

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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DIGITAL EQUIPMENT CORPORATION

1. ABSTRACT

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

2. REQUIREMENTS

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

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

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

4.1 CONTROL SWITCH SETTINGS

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

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

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

STATIC IOT TESTS FOR CR8E CARD READER

- 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

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

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

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

- 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

REFERENCE 6,0

4, DOCUMENTATION M200 (CRBF) PROGRAM AND/OR OPERATOR ACTION

STATIC IOT TESTS FOR CRBF CARD READER

- 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 CRBF CARD READER

- 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

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

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

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

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	RCSD FAILED OR CARD DONE FLAG PRESENT AT WRONG TIME
E42	1460	RCSE FAILED OR READER NOT READY
E43	1476	RCSE 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	RCSE DIDN'T SKIP ON DATA READY INTERRUPT
E46	1611	RCNI-DATA READY STATUS BIT (AC0) DIDN'T CLEAR
E48	1655	RCSD 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	RCSE DIDN'T SKIP ON CARD DONE INTERRUPT
E52	1704	RCRD 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

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, ALPHA-NUMERIC 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

/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
/SW0 = 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

/I/O 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 5402 JMP I ,+1 /EXIT FROM INTERRUPT
0002 0000 /INTERRUPT RETURN POINTER
*003 7402 HLT /ERROR, SHOULD NEVER REACH HERE

/PAGE REFERENCE POINTERS
*20
0020 0212 XXRCSE, XRCSE
0021 0217 XXRCRA, XRCRA
0022 0224 XXRCRB, XRCRB
0023 0231 XXRCRC, XRCRC
0024 0236 XXRCSD, XRCSD
0025 0243 XXRCSE, XRCSE
0026 0250 XXRCRD, XRCRD
0027 0254 XXRCNO, XRCNO
0030 0260 XXRCNI, XRCNI

0031 0265 XXRCSE, XRCSE
0032 0272 XXRCTF, XRCTF
0033 0230 XDCPRT, DECPRT
0034 0200 XDCPRT, OCTPRT
0035 0316 XTXT, TSR
0036 0065 XOTY, OTY
0037 0362 XCRLF, CRLF
0040 1674 XIONB, IONB
0041 1600 XIONC, IONC
0042 0535 XIOND, IOND
0043 0634 XIONE, IONE
0044 0720 XIONF, IONF
0045 1440 XLOOP1, LOOP1
0046 1461 XLOOP2, LOOP2
0047 3400 ALPCOD, ALPCD
0050 3200 BINCOD, BINCD
0051 4000 VALCOD, VALCD
0052 3600 CMPCOD, CMPRCD
0053 3520 ENDA, ENDA1+1
0054 3320 ENDB, ENDB1+1
0055 3720 ENC, ENCM1+1
0056 4120 ENV, ENOV1+1
0057 2630 XMES9, MES9+1
0060 0023 XDATER, DATERR
0061 1604 XRDATA, RDATA1
0062 1442 XLOPA, LOOPA
0063 0034 PRINTA, PRINT
0064 0276 XIOTST, IOTST
0065 1400 XDATST, DATST
0066 0400 XMNUAL, MANTST
0067 1200 XCMPBE, CMPST
0070 1224 XVALID, VALST
0071 0074 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

0114 0001 K0001, 0001
 0115 0002 K0002, 0002
 0116 0003 K0003, 0003
 0117 0007 K0007, 0007
 0120 0051 K0051, 51
 0121 0077 K0077, 77
 0122 0121 K0121, 121
 0123 0207 K0207, 207
 0124 0212 K0212, 212
 0125 0215 K0215, 215
 0126 0240 K0240, 240
 0127 0252 K0252, 252
 0130 0260 K0260, 260
 0131 0340 K0340, 340
 0132 0400 K0400, 400
 0133 1000 K1000, 1000
 0134 2000 K2000, 2000
 0135 4000 K4000, 4000
 0136 5252 K5252, 5252
 0137 6632 K6632, 6632
 0140 6634 K6634, 6634
 0141 6636 K6636, 6636
 0142 7777 K7777, 7777
 0143 0377 K377, 377
 0144 7370 K7370, 7370
 0145 7660 K7660, 7660
 0146 7701 K7701, 7701
 0147 7702 K7702, 7702
 0150 7703 K7703, 7703
 0151 7715 K7715, 7715
 0152 7726 K7726, 7726
 0153 7730 K7730, 7730
 0154 7740 K7740, 7740
 0155 7771 K7771, 7771
 0156 7000 K7000, 7000

