

IDENTIFICATION

PRODUCT NAME: HIGH-SPEED READER/PUNCH TESTS  
 PRODUCT CODE: MAINDEC-GB-DHPCA-A-D  
 PRODUCT DATE: MARCH 1977  
 MAINTAINER: DIAGNOSTIC ENGINEERING  
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1.0 ABSTRACT

THE PCB-E HIGH-SPEED READER AND PUNCH TESTS ARE A TEST PACKAGE USED TO TEST THE TYPE PCB-E AND PCB-E HIGH-SPEED READER/PUNCH WHEN ATTACHED TO A PDP-8E SYSTEMS. THE TESTS REPAIR BASIC INPUT AND OUTPUT CONTROL LOGIC TESTS, READER AND PUNCH TESTS, READER AND PUNCH SPEED PRINTOUTS, AND PROVIDE MAINTENANCE LOOPS USEFUL IN ADJUSTING THE READER AND PUNCH.

THE AVAILABLE TEST PROGRAMS ARE:

- PRG0 - BASIC READER AND READER CONTROL LOGIC TEST.
- PRG1 - BASIC PUNCH AND PUNCH CONTROL LOGIC TEST.
- PRG2 - READER TEST, SPECIAL BINARY COUNT PATTERN.
- PRG3 - PUNCH TEST, SPECIAL BINARY COUNT PATTERN.
- PRG4 - PUNCH VERIFY, SPECIAL BINARY COUNT PATTERN.
- PRG5 - PUNCH TEST, RANDOM CHARACTERS.
- PRG6 - PUNCH VERIFY, RANDOM CHARACTERS.
- PRG7 - COMBINED READER-PUNCH TEST, SPECIAL BINARY COUNT PATTERN.
- PRG10 - READ AMPLIFIER ADJUSTMENT LOOP, 1'S AND 0'S TAPE.
- PRG11 - PUNCH ANY CHARACTER IN SR LOOP.
- PRG12 - 1'S AND 0'S PUNCH LOOP.
- PRG13 - READER SPEED PRINT LOOP.
- PRG14 - PUNCH SPEED PRINT LOOP.
- PRG15 - READ X CHARACTERS, STALL Y MS LOOP.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP-8E WITH ASR33/35 TELETYPE, PRB-E READER, OR PRP-E PUNCH, OR PUB-E READER/PUNCH. THE FOLLOWING TAPES ARE REQUIRED IN CONJUNCTION WITH THIS TEST:

- MAINDEC-GB-D2G1-PT
- MAINDEC-GB-D2G2-PT
- MAINDEC-GB-D2G4-PT

2.2 STORAGE

LOCATIONS 0000 THROUGH 4377 ARE USED.

2.3 PRELIMINARY PROGRAMS

ALL BASIC CPU AND TELETYPE MAINDEC'S MUST HAVE BEEN RUN SUCCESSFULLY.

3.0 LOADING PROCEDURE

THE BINARY LOADER IS USED TO LOAD THE PROGRAM.

4.0 USE PROCEDURES

THE FOLLOWING PAGES EXPLAIN IN DETAIL THE STEPS NECESSARY TO

RUN EACH PROGRAM.

4.1 PRG0 USE PROCEDURE

- A. INSURE THAT THE TELETYPE IS ON-LINE.
- B. LOAD READER WITH ALL 0'S TEST TAPE, PREFERABLY THE TAPE SHOULD BE SPLICED INTO A LOOP.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0000. PRESS START.
- E. PROGRAM HALTS AT LOC 0242 TO PERMIT SETTING OF SR OPTIONS. SET DESIRED OPTIONS AND PRESS CONTINUE.

PRG0 SR OPTIONS

- SR0 HALT AT ROUTINE END. ROUTINE NUMBER IN AC.
- SR1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR0-SR11.
- SR2 LOOP PROGRAM.
- SR3 0=HALT ON ERROR. 1=DO NOT HALT ON ERROR.
- SR4 SKIP TEST AFTER ERROR.
- SR5 ENTER SCOPE LOOP AFTER ERROR.
- SR6 THROUGH ROUTINE NUMBER TO BE SELECTED.
- SR11

- F. THE PROGRAM RUNS AND HALTS AT PROGRAM END HALT. AT LOC 0305 UNLESS PREVENTED FROM ENDING BY ERRORS, OR SR OPTIONS.

