TO MAKE SURE THAT THE CARD DONE FLAG ONLY OCCURS AFTER THE CARD HAS PASSED THE READ STATION.

## 9.5 SCOPE LOOP

THIS ROUTINE WILL CYCLE CARDS THROUGH THE READER WITHOUT MAKING DATA TESTS. IT'S ONLY PURPOSE IS TO AID IN MAINTENANCE PROCEDURES BY ALLOWING THE LOGIC TO OPERATE WHILE IT IS BEING CHECKED WITH A SCOPE. CARD DECKS TO BE USED MAY CONTAIN ANY NUMBER OF CARDS WITH ANY HOLE PATTERN THE USER WISHES.

## 9.6 LISTING \*\*\*\*\*

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/CR8E/CR8F CARD READER TEST
/MAINDEC-08-DHCRA=A
/COPYRIGHT 1971, 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS, 01754

/THIS PROGRAM TESTS FOR THE CORRECT OPERATION OF THE G.D.I. 100MS
/CARD READER(CR8E)OR THE DOCUMENTION M200 CARD READER(CR8F)
/WHEN USED WITH PDP8E,
/

/CONTROL SWITCH SETTINGS:
/SW2 = 0 TEST ALPHA NUMERIC DECK
/SW0 = 1 TEST BINARY DECK
/SW1 = 0 PRINT DATA ERROR
/SW1 = 1 SUPPRESS PRINT DATA ERROR
/SW2 = 0 HALT AFTER DATA ERROR
/SW2 = 1 SUPPRESS HALT AFTER DATA ERROR
/SW3 = 0 HALT AT THE END OF TEST DECK
/SW3 = 1 CONTINUE TO NEXT TEST DECK WITHOUT HALT
/

/NOT EQUALITIES
4420 RCSE=JMS I XXRCSE /SKIP ON DATA FLAG
4421 RCRA=JMS I XXRCRA /READ ALPHA
4422 RCRB=JMS I XXRCRB /READ BINARY
4423 RCRC=JMS I XXRCRC /READ COMPRESSED
4424 RCSD=JMS I XXRCSD /SKIP ON CARD DONE FLAG
4425 RCSE=JMS I XXRCSE /START CARD MOTION AND SKIP IF READER READY
4426 RCRD=JMS I XXRCRD /CLEAR CARD DONE FLAG
4427 RCNO=JMS I XXRCNO /READ CONDITIONS OUT TO CARD READER
4430 RCNI=JMS I XXRCNI /READ CONDITIONS IN FROM CARD READER
4431 RCSE=JMS I XXRCSE /SKIP IF INTERRUPT BEING GENERATED
4432 RCTF=JMS I XXRCTF /CLEAR TRANSITION FLAGS
6007 CAF=6007 /CLEAR ALL FLAGS
/

/PRIORITY INTERRUPT RETURN
*0
0000 0000
0001 0002 JMP I ,+1 /EXIT FROM INTERRUPT
0002 0000 /INTERRUPT RETURN POINTER
0003 0002 HLT /ERROR, SHOULD NEVER REACH HERE
/

*20
0020 0020 /PAGE REFERENCE POINTERS
0020 0022 XXRCSE, XXRCSE
0021 0024 XXRCRA, XXRCRA
0022 0026 XXRCRB, XXRCRB
0023 0028 XXRCRC, XXRCRC
0024 0030 XXRCSD, XXRCSD
0025 0032 XXRCSE, XXRCSE
0026 0034 XXRCRD, XXRCRD
0027 0036 XXRCNO, XXRCNO
0030 0038 XXRCNI, XXRCNI

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0031 0065 XXRCSE, XXRCSE
0032 0072 XXRCTF, XXRCTF
0033 0080 XDCPRT, XDCPRT
0034 0088 XDCPRT, XDCPRT
0035 0096 XTEXT, TSR
0036 0104 XOTY, OTY
0037 0112 XCRLF, CRLF
0040 0174 XIONB, IONB
0041 0182 XIONC, IONC
0042 0190 XIOND, IOND
0043 0198 XIONE, IONE
0044 0206 XIONF, IONF
0045 0214 XLOOP1, LOOP1
0046 0222 XLOOP2, LOOP2
0047 0230 ALPCOD, ALPCD
0050 0280 BINCOD, BINCD
0051 0288 VALCOD, VALCD
0052 0296 CMPCOD, CMPCRD
0053 0304 ENDA, ENDA1+1
0054 0312 ENDB, ENDB1+1
0055 0320 ENC, ENDCM1+1
0056 0328 ENVI, ENDOVL1+1
0057 0336 XMES9, MES9+1
0060 0384 XDATER, DATERR
0061 0392 XRDAT1, RDAT1
0062 0400 XLOOPA, LOOPA
0063 0408 PRINTA, PRINT
0064 0416 XIOTST, IOTST
0065 0424 XDATST, DATST
0066 0432 XMNUAL, MANTST
0067 0440 XCMPE, CMPTST
0070 0484 XVALID, VALTST
0071 0492 UPDAT, UPDATA
/STORAGE AND WORK AREA
0072 0000 COLCNT, 0 /COLUMN COUNT
0073 0000 CRDCNT, 0 /CARD COUNT
0074 0000 MODE, 0 /ALPHA OR BINARY POINTER
0075 0000 MODE1, 0 /TABLE STARTING ADDRESS FOR EACH CARD
0076 0000 DATA, 0 /DATA TABLE POINTER
0077 0000 READ1, 0 /1ST DATA READ
0100 0000 READ2, 0 /2ND DATA READ
0101 0000 DFCNT, 0 /DATA DELAY COUNT
0102 0000 DFCNT1, 0
0103 0000 RDCNT, 0 /READ DELAY COUNT (PERMANENT)
0104 0000 RDCNT1, 0 /READ DELAY COUNT (MODIFIED)
0105 0000 DNFLG, 0 /DONE FLAG DELAY COUNT (PERMANENT)
0106 0000 DNFLG1, 0 /DONE FLAG DELAY COUNT (MODIFIED)
0107 0000 END, 0 /TABLE TERMINATOR
0110 0000 ACSTAT, 0
0111 0000 IOTCNT, 0
0112 0000 CMCHK, 0
0113 0000 VALCHK, 0
/

/CONSTANTS

```

```

2114 0001 K0001, 0001
2115 0002 K0002, 0002
2116 0003 K0003, 0003
2117 0007 K0007, 0007
2120 0051 K0051, 51
2121 0077 K0077, 77
2122 0121 K0121, 121
2123 0207 K0207, 207
2124 0212 K0212, 212
2125 0215 K0215, 215
2126 0240 K0240, 240
2127 0252 K0252, 252
2130 0260 K0260, 260
2131 0340 K0340, 340
2132 0400 K0400, 400
2133 1000 K1000, 1000
2134 2000 K2000, 2000
2135 4000 K4000, 4000
2136 5252 K5252, 5252
2137 6632 K6632, 6632
2140 6634 K6634, 6634
2141 6636 K6636, 6636
2142 7777 K7777, 7777
2143 8377 K377, 377
2144 7370 K7370, 7370
2145 7660 K7660, 7660
2146 7701 K7701, 7701
2147 7702 K7702, 7702
2150 7703 K7703, 7703
2151 7715 K7715, 7715
2152 7726 K7726, 7726
2153 7730 K7730, 7730
2154 7740 K7740, 7740
2155 7771 K7771, 7771
2156 7000 K7000, 7000

```

0200 \*200

```

2200 5465 DATA, JMP I XDATST /DATA TEST
2201 7402 HLT
2202 5464 IOTS, JMP I XIOTST /STATIC IOT TESTS
2203 7402 HLT
2204 5466 MNUAL, JMP I XMNUAL /MANUAL INTERVENTION TESTS
2205 7402 HLT
2206 5467 CMPDE, JMP I XCMPDE /COMPRESSED CODE TEST
2207 7402 HLT
2210 5470 VALID, JMP I XVALID /VALIDITY BIT TEST
2211 7402 HLT

```

/IOT MODIFICATION SECTION

```

2212 0000 XRCSE, 0
2213 6631 /SKIP ON DATA FLAG

```

```

2214 7410 SKP
2215 2212 ISZ XRCSE
2216 5612 JMP I XRCSE

2217 0000 XRCRA, 0
2220 7200 CLA
2221 6632 6632 /READ ALPHA
2222 5617 JMP I XRCRA
2223 7402 HLT

2224 0000 XRCRB, 0
2225 7200 CLA
2226 6634 6634 /READ BINARY
2227 5624 JMP I XRCRB
2230 7402 HLT

2231 0000 XRCRC, 0
2232 7200 CLA
2233 6636 6636 /READ COMPRESSED
2234 5631 JMP I XRCRC
2235 7402 HLT

2236 0000 XRCSD, 0
2237 6671 6671 /SKIP ON CARD DONE FLAG
2240 7410 SKP
2241 2236 ISZ XRCSD
2242 5636 JMP I XRCSD

2243 0000 XRCSE, 0
2244 6672 6672 /START CARD MOTION AND SKIP IF READER READY
2245 7410 SKP
2246 2243 ISZ XRCSE
2247 5643 JMP I XRCSE

2250 0000 XRCRD, 0
2251 6674 6674 /CLEAR CARD DONE FLAG
2252 5650 JMP I XRCRD
2253 7402 HLT

2254 0000 XRCNO, 0
2255 6635 6635 /READ CONDITIONS OUT TO CARD READER
2256 5654 JMP I XRCNO
2257 7402 HLT

2260 0000 XRCNI, 0
2261 7300 CLA CLL
2262 6637 6637 /READ CONDITIONS OUT TO CARD READER
2263 5660 JMP I XRCNI
2264 7402 HLT

2265 0000 XRCSE, 2
2266 6675 6675 /SKIP IF INTERRUPT BEING GENERATED
2267 7410 SKP
2270 2265 ISZ XRCSE
2271 5665 JMP I XRCSE

```

```

0272 0000 XRCF, 0
0273 6677 /CLEAR TRANSITION FLAGS
0274 5672 JMP I XRCF
0275 7402 HLT

/TEST CARD READER'S IOT'S WITH READER NOT READY
/THIS TEST MUST RUN SUCCESSFULLY BEFORE THE DATA TEST
/CAN BE ATTEMPTED

/TEST RCSE TO NOT SKIP AND READ CONDITIONS INTO AC
0276 7300 IOTST, CLA CLL
0277 1122 TAD K0121 /SET UP LOOP COUNT
0300 3111 DCA IOTCNT
0301 6007 CAF /CLEAR ALL FLAGS
0302 4425 RCSE /SKIP ON READER READY (SHOULD NOT SKIP)
0303 7410 SKP /OK
0304 7402 E1, HLT /ERROR, READER SHOULD NOT BE READY OR RCSE FAILED
0305 4777 JMS CQSTA1 /CHECK CARD READER STATUS BITS

/TEST RCSI TO NOT SKIP
0306 4431 RCSI /SKIP IF INTERRUPT BEING GENERATED
0307 7410 SKP
0310 7402 E2, HLT /ERROR, RCSI SHOULDN'T HAVE SKIPPED
0311 4777 JMS CQSTA1

/TEST RCSP TO NOT SKIP
0312 6002 IOF
0313 4420 RCSP /SKIP ON DATA FLAG (SHOULD NOT SKIP)
0314 7410 SKP
0315 7402 E3, HLT /ERROR, DATA FLAG SHOULD NOT BE SET OR RCSP FAILED
0316 4777 JMS CQSTA1 /CHECK CARD READER STATUS BITS

/TEST RCSD TO NOT SKIP
0317 4424 RCSD /SKIP ON CARD DONE (SHOULD NOT SKIP)
0320 7410 SKP
0321 7402 E4, HLT /ERROR, CARD DONE FLAG SHOULD NOT BE SET OR RCSD FAILED
0322 4777 JMS CQSTA1 /CHECK CARD READER STATUS BITS

/TEST TO MAKE SURE THAT READER ISN'T CAUSING AN INTERRUPT
0323 7200 CLA
0324 1116 TAD K0003 /ENABLE READY/TROUBLE INTERRUPT ENABLE
0325 4427 RCNO
0326 7410 SKP
0327 0335 E5
0330 1327 TAD ,=1 /GET INTERRUPT RETURN
0331 3002 DCA 2 /INITIALIZE RETURN POINTER
0332 6001 ION /TURN ON INTERRUPT
0333 7000 NOP
0334 7410 SKP /SHOULD EXECUTE THIS INSTRUCTION
0335 7402 E5, HLT /ERROR, SOMETHING CAUSED AN ILLEGAL INTERRUPT
0336 6002 IOF
0337 2111 ISE IOTCNT /DO STATIC TEST 4000 TIMES
0340 5302 JMP IOT1

```