0200 *200

0200 5465 DATAB, JMP I XDATST /DATA TEST
 0201 7402 HLT
 0202 5464 IOTB, JMP I XIOTST /STATIC IOT TESTS
 0203 7402 HLT
 0204 5466 MNUAL, JMP I XMNUAL /MANUAL INTERVENTION TESTS
 0205 7402 HLT
 0206 5467 CMPBE, JMP I XCMPBE /COMPRESSED CODE TEST
 0207 7402 HLT
 0210 5470 VALID, JMP I XVALID /VALIDITY BIT TEST
 0211 7402 HLT

/IOT MODIFICATION SECTION

0212 0002 XRCSF, 0
 0213 6631 6631 /SKIP ON DATA FLAG

0214 7410 SKP
 0215 2212 ISZ XRCSF
 0216 5612 JMP I XRCSF

0217 0000 XRCRA, 0
 0220 7200 CLA
 0221 6632 6632 /READ ALPHA
 0222 5617 JMP I XRCRA
 0223 7402 HLT

0224 0000 XRCRB, 0
 0225 7200 CLA
 0226 6634 6634 /READ BINARY
 0227 5624 JMP I XRCRB
 0230 7402 HLT

0231 0000 XRCRC, 0
 0232 7200 CLA
 0233 6636 6636 /READ COMPRESSED
 0234 5631 JMP I XRCRC
 0235 7402 HLT

0236 0000 XRCSD, 0
 0237 6671 6671 /SKIP ON CARD DONE FLAG
 0240 7410 SKP
 0241 2236 ISZ XRCSD
 0242 5636 JMP I XRCSD

0243 0000 XRCSE, 0
 0244 6672 6672 /START CARD MOTION AND SKIP IF READER READY
 0245 7410 SKP
 0246 2243 ISZ XRCSE
 0247 5643 JMP I XRCSE

0250 0000 XRCRD, 0
 0251 6674 6674 /CLEAR CARD DONE FLAG
 0252 5650 JMP I XRCRD
 0253 7402 HLT

0254 0000 XRCNO, 0
 0255 6635 6635 /READ CONDITIONS OUT TO CARD READER
 0256 5654 JMP I XRCNO
 0257 7402 HLT

0260 0000 XRCNI, 0
 0261 7300 CLA CLL
 0262 6637 6637 /READ CONDITIONS OUT TO CARD READER
 0263 5660 JMP I XRCNI
 0264 7402 HLT

0265 0000 XRCSI, 2
 0266 6675 6675 /SKIP IF INTERRUPT BEING GENERATED
 0267 7410 SKP
 0270 2265 ISZ XRCSI
 0271 5665 JMP I XRCSI

```

0272 0000 XRCTF, 0
0273 6677 /CLEAR TRANSITION FLAGS
0274 5672 JMP I XRCTF
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 IOT1, 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 C0STA1 /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 C0STA1

/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 C0STA1 /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 C0STA1 /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 1115 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 DPCNT1
0415 3101 DCA DPCNT
0416 4420 RCSP /RCSP = SKIP ON DATA FLAG
0417 7410 SKP
0420 5231 JMP MANTS1
0421 2101 ISE DPCNT
0422 5216 JMP ,=4
0423 2102 ISE DPCNT1 /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, RCRB
0432 1103 TAD RCNT
0433 3105 DCA DNPLG
0434 3106 DCA DNPLG1
0435 4424 RCSD /SKIP ON CARD DONE FLAG
0436 7410 SKP

```

```

0437 5256 JMP MANTS2 /HAVE CARD DONE FLAG
0440 2105 ISZ DNFLG
0441 5235 JMP ,=4
0442 2106 ISZ DNFLG1 /WAITED LONG ENOUGH FOR CARD DONE FLAG?
0443 5235 JMP ,=6 /NO
0444 4435 JMS I XTEXT /ERROR, CARD DONE FLAG FAILED TO OCCUR
0445 2525 MES5 /RCSO FAILED OR CARD DONE FLAG DIDN'T SET
0446 4430 RCNI /READ CONDITIONS INTO AC
0447 7402 E8, HLT /ERROR, PROGRAM MUST BE RE-INITIALIZED
0450 4777' MANTS2, JMS COSTA3 /CHECK CARD READER CONDITIONS INTO AC
0451 6007 CAF /CLEAR ALL FLAGS
0452 4424 RCSO /SKIP ON CARD DONE FLAG
0453 7410 SKP
0454 7402 E9, HLT /ERROR, CAF, DID NOT CLEAR CARD DONE FLAG
0455 4776' JMS COSTA1 /CHECK CARD READER CONDITIONS TO AC