4.2 PRG1 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. MAKE PUNCH READY, INSURING THAT THERE ARE SEVERAL INCHES OF BLANK LEADER.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0001. PRESS START.
- E. PROGRAM HALTS AT LOC 0242 TO PERMIT SETTING OF SR OPTIONS. SET DESIRED OPTIONS AND PRESS CONTINUE.

PRG1 SR OPTIONS

- SR0 HALT AT ROUTINE END. ROUTINE NUMBER IN AC.
- SR1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR0-SR11.
- SR2 LOOP PROGRAM.
- SR3 0=HALT ON ERROR. 1=DO NOT HALT ON ERROR.
- SR4 SKIP TEST AFTER ERROR.
- SR5 ENTER SCOPE LOOP AFTER ERROR.
- SR6 THROUGH ROUTINE NUMBER TO BE SELECTED.
- SR11

- F. THE PROGRAM RUNS TO COMPLETION AND HALTS AT PROGRAM END HALT AT LOC 0305, UNLESS PREVENTED FROM ENDING BY ERRORS, OR SR OPTIONS.

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NOTE

THE RESULTING PUNCHED TAPE MUST BE INSPECTED VISUALLY, EXCEPT FOR TWO 500 CHARACTER BLOCKS CONTAINING PUNCHES IN ALTERNATE CHANNELS. THE REMAINDER OF THE TAPE SHOULD BE BLANK.

4.3 PRG2 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. LOAD READER WITH SPECIAL BINARY COUNT PATTERN TEST LOOP.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0002. PRESS START.
- E. THE PROGRAM RUNS CONTINUOUSLY UNLESS ERRORS OCCUR.

PRG2 SR OPTIONS

- SR3 0=HALT ON ERROR. SR3=1=NO HALT ON ERROR.
- SR6 0=STALL (RANDOM). SR6=1=RUN FULL SPEED.
- SR7 LOCK IN CURRENT STALL (SR6 MUST BE 0).

4.4 PRG3 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. MAKE PUNCH READY.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0003. PRESS START.
- E. THE PROGRAM PUNCHES SPECIAL BINARY COUNT PATTERN CONTINUOUSLY UNTIL STOPPED BY USER.

PRG3 SR OPTIONS

- SR6 0=STALL (RANDOM). SR=1=RUN FULL SPEED.
- SR7 LOCK ON STALL (SR6 MUST BE 0).

4.5 PRG4 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. LOAD READER WITH TAPE PUNCHED BY PRG3. BLANK LEADER SHOULD BE UNDER READ STATION, WITH "UP" MARKER TO THE LEFT.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0004. PRESS START.
- E. THE PROGRAM READS CONTINUOUSLY UNTIL ERRORS OCCUR, OR UNTIL THE READER RUNS OUT OF TAPE.

PRG4 SR OPTIONS

- SR3 0=HALT ON ERROR. SR3=1=NO HALT ON ERROR.

DISREGARD ERRORS THAT OCCUR WHEN THE END OF SPECIAL BINARY COUNT PATTERN IS REACHED.

## 4.6 PRG5 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. MAKE PUNCH READY.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0006. PRESS START.
- E. THE PROGRAM PUNCHES RANDOM CHARACTERS CONTINUOUSLY UNTIL STOPPED BY USER.

## PRG5 SR OPTIONS

SR6 =0-STALL (RANDOM), SR6=1-RUN FULL SPEED.  
SR7 LOCK ON STALL (SR6 MUST BE 0).

## 4.7 PRG6 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. LOAD READER WITH TAPE PUNCHED BY PRG5. BLANK LEADER SHOULD BE UNDER READ STATION, WITH "UP" MARKER TO THE LEFT.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0006. PRESS START.
- E. THE PROGRAM READS CONTINUOUSLY UNTIL ERRORS OCCUR, OR UNTIL THE READER RUNS OUT OF TAPE.

## PRG6 SR OPTIONS

SR3 =0-HALT ON ERROR, SR3=1-NO HALT ON ERROR.

## NOTE

DISREGARD ERRORS THAT OCCUR WHEN THE END OF RANDOM CHARACTER DATA IS REACHED.

## 4.8 PRG7 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. MAKE PUNCH READY, PUNCH ABOUT 20 INCHES (MAXIMUM) OF BLANK LEADER, AND LOAD READER WITH THE BLANK LEADER. THE PUNCH TO READER SLACK SHOULD NOT BE EXCESSIVE.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0007. PRESS START.
- E. THE PROGRAM PUNCHES AND READ CHECKS SPECIAL BINARY COUNT PATTERN CONTINUOUSLY UNTIL ERROR OCCURS, OR SUPPLY OF TAPE IS EXHAUSTED.