```

0341 7200 CLA
0342 1116 TAD K0002 /DISABLE READY/TROUBLE INTERRUPT ENABLE
0343 4435 JMS I XTEXT
0344 2654 MES14 /"IOTS OK"
0345 7402 HLT /END OF IOT TEST

```

# /MANUAL TEST

/THIS TEST WILL CHECK CAF INSTRUCTION TO INITIALIZE FLAGS AND ALSO  
 /CHECK READY/TROUBLE INTERRUPTION THROUGH OPERATOR INTERVENTION,  
 /TEST SHOULD BEGIN WITH EITHER BINARY OR ALPHA CARD DECK IN READER  
 /AND CARD READER START DEPRESSED; TEST WILL HALT UPON ERROR WITH  
 /ERROR MESSAGE LOCATED IN LISTING; WHEN MANUAL TEST IS COMPLETED  
 /SUCCESSFULLY "MANUAL TEST OK" WILL PRINT OUT ON TELETYPE;

```

/INITIALIZE MANUAL TEST
0377 1000 *400
0400 7200 MANTST, CLA
0401 1144 TAD K7370 /1.0 MSEC DELAY
0402 3103 DCA RCNT
0403 6007 CAF /CLEAR ALL FLAGS
0404 4425 RCSE /SELECT CARD
0405 7410 SKP
0406 5213 JMP ,=5
0407 4435 JMS I XTEXT /"RCSE FAILED OR READER NOT READY"
0410 2425 MES2
0411 4430 RCNI
0412 7402 E6, HLT /ERROR HALT PROGRAM MUST BE REINITIALIZED
0413 1103 TAD RCNT
0414 3102 DCA DFCNT1
0415 3101 DCA DFCNT
0416 4420 RCSP /RCSP = SKIP ON DATA FLAG
0417 7410 SKP
0420 5231 JMP MANTS1
0421 2101 ISE DFCNT
0422 5216 JMP ,=4
0423 2102 ISE DFCNT1 /HAVE WE WAITED LONG ENOUGH FOR DATA FLAG
0424 5216 JMP ,=6 /NO
0425 4435 JMS I XTEXT /ERROR, DIDN'T GET DATA FLAG
0426 2447 MES3
0427 4430 RCNI /READ CONDITIONS INTO AC
0430 7402 E7, HLT /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED

/CHECK CAF TO CLEAR CARD DONE FLAG
0431 4422 MANTS1, RCSD
0432 1103 TAD RCNT
0433 3105 DCA DNPLG
0434 3106 DCA DNPLG1
0435 4424 RCSD /SKIP ON CARD DONE FLAG
0436 7410 SKP

```

```

3437 5256 JMP MANTS2 /HAVE CARD DONE FLAG
3440 2105 ISZ DNFLG
3441 5235 JMP ,=4
3442 2106 ISZ DNFLG1 /WAITED LONG ENOUGH FOR CARD DONE FLAG?
3443 5235 JMP ,=6 /NO
3444 4435 JMS I XTEXT /ERROR, CARD DONE FLAG FAILED TO OCCUR
3445 2525 MES5 /RCSO FAILED OR CARD DONE FLAG DIDN'T SET
3446 4430 RCNI /READ CONDITIONS INTO AC
3447 7402 E8, HLT /ERROR, PROGRAM MUST BE RE-INITIALIZED
3450 4777 MANTS2, JMS COSTA3 /CHECK CARD READER CONDITIONS INTO AC
3451 6007 CAF /CLEAR ALL FLAGS
3452 4424 RCSO /SKIP ON CARD DONE FLAG
3453 7410 SKP
3454 7402 E9, HLT /ERROR, CAF, DID NOT CLEAR CARD DONE FLAG
3455 4776 JMS COSTA1 /CHECK CARD READER CONDITIONS TO AC

```

/CHECK CAF TO CLEAR DATA FLAG

```

3456 4425 RCSE /SELECT CARD
3457 5256 JMP ,=1
3460 4420 RCSF
3461 5260 JMP ,=1
3462 4775 JMS COSTA2 /READ CONDITIONS INTO AC
3463 6007 CAF /CLEAR ALL FLAGS
3464 4420 RCSF /SKIP ON DATA FLAG
3465 7410 SKP
3466 7402 E10, HLT /ERROR HLT,CAF SHOULD HAVE CLEARED DATA FLAG
3467 4776 JMS COSTA1 /READ CONDITIONS INTO AC
3470 4422 RCRB
3471 4424 RCSO /SKIP ON CARD DONE FLAG
3472 5271 JMP ,=1
3473 6007 CAF /CLEAR ALL FLAGS

```

/CHECK "RCNO" TO DISABLE DATA + CARD DONE INTERRUPT ENABLE

```

3474 7200 CLA /DISABLE DATA + CARD DONE INTERRUPT ENABLE
3475 4427 RCNO /READ AC INTO CARD READER
3476 1301 TAD ,=3
3477 3002 DCA 2
3500 7410 SKP
3501 0520 E11
3502 4425 RCSE /SELECT CARD
3503 5302 JMP ,=1
3504 4420 RCSF /SKIP ON DATA FLAG
3505 5304 JMP ,=1
3506 6001 ION /TURN ON INTERRUPT
3507 7000 NOP
3510 6002 IOF /TURN OFF INTERRUPT
3511 4422 RCRB
3512 4424 RCSO /SKIP ON CARD DONE FLAG
3513 5312 JMP ,=1
3514 6001 ION /TURN ON INTERRUPT
3515 7000 NOP
3516 6002 IOF

```

```

3517 7410 SKP
3520 7402 E11, HLT /ERROR, RCNO DID NOT DISABLE DATA+CARD DONE INTERRUPT ENABLE

```

/CHECK CAF TO ENABLE DATA + CARD DONE INTERRUPT ENABLE

```

3521 6007 CAF /CLEAR ALL FLAGS
3522 7200 CLA
3523 1042 TAD XIOND
3524 3002 DCA 2
3525 4425 RCSE /SELECT CARD
3526 5325 JMP ,=1
3527 4420 RCSF /SKIP ON DATA FLAG
3530 5327 JMP ,=1
3531 6001 ION /TURN ON INTERRUPT
3532 7000 NOP
3533 6002 IOF /SHOULD NOT GET TO THIS LOCATION
3534 7402 E12, HLT /ERROR, CAF DID NOT ENABLE DATA + CARD DONE INT ENABLE
3535 4422 IOND, RCRB
3536 4424 RCSO
3537 5336 JMP ,=1
3540 5774 JMS MANTS3

```

/CHECK TROUBLE TRANSITION INTERRUPT ENABLE

```

3574 0600
3575 1030
3576 1000
3577 1061
3600 0600 *600
3600 6007 MANTS3, CAF /CLEAR ALL FLAGS
3601 7200 CLA
3602 1042 TAD XIONE
3603 3002 DCA 2
3604 1115 TAD K0002 /ENABLE READY/TROUBLE INTERRUPT
3605 4427 RCNO /READ AC INTO CARD READER
3606 4435 JMS I XTEXT /"OPERATOR MUST PRESS READ STOP (G;D;I;)"
3607 2777 MES19 /OR STOP (DOCUMENTATION);"
3610 6001 ION /TURN ON INTERRUPT
3611 1103 TAD RCNT
3612 3102 DCA DFCNT1
3613 1135 TAD K4000 /DELAY BEFORE MESSAGE RETYPE
3614 3101 DCA DFCNT
3615 2102 ISZ DFCNT1
3616 5215 JMP ,=1
3617 2101 ISZ DFCNT
3620 5215 JMP ,=3
3621 6002 IOF /TURN INTERRUPT OFF
3622 4425 RCSE /ATTEMPT TO SELECT A CARD
3623 5230 JMP ,=5
3624 4435 JMS I XTEXT
3625 2733 MES21 /"READ STOP (G;D;I;)" OR STOP (DOCUMENTATION)"
3626 4430 RCNI /WAS NOT PRESSED,RESTART TEST,"
3627 7402 E13, HLT /ERROR, TEST MUST BE RESTARTED

```

```

0630 4435      JMS I XTEXT
0631 2666      MES17      /"READY/TROUBLE FLAG DIDN'T CAUSE PROGRAM INTERRUPT"
0632 4430      RCNI
0633 7432      E14,      HLT      /ERROR, TEST MUST BE RE-INITIALIZED

/RETURN HERE AFTER PROGRAM INTERRUPT FROM TROUBLE TRANSITION
0634 7200      IONE,      CLA
0635 4430      RCNI      /READ CARD READER FLAGS INTO AC
0636 1133      AND K1000    /IS TROUBLE TRANSITION STATUS BIT (AC2) A ONE?
0637 7650      SNA CLA
0640 7402      E15,      HLT      /ERROR, TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ONE

/CHECK RCNI TO SKIP WITH TROUBLE TRANSITION FLAG ENABLED
0641 4431      RCNI
0642 7402      E16,      HLT      /SKIP IF INTERRUPT IS GENERATED
                                /ERROR, RCNI SHOULD HAVE SKIPPED

/CLEAR TRANSITION FLOP AND CHECK FOR INTERRUPT
0643 4432      RCTF      /CLEAR TRANSITION FLAGS
0644 4431      RCNI
0645 7410      SKP
0646 7402      HLT      /ERROR, RCTF DID NOT CLEAR TRANSITION FLOP
0647 1252      TAD ,+3
0650 3002      DCA 2
0651 7410      SKP
0652 0697      E17,      ION
0653 6001      NOP
0654 7000      IOF
0655 6002      SKP
0656 7410      HLT      /ERROR, RCTF DID NOT DISABLE TRANSITION INTERRUPT
0657 7402      RCNI      /READ CARD READER FLAGS INTO AC
0660 4430      AND K1000    /IS TROUBLE TRANSITION STATUS BIT (AC2) A ZERO?
0661 1133      SZA      /YES, SKIP
0662 7440      E18,      HLT      /ERROR, TROUBLE TRANSITION STATUS BIT SHOULD BE A ZERO

/CHECK READY TRANSITION INTERRUPT ENABLE
0664 6007      MANTS4, CAF      /CLEAR ALL FLAGS
0665 7200      CLA
0666 1044      TAD XIONF
0667 3002      DCA 2
0670 1115      TAD K0002      /ENABLE READY/TROUBLE INTERRUPT
0671 4427      RCNO      /READ AC INTO CARD READER
0672 4435      JMS I XTEXT
0673 3041      MES18      /"OPERATOR MUST PRESS READ START(G,D,1)
                                / OR RESET (DOCUMENTATION),"
                                /TURN ON INTERRUPT
0674 6001      ION
0675 1103      TAD RDCNT
0676 3102      DCA DFCNT1
0677 1135      TAD K4000
0678 3101      DCA DFCNT
0679 2132      ISZ DFCNT1
0680 5301      JMP ,+1
0681 2101      ISZ DFCNT

```

```

0704 5301      JMP ,+3
0705 6002      IOF
0706 4425      RCSE
0707 5314      JMP ,+5
0710 4435      JMS I XTEXT
0711 2666      MES17      /"READY/TROUBLE FLAG DIDN'T CAUSE PROGRAM INTERRUPT"
0712 4430      RCNI      /READ FLAGS INTO AC
0713 7402      E19,      HLT      /ERROR, TEST MUST BE RE-INITIALIZED
0714 4435      JMS I XTEXT
0715 3103      MES22      /"READ START (G,D,1) OR RESET (DOCUMENTATION)
                                /WAS NOT PRESSED, RESTART TEST,"
                                /READ CARD READER FLAGS INTO AC

0716 4430      RCNI
0717 7402      E20,      HLT

/RETURN HERE AFTER PROGRAM INTERRUPT FROM READY/TRUE TRANSITION
0720 7200      IONF,      CLA
0721 4777      JMS CDSTA4      /CHECK READY TRANSITION FLAG
0722 4431      RCNI      /SKIP IF INTERRUPT IS GENERATED
0723 7402      E21,      HLT      /ERROR, RCNI SHOULD HAVE SKIPPED