```

/CHECK CAF TO CLEAR DATA FLAG

```

0456 4425 RCSE /SELECT CARD
0457 5256 JMP ,=1
0460 4420 RCSF
0461 5260 JMP ,=1
0462 4775' JMS COSTA2 /READ CONDITIONS INTO AC
0463 6007 CAF /CLEAR ALL FLAGS
0464 4420 RCSF /SKIP ON DATA FLAG
0465 7410 SKP
0466 7402 E10, HLT /ERROR HLT,CAF SHOULD HAVE CLEARED DATA FLAG
0467 4776' JMS COSTA1 /READ CONDITIONS INTO AC
0470 4422 RCRB
0471 4424 RCSO /SKIP ON CARD DONE FLAG
0472 5271 JMP ,=1
0473 6007 CAF /CLEAR ALL FLAGS

```

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

```

0474 7200 CLA /DISABLE DATA + CARD DONE INTERRUPT ENABLE
0475 4427 RCNO /READ AC INTO CARD READER
0476 1301 TAD ,+3
0477 3002 DCA 2
0500 7410 SKP
0501 0520 E11
0502 4425 RCSE /SELECT CARD
0503 5302 JMP ,=1
0504 4420 RCSF /SKIP ON DATA FLAG
0505 5304 JMP ,=1
0506 6001 ION /TURN ON INTERRUPT
0507 7000 NOP
0510 6002 IOF /TURN OFF INTERRUPT
0511 4422 RCRB
0512 4424 RCSO /SKIP ON CARD DONE FLAG
0513 5312 JMP ,=1
0514 6001 ION /TURN ON INTERRUPT
0515 7000 NOP
0516 6002 IOF

```

```

0517 7410 SKP
0520 7402 E11, HLT /ERROR, RCNO DID NOT DISABLE DATA+CARD DONE INTERRUPT ENABLE

```

/CHECK CAF TO ENABLE DATA + CARD DONE INTERRUPT ENABLE

```

0521 6007 CAF /CLEAR ALL FLAGS
0522 7200 CLA
0523 1042 TAD XIOND
0524 3002 DCA 2
0525 4425 RCSE /SELECT CARD
0526 5325 JMP ,=1
0527 4420 RCSF /SKIP ON DATA FLAG
0530 5327 JMP ,=1
0531 6001 ION /TURN ON INTERRUPT
0532 7000 NOP
0533 6002 IOF /SHOULD NOT GET TO THIS LOCATION
0534 7402 E12, HLT /ERROR, CAF DID NOT ENABLE DATA + CARD DONE INT ENABLE
0535 4422 IOND, RCRB
0536 4424 RCSO
0537 5336 JMP ,=1
0540 5774' JMP MANTS3