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## PRG7 SR OPTIONS

SR3 =0-HALT ON ERROR, SR3=1-NO HALT ON ERROR.  
SR6 =0-STALL (RANDOM), SR6=1-FULL SPEED RUN.  
SR7 LOCK ON CURRENT STALL (SR6 MUST BE 0).

## 4.9 PRG10 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. LOAD READER WITH 11'S AND 0'S TEST TAPE LOOP.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0010. PRESS START.
- E. THE PROGRAM RUNS CONTINUOUSLY UNTIL STOPPED BY USER. WITH THE PROGRAM RUNNING, THE USER CAN ADJUST THE READ AND WRITE SPEEDS.
- F. A READ ERROR IS INDICATED BY AN ERROR PRINTOUT, CROPPING OF READER FLAG IS INDICATED BY 3 BELLS.

## 4.10 PRG11 USE PROCEDURE

- A. INSURE THAT TELETYPE IS ON-LINE.
- B. MAKE PUNCH READY.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0011. PRESS START.
- E. PROGRAM PUNCHES CONTINUOUSLY THE CODE SET IN SR SWITCHES 4 TO 11. THE SWITCHES MAY BE CHANGED WHILE RUNNING.

## 4.11 PRG12 USE PROCEDURE

- A. INSURE TELETYPE IS ON-LINE.
- B. MAKE PUNCH READY.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0012. PRESS START.
- E. PROGRAM PUNCHES 11'S AND 0'S TAPE CONTINUOUSLY.

## PRG12 SR OPTIONS

SR6 =0-STALL (RANDOM), SR6=1-RUN FULL SPEED.  
SR7 LOCK ON CURRENT STALL (SR6 MUST BE 0).

4.12 PRG13 USE PROCEDURE

PRG13 IS USED TO TIME THE HIGH SPEED READER WITH THE AID OF A WATCH WITH SWEEP SECOND HAND. THE READER CAN BE TIMED IN 2 WAYS:

- A. 30 SECOND TIMING. USED FOR APPROXIMATE SPEED SETTINGS.
- B. 300 SECOND TIMING (5 MINUTES) FOR ACCURATE AND FINAL VERIFICATION OF READER SPEED.

TO TIME THE READER PROCEED AS FOLLOWS:

- A. INSURE TELETYPE IS ON-LINE
- B. LOAD ANY TAPE IN READER
- C. LOAD ADDRESS 0200
- D. SET SR TO 0013
- E. FOR 30 SECOND TIMING, LEAVE SRI=0, FOR 300 SECOND TIMING, SET SRI TO A 1.
- F. PRESS START. READER WILL RUN CONTINUOUSLY. WHEN THE 30 OR 300 SECOND TIME IS UP, TURN ON SRC, AND THEN THEN TURN IT OFF. THE PROGRAM WILL TYPE OUT THE READER SPEED IN CHARACTERS PER SECOND (CPS)
- G. PROGRAM HALTS AT LOC 4230 AFTER PRINTOUT.
- H. TO RETIME THE READER, PRESS CONTINUE AFTER MAKING SURE THAT SRC IS OFF, AND THAT SRI IS SET TO THE CORRECT TIME BASE.

NOTE

ACCURATE READER SPEED MEASUREMENT DEPENDS ON THE USER'S ATTENTION TO THE STARTING AND STOPPING TIMES.

4.13 PRG14 USE PROCEDURE

PRG14 IS USED TO TIME THE HIGH SPEED PUNCH WITH THE AID OF A WATCH WITH SWEEP SECOND HAND. THE PUNCH IS TIMED OVER A PERIOD OF 60 SECONDS. TO TIME THE PUNCH, PROCEED AS FOLLOWS:

- A. INSURE TELETYPE IS ON-LINE
- B. MAKE PUNCH READY
- C. LOAD ADDRESS 0200
- D. SET SR TO 0014
- E. PRESS START. PUNCH RUNS CONTINUOUSLY.
- F. AFTER 60 SECONDS TURN ON SRC, AND THEN TURN IT OFF. THE PROGRAM WILL TYPE OUT THE PUNCH SPEED IN CHARACTERS PER SECOND (CPS).

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- G. PROGRAM HALTS AT LOC 4255 AFTER PRINTOUT.
- H. TO RETIME THE PUNCH, PRESS CONTINUE AFTER MAKING SURE THAT SRC IS OFF.