/CLEAR TRANSITION FLOP WITH CAF INSTRUCTION
0724 6007      CAF      /CLEAR ALL FLAGS
0725 4431      RCNI      /SKIP IF INTERRUPT IS GENERATED
0726 7410      SKP
0727 7432      E22,      HLT      /ERROR, CAF DID NOT CLEAR TRANSITION FLOP
0730 1333      TAD ,+3
0731 3002      DCA 2
0732 7410      SKP
0733 0740      E23,      E23
0734 6001      ION      /TURN ON INTERRUPT
0735 7000      NOP
0736 6002      IOF      /TURN OFF INTERRUPT
0737 7410      SKP
0740 7402      E23,      HLT      /ERROR, CAF DID NOT DISABLE TRANSITION INTERRUPT
0741 4430      RCNI      /READ CARD READER FLAGS INTO AC
0742 1132      AND K0400    /IS READY TRUE STATUS BIT (AC3) A ZERO?
0743 7440      SZA
0744 7402      E24,      HLT      /ERROR, READY TRUE STATUS BIT (AC3) SHOULD BE A ZERO;
0745 4435      JMS I XTEXT
0746 2721      MES20      /"MANUAL TESTS OK"
0747 7402      HLT

0777 1112
0778 1000      *1000
                                /CHECK RCNI WITH CARD READER INITIALIZED
1000 2000      CDSTA1, 0
1001 7300      CLA CLL
1002 4430      RCNI
1003 3110      DCA ACSTAT
1004 1110      TAD ACSTAT      /LOAD CARD READER STATUS BITS INTO AC
1005 0132      AND K0400    /IS READY TRUE TRANSITION STATUS BIT (AC3) A ZERO?
1006 7440      SZA      /YES, SKIP

```

/CRBE/CRBF CARD READER TEST PAL10 V141 22-MAY-72 10104 PAGE 1-10

```

1077 7402 E25, HLT /ERROR, READY TRUE TRANSITION STATUS BIT (AC3) SHOULD BE ZERO
1010 7300 CLA CLL
1011 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1012 0133 AND K1000 /IS TROUBLE TRANSITION STATUS BIT (AC2) A ZERO
1013 7440 SZA /YES, SKIP
1014 7402 E26, HLT /ERROR, TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE ZERO
1015 7300 CLA CLL
1016 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1017 0134 AND K2000 /IS CARD DONE STATUS BIT (AC1) A ZERO?
1020 7440 SZA /YES, SKIP
1021 7402 E27, HLT /ERROR, CARD DONE STATUS BIT (AC1) SHOULD BE ZERO
1022 7300 CLA CLL
1023 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1024 0135 AND K4000 /IS DATA READY STATUS BIT (AC0) A ZERO?
1025 7440 SZA /YES, SKIP
1026 7402 E28, HLT /ERROR, DATA READY STATUS BIT (AC0) SHOULD BE A ZERO
1027 5600 JMP I CDSTA1

/CHECK RCNI WITH DATA FLAG ENABLED
CDSTA2, 0
1030 0000 CLA CLL
1031 7300 RCNI
1032 4430 DCA ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1033 3110 TAD ACSTAT /IS READY TRUE TRANSITION STATUS BIT (AC3) A ZERO?
1034 1110 AND K0400 /YES, SKIP
1035 0132 SZA /ERROR, READY TRUE TRANSITION STATUS BIT (AC3) SHOULD BE A ZERO
1036 7440 E29, HLT
1037 7402 CLA CLL
1040 7300 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1041 1110 AND K1000 /IS TROUBLE TRANSITION STATUS BIT (AC2) A ZERO
1042 0133 SZA /YES, SKIP
1043 7440

1044 7402 E30, HLT /ERROR, TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO
1045 7300 CLA CLL
1046 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1047 0134 AND K2000 /IS CARD DONE STATUS BIT (AC1) A ZERO
1050 7440 SZA /YES, SKIP
1051 7402 E31, HLT /ERROR, CARD DONE STATUS BIT (AC1) SHOULD BE A ZERO
1052 7300 CLA CLL
1053 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1054 0135 AND K4000 /IS DATA READY STATUS BIT (AC0) A ONE
1055 7450 SNA /YES, SKIP
1056 7402 E32, HLT /ERROR, DATA READY STATUS BIT (AC0) SHOULD BE A ONE
1057 7200 CLA
1060 5630 JMP I CDSTA2

/CHECK RCNI WITH CARD DONE FLAG ENABLED
CDSTA3, 0
1061 0000 RCRB /CLEAR DATA READY
1062 4422 RCNI
1063 4430 DCA ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1064 3110 TAD ACSTAT /IS READY TRUE TRANSITION STATUS BIT (AC3) A ZERO?
1065 1110 AND K0400 /YES, SKIP
1066 0132 SZA
1067 7440

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/CRBE/CRBF CARD READER TEST PAL10 V141 22-MAY-72 10104 PAGE 1-11

```

1070 7402 E33, HLT /ERROR, READY TRUE TRANSITION STATUS BIT (AC3) SHOULD BE A ZERO
1071 7300 CLA CLL
1072 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1073 0133 AND K1000 /IS TROUBLE TRANSITION STATUS BIT (AC2) A ZERO
1074 7440 SZA /YES, SKIP
1075 7402 E34, HLT /ERROR, TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO
1076 7300 CLA CLL
1077 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1100 0134 AND K2000 /IS CARD DONE STATUS BIT (AC1) A ONE
1101 7450 SNA /YES, SKIP
1102 7402 E35, HLT /ERROR, CARD DONE STATUS BIT (AC1) SHOULD BE A ONE
1103 7300 CLA CLL
1104 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1105 0135 AND K4000 /IS DATA READY STATUS BIT (AC0) A ZERO
1106 7440 SZA /YES, SKIP
1107 7402 E36, HLT /ERROR, DATA READY STATUS BIT (AC0) SHOULD BE A ZERO
1110 7200 CLA
1111 5661 JMP I CDSTA3

/CHECK RCNI WITH READY TRUE TRANSITION ENABLED
CDSTA4, 0
1112 0000 CLA CLL
1113 7300 RCNI
1114 4430 DCA ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1115 3110 TAD ACSTAT /IS READY TRUE TRANSITION STATUS BIT (AC3) A ONE
1116 1110 AND K0400 /YES, SKIP
1117 0132 SNA /ERROR, READY TRUE TRANSITION STATUS BIT (AC3) SHOULD BE A ONE
1120 7450 E37, HLT
1121 7402 CLA CLL
1122 7300 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1123 1110 AND K1000 /IS TROUBLE TRANSITION STATUS BIT (AC2) A ZERO
1124 0133 SZA /YES, SKIP
1125 7440 E38, HLT /ERROR, TROUBLE TRANSITION STATUS BIT (AC2) SHOULD BE A ZERO
1126 7402 CLA CLL
1127 7300 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1130 1110 AND K2000 /IS CARD DONE STATUS BIT (AC1) A ZERO
1131 0134 SZA /YES, SKIP
1132 7440 E39, HLT /ERROR, CARD DONE STATUS BIT (AC1) SHOULD BE A ZERO
1133 7402 CLA CLL
1134 7300 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1135 1110 AND K4000 /IS DATA READY STATUS BIT (AC0) A ZERO
1136 0135 SZA /YES, SKIP
1137 7440 E40, HLT /ERROR, DATA READY STATUS BIT (AC0) SHOULD BE A ZERO
1140 7402 CLA
1141 7200 JMP I CDSTA4
1142 5712

1200 *1200
/TEST COMPRESSED CODE OF ALPHA DECK WITH COMPRESSED
/COE TABLE AND VERIFY THAT VALIDITY BIT (ACP) DOES NOT SET
1200 7300 CMPTST, CLA CLL
1201 3113 DCA VALCHK
1202 1144 TAD K7370 /1.0 MSEC DELAY

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/CRBE/CRBF CARD READER TEST    PAL10  V141    22-MAY-72    10104    PAGE 1-12

1203 3103      DCA RDCNT
1204 1052      TAD CMPCOD      /SET MODE TO COMPRESSED
1205 3074      DCA MODE
1206 1074      TAD MODE
1207 3075      DCA MODE1
1210 1150      TAD K7703      /SET "C" IN TYP0UT
1211 3457      DCA I XMES9
1212 1141      TAD K6636      /STORE COMPRESSED CODE 10T
1213 3777'     DCA RDATA1
1214 1777'     TAD RDATA1
1215 3776'     DCA RDATA2
1216 2112      ISZ CMCHK      /COMPRESSED CODE INDICATOR
1217 1055      TAD ENC        /SET UP COMPRESSED TABLE TERMINATOR
1220 3107      DCA END
1221 1145      TAD K7660
1222 3073      DCA CRDCNT      /INITIALIZE 80 CARD COUNT
1223 5445      JMP I XLOOP1    /TEST ALPHA CARD DECK IN COMPRESSED MODE

```

/EXERCISE VALIDITY BIT (0) TO DETECT ERRORS BY READING BINARY  
/DECK IN THE COMPRESSED MODE

```

1224 7300      VALTST, CLA CLL
1225 3112      DCA CMCHK
1226 2113      ISZ VALCHK
1227 1144      TAD K7370      /1.0 MSEC DELAY
1230 3103      DCA RDCNT
1231 1051      TAD VALCOD      /SET MODE TO VALIDITY
1232 3074      DCA MODE
1233 1074      TAD MODE
1234 3075      DCA MODE1
1235 1152      TAD K7726      /SET "V" IN TYP0UT
1236 3457      DCA I XMES9
1237 1141      TAD K6636      /STORE COMPRESSED CODE 10T
1240 3777'     DCA RDATA1
1241 1777'     TAD RDATA1
1242 3776'     DCA RDATA2
1243 1145      TAD K7660
1244 3073      DCA CRDCNT      /INITIALIZE 80 CARD COUNT
1245 1056      TAD ENV        /SET UP VALIDITY TABLE TERMINATOR
1246 3107      DCA END
1247 5445      JMP I XLOOP1    /EXERCISE VALIDITY BIT

```

```

1376 1617
1377 1604
1400 1400      *1400
/INITIALIZE DATA ROUTINE FOR POP-8E
DATST, CAF      /CLEAR ALL FLAGS
1401 7200      CLA
1402 1144      TAD K7370      /1.0 MSEC DELAY
1403 3103      DCA RDCNT
1404 7200      CLA
1405 3112      DCA CMCHK      /CLEAR COMPRESSED MODE INDICATOR
1406 3113      DCA VALCHK      /CLEAR VALIDITY MODE INDICATOR

```

```

/CRBE/CRBF CARD READER TEST    PAL10  V141    22-MAY-72    10104    PAGE 1-13

/ DATA TEST
1407 7604      BEGIN, LAS      /TEST AC SW0 = 1 FOR BINARY = 0 FOR ALPHA
1410 7710      SPA CLA
1411 5222      JMP SETBIN
1412 1047      TAD ALPCOD
1413 3074      DCA MODE      /SET MODE TO ALPHA
1414 1146      TAD K7701
1415 3457      DCA I XMES9      /SET "A" IN TYP0UT
1416 1053      TAD ENDA      /SET UP ALPHA TABLE TERMINATOR
1417 3107      DCA END
1420 1137      TAD K6632
1421 5231      JMP ,+10
1422 1050      SETBIN, TAD BINCOD
1423 3074      DCA MODE      /SET MODE TO BINARY
1424 1147      TAD K7702
1425 3457      DCA I XMES9      /SET "B" IN TYP0UT
1426 1054      TAD ENDB      /SET UP BINARY TABLE TERMINATOR
1427 3107      DCA END
1430 1140      TAD K6634
1431 3777'     DCA RDATA1
1432 1777'     TAD RDATA1
1433 3776'     DCA RDATA2
1434 1145      TAD K7660
1435 3073      DCA CRDCNT      /INITIALIZE 80 CARD COUNT
1436 1074      TAD MODE
1437 3075      DCA MODE1
1440 1075      LOOP1, TAD MODE1
1441 3076      DCA DATA
1442 1145      LOOPA, TAD K7660
1443 3072      DCA COLCNT
1444 4424      RCSD
1445 5252      JMP ,+5
1446 4435      JMS I XTEXT      /RCSD = SKIP ON CARD DONE FLAG
1447 2371      MES1            /OK, DID NOT SKIP
1450 4430      RCNI            /ERROR, RCSD SHOULDN'T HAVE SKIPPED
1451 7402      E41, HLT          /"RCSD FAILED OR CARD DONE FLAG PRESENT AT WRONG TIME"
1452 4425      RCSE
1453 7410      SKP
1454 5261      JMP ,+5
1455 4435      JMS I XTEXT      /
1456 2425      MES2            /"RCSE FAILED OR READER NOT READY"
1457 4430      RCNI
1460 7402      E42, HLT          /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED
1461 1103      LOOP2, TAD RDCNT
1462 3102      DCA DFCNT1
1463 3101      DCA DFCNT
1464 4420      RCSF
1465 7410      SKP
1466 5277      JMP E43+1
1467 2101      ISZ DFCNT
1470 5264      JMP ,+4
1471 2102      ISZ DFCNT1
1472 5264      JMP ,+6
1473 4435      JMS I XTEXT      /HAVE DATA FLAG, GO READ DATA
1474 2447      MES3            /NO
/RCSE = SKIP ON DATA FLAG
/HAVE DATA FLAG, GO READ DATA
/HAVE WE WAITED LONG ENOUGH FOR DATA FLAG
/NO
/ERROR, DIDN'T GET DATA FLAG
/"RCSF FAILED OR DATA READY FLAG DIDN'T SET"