```

/CHECK TROUBLE TRANSITION INTERRUPT ENABLE

```

0574 0600
0575 1030
0576 1000
0577 1061
0600 0600 *600
0600 6007 MANTS3, CAF /CLEAR ALL FLAGS
0601 7200 CLA
0602 1043 TAD XIONE
0603 3002 DCA 2
0604 1115 TAD K0002 /ENABLE READY/TROUBLE INTERRUPT
0605 4427 RCNO /READ AC INTO CARD READER
0606 4435 JMS I XTEXT
0607 2777 MES19 /"OPERATOR MUST PRESS READ STOP (G;D;I;)"
/ OR STOP (DOCUMENTATION);"
/TURN ON INTERRUPT
0610 6001 ION
0611 1103 TAD RCNT
0612 3102 DCA DFCNT1
0613 1135 TAD K4000 /DELAY BEFORE MESSAGE RETYPE
0614 3101 DCA DFCNT
0615 2102 ISZ DFCNT1
0616 5215 JMP ,=1
0617 2101 ISZ DFCNT
0620 5215 JMP ,=3
0621 6002 IOF /TURN INTERRUPT OFF
0622 4425 RCSE /ATTEMPT TO SELECT A CARD
0623 5230 JMP ,=5
0624 4435 JMS I XTEXT
0625 2733 MES21 /"READ STOP (G;D;I;)" OR STOP (DOCUMENTATION)"
/ WAS NOT PRESSED,RESTART TEST;"
0626 4430 RCNI
0627 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 7402      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 0133      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 RC SI TO SKIP WITH TROUBLE TRANSITION FLAG ENABLED
0641 4431      RC SI   /SKIP IF INTERRUPT IS GENERATED
0642 7402      E16,    HLT      /ERROR, RC SI SHOULD HAVE SKIPPED

/CLEAR TRANSITION FLOP AND CHECK FOR INTERRUPT
0643 4432      RCTF    /CLEAR TRANSITION FLAGS
0644 4431      RC SI
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      RC NI   /READ CARD READER FLAGS INTO AC
0660 4430      AND K1000 /IS TROUBLE TRANSITION STATUS BIT (AC2) A ZERO?
0661 0133      SZA
0662 7440      /YES, SKIP
0663 7402      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 2102      ISZ DFCNT1
0680 5301      JMP ,+1
0683 2101      ISZ DFCNT

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```

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      RC SI   /SKIP IF INTERRUPT IS GENERATED
0723 7402      E21,    HLT      /ERROR, RC SI SHOULD HAVE SKIPPED

/CLEAR TRANSITION FLOP WITH CAF INSTRUCTION
0724 6007      CAF      /CLEAR ALL FLAGS
0725 4431      RC SI   /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      HLT      /ERROR, CAF DID NOT DISABLE TRANSITION INTERRUPT
0741 4430      RC NI   /READ CARD READER FLAGS INTO AC
0742 0132      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
1000 1000      *1000
1000 2000      /CHECK RCNI WITH CARD READER INTIALIZED
1001 7300      CDSTA1, 0
1002 4430      CLA CLL
1003 3110      RC NI
1004 1110      DCA ACSTAT
1005 1110      TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1006 0132      AND K0400 /IS READY TRUE TRANSITION STATUS BIT (AC3) A ZERO?
1007 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 RCNI
1031 7300 CLA CLL
1032 4430 RCNI
1033 3110 DCA ACSTAT
1034 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1035 0132 AND K0400 /IS READY TRUE TRANSITION STATUS BIT (AC3) A ZERO?
1036 7440 SZA /YES, SKIP
1037 7402 E29, HLT /ERROR, READY TRUE TRANSITION STATUS BIT (AC3) SHOULD BE A ZERO
1040 7300 CLA CLL
1041 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1042 0133 AND K1000 /IS TROUBLE TRANSITION STATUS BIT (AC2) A ZERO
1043 7440 SZA /YES, SKIP

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 RCNI
1064 3110 DCA ACSTAT
1065 1110 TAD ACSTAT /LOAD CARD READER STATUS BITS INTO AC
1066 0132 AND K0400 /IS READY TRUE TRANSITION STATUS BIT (AC3) A ZERO?
1067 7440 SZA /YES, SKIP

```

```

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

```

```

1200 *1200
/TEST COMPRESSED CODE OF ALPHA DECK WITH COMPRESSED
/ CODE 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

```

```

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 IOT
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 IOT
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
1400 6007 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

```

```

/ 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 /RCSD = SKIP ON CARD DONE FLAG
1446 4435 JMS I XTEXT /OK, DID NOT SKIP
1447 2371 MES1 /ERROR, RCSD SHOULDN'T HAVE SKIPPED
1450 4430 RCNI /"RCSD FAILED OR CARD DONE FLAG PRESENT AT WRONG TIME"
1451 7402 E41, HLT /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED
1452 4425 RCSE /RCSE = SELECT CARD, SKIP ON READER READY
1453 7410 SKP /ERROR, RCSE DID NOT SKIP
1454 5261 JMP ,+5 /OK
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 /RCSF = SKIP ON DATA FLAG
1465 7410 SKP
1466 5277 JMP E43+1 /HAVE DATA FLAG, GO READ DATA
1467 2101 ISZ DFCNT
1470 5264 JMP ,+4
1471 2102 ISZ DFCNT1 /HAVE WE WAITED LONG ENOUGH FOR DATA FLAG
1472 5264 JMP ,+6 /NO
1473 4435 JMS I XTEXT /ERROR, DIDN'T GET DATA FLAG
1474 2447 MES3 /"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 XIONC
1524 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 *1600

/RETURN HERE AFTER PROGRAM INTERRUPT
1600 4420 IONC, RCSE
1601 5200 JMP .-1
1602 4431 RCSE! /SKIP IF DATA READY INTERRUPT IS GENERATED
1603 7402 E45, HLT /ERROR, RCSE DIDN'T SKIP ON DATA READY INTERRUPT
1604 3000 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 E46, HLT /ERROR, DATA READY STATUS BIT DIDN'T CLEAR
1612 7200 CLA
1613 1103 TAD RDCNT
1614 3104 DCA RDCNT1
1615 2104 ISZ RDCNT1 /DELAY BEFORE RE-READ
1616 5215 JMP .-1
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 /*+1 TO DATA TABLE
1634 4471 JMS I UPDAT
1635 2072 ISZ COLCNT /FINISHED 00 COLUMNS?
1636 5200 JMP IONC
1637 5240 JMP RDONE
1640 1103 RDONE, TAD RDCNT /TEST CARD DONE FLAG