NOTE

ACCURATE PUNCH SPEED MEASUREMENT DEPENDS ON THE USER'S ATTENTION TO THE STARTING AND STOPPING TIMES.

4.14 PRG15 USE PROCEDURE

- A. LOAD ANY TAPE IN READER.
- B. LOAD ADDRESS 0200.
- CL SET SR TO 0015. PRESS START.
- D. PROGRAM HALTS AT LOC 4332.
- E. SET SR SWITCHES 0 THROUGH 4 TO NUMBER OF CHARACTERS TO READ (1 TO 37 OCTAL).
- F. SET SR SWITCHES 5 THROUGH 11 TO NUMBER OF MILLISECONDS TO STALL AFTER READING CHARACTERS (1 TO 177 OCTAL).
- G. PRESS CONTINUE
- H. PROGRAM RUNS CONTINUOUSLY, READING THE SPECIFIED NUMBER OF CHARACTERS, AND THEN STALLING FOR THE SPECIFIED NUMBER OF MILLISECONDS.

NOTE

THE NUMBER OF CHARACTERS READ AND/OR THE STALL COUNT MAY BE CHANGED AT ANY TIME. THIS PROGRAM DOES NOT CHECK FOR CORRECT DATA, IT IS INTENDED PRIMARILY AS AN AID IN ADJUSTING READER TIMINGS.

E. OPERATING PROCEDURES

E.1 PROGRAM AND/OR OPERATOR ACTION

E.1.1 NORMAL HALTS

- LOC 0242 SR OPTIONS HALT. THIS HALT OCCURS DURING EXECUTION OF PRGD AND PRG1 TO PERMIT SETTING OF DESIRED OPTIONS. PRESS CONTINUE TO PROCEED.
- LOC 0305 PROGRAM END HALT. OCCURS AT END OF PRGD AND PRG1 IF "LOOP PROGRAM" OPTION IS NOT SET. SET DESIRED OPTION(S) AND PRESS CONTINUE. IF NO OPTIONS ARE SET, THIS HALT REOCCURS.

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- LOC 0340 ROUTINE END HALT. OCCURS DURING EXECUTION OF PRGD AND PRG1 IF SR0 IS 1.
- LOC 4230 THIS HALT OCCURS IN PRG13 AFTER PROGRAM TYPES THE READER SPEED IN CHARACTERS PER SECOND. TO RETIME THE READER, PRESS CONTINUE AFTER MAKING SURE THAT SR0 IS OFF, AND THAT SR1 IS SET TO THE CORRECT TIME BASE.
- LOC 4255 THIS HALT OCCURS IN PRG14 AFTER PROGRAM TYPES THE PUNCH SPEED IN CHARACTERS PER SECOND. TO RETIME THE PUNCH, PRESS CONTINUE AFTER MAKING SURE THAT SR0 IS OFF.
- LOC 4332 PRG15 SR SET HALT. OCCURS TO PERMIT SETTING OF DESIRED CHARACTER AND STALL COUNT. SET SR0-4 TO NUMBER OF CHARACTERS TO BE READ. SET SR5-11 TO NUMBER OF MILLISECONDS TO STALL AFTER READING CHARACTERS, PRESS CONTINUE.

E.2 ERRORS

ERROR PRINTOUTS AND ERROR HALTS ARE USED IN THIS PROGRAM.

E.2.1 ERROR PRINTOUTS

ERROR PRINTOUTS ARE IDENTIFIED BY AN ASTERISK(\*) PRECEDING THE PRINTOUT. MOST ERROR PRINTOUTS TAKE THE FORM:

\*P00XX R00YY ZZZZZZZZZ

WHERE,

P00XX=PROGRAM NUMBER  
R00YY=ROUTINE NUMBER IN THE PROGRAM  
Y=A LETTER, INDICATES WHICH ERROR OCCURRED WITHIN A ROUTINE. IF NO LETTER IS PRINTED, ONLY ONE ERROR IS POSSIBLE IN THE ROUTINE  
ZZZZZ=ADDITIONAL INFORMATION PRINTOUT.

FOLLOWING AN ERROR PRINTOUT THE PROGRAM HALTS IF SR3 (HALT-ON-ERROR OPTION) IS OFF, AND THE OPTION APPLIES TO THE PROGRAM.