```

```

/CRBE/CRRF CARD READER TEST    PAL10  V141    22-MAY-72    10104    PAGE 1-14

1475 4430      RCNI      /HEAD CARD READER FLAGS INTO AC
1476 7402      HLT      /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED
1477 4430      RCNI      /READ FLAGS INTO AC
1500 2135      AND K4000  /IS DATA READY STATUS BIT (AC0) A ONE?
1501 7650      SNA CLA
1502 7402      HLT      /ERROR, DATA READY STATUS BIT (AC0) SHOULD BE A ONE
1503 1041      TAD X10NC
1504 3002      DCA 2
1505 6001      ION      /TURN ON INTERRUPT
1506 7000      NOP      /DATA FLAG SHOULD CAUSE INTERRUPT NOW
1507 6002      IOF
1510 4435      JMS I XTEXT /ERROR NO INTERRUPT OCCURRED
1511 2476      MES4      /"DATA FLAG DIDNT CAUSE PROGRAM INTERRUPT"
1512 4430      RCNI
1513 7402      HLT      /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED

1576 1617
1577 1604
      1600      *1600

/RETURN HERE AFTER PROGRAM INTERRUPT
1600 4420      IONC,     RCSF
1601 5200      JMP .-1
1602 4431      RCS!      /SKIP IF DATA READY INTERRUPT IS GENERATED
1603 7402      E45,     HLT      /ERROR, RCS1 DIDN'T SKIP ON DATA READY INTERRUPT
1604 2000      RDATA1, 0      /RCRA OR RCRB, READ ALPHA OR BINARY DATA
1605 3077      DCA READ1    /SAVE READ 1
1606 4430      RCNI      /READ FLAGS INTO THE AC
1607 0135      AND K4000  /DID DATA READY FLAG CLEAR
1610 7440      SZA      /YES SKIP
1611 7402      HLT      /ERROR, DATA READY STATUS BIT DIDN'T CLEAR
1612 7200      CLA
1613 1103      TAD RDCNT
1614 3104      DCA RDCNT1
1615 2104      ISZ RDCNT1
1616 5215      JMP .-1      /DELAY BEFORE RE-READ
1617 3000      RDATA2, 0    /DO 2ND READ
1620 3100      DCA READ2    /SAVE READ 2
1621 1077      RDCCHK, TAD READ1
1622 7041      CIA
1623 1100      TAD READ2
1624 7640      SZA CLA      /DOES READ1 = READ2 ?
1625 5460      JMP I XDATER  /NO, GO TO ERROR ROUTINE
1626 1077      TAD READ1    /YES
1627 7041      CIA
1630 1476      TAD I DATA
1631 7640      SZA CLA      /DOES READ = EXPECTED DATA?
1632 5460      JMP I XDATER  /NO, GO TO ERROR ROUTINE
1633 2076      ISZ DATA     /* TO DATA TABLE
1634 4471      JMS I UPDAT
1635 2072      ISZ COLCNT
1636 5200      JMP IONC
1637 5240      JMP RDONE

1640 1103      RDONE, TAD RDCNT /TEST CARD DONE FLAG

```

```

/CRBE/CRBF CARD READER TEST    PAL10  V141    22-MAY-72    10104    PAGE 1-15

1641 3105      DCA DNFLG
1642 3106      DCA DNFLG1
1643 4424      RCSD      /RCSD = SKIP ON CARD DONE FLAG
1644 7410      SKP
1645 5256      JMP E48+1    /HAVE CARD DONE FLAG
1646 2105      ISZ DNFLG
1647 5243      JMP .-4
1650 2106      ISZ DNFLG1
1651 5243      JMP .-6
1652 4435      JMS I XTEXT /ERROR, CARD DONE FAILED TO OCCUR
1653 2525      MES5      /"RCSD FAILED OR CARD DONE FLAG DIDN'T SET"
1654 4430      RCNI
1655 7402      E48,     HLT      /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED
1656 4430      RCNI
1657 8134      AND K2000  /DID CARD DONE STATUS BIT (AC1) SET
1660 7650      SNA CLA
1661 7402      HLT      /ERROR, CARD DONE STATUS BIT (AC1) DID NOT SET
1662 7200      CLA
1663 1040      TAD X10NB
1664 3002      DCA 2
1665 6001      ION      /TURN ON INTERRUPT
1666 7000      NOP      /CARD DONE FLAG SHOULD CAUSE INTERRUPT NOW
1667 6002      IOF
1670 4435      JMS I XTEXT /ERROR, NO INTERRUPT OCCURRED
1671 2554      MES6      /"CARD DONE FLAG DIDN'T CAUSE PROGRAM INTERRUPT"
1672 4430      RCNI
1673 7402      HLT      /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED
1674 4431      IONB,     RCS1
1675 7402      HLT      /SKIP IF CARD DONE FLAG IS A ONE
1676 4426      E51,     RCRD    /ERROR, RCS1 DIDN'T SKIP ON CARD DONE INTERRUPT
1677 4424      RCRD      /RCRD = CLEAR CARD DONE FLAG
1678 5305      RCSD      /RCSD = SKIP ON CARD DONE FLAG
1679 4435      JMP .-5      /OK
1681 4435      JMS I XTEXT /ERROR, RCRD FAILED
1682 2605      MES7      /"RCRD DIDN'T CLEAR DONE FLAG"
1683 4430      RCNI      /READ FLAGS INTO THE AC
1684 7402      HLT      /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED

1705 4426      /
1706 4422      RCRD      /CLEAR CARD DONE
1707 2073      RCRB      /CLEAR DATA READY
1710 7410      ISZ CRDCNT
1711 5777      SKP
1712 7604      JMP FINIS
1713 7006      LAS
1714 7006      RTL
1715 3104      DCA RDCNT1
1716 2104      ISZ RDCNT1
1717 5316      JMP .-1
1720 2075      ISZ MODE1
1721 7200      CLA
1722 5445      JMP I XLOOP1
1723 2000
      2000      *2000

2020 7200      FINIS, CLA

```

```

2001 1123      TAD K0207
2002 4436      JMS I XOTY
2003 1127      TAD K0252
2004 4436      JMS I XOTY      /RING BELL AND PRINT "*" AT END OF TEST DECK
2005 7604      LAS
2006 7004      RAL
2007 7006      RTL
2010 7500      SMA      /TEST SW 3=1 TO CONTINUE WITH NEXT TEST DECK,
2011 7402      HLT      /HALT AT END OF TEST DECK
2012 7300      CLA CLL      /COMPRESSED MODE?
2013 1112      TAD CMCHK
2014 7440      SEA
2015 5467      JMP I XCMPE
2016 1113      TAD VALCHK      /VALIDITY CHECK MODE?
2017 7440      SEA
2020 5470      JMP I XVALID
2021 5622      JMP I ,+1      /RESTART DATA TEST
2022 1407      BEGIN

/
/HAVE A DATA ERROR
/SW 1 = 0 PRINT ERROR
/SW 2 = 0 HALT ON ERROR
2023 7604      DATERR, LAS
2024 7004      RAL
2025 7500      SMA      /DOES SW 1 = 0 TO PRINT ERROR?
2026 4234      JMS PRINT      /YES
2027 7604      LAS
2028 7006      RTL
2031 7700      SMA CLA      /DOES SW 2 = 0 TO HALT ON ERROR
2032 7402      HLT      /YES
2033 5777      JMP RDONE

/PRINT ERROR MESSAGE
PRINT, 0
2034 0000      JMS I XTEXT
2035 4435      MES9      /A OR B = CD
2036 2627      TAD CRDNT
2037 1073      TAD K0121
2040 1122      JMS I XDCPRT
2041 4433      JMS I XTEXT
2042 4435      MES10      /CL
2043 2634      TAD COLCNT
2044 1072      TAD K0121
2045 1122      JMS I XDCPRT
2046 4433      JMS I XTEXT
2047 4435      MES11      /G
2050 2640      TAD I DATA
2051 1476      JMS I XDCPRT
2052 4434      JMS I XTEXT
2053 4435      MES12      /R1
2054 2644      TAD READ1
2055 1077      JMS I XDCPRT      /PRINT 1ST READ
2056 4434      JMS I XTEXT
2057 4435

```

```

2060 2650      MES13      /R2
2061 1100      TAD READ2
2062 4434      JMS I XDCPRT      /PRINT 2ND READ
2063 4437      JMS I XCRLF
2064 5634      JMP I PRINT

/TYPE CHARACTER IN AC
OTY, 0
2065 0000      TLA
2066 6046      TSF
2067 6041      JMP ,=1
2070 5267      TCF
2071 6042      CLA
2072 7200      JMP I OTY
2073 5665

/
2074 0000      UPDATA, 0
2075 1076      TAD DATA      /TEST FOR END OF DATA TABLE
2076 7041      CIA
2077 1107      TAD END
2100 7640      SEA CLA
2101 5304      JMP ,+3
2102 1074      TAD MODE      /YES, WE ARE AT END OF DATA TABLE
2103 3076      DCA DATA      /RE-INITIALIZE DATA TABLE
2104 5674      JMP I UPDATA

/
2177 1640      *2200
2200

/PRINT OCTAL NUMBER IN AC
OCTPRT, 0
2200 0000      DCA OCT1
2201 3222      TAD OCT1
2202 1222      RTL
2203 7006      RTL
2204 7006      JMS OCT2      /PRINT 1ST DIGIT
2205 4223      TAD OCT1
2206 1222      RTR
2207 7012      RTR
2210 7012      RTR
2211 7012      JMS OCT2      /PRINT 2ND DIGIT
2212 4223      TAD OCT1
2213 1222      RTR
2214 7012      RAR
2215 7010      JMS OCT2      /PRINT 3RD DIGIT
2216 4223      TAD OCT1
2217 1222      JMS OCT2      /PRINT 4TH DIGIT
2220 4223      JMP I OCTPRT
2221 5600      OCT1, 0
2222 0000      OCT2, 0
2223 0000
2224 7117      AND K0007
2225 1130      TAD K0260
2226 4436      JMS I XOTY
2227 5623      JMP I OCT2

```

```

2230 7070 /TYPE DECIMAL DIGIT IN AC
2231 7510 DECPRT, 0
2232 7040 SPA
2233 3267 CMA
2234 1264 DCA VALUE /SAVE INPUT
2235 3271 TAD CNTR2A
2236 1263 DCA CNTR2B /SET COUNTER TO TWO
2237 3244 TAD ADDR2A
2240 7410 DCA ARROW
2241 3267 SKP
2242 7100 DCA VALUE
2243 1267 CLL
2244 1265 TAD VALUE
2245 7430 TAD TENPWR /SUBTRACT POWER OF TEN
2246 2270 SZL
2247 7430 ISZ DIGIT /DEVELOP BCD DIGIT
2248 5241 JMP ARROW=3 /LOOP
2249 7200 CLA /HAVE BCD DIGIT
2250 1270 TAD DIGIT /GET DIGIT
2251 1130 TAD K0260 /MAKE ASCII
2252 4436 JMS I XOTY /PRINT
2253 7200 CLA
2254 3270 DCA DIGIT /CLEAR
2255 2244 ISZ ARROW /UPDATE POINTER
2256 2271 ISZ CNTR2B /DONE
2257 5243 JMP ARROW=1 /NO