```

```

/CRBE/CRRF 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 /WAITED LONG ENOUGH FOR CARD DONE FLAG?
1651 5243 JMP .-6 /NO
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 REINITIALIZED
1656 4430 RCNI
1657 8134 AND K2000 /DID CARD DONE STATUS BIT (AC1) SET
1660 7650 SNA CLA
1661 7402 E49, HLT /ERROR, CARD DONE STATUS BIT (AC1) DID NOT SET
1662 7200 CLA
1663 1040 TAD XIONB
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 E50, HLT /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED
1674 4431 IONB, RCSE! /SKIP IF CARD DONE FLAG IS A ONE
1675 7402 E51, HLT /ERROR, RCSE DIDN'T SKIP ON CARD DONE INTERRUPT
1676 4426 RCRD /RCRD = CLEAR CARD DONE FLAG
1677 4424 RCSD /RCSD = SKIP ON CARD DONE FLAG
1720 5305 JMP .-5 /OK
1721 4435 JMS I XTEXT /ERROR, RCRD FAILED
1722 2605 MES7 /"RCRD DIDN'T CLEAR DONE FLAG"
1723 4430 RCNI /READ FLAGS INTO THE AC
1724 7402 E52, HLT /ERROR HALT, PROGRAM MUST BE RE-INITIALIZED

1705 4426 RCRD /CLEAR CARD DONE
1706 4422 RCRB /CLEAR DATA READY
1727 2073 ISZ CRDCNT
1710 7410 SKP
1711 5777 JMP FINIS
1712 7604 LAS /DELAY BEFORE NEXT CARD
1713 7006 RTL /INPUT BY READING AC
1714 7006 RTL /SWITCHES 4-11 DETERMINING
1715 3104 DCA RDCNT1 /THE DELAY TIME,
1716 2104 ISZ RDCNT1
1717 5316 JMP .-1
1720 2075 ISZ MODE1
1721 7200 CLA
1722 5445 JMP I XLOOP1
1777 2000
2000 2000 *2000

2000 7200 FINIS, CLA

```

```

2001 1123 TAD K0207
2002 4436 JMS I XOTY
2003 1127 TAD K0252
2004 4436 JMS I XOTY
2005 7604 LAS
2006 7004 RAL
2007 7006 RTL
2010 7500 SMA
2011 7402 HLT
2012 7300 CLA CLL
2013 1112 TAD CMCHK
2014 7440 SEA
2015 5467 JMP I XCOMP8E
2016 1113 TAD VALCHK
2017 7440 SEA
2020 5470 JMP I XVALID
2021 5622 JMP I ,+1
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
2026 4234 JMS PRINT
2027 7604 LAS
2030 7006 RTL
2031 7700 SMA CLA
2032 7402 HLT
2033 5777 JMP RDONE

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

/RING BELL AND PRINT "*" AT END OF TEST DECK
/TEST SW 3=1 TO CONTINUE WITH NEXT TEST DECK,
/HALE AT END OF TEST DECK
/COMPRESSED MODE?
/VALIDITY CHECK MODE?
/RESTANT DATA TEST
/DOES SW 1 = 0 TO PRINT ERROR?
/YES
/DOES SW 2 = 0 TO HALT ON ERROR
/YES
/A OR B = CD
/CL
/G
/R1
/PRINT 1ST HEAD

```

```

2060 2650 MES13
2061 1100 TAD READ2
2062 4434 JMS I XDCPRT
2063 4437 JMS I XCRLF
2064 5634 JMP I PRINT
2065 0000 /TYPE CHARACTER IN AC
2066 6046 OTY, 0
2067 6041 TLS
2070 5267 TSF
2071 6042 JMP ,=1
2072 7200 TCF
2073 5665 CLA
JMP I OTY

/
2074 0000 UPDATA, 0
2075 1076 TAD DATA
2076 7041 CIA
2077 1107 TAD END
2100 7640 SEA CLA
2101 5304 JMP ,+3
2102 1074 TAD MODE
2103 3076 DCA DATA
2104 5674 JMP I UPDATA

/
2177 1640 *2200
2200 /PRINT OCTAL NUMBER IN AC
OCTPRT, 0
2201 0000 DCA OCT1
2202 3222 TAD OCT1
2203 1222 RTL
2204 7006 RTL
2205 4223 JMS OCT2
2206 1222 TAD OCT1
2207 7012 RTR
2210 7012 RTR
2211 7012 RTR
2212 4223 JMS OCT2
2213 1222 TAD OCT1
2214 7012 RTR
2215 7010 RAR
2216 4223 JMS OCT2
2217 1222 TAD OCT1
2220 4223 JMS OCT2
2221 5600 JMP I OCTPRT
2222 0000 OCT1, 0
2223 0000 OCT2, 0
2224 1117 AND K0007
2225 1130 TAD K0260
2226 4436 JMS I XOTY
2227 5623 JMP I OCT2

/TEST FOR END OF DATA TABLE
/YES, WE ARE AT END OF DATA TABLE
/RE-INITIALIZE DATA TABLE
/PRINT 1ST DIGIT
/PRINT 2ND DIGIT
/PRINT 3RD DIGIT
/PRINT 4TH DIGIT