\*P0000 R0000

250 MS AFTER ISSUING RCF COMMAND (IOTC14) RSF DID NOT SKIP. FLAG IS NOT SET, OR RSF COMMAND FAILED TO SKIP.

\*P0000 R0001

WITH READ FLAG = 1, RSF (IOT011) COMMAND FAILED TO SKIP.

\*P0000 R0002

RRB(IOT012) FAILED TO CLEAR FLAG. OR RSF(IOT011) SKIPPED WITH FLAG = 0.

\*P0000 R0003

SKIP NOT GENERATED WITH INTERRUPT OFF. OP 6D10 (RPE) MALFUNCTION.

\*P0000 R0004

PCE (6U20) MALFUNCTION. INTERRUPT ENABLE NOT CLEARED.

\*P0000 R0005

RRB(IOT012) COMMAND FAILED TO CLEAR FLAG.

\*R0000 R0006

RFC(IOT014) FAILED TO CLEAR FLAG.

\*P0000 R0007

RRB(IOT012) COMMAND RESULTED IN NON-ZERO CHARACTER SET INTO AC. SHOULD BE ALL 0'S. AN ALL 0'S TEST TAPE SHOULD BE IN THE READER.

\*P0000 R00010A

UNEXPECTED INTERRUPT AFTER CLEARING READER PUNCH, TTY PUNCH, AND TTY READER. TURN OFF INTERRUPTING DEVICE.

\*P0000 R00010B

WITH READER FLAG SET, READER FAILED TO INTERRUPT.

\*P0000 R00011A

"STOP DELAY" NOT FIRING OR SET FOR TOO SHORT A DURATION, REFER TO SECTION 9 FOR TEST DESCRIPTION.

\*P0000 R00011B

"STOP DELAY" TIME OUT IS TOO LONG. REFER TO SECTION 9 FOR TEST DESCRIPTION.

\*P0001 R0000

PSF(IOT021) COMMAND SKIPPED WITH FLAG = 0. OR, LESS LIKELY.

MO1

PCF(IOT022) FAILED TO CLEAR FLAG.

\*P0001 R0001

PSF(IOT021) FAILED TO SKIP WITH FLAG = 1. OR FLAG IS NOT SET.

\*P0001 R0002

PCF(IOT022) FAILED TO CLEAR FLAG.

\*P0001 R00010A

UNEXPECTED INTERRUPT AFTER CLEARING PUNCH, READER, TTY PUNCH, AND TTY READER. TURN OFF INTERRUPTING DEVICE.

\*P0001 R00010B

WITH PUNCH FLAG SET, PUNCH FAILED TO INTERRUPT

*P0002 R0000	S/B	XXXX	WAS	YYYY
*P0004 R0000	S/B	XXXX	WAS	YYYY
*P0006 R0000	S/B	XXXX	WAS	YYYY
*P0007 R0000	S/B	XXXX	WAS	YYYY
*P0010 R0000	S/B	XXXX	WAS	YYYY

ONE OF THE ABOVE PRINTOUTS OCCURS DURING ITS RESPECTIVE PROGRAM WHEN THE DATA READ FROM PAPER TAPE AND THE EXPECTED DATA DO NOT MATCH. S/B XXXX REPRESENTS THE EXPECTED CHARACTER. WAS YYYY REPRESENTS THE CHARACTER READ.

PCF(I0T022) FAILED TO CLEAR FLAG.

\*P0001 R0001

PSF(I0T021) FAILED TO SKIP WITH FLAG = 1. OR FLAG IS NOT SET.

\*P0001 R0002

PCF(I0T022) FAILED TO CLEAR FLAG.

\*P0001 R00010A

UNEXPECTED INTERRUPT AFTER CLEARING PUNCH, READER, TTY PUNCH, AND TTY READER. TURN OFF INTERRUPTING DEVICE.

\*P0001 R00010B

WITH PUNCH FLAG SET, PUNCH FAILED TO INTERRUPT.

*P0002 R0000	S/B	XXXX	WAS	YYYY
*P0004 R0000	S/B	XXXX	WAS	YYYY
*P0006 R0000	S/B	XXXX	WAS	YYYY
*P0007 R0000	S/B	XXXX	WAS	YYYY
*P0010 R0000	S/B	XXXX	WAS	YYYY

ONE OF THE ABOVE PRINTOUTS OCCURS DURING ITS RESPECTIVE PROGRAM WHEN THE DATA READ FROM PAPER TAPE AND THE EXPECTED DATA DO NOT MATCH. S/B XXXX REPRESENTS THE EXPECTED CHARACTER, WAS YYYY REPRESENTS THE CHARACTER READ.