```

```

2262 5630 JMP I DECPRT /YES
2263 1265 ADDR2A, TAD TENPWR
2264 7776 CNTR2A, -2
2265 7766 TENPWR, -12
2266 7777 -1
2267 0000 VALUE, 0
2270 0000 DIGIT, 0
2271 0000 CNTR2B, 0

2300 *2300
2300 4425 /SCOPE LOOP TEST
2301 7402 SCOPE, RCSE
2302 7200 MLY
2303 1145 CLA
2304 3072 TAD K7600
2305 4420 DCA COLCNT
2306 5305 RGSF /SKIP ON DATA READY
2307 4422 JMP, -1 /READ BINARY DATA
2308 2072 RCRB
2309 5305 ISZ COLCNT
2310 5305 JMP, -4
2311 4424 RCRD /SKIP ON CARD DONE
2312 5312 JMP, -1
2313 4426 RCRD /CLEAR CARD DONE FLAG
2314 5300 JMP SCOPE /GET NEXT CARD

```

```

2316 0000 /TAPE 2
2317 7200 /TYPE TEXT
2318 1716 TSR, 0
2319 2316 CLA
2320 3010 TAD I TSR
2321 1410 ISZ TSR
2322 3335 DCA I 10
2323 1410 TAD I 10 /GET CHARACTER
2324 3335 DCA TSR1
2325 1335 TAD TSR1
2326 7012 RTR
2327 7012 RTR
2328 7012 RTR
2329 4336 JMS TSR2 /PRINT LEFT CHARACTER
2330 1335 TAD TSR1
2331 4336 JMS TSR2 /PRINT RIGHT CHARACTER
2332 5323 JMP TSR=5
2333 0000 TSR1, 0
2334 0000 TSR2, 0
2335 0121 AND K0077
2336 7450 SNA /IS CODE = 00
2337 5716 JMP I TSR /YES EXIT
2338 7040 CMA
2339 0121 AND K0077
2340 7440 SZA /IS CODE = 77
2341 5350 JMP, -3 /NO
2342 4437 JMS I XCRLF /YES CR-LF

```

|      |      |            |                                     |
|------|------|------------|-------------------------------------|
| 2347 | 5736 | JMP I TSR2 |                                     |
| 2350 | 7040 | CMA        |                                     |
| 2351 | 0121 | AND K0077  |                                     |
| 2352 | 1154 | TAD K7740  | /RECOMBINE ASCII WITH STRIPPED CODE |
| 2353 | 7500 | SMA        |                                     |
| 2354 | 5357 | JMP ,*3    |                                     |
| 2355 | 1131 | TAD K0340  | /CHARACTER WAS < 40, ADD 300        |
| 2356 | 7410 | SKP        |                                     |
| 2357 | 1126 | TAD K0240  | /CHARACTER WAS > 40, ADD 200        |
| 2360 | 4436 | JMS I XOTY | /PRINT CHARACTER                    |
| 2361 | 5736 | JMP I TSR2 | /EXIT                               |

/CARRIAGE RETURN = LINE FEED

|      |      |            |   |
|------|------|------------|---|
| 2362 | 0000 | CRLF,      | 0 |
| 2363 | 7200 | CLA        |   |
| 2364 | 1125 | TAD K0215  |   |
| 2365 | 4436 | JMS I XOTY |   |
| 2366 | 1124 | TAD K0212  |   |
| 2367 | 4436 | JMS I XOTY |   |
| 2370 | 5762 | JMP I CRLF |   |

/RCS0 FAILED OR CARD DONE FLAG PRESENT AT WRONG TIME

MES1,

|      |      |      |  |
|------|------|------|--|
| 2371 | 2371 | 7722 |  |
| 2372 | 7722 | 0323 |  |
| 2373 | 0323 | 0440 |  |
| 2374 | 0440 | 0601 |  |
| 2375 | 0601 | 1114 |  |
| 2376 | 1114 | 0504 |  |
| 2377 | 0504 | 4017 |  |
| 2400 | 4017 | 2240 |  |
| 2401 | 2240 | 0301 |  |
| 2402 | 0301 | 2204 |  |
| 2403 | 2204 | 4004 |  |
| 2404 | 4004 | 1716 |  |
| 2405 | 1716 | 0540 |  |
| 2406 | 0540 | 0614 |  |
| 2407 | 0614 | 0107 |  |
| 2410 | 0107 | 4020 |  |
| 2411 | 4020 | 2205 |  |
| 2412 | 2205 | 2305 |  |
| 2413 | 2305 | 1624 |  |
| 2414 | 1624 | 4001 |  |
| 2415 | 4001 | 2440 |  |
| 2416 | 2440 | 2722 |  |
| 2417 | 2722 | 1716 |  |
| 2420 | 1716 | 0740 |  |
| 2421 | 0740 | 2411 |  |
| 2422 | 2411 | 1505 |  |
| 2423 | 1505 | 7700 |  |
| 2424 | 7700 |      |  |

/RCSE FAILED OR READER NOT READY

MES2,

|      |      |      |  |
|------|------|------|--|
| 2425 | 2425 | 7722 |  |
| 2426 | 7722 | 0323 |  |
| 2427 | 0323 | 0540 |  |
| 2430 | 0540 | 0601 |  |
| 2431 | 0601 |      |  |

|      |      |      |  |
|------|------|------|--|
| 2432 | 1114 | 1114 |  |
| 2433 | 0504 | 0504 |  |
| 2434 | 4017 | 4017 |  |
| 2435 | 2240 | 2240 |  |
| 2436 | 2205 | 2205 |  |
| 2437 | 0104 | 0104 |  |
| 2440 | 0522 | 0522 |  |
| 2441 | 4016 | 4016 |  |
| 2442 | 1724 | 1724 |  |
| 2443 | 4022 | 4022 |  |
| 2444 | 0501 | 0501 |  |
| 2445 | 0431 | 0431 |  |
| 2446 | 7700 | 7700 |  |

/RCSF FAILED OR DATA READY FLAG DIDN'T SET

MES3,

|      |      |      |  |
|------|------|------|--|
| 2447 | 2447 | 7722 |  |
| 2450 | 7722 | 0323 |  |
| 2451 | 0323 | 0640 |  |
| 2452 | 0640 | 0601 |  |
| 2453 | 0601 | 1114 |  |
| 2454 | 1114 | 0504 |  |
| 2455 | 0504 | 4017 |  |
| 2456 | 4017 | 2240 |  |
| 2457 | 2240 | 0401 |  |
| 2460 | 0401 | 2401 |  |
| 2461 | 2401 | 4022 |  |
| 2462 | 4022 | 0501 |  |
| 2463 | 0501 | 0431 |  |
| 2464 | 0431 | 4006 |  |
| 2465 | 4006 | 1401 |  |
| 2466 | 1401 | 0740 |  |
| 2467 | 0740 | 0411 |  |
| 2470 | 0411 | 0416 |  |
| 2471 | 0416 | 4724 |  |
| 2472 | 4724 | 4023 |  |
| 2473 | 4023 | 0524 |  |
| 2474 | 0524 | 7700 |  |
| 2475 | 7700 |      |  |

/DATA FLAG DIDN'T CAUSE PROGRAM INTERRUPT

MES4,

|      |      |      |  |
|------|------|------|--|
| 2476 | 2476 | 7704 |  |
| 2477 | 7704 | 0124 |  |
| 2500 | 0124 | 0140 |  |
| 2501 | 0140 | 0614 |  |
| 2502 | 0614 | 0107 |  |
| 2503 | 0107 | 4004 |  |
| 2504 | 4004 | 1104 |  |
| 2505 | 1104 | 1647 |  |
| 2506 | 1647 | 2440 |  |
| 2507 | 2440 | 0301 |  |
| 2510 | 0301 | 2523 |  |
| 2511 | 2523 | 0540 |  |
| 2512 | 0540 | 2022 |  |
| 2513 | 2022 | 1707 |  |
| 2514 | 1707 | 2201 |  |
| 2515 | 2201 |      |  |

2516 1540 1540  
 2517 1116 1116  
 2520 2405 2405  
 2521 2222 2222  
 2522 2520 2520  
 2523 2477 2477  
 2524 0000 0000

/RCSD FAILED OR CARD DONE FLAG DIDN'T SET

2525 2525  
 2526 7722  
 2527 0323  
 2530 0440  
 2531 0601  
 2532 1114  
 2533 0504  
 2534 4017  
 2535 2240  
 2536 0301  
 2537 2204  
 2540 4004  
 2541 1716  
 2542 0540  
 2543 0614  
 2544 0107  
 2545 4004  
 2546 1104  
 2547 1647  
 2550 2440  
 2551 2305  
 2552 2477  
 2553 0000

/CARD DONE FLAGS DIDN'T CAUSE PROGRAM INTERRUPT

2554 2554  
 2555 7703  
 2556 0122  
 2557 0440  
 2560 0417  
 2561 1605  
 2562 4006  
 2563 1401  
 2564 0740  
 2565 0411  
 2566 0416  
 2567 4724  
 2570 4003  
 2571 0125  
 2572 2305  
 2573 4020  
 2574 2217  
 2575 0722  
 2576 0115  
 2577 4011  
 2600 1624  
 2601 0522

2602 2225 2225  
 2603 2024 2024  
 2604 7700 7700

/RCRD DIDN'T CLEAR CARD DONE FLAG

2605 2605  
 2606 2203  
 2607 2204  
 2610 4004  
 2611 1104  
 2612 1647  
 2613 2440  
 2614 0314  
 2615 0501  
 2616 2240  
 2617 0301  
 2620 2204  
 2621 4004  
 2622 1716  
 2623 0540  
 2624 0614  
 2625 0107  
 2626 7700

/ALPHA OR BINARY DECK

2627 2627  
 2630 7700  
 2631 4040  
 2632 0304  
 2633 5500  
 2634 2634  
 2635 4040  
 2636 0314  
 2637 5500  
 2640 2640

MES10,

MES11,

MES12,

MES13,

MES14,

MES16,

/MODIFIED (A OR B)

/GL

/G

/RL

/R2

/LOTS OK

/B

|                                                    |      |          |
|----------------------------------------------------|------|----------|
| 2663                                               | 4040 | 4040     |
| 2664                                               | 0255 | 0255     |
| 2665                                               | 2000 | 0000     |
| /READY/TROUBLE FLAG DIDN'T CAUSE PROGRAM INTERRUPT |      |          |
| 2666                                               | 2666 | MES17, 1 |
| 2667                                               | 7722 | 7722     |
| 2670                                               | 0501 | 0501     |
| 2671                                               | 0431 | 0431     |
| 2672                                               | 3424 | 3424     |
| 2673                                               | 2217 | 2217     |
| 2674                                               | 2502 | 2502     |
| 2675                                               | 1405 | 1405     |
| 2676                                               | 4006 | 4006     |
| 2677                                               | 1401 | 1401     |
| 2700                                               | 0740 | 0740     |
| 2701                                               | 0411 | 0411     |
| 2702                                               | 0416 | 0416     |
| 2703                                               | 4724 | 4724     |
| 2704                                               | 4003 | 4003     |
| 2705                                               | 0125 | 0125     |
| 2706                                               | 2305 | 2305     |
| 2707                                               | 4020 | 4020     |
| 2710                                               | 2217 | 2217     |
| 2711                                               | 0722 | 0722     |
| 2712                                               | 0115 | 0115     |
| 2713                                               | 4011 | 4011     |
| 2714                                               | 1624 | 1624     |
| 2715                                               | 0522 | 0522     |
| 2716                                               | 2225 | 2225     |
| 2717                                               | 2024 | 2024     |
| 2720                                               | 7700 | 7700     |

/MANUAL TESTS OK

|      |      |          |
|------|------|----------|
| 2721 | 2721 | MES20, 1 |
| 2722 | 7715 | 7715     |
| 2723 | 0116 | 0116     |
| 2724 | 2501 | 2501     |
| 2725 | 1440 | 1440     |
| 2726 | 2405 | 2405     |
| 2727 | 2324 | 2324     |
| 2730 | 2340 | 2340     |
| 2731 | 1713 | 1713     |
| 2732 | 7700 | 7700     |