```



```

2230 0070 /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 ARROW, ISZ DIGIT /DEVELOP BCD DIGIT
2247 7430 SEL
2250 5241 JMP ARROW=3 /LOOP
2251 7200 CLA /HAVE BCD DIGIT
2252 1270 TAD DIGIT /GET DIGIT
2253 1130 TAD K0260 /MAKE ASCII
2254 4436 JMS I XOTY /PRINT
2255 7200 CLA
2256 3270 DCA DIGIT /CLEAR
2257 2244 ISZ ARROW /UPDATE POINTER
2260 2271 ISZ CNTR2B /DONE
2261 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 /SKIP ON READY AND SELECT CARD
2302 7200 MLT /ERROR OR NO CARDS IN READER
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
2310 2072 RCRB
2311 5305 ISZ COLCNT
2312 4424 JMP .-4
2313 5312 RCSD /SKIP ON CARD DONE
2314 4426 JMP .-1
2315 5300 RCRD /CLEAR CARD DONE FLAG
2316 0000 JHP SCOPE /GET NEXT CARD

/TAPE 2
/TYPE TEXT
2316 0000 TSR, 0
2317 7200 CLA
2320 1716 TAD I TSR
2321 2316 ISZ TSR
2322 3010 DCA 10
2323 1410 TAD I 10 /GET CHARACTER
2324 3335 DCA TSR1
2325 1335 TAD TSR1
2326 7012 RTR
2327 7012 RTR
2330 7012 RTR
2331 4336 JMS TSR2 /PRINT LEFT CHARACTER
2332 1335 TAD TSR1
2333 4336 JMS TSR2 /PRINT RIGHT CHARACTER
2334 5323 JMP TSR=5
2335 0000 TSR1, 0
2336 0000 TSR2, 0
2337 0121 AND K0077
2340 7450 SNA /IS CODE = 00
2341 5716 JMP I TSR /YES EXIT
2342 7040 CMA
2343 0121 AND K0077
2344 7440 SZA /IS CODE = 77
2345 5350 JMP .+3 /NO
2346 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