/READ STOP (G,D,I) OR STOP (DOCUMENTATION) WAS NOT PRESSED, RESTART TEST

|      |      |          |
|------|------|----------|
| 2733 | 2733 | MES21, 1 |
| 2734 | 7722 | 7722     |
| 2735 | 0501 | 0501     |
| 2736 | 0440 | 0440     |
| 2737 | 2324 | 2324     |
| 2740 | 1720 | 1720     |

|      |      |      |
|------|------|------|
| 2741 | 5007 | 5007 |
| 2742 | 5604 | 5604 |
| 2743 | 5611 | 5611 |
| 2744 | 5651 | 5651 |
| 2745 | 4017 | 4017 |
| 2746 | 2240 | 2240 |
| 2747 | 2324 | 2324 |
| 2750 | 1720 | 1720 |
| 2751 | 5004 | 5004 |
| 2752 | 1703 | 1703 |
| 2753 | 2515 | 2515 |
| 2754 | 0124 | 0124 |
| 2755 | 1117 | 1117 |
| 2756 | 1651 | 1651 |
| 2757 | 4027 | 4027 |
| 2760 | 0123 | 0123 |
| 2761 | 4016 | 4016 |
| 2762 | 1724 | 1724 |
| 2763 | 4020 | 4020 |
| 2764 | 2205 | 2205 |
| 2765 | 2323 | 2323 |
| 2766 | 0504 | 0504 |
| 2767 | 5422 | 5422 |
| 2770 | 0523 | 0523 |
| 2771 | 2401 | 2401 |
| 2772 | 2224 | 2224 |
| 2773 | 4024 | 4024 |
| 2774 | 0523 | 0523 |
| 2775 | 2456 | 2456 |
| 2776 | 7700 | 7700 |

/OPERATOR MUST NOW PRESS READ STOP (G,D,I) OR STOP (DOCUMENTATION)

|      |      |          |
|------|------|----------|
| 2777 | 2777 | MES19, 1 |
| 3000 | 7717 | 7717     |
| 3001 | 2005 | 2005     |
| 3002 | 2201 | 2201     |
| 3003 | 2417 | 2417     |
| 3004 | 2240 | 2240     |
| 3005 | 1525 | 1525     |
| 3006 | 2324 | 2324     |
| 3007 | 4016 | 4016     |
| 3010 | 1727 | 1727     |
| 3011 | 4020 | 4020     |
| 3012 | 2205 | 2205     |
| 3013 | 2323 | 2323     |
| 3014 | 4022 | 4022     |
| 3015 | 0501 | 0501     |
| 3016 | 0440 | 0440     |
| 3017 | 2324 | 2324     |
| 3020 | 1720 | 1720     |
| 3021 | 5007 | 5007     |
| 3022 | 5604 | 5604     |
| 3023 | 5611 | 5611     |
| 3024 | 5651 | 5651     |

|      |      |      |
|------|------|------|
| 3025 | 4017 | 4017 |
| 3026 | 2240 | 2240 |
| 3027 | 2324 | 2324 |
| 3030 | 1720 | 1720 |
| 3031 | 5004 | 5004 |
| 3032 | 1703 | 1703 |
| 3033 | 2515 | 2515 |
| 3034 | 0124 | 0124 |
| 3035 | 1117 | 1117 |
| 3036 | 1651 | 1651 |
| 3037 | 5677 | 5677 |
| 3040 | 0000 | 0000 |

/OPERATOR MUST NOW PRESS READ START (G,D,I) OR RESET (DOCUMENTATION),

|      |      |          |
|------|------|----------|
| 3041 | 3041 | MES10, 1 |
| 3042 | 7717 | 7717     |
| 3043 | 2005 | 2005     |
| 3044 | 2201 | 2201     |
| 3045 | 2417 | 2417     |
| 3046 | 2240 | 2240     |
| 3047 | 1525 | 1525     |
| 3050 | 2324 | 2324     |
| 3051 | 4016 | 4016     |
| 3052 | 1727 | 1727     |
| 3053 | 4020 | 4020     |
| 3054 | 2205 | 2205     |
| 3055 | 2323 | 2323     |
| 3056 | 4022 | 4022     |
| 3057 | 0501 | 0501     |
| 3060 | 0440 | 0440     |
| 3061 | 2324 | 2324     |
| 3062 | 0122 | 0122     |
| 3063 | 2450 | 2450     |
| 3064 | 0756 | 0756     |
| 3065 | 0456 | 0456     |
| 3066 | 1151 | 1151     |
| 3067 | 4017 | 4017     |
| 3070 | 2240 | 2240     |
| 3071 | 2205 | 2205     |
| 3072 | 2305 | 2305     |
| 3073 | 2450 | 2450     |
| 3074 | 0417 | 0417     |
| 3075 | 0325 | 0325     |
| 3076 | 1501 | 1501     |
| 3077 | 2411 | 2411     |
| 3100 | 1710 | 1710     |
| 3101 | 5156 | 5156     |
| 3102 | 7700 | 7700     |

/READ START (G,D,I) OR RESET (DOCUMENTATION) WAS NOT PRESSED, RESTART TEST

|      |      |          |
|------|------|----------|
| 3103 | 3103 | MES22, 1 |
| 3104 | 7722 | 7722     |
| 3105 | 0501 | 0501     |

|      |      |      |
|------|------|------|
| 3106 | 0440 | 0440 |
| 3107 | 2324 | 2324 |
| 3110 | 0122 | 0122 |
| 3111 | 2450 | 2450 |
| 3112 | 0756 | 0756 |
| 3113 | 0456 | 0456 |
| 3114 | 1156 | 1156 |
| 3115 | 5140 | 5140 |
| 3116 | 1722 | 1722 |
| 3117 | 4022 | 4022 |
| 3120 | 0523 | 0523 |
| 3121 | 0524 | 0524 |
| 3122 | 5004 | 5004 |
| 3123 | 1703 | 1703 |
| 3124 | 2515 | 2515 |
| 3125 | 0124 | 0124 |
| 3126 | 1117 | 1117 |
| 3127 | 1651 | 1651 |
| 3130 | 4027 | 4027 |
| 3131 | 0123 | 0123 |
| 3132 | 4016 | 4016 |
| 3133 | 1724 | 1724 |
| 3134 | 4020 | 4020 |
| 3135 | 2205 | 2205 |
| 3136 | 2323 | 2323 |
| 3137 | 0504 | 0504 |
| 3140 | 5422 | 5422 |
| 3141 | 0523 | 0523 |
| 3142 | 2401 | 2401 |
| 3143 | 2224 | 2224 |
| 3144 | 4024 | 4024 |
| 3145 | 0523 | 0523 |
| 3146 | 2456 | 2456 |
| 3147 | 7700 | 7700 |

3200 \*3200

|      |      |          |              |
|------|------|----------|--------------|
| 3200 | 0000 | BINCD, 0 | /CARD COLUMN |
| 3201 | 0001 | 1        | /1           |
| 3202 | 0002 | 2        | /2           |
| 3203 | 0004 | 4        | /4           |
| 3204 | 0010 | 10       | /5           |
| 3205 | 0020 | 20       | /6           |
| 3206 | 0040 | 40       | /7           |
| 3207 | 0100 | 100      | /8           |
| 3210 | 0200 | 200      | /9           |
| 3211 | 0400 | 400      | /10          |
| 3212 | 1000 | 1000     | /11          |
| 3213 | 2000 | 2000     | /12          |
| 3214 | 4000 | 4000     | /13          |
| 3215 | 1111 | 1111     | /14          |
| 3216 | 2222 | 2222     | /15          |
| 3217 | 3333 | 3333     | /16          |
| 3220 | 4444 | 4444     | /17          |

|      |      |      |     |
|------|------|------|-----|
| 3221 | 5555 | 5555 | /18 |
| 3222 | 6666 | 6666 | /19 |
| 3223 | 7777 | 7777 | /20 |
| 3224 | 1010 | 1010 | /21 |
| 3225 | 1212 | 1212 | /22 |
| 3226 | 1313 | 1313 | /23 |
| 3227 | 1414 | 1414 | /24 |
| 3230 | 1515 | 1515 | /25 |
| 3231 | 1616 | 1616 | /26 |
| 3232 | 1717 | 1717 | /27 |
| 3233 | 2020 | 2020 | /28 |
| 3234 | 2121 | 2121 | /29 |
| 3235 | 2323 | 2323 | /30 |
| 3236 | 2424 | 2424 | /31 |
| 3237 | 2525 | 2525 | /32 |
| 3240 | 2626 | 2626 | /33 |
| 3241 | 2727 | 2727 | /34 |
| 3242 | 3030 | 3030 | /35 |
| 3243 | 3131 | 3131 | /36 |
| 3244 | 3232 | 3232 | /37 |
| 3245 | 3434 | 3434 | /38 |
| 3246 | 3535 | 3535 | /39 |
| 3247 | 3636 | 3636 | /40 |
| 3250 | 3737 | 3737 | /41 |
| 3251 | 4040 | 4040 | /42 |
| 3252 | 4141 | 4141 | /43 |
| 3253 | 4242 | 4242 | /44 |
| 3254 | 4343 | 4343 | /45 |
| 3255 | 4545 | 4545 | /46 |
| 3256 | 4646 | 4646 | /47 |
| 3257 | 4747 | 4747 | /48 |
| 3260 | 5050 | 5050 | /49 |
| 3261 | 5151 | 5151 | /50 |
| 3262 | 5252 | 5252 | /51 |
| 3263 | 5353 | 5353 | /52 |
| 3264 | 5454 | 5454 | /53 |
| 3265 | 5656 | 5656 | /54 |
| 3266 | 5757 | 5757 | /55 |
| 3267 | 6060 | 6060 | /56 |
| 3270 | 6161 | 6161 | /57 |
| 3271 | 6262 | 6262 | /58 |
| 3272 | 6363 | 6363 | /59 |
| 3273 | 6464 | 6464 | /60 |
| 3274 | 6565 | 6565 | /61 |
| 3275 | 6767 | 6767 | /62 |
| 3276 | 7070 | 7070 | /63 |
| 3277 | 7171 | 7171 | /64 |
| 3300 | 7272 | 7272 | /65 |
| 3301 | 7373 | 7373 | /66 |
| 3302 | 7474 | 7474 | /67 |
| 3303 | 7575 | 7575 | /68 |
| 3304 | 7676 | 7676 | /69 |
| 3305 | 0101 | 0101 | /70 |
| 3306 | 0202 | 0202 | /71 |
| 3307 | 0303 | 0303 | /72 |

|      |                   |      |     |
|------|-------------------|------|-----|
| 3310 | 0404              | 0404 | /73 |
| 3311 | 0505              | 0505 | /74 |
| 3312 | 0606              | 0606 | /75 |
| 3313 | 0707              | 0707 | /76 |
| 3314 | 3210              | 3210 | /77 |
| 3315 | 0123              | 0123 | /78 |
| 3316 | 7654              | 7654 | /79 |
| 3317 | 4567              | 4567 | /80 |
| 3400 | ENDB1,<br>/ *3400 |      |     |

|      |      |    | /COLUMN CHAR HOLLERITH |   |
|------|------|----|------------------------|---|
| 3400 | 0060 | 60 | /1                     | A |
| 3401 | 0061 | 61 | /2                     | B |
| 3402 | 0062 | 62 | /3                     | C |
| 3403 | 0063 | 63 | /4                     | D |
| 3404 | 0064 | 64 | /5                     | E |
| 3405 | 0065 | 65 | /6                     | F |
| 3406 | 0066 | 66 | /7                     | G |
| 3407 | 0067 | 67 | /8                     | H |
| 3410 | 0070 | 70 | /9                     |   |

|      |      |    | /COLUMN CHAR HOLLERITH |      |
|------|------|----|------------------------|------|
| 3411 | 0071 | 71 | /10                    | I    |
| 3412 | 0072 | 72 | /11                    | CENT |
| 3413 | 0073 | 73 | /12                    | J    |
| 3414 | 0074 | 74 | /13                    | K    |
| 3415 | 0075 | 75 | /14                    | L    |
| 3416 | 0076 | 76 | /15                    | M    |
| 3417 | 0077 | 77 | /16                    | N    |
| 3420 | 0040 | 40 | /17                    | O    |
| 3421 | 0041 | 41 | /18                    | P    |
| 3422 | 0042 | 42 | /19                    | Q    |
| 3423 | 0043 | 43 | /20                    | R    |
| 3424 | 0044 | 44 | /21                    | S    |
| 3425 | 0045 | 45 | /22                    | T    |
| 3426 | 0046 | 46 | /23                    | U    |
| 3427 | 0047 | 47 | /24                    | V    |
| 3430 | 0050 | 50 | /25                    | W    |
| 3431 | 0051 | 51 | /26                    | X    |
| 3432 | 0052 | 52 | /27                    | Y    |
| 3433 | 0053 | 53 | /28                    | Z    |
| 3434 | 0054 | 54 | /29                    |      |
| 3435 | 0055 | 55 | /30                    |      |
| 3436 | 0056 | 56 | /31                    |      |
| 3437 | 0057 |    | /32                    |      |
| 3440 | 0020 | 20 | /33                    |      |
| 3441 | 0021 | 21 | /34                    |      |
| 3442 | 0022 | 22 | /35                    |      |
| 3443 | 0023 | 23 | /36                    |      |
| 3444 | 0024 | 24 | /37                    |      |
| 3445 | 0025 | 25 | /38                    |      |
| 3446 | 0026 | 26 | /39                    |      |
| 3447 | 0027 | 27 | /40                    |      |
| 3450 | 0030 | 30 | /41                    |      |
| 3451 | 0031 | 31 | /42                    |      |

|      |      |    |     |       |        |
|------|------|----|-----|-------|--------|
| 3452 | 0032 | 32 | /43 | 0 8 2 | 1202   |
| 3453 | 0033 | 33 | /44 | 0 8 3 | 1102   |
| 3454 | 0034 | 34 | /45 | 0 8 4 | 1042   |
| 3455 | 0035 | 35 | /46 | 0 8 5 | 1022   |
| 3456 | 0036 | 36 | /47 | 0 8 6 | 1012   |
| 3457 | 0037 | 37 | /48 | 0 8 7 | 1002   |
| 3460 | 0000 | 00 | /49 | BLANK |        |
| 3461 | 0001 | 01 | /50 | 1     | 400    |
| 3462 | 0002 | 02 | /51 | 2     | 200    |
| 3463 | 0003 | 03 | /52 | 3     | 100    |
| 3464 | 0004 | 04 | /53 | 4     | 40     |
| 3465 | 0005 | 05 | /54 | 5     | 20     |
| 3466 | 0006 | 06 | /55 | 6     | 10     |
| 3467 | 0007 | 07 | /56 | 7     | 4      |
| 3470 | 0010 | 10 | /57 | 8     | 2      |
| 3471 | 0011 | 11 | /58 | 9     | 1      |
| 3472 | 0012 | 12 | /59 | 0 2   | 0202   |
| 3473 | 0013 | 13 | /60 | 0 3   | 0102   |
| 3474 | 0014 | 14 | /61 | 0 4   | 0042   |
| 3475 | 0015 | 15 | /62 | 0 5   | 22     |
| 3476 | 0016 | 16 | /63 | 0 6   | 12     |
| 3477 | 0017 | 17 | /64 | 0 7   | 6      |
| 3500 | 0060 | 00 | /65 | 12    | 4000   |
| 3501 | 0061 | 01 | /66 | 12 1  | 4000   |
| 3502 | 0062 | 02 | /67 | 12 2  |        |
| 3503 | 0063 | 03 | /68 | 12 3  |        |
| 3504 | 0064 | 04 | /69 | 12 4  |        |
| 3505 | 0065 | 05 | /70 | 12 5  |        |
| 3506 | 0066 | 06 | /71 | 12 6  |        |
| 3507 | 0067 | 07 | /72 | 12 7  |        |
| 3510 | 0070 | 70 | /73 | 12 8  |        |
| 3511 | 0071 | 71 | /74 | 12 9  |        |
| 3512 | 0072 | 72 | /75 | CENT  | 12 8 2 |
| 3513 | 0073 | 73 | /76 |       | 12 8 3 |
| 3514 | 0074 | 74 | /77 |       | 12 8 4 |
| 3515 | 0075 | 75 | /78 |       | 12 8 5 |
| 3516 | 0076 | 76 | /79 |       | 12 8 6 |
| 3517 | 0077 | 77 | /80 | 1     | 12 8 7 |

/COMPRESSED CODE TABLE

| 3600 | *3600 | /COLUMN | /CHAR | /HOLLERITH |
|------|-------|---------|-------|------------|
| 3600 | 0100  | /1      | A     | 12 1       |
| 3601 | 0101  | /2      | B     | 12 2       |
| 3602 | 0102  | /3      | C     | 12 3       |
| 3603 | 0103  | /4      | D     | 12 4       |
| 3604 | 0104  | /5      | E     | 12 5       |
| 3605 | 0105  | /6      | F     | 12 6       |
| 3606 | 0106  | /7      | G     | 12 7       |
| 3607 | 0107  | /8      | H     | 12 8       |
| 3610 | 0110  | /9      | I     | 12 9       |
| 3611 | 0300  | /10     | CENT  | 12 8 2     |
| 3612 | 0112  | /11     |       |            |

|      |      |     |     |        |
|------|------|-----|-----|--------|
| 3613 | 0113 | 113 | /12 | 12 8 3 |
| 3614 | 0114 | 114 | /13 | 12 8 4 |
| 3615 | 0115 | 115 | /14 | 12 8 5 |
| 3616 | 0116 | 116 | /15 | 12 8 6 |
| 3617 | 0117 | 117 | /16 | 12 8 7 |
| 3620 | 0040 | 40  | /17 | 11     |
| 3621 | 0041 | 41  | /18 | 11 1   |
| 3622 | 0042 | 42  | /19 | 11 2   |
| 3623 | 0043 | 43  | /20 | 11 3   |
| 3624 | 0044 | 44  | /21 | 11 4   |
| 3625 | 0045 | 45  | /22 | 11 5   |
| 3626 | 0046 | 46  | /23 | 11 6   |
| 3627 | 0047 | 47  | /24 | 11 7   |
| 3630 | 0050 | 50  | /25 | 11 8   |
| 3631 | 0240 | 240 | /26 | 11 9   |
| 3632 | 0052 | 52  | /27 | 11 0 2 |
| 3633 | 0053 | 53  | /28 | 11 0 3 |
| 3634 | 0054 | 54  | /29 | 11 0 4 |
| 3635 | 0055 | 55  | /30 | 11 0 5 |
| 3636 | 0056 | 56  | /31 | 11 0 6 |
| 3637 | 0057 | 57  | /32 | 11 0 7 |
| 3640 | 0020 | 20  | /33 | 0      |
| 3641 | 0021 | 21  | /34 | 0 1    |
| 3642 | 0022 | 22  | /35 | 0 2    |
| 3643 | 0023 | 23  | /36 | 0 3    |
| 3644 | 0024 | 24  | /37 | 0 4    |
| 3645 | 0025 | 25  | /38 | 0 5    |
| 3646 | 0026 | 26  | /39 | 0 6    |
| 3647 | 0027 | 27  | /40 | 0 7    |
| 3650 | 0030 | 30  | /41 | 0 8    |
| 3651 | 0220 | 220 | /42 | 0 9    |
| 3652 | 0032 | 32  | /43 | 0 8 2  |
| 3653 | 0033 | 33  | /44 | 0 8 3  |
| 3654 | 0034 | 34  | /45 | 0 8 4  |
| 3655 | 0035 | 35  | /46 | 0 8 5  |
| 3656 | 0036 | 36  | /47 | 0 8 6  |
| 3657 | 0037 | 37  | /48 | 0 8 7  |
| 3660 | 0000 | 00  | /49 | BLANK  |
| 3661 | 0001 | 01  | /50 | 1      |
| 3662 | 0002 | 02  | /51 | 2      |
| 3663 | 0003 | 03  | /52 | 3      |
| 3664 | 0004 | 04  | /53 | 4      |
| 3665 | 0005 | 05  | /54 | 5      |
| 3666 | 0006 | 06  | /55 | 6      |
| 3667 | 0007 | 07  | /56 | 7      |
| 3670 | 0010 | 10  | /57 | 8      |
| 3671 | 0200 | 200 | /58 | 9      |
| 3672 | 0012 | 12  | /59 | 0 2    |
| 3673 | 0013 | 13  | /60 | 0 3    |
| 3674 | 0014 | 14  | /61 | 0 4    |
| 3675 | 0015 | 15  | /62 | 0 5    |
| 3676 | 0016 | 16  | /63 | 0 6    |
| 3677 | 0017 | 17  | /64 | 0 7    |
| 3700 | 0100 | 100 | /65 | 12     |
| 3701 | 0101 | 101 | /66 | 12 1   |

|      |      |     |     |      |        |
|------|------|-----|-----|------|--------|
| 3702 | 0102 | 102 | /67 | B    | 12 2   |
| 3703 | 0103 | 103 | /68 | C    | 12 3   |
| 3704 | 0104 | 104 | /69 | D    | 12 4   |
| 3705 | 0105 | 105 | /70 | E    | 12 5   |
| 3706 | 0106 | 106 | /71 | F    | 12 6   |
| 3707 | 0107 | 107 | /72 | G    | 12 7   |
| 3710 | 0110 | 110 | /73 | H    | 12 8   |
| 3711 | 0300 | 300 | /74 | I    | 12 9   |
| 3712 | 0112 | 112 | /75 | CENT | 12 8 2 |
| 3713 | 0113 | 113 | /76 | ,    | 12 8 3 |
| 3714 | 0114 | 114 | /77 | .    | 12 8 4 |
| 3715 | 0115 | 115 | /78 | !    | 12 8 5 |
| 3716 | 0116 | 116 | /79 | @    | 12 8 6 |
| 3717 | 0117 | 117 | /80 | 1    | 12 8 7 |

ENDCM1, 117

4000 \*4000

/VALIDITY BIT TABLE  
/TABLE OF BINARY CARD DECK IN COMPRESSED MODE TABLE USED  
/TO VERIFY VALIDITY BIT

/COLUMN /BINARY /ONES

|      |      |          |     |      |                                        |
|------|------|----------|-----|------|----------------------------------------|
| 4000 | 0000 | VALCD: 0 | /1  | 0    | 0                                      |
| 4001 | 0200 | 200      | /2  | 1    | 29                                     |
| 4002 | 0010 | 10       | /3  | 2    | 00                                     |
| 4003 | 0007 | 7        | /4  | 4    | 27                                     |
| 4004 | 0006 | 6        | /5  | 10   | 26                                     |
| 4005 | 0005 | 5        | /6  | 20   | 25                                     |
| 4006 | 0004 | 4        | /7  | 40   | 24                                     |
| 4007 | 0003 | 3        | /8  | 100  | 23                                     |
| 4010 | 0002 | 2        | /9  | 200  | 22                                     |
| 4011 | 0001 | 1        | /10 | 400  | 21                                     |
| 4012 | 0020 | 20       | /11 | 1000 | 210                                    |
| 4013 | 0040 | 40       | /12 | 2000 | 211                                    |
| 4014 | 2100 | 100      | /13 | 4000 | 212                                    |
| 4015 | 4227 | 4227     | /14 | 1111 | 210,23,24,29                           |
| 4016 | 4057 | 4057     | /15 | 2222 | 211,22,25,28                           |
| 4017 | 4277 | 4277     | /16 | 3333 | 211,210,22,23,25,26,28,29              |
| 4020 | 4107 | 4107     | /17 | 4444 | 212,21,24,27                           |
| 4021 | 4327 | 4327     | /18 | 5555 | 212,210,21,23,24,26,27,29              |
| 4022 | 4157 | 4157     | /19 | 6666 | 212,211,21,22,24,25,27,28              |
| 4023 | 4377 | 4377     | /20 | 7777 | 212,211,210,21,22,23,24,25,26,27,28,29 |
| 4024 | 0026 | 26       | /21 | 1010 | 210,26                                 |
| 4025 | 4036 | 4036     | /22 | 1212 | 210,22,26,28                           |
| 4026 | 4237 | 4237     | /23 | 1313 | 210,22,23,26,28,29                     |
| 4027 | 4027 | 4027     | /25 | 1414 | 210,21,26,27                           |
| 4030 | 4227 | 4227     | /25 | 1515 | 210,21,23,26,27,29                     |
| 4031 | 4037 | 4037     | /26 | 1616 | 210,21,22,26,27,28                     |
| 4032 | 4237 | 4237     | /27 | 1717 | 210,21,22,23,24,27,28,29               |
| 4033 | 0045 | 45       | /28 | 2020 | 211,25                                 |

|      |      |      |     |      |                           |
|------|------|------|-----|------|---------------------------|
| 4034 | 4247 | 4247 | /29 | 2121 | 211,23,25,29              |
| 4035 | 4257 | 4257 | /30 | 2323 | 211,22,23,25,28,29        |
| 4036 | 4047 | 4047 | /31 | 2424 | 211,21,25,27              |
| 4037 | 4247 | 4247 | /32 | 2525 | 211,21,23,25,27,29        |
| 4040 | 4057 | 4057 | /33 | 2626 | 211,21,22,25,27,28        |
| 4041 | 4257 | 4257 | /34 | 2727 | 211,21,22,23,25,27,28,29  |
| 4042 | 4067 | 4067 | /35 | 3030 | 211,210,25,26             |
| 4043 | 4267 | 4267 | /36 | 3131 | 211,210,23,25,26,29       |
| 4044 | 4077 | 4077 | /37 | 3232 | 211,210,22,25,26,28       |
| 4045 | 4067 | 4067 | /38 | 3434 | 211,210,21,25,26,27       |
| 4046 | 4267 | 4267 | /39 | 3535 | 211,210,21,23,25,26,27,29 |
| 4047 | 4077 | 4077 | /40 | 3636 | 211,210,21,22,25,26,27,28 |