```

```

/RCSD 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

```

```

/RCSE 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

/RCSO 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

MESS, 7722
 0323
 0440
 0601
 1114
 0504
 4017
 2240
 0301
 2204
 4004
 1716
 0540
 0614
 0107
 4004
 1104
 1647
 2440
 2305
 2477
 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

MESS6, 7703
 0122
 0440
 0417
 1605
 4006
 1401
 0740
 0411
 0416
 4724
 4003
 0125
 2305
 4020
 2217
 0722
 0115
 4011
 1624
 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

MESS7, 2203
 2204
 4004
 1104
 1647
 2440
 0314
 0501
 2240
 0301
 2204
 4004
 1716
 0540
 0614
 0107
 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
 2641 4040
 2642 0755
 2643 0000
 2644 2644
 2645 4040
 2646 2261
 2647 5500
 2650 2650
 2651 4040
 2652 2262
 2653 5500
 2654 2654
 2655 7711
 2656 1724
 2657 2340
 2660 1713
 2661 7700
 2662 2662

MESS9, 7700
 4040
 0304
 5500
 2634
 4040
 0314
 5500
 2640
 4040
 0755
 0000
 2644
 4040
 2261
 5500
 2650
 4040
 2262
 5500
 2654
 7711
 1724
 2340
 1713
 7700
 MESS10, 2662

/MODIFIED (A OR B)

/GL

/E

/RL

/RE

/LOTS OK

/B

2663	4040	4040
2664	0255	0255
2665	0000	0000

/READY/TROUBLE FLAG DIDN'T CAUSE PROGRAM INTERRUPT

MES17: ,

2666	2666	7722
2667	7722	0501
2670	0501	0431
2671	0431	3424
2672	3424	2217
2673	2217	2502
2674	2502	1405
2675	1405	4006
2676	4006	1401
2677	1401	0740
2700	0740	0411
2701	0411	0416
2702	0416	4724
2703	4724	4003
2704	4003	0125
2705	0125	2305
2706	2305	4020
2707	4020	2217
2710	2217	0722
2711	0722	0115
2712	0115	4011
2713	4011	1624
2714	1624	0522
2715	0522	2225
2716	2225	2024
2717	2024	7700

/MANUAL TESTS OK

MES20: ,

2721	2721	7715
2722	7715	0116
2723	0116	2501
2724	2501	1440
2725	1440	2405
2726	2405	2324
2727	2324	2340
2730	2340	1713
2731	1713	7700

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

MES21: ,

2733	2733	7722
2734	7722	0501
2735	0501	0440
2736	0440	2324
2737	2324	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)

MES19: ,

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

ENDB1,
/ *3400

3400	0060	60	
3401	0061	61	
3402	0062	62	
3403	0063	63	
3404	0064	64	
3405	0065	65	
3406	0066	66	
3407	0067	67	
3410	0070	70	

ALPCD,

/COLUMN	CHAR	HOLLERITH	
/1	A	12 1	4000
/2	B	12 2	4100
/3	C	12 3	4200
/4	D	12 4	4300
/5	E	12 5	4400
/6	F	12 6	4500
/7	G	12 7	4600
/8	H	12 8	4700
/9			

3411	0071	71	
3412	0072	72	
3413	0073	73	
3414	0074	74	
3415	0075	75	
3416	0076	76	
3417	0077	77	
3420	0040	40	
3421	0041	41	
3422	0042	42	
3423	0043	43	
3424	0044	44	
3425	0045	45	
3426	0046	46	
3427	0047	47	
3430	0050	50	
3431	0051	51	
3432	0052	52	
3433	0053	53	
3434	0054	54	
3435	0055	55	
3436	0056	56	
3437	0057		
3440	0020	20	
3441	0021	21	
3442	0022	22	
3443	0023	23	
3444	0024	24	
3445	0025	25	
3446	0026	26	
3447	0027	27	
3450	0030	30	
3451	0031	31	

/COLUMN	CHAR	HOLLERITH	
/10	I	12 9	4800
/11	CENT	12 0	4202
/12	!	12 8	4102
/13	<	12 8 4	4042
/14	(12 8 5	4022
/15	+	12 8 6	4002
/16		12 8 7	4000
/17	-	11	2000
/18	J	11 1	2400
/19	K	11 2	2200
/20	L	11 3	2100
/21	M	11 4	2010
/22	N	11 5	2020
/23	O	11 6	2010
/24	P	11 7	2004
/25	Q	11 8	2002
/26	R	11 9	2001
/27	!	11 8 2	2202
/28	S	11 8 3	2102
/29	*	11 8 4	2042
/30)	11 8 5	2022
/31		11 8 6	2012
/32		11 8 7	2004
/33	/	0	1000
/34	0	0 1	1400
/35	S	0 2	1200
/36	T	0 3	1100
/37	U	0 4	1040
/38	V	0 5	1010
/39	W	0 6	1000
/40	X	0 7	1004
/41	Y	0 8	1002
/42	Z	0 9	1000

3452	0032	32	/43		0 8 2	1202
3453	0033	33	/44		0 8 3	1102
3454	0034	34	/45	X	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	1	400
3462	0002	02	/51	2	2	200
3463	0003	03	/52	3	3	100
3464	0004	04	/53	4	4	40
3465	0005	05	/54	5	5	20
3466	0006	06	/55	6	6	10
3467	0007	07	/56	7	7	4
3470	0010	10	/57	8	8	2
3471	0011	11	/58	9	9	1
3472	0012	12	/59	I	8 2	0202
3473	0013	13	/60	#	8 3	0102
3474	0014	14	/61	A	8 4	0042
3475	0015	15	/62	'	8 5	22
3476	0016	16	/63	"	8 6	12
3477	0017	17	/64	"	8 7	6
3500	0060	00	/65	&	12	4000
3501	0061	01	/66	A	12 1	4000
3502	0062	02	/67	B	12 2	
3503	0063	03	/68	C	12 3	
3504	0064	04	/69	D	12 4	
3505	0065	05	/70	E	12 5	
3506	0066	06	/71	F	12 6	
3507	0067	07	/72	G	12 7	
3510	0070	70	/73	H	12 8	
3511	0071	71	/74	I	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	CMPCD,	/1	&	12 1
3601	0101		/2	A	12 2
3602	0102		/3	B	12 3
3603	0103		/4	C	12 4
3604	0104		/5	D	12 5
3605	0105		/6	E	12 6
3606	0106		/7	F	12 7
3607	0107		/8	G	12 8
3610	0110		/9	H	12 9
3611	0300		/10	I	12 8 2
3612	0112		/11	CENT	12 8 3

3613	0113	113	/12	,	12 8 4
3614	0114	114	/13	<	12 8 5
3615	0115	115	/14	(12 8 6
3616	0116	116	/15	+	12 8 7
3617	0117	117	/16	1	11
3620	0040	40	/17	-	11 1
3621	0041	41	/18	J	11 2
3622	0042	42	/19	K	11 3
3623	0043	43	/20	L	11 4
3624	0044	44	/21	M	11 5
3625	0045	45	/22	N	11 6
3626	0046	46	/23	O	11 7
3627	0047	47	/24	P	11 8
3630	0050	50	/25	Q	11 9
3631	0240	240	/26	R	11 0 2
3632	0052	52	/27	I	11 0 3
3633	0053	53	/28	S	11 0 4
3634	0054	54	/29	*	11 0 5
3635	0055	55	/30)	11 0 6
3636	0056	56	/31	!	11 0 7
3637	0057	57	/32	!	11 0 8
3640	0020	20	/33	@	11 0 9
3641	0021	21	/34	/	11 1 0
3642	0022	22	/35	\$	11 1 1
3643	0023	23	/36	T	11 1 2
3644	0024	24	/37	U	11 1 3
3645	0025	25	/38	V	11 1 4
3646	0026	26	/39	W	11 1 5
3647	0027	27	/40	X	11 1 6
3650	0030	30	/41	Y	11 1 7
3651	0220	220	/42	Z	11 1 8
3652	0032	32	/43	;	11 1 9
3653	0033	33	/44	,	11 2 0
3654	0034	34	/45	X	11 2 1
3655	0035	35	/46	=	11 2 2
3656	0036	36	/47	>	11 2 3
3657	0037	37	/48	?	11 2 4
3660	0000	00	/49		BLANK
3661	0001	01	/50	1	1
3662	0002	02	/51	2	2
3663	0003	03	/52	3	3
3664	0004	04	/53	4	4
3665	0005	05	/54	5	5
3666	0006	06	/55	6	6
3667	0007	07	/56	7	7
3670	0010	10	/57	8	8
3671	0200	200	/58	9	9
3672	0012	12	/59	I	8 2
3673	0013	13	/60	#	8 3
3674	0014	14	/61	A	8 4
3675	0015	15	/62	'	8 5
3676	0016	16	/63	"	8 6
3677	0017	17	/64	"	8 7
3700	0100	100	/65	&	12
3701	0101	101	/66	A	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	ENDCM1, 117	/80	1	12 8 7

4000 *4000

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

			/COLUMN	/BINARY	/ZONES
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	0100	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	ENDVL1, 4317	/80	4567	212, 21, 23, 24, 25, 27, 28, 29