/COLUMN BINARY ZONES

|      |      |      |     |      |                                  |
|------|------|------|-----|------|----------------------------------|
| 4050 | 4277 | 4277 | /41 | 3737 | 211,210,21,22,23,25,26,27,28,29  |
| 4051 | 0104 | 104  | /42 | 4040 | 212,24                           |
| 4052 | 4307 | 4307 | /43 | 4141 | 212,23,24,29                     |
| 4053 | 4116 | 4116 | /44 | 4247 | 212,22,24,28                     |
| 4054 | 4317 | 4317 | /45 | 4343 | 212,22,23,24,28,29               |
| 4055 | 4307 | 4307 | /46 | 4545 | 212,21,23,24,27,29               |
| 4056 | 4117 | 4117 | /47 | 4646 | 212,21,22,24,27,28               |
| 4057 | 4317 | 4317 | /48 | 4747 | 212,21,22,23,24,27,28,29         |
| 4060 | 4126 | 4126 | /49 | 5050 | 212,210,24,26                    |
| 4061 | 4327 | 4327 | /50 | 5151 | 212,210,23,24,26,29              |
| 4062 | 4136 | 4136 | /51 | 5252 | 212,210,22,24,26,28              |
| 4063 | 4337 | 4337 | /52 | 5353 | 212,210,22,23,24,26,28,29        |
| 4064 | 4127 | 4127 | /53 | 5454 | 212,210,21,24,26,27              |
| 4065 | 4137 | 4137 | /54 | 5656 | 212,210,21,22,24,26,27,28        |
| 4066 | 4337 | 4337 | /55 | 5757 | 212,210,21,22,23,24,26,27,28,29  |
| 4067 | 4145 | 4145 | /56 | 6060 | 212,211,24,25                    |
| 4070 | 4347 | 4347 | /57 | 6161 | 212,211,23,24,25,29              |
| 4071 | 4157 | 4157 | /58 | 6262 | 212,211,22,24,25,28              |
| 4072 | 4357 | 4357 | /59 | 6363 | 212,211,22,23,24,25,28,29        |
| 4073 | 4147 | 4147 | /60 | 6464 | 212,211,21,24,25,27              |
| 4074 | 4347 | 4347 | /61 | 6565 | 212,211,21,23,24,25,27,29        |
| 4075 | 4357 | 4357 | /62 | 6767 | 212,211,21,22,23,24,25,27,28,29  |
| 4076 | 4167 | 4167 | /63 | 7070 | 212,211,210,24,25,26             |
| 4077 | 4367 | 4367 | /64 | 7171 | 212,211,210,23,24,25,26,29       |
| 4100 | 4177 | 4177 | /65 | 7272 | 212,211,210,22,24,25,26,28       |
| 4101 | 4377 | 4377 | /66 | 7373 | 212,211,210,22,23,24,25,26,28,29 |
| 4102 | 4167 | 4167 | /67 | 7474 | 212,211,210,21,24,25,26,27       |
| 4103 | 4367 | 4367 | /68 | 7575 | 212,211,210,21,23,24,25,26,27,29 |
| 4104 | 4177 | 4177 | /69 | 7676 | 212,211,210,21,22,25,26,27,28    |
| 4105 | 0203 | 203  | /70 | 0101 | 23,29                            |
| 4106 | 0012 | 12   | /71 | 0202 | 22,28                            |
| 4107 | 4213 | 4213 | /72 | 0303 | 22,23,28,29                      |
| 4110 | 4007 | 4007 | /73 | 0404 | 21,27                            |
| 4111 | 4207 | 4207 | /74 | 0505 | 21,23,27,29                      |
| 4112 | 4017 | 4017 | /75 | 0606 | 21,22,27,28                      |
| 4113 | 4217 | 4217 | /76 | 0707 | 21,22,23,27,28,29                |
| 4114 | 4066 | 4066 | /77 | 3210 | 211,210,22,26                    |
| 4115 | 4217 | 4217 | /78 | 0213 | 23,25,27,28,29                   |
| 4116 | 4167 | 4167 | /79 | 7654 | 212,211,210,21,22,24,26,27       |
| 4117 | 4317 | 4317 | /80 | 4567 | 212,21,23,24,25,27,28,29         |

ENDVL1, 4317



```

4000 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
4100 11111111 11111111 00000000 00000000 00000000 00000000 00000000 00000000

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700

```

| /CR8E/CR8F CARD READER TEST |      | PAL10  | V141 | 22-MAY-72 | 10104 | PAGE 2-18   |
|-----------------------------|------|--------|------|-----------|-------|-------------|
| ACSTAT                      | 0110 | E27    | 1021 | IOTCNT    | 0111  | ME017 2666  |
| ADDRZA                      | 2263 | E28    | 1026 | IOTST     | 0276  | ME018 3041  |
| ALPCD                       | 3490 | E29    | 1037 | K0001     | 0114  | ME019 2777  |
| ALPCOD                      | 0047 | E3     | 0315 | K0002     | 0115  | ME02 2425   |
| ARROW                       | 2244 | E30    | 1044 | K0003     | 0116  | ME020 2721  |
| BEGIN                       | 1407 | E31    | 1051 | K0007     | 0117  | ME021 2733  |
| BINCD                       | 3200 | E32    | 1056 | K0051     | 0120  | ME022 3103  |
| BINCOD                      | 0050 | E33    | 1070 | K0077     | 0121  | ME03 2447   |
| CAF                         | 6007 | E34    | 1075 | K0121     | 0122  | ME04 2476   |
| CDSTA1                      | 1000 | E35    | 1102 | K0207     | 0123  | ME05 2525   |
| CDSTA2                      | 1030 | E36    | 1107 | K0212     | 0124  | ME06 2554   |
| CDSTA3                      | 1061 | E37    | 1121 | K0215     | 0125  | ME07 2605   |
| CDSTA4                      | 1112 | E38    | 1126 | K0240     | 0126  | ME09 2627   |
| CMCHK                       | 0112 | E39    | 1133 | K0252     | 0127  | MNUAL 0204  |
| CMPCB                       | 0206 | E4     | 0321 | K0260     | 0130  | MODE 0074   |
| CMPCOD                      | 0052 | E40    | 1140 | K0340     | 0131  | MODE1 0075  |
| CMPCRD                      | 3600 | E41    | 1451 | K0400     | 0132  | ODT1 2222   |
| CMPTST                      | 1200 | E42    | 1460 | K1000     | 0133  | ODT2 2223   |
| CNTRZA                      | 2264 | E43    | 1476 | K2000     | 0134  | ODTPRT 2200 |
| CNTRZB                      | 2271 | E43A   | 1502 | K377      | 0143  | OTY 2065    |
| COLCNT                      | 0072 | E44    | 1513 | K4000     | 0135  | PRINT 2034  |
| CRDCNT                      | 0073 | E45    | 1603 | K5252     | 0136  | PRINTA 0063 |
| CRLF                        | 2362 | E46    | 1611 | K6032     | 0137  | RQNI 4430   |
| DATA                        | 0076 | E48    | 1655 | K6034     | 0140  | RQNO 4427   |
| DATAB                       | 0200 | E49    | 1661 | K6036     | 0141  | RCRA 4421   |
| DATERR                      | 2023 | E5     | 0335 | K7000     | 0156  | RCRB 4422   |
| DATST                       | 1400 | E50    | 1673 | K7370     | 0144  | RCRC 4423   |
| DECPRT                      | 2230 | E51    | 1675 | K7660     | 0145  | RCRD 4426   |
| DFCNT                       | 0101 | E52    | 1704 | K7701     | 0146  | RCSD 4424   |
| DFCNT1                      | 0102 | E53    | 2011 | K7702     | 0147  | RCSE 4425   |
| DIGIT                       | 2270 | E54    | 2032 | K7703     | 0150  | RCBF 4420   |
| DNFLG                       | 0105 | E6     | 0412 | K7715     | 0151  | RCBI 4431   |
| DNFLG1                      | 0106 | E7     | 0430 | K7726     | 0152  | RCIF 4432   |
| E1                          | 0304 | E8     | 0447 | K7730     | 0153  | RDATA1 1604 |
| E10                         | 0466 | E9     | 0454 | K7740     | 0154  | RDATA2 1617 |
| E11                         | 0520 | ENC    | 0055 | K7771     | 0155  | RDCHCK 1621 |
| E12                         | 0534 | END    | 0107 | K7777     | 0142  | RDONT 0103  |
| E13                         | 0627 | ENDA   | 0093 | LOOP1     | 1440  | RDONT1 0104 |
| E14                         | 0633 | ENDA1  | 3517 | LOOP2     | 1441  | RDONE 1640  |
| E15                         | 0640 | ENDB   | 0094 | LOOPA     | 1442  | READ1 0077  |
| E16                         | 0642 | ENDB1  | 3317 | MANTS1    | 0431  | READ2 0100  |
| E17                         | 0657 | ENDCH1 | 3717 | MANTS2    | 0400  | SCOPE 2300  |
| E18                         | 0663 | ENDVLI | 4117 | MANTS3    | 0600  | SETBIN 1422 |
| E19                         | 0713 | ENV    | 0096 | MANTS4    | 0644  | TENPWR 2245 |
| E2                          | 0310 | FINIS  | 2000 | MANTS7    | 0400  | TSR 2314    |
| E20                         | 0717 | IONB   | 1674 | ME01      | 2371  | TSR1 2335   |
| E21                         | 0723 | IONC   | 1600 | ME010     | 2634  | TSR2 2336   |
| E22                         | 0727 | IOND   | 0535 | ME011     | 2640  | UPDAT 0071  |
| E23                         | 0740 | IONE   | 0634 | ME012     | 2644  | UPDATA 2074 |
| E24                         | 0744 | IONF   | 0720 | ME013     | 2650  | VALCO 4000  |
| E25                         | 1007 | IOY1   | 0302 | ME014     | 2694  | VALCHK 0113 |
| E26                         | 1014 | IOY0   | 0202 | ME016     | 2662  | VALCOD 0051 |

VALID 2210  
VALTST 1224  
VALUE 2267  
XCMPBE 2067  
XCRLF 0037  
XDATER 0060  
XDATST 0065  
XDCPRT 0033  
XIONB 0040  
XIONC 0041  
XIOND 0042  
XIONE 0043  
XIONF 0044  
XIOTST 0064  
XLOOP1 0045  
XLOOP2 0046  
XLOOPA 0062  
XMES9 0057  
XNUAL 0066  
XDCPRT 0034  
XQTY 0036  
XRCNI 0240  
XRCNO 0254  
XRCRA 0217  
XRCRB 0224  
XRCRC 0231  
XRCRD 0250  
XRCSD 0236  
XRCSE 0243  
XRCSE 0212  
XRCSE 0265  
XRCSE 0272  
XRDAT1 0061  
XTEXT 0035  
XVALID 0070  
XXRCNI 0030  
XXRCNO 0027  
XXRCRA 0021  
XXRCRB 0022  
XXRCRC 0023  
XXRCRD 0026  
XXRCSD 0024  
XXRCSE 0025  
XXRCSE 0020  
XXRCSE 0031  
XXRCTF 0032

ERRORS DETECTED: 0

LINKS GENERATED: 21

RUN-TIME: 13 SECONDS