```

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

```

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	MANUAL	0204
CMPBE	0206	E4	0321	K0260	0130	MODE	0074
CMPCOD	0052	E40	1140	K0340	0131	MODE1	0075
CMPROD	3600	E41	1451	K0400	0132	ODT1	2222
CMPYST	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	RGNO	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	RCBF	4432
E1	0304	E8	0447	K7730	0153	RDATA1	1604
E10	0466	E9	0494	K7740	0154	RDATA2	1617
E11	0520	ENC	0055	K7771	0155	RDCHCK	1621
E12	0534	END	0107	K7777	0142	RDGNT	0103
E13	0627	ENDA	0093	LOOP1	1440	RDGNT1	0104
E14	0633	ENDA1	3517	LOOP2	1441	RDONE	1640
E15	0640	ENDB	0094	LOOPA	1442	READ1	0077
E16	0642	ENDB1	3317	HANTS1	0431	READ2	0100
E17	0657	ENDCH1	3717	HANTS2	0400	SCOPE	2300
E18	0663	ENDV1	4117	HANTS3	0600	SETBIN	1422
E19	0713	ENV	0096	HANTS4	0644	TENPHR	2245
E2	0310	FINIS	2000	HANTS5	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	0074
E24	0744	IONF	0720	ME013	2650	VALCO	4000
E25	1007	IOT1	0302	ME014	2694	VALCHK	0113
E26	1014	IOT8	0202	ME016	2662	VALCOD	0051

VALID 2210
VALTST 1224
VALUE 2267
XCMPRE 2067
XCRLF 0037
XDATR 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 0260
XRCNO 0254
XRCRA 0217
XRCRB 0224
XRCRC 0231
XRCRD 0250
XRCSD 0236
XRCSE 0243
XRCSE 0212
XRCSE 0265
XRCTF 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