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SEQ 0013

## INCORRECT RTN SELECTED

THIS PRINTOUT OCCURS DURING EXECUTION OF PRG0 AND PRG1 IF A NONEXISTENT ROUTINE IS SELECTED. THE PROGRAM HALTS, SET CORRECT ROUTINE NUMBER IN SR AND PRESS CONTINUE.

## UNEXPECTED INTERRUPT

THIS PRINTOUT OCCURS DURING PRG7 EXECUTION. PROGRAM HALTS, TURN OFF INTERRUPTING DEVICE. PRESS CONTINUE.

## 6.2 ERROR HALTS

- L00 0201 INCORRECT PROGRAM NUMBER SELECTED. SET SR TO CORRECT NUMBER AND PRESS CONTINUE.
- L00 0266 INCORRECT ROUTINE NUMBER SELECTED. PRECEDED BY PRINTOUT. SET CORRECT ROUTINE NUMBER IN SR AND PRESS CONTINUE.
- L00 0732 UNEXPECTED INTERRUPT. PRECEDED BY PRINTOUT. OCCURS DURING PRG7 EXECUTION. TURN OFF INTERRUPTING DEVICE. PRESS CONTINUE.
- L00 1347 SYNC ERROR. OCCURS DURING PRG2 AND PRG7. IF PROGRAM IS UNABLE TO SYNC. PRESS CONTINUE TO RETRY.
- L00 1076 COMMON ERROR HALT. OCCURS AFTER ERROR PRINTOUT IF SR3=0 AND OPTION APPLIES TO PROGRAM BEING RUN. PRESS CONTINUE.
- L00 3631 PRG7. PUNCH COUNT HAS EXCEEDED 100. READER IS PROBABLY NOT RUNNING. RESTART PROGRAM.

## 7.0 RESTRICTIONS

### 7.1 STARTING RESTRICTIONS

THIS PROGRAM MUST BE STARTED AT L00 0200.

### 8.0 MISCELLANEOUS

#### 8.1 EXECUTION TIME

PRG0 1 MINUTE 50 SECONDS  
 PRG1 45 SECONDS  
 PRG2 THROUGH PRG16 ARE CONTINUOUS RUNNING PROGRAMS.

8.2 TEST TAPES

MAINDEC-00-D2G4-PT SPECIAL BINARY COUNT PATTERN TEST TAPE IS PROVIDED WITH THIS PROGRAM. FOR EASE OF USE, THE TAPE SHOULD BE SPLICED INTO A LOOP INSURING THAT THE PATTERN IS MATCHED AT THE SPlice POINT. THE END OF A PATTERN IS INDICATED BY THE CHARACTERS: RUBOUT, ALL 0'S CHARACTER, ALL 0'S CHARACTER, AND THEN ANOTHER RUBOUT.

IT IS DESIRABLE TO SPLICE INTO LOOPS. MAINDEC-00-D2G1-PT AND MAINDEC-00-D2G2-PT TO FACILITATE TESTING.

9.0. PROGRAM DESCRIPTION

THIS PROGRAM CONSISTS OF 14 INDIVIDUAL PROGRAMS NUMBERED FROM 00 TO 15 (OCTAL). PROGRAMS ARE SELECTED BY MEANS OF THE SWITCH REGISTER (SR).

9.1 PRG0 - BASIC READER AND READER CONTROL LOGIC TEST

THIS PROGRAM CONTAINS TEN ROUTINES NUMBERED FROM 0 TO 11 (OCTAL).

- RTN0 CHECKS THAT FLAG IS SET 250 MS AFTER ISSUING RFC COMMAND (I0T014). FAILURE TO SKIP ON FLAG COULD BE CAUSED BY FLAG NOT SET, OR PSF FAILURE TO SKIP. TEST IS DONE 200 TIMES.
- RTN1 CHECKS THAT RSF COMMAND (I0T011) SKIPS WITH FLAG = 1. TEST IS DONE 4095 TIMES.
- RTN2 CHECK THAT RSF COMMAND (I0T011) DOES NOT SKIP WITH FLAG = 0. DONE 4095 TIMES.
- RTN3 CHECKS FOR SKIP WITH INTERRUPT OFF. (DONE 2047 TIMES)
- RTN4 CHECKS THAT INTERRUPT ENABLE CAN BE CLEARED FOR READER. (DONE 4095 TIMES)
- RTN5 CHECKS THAT RRB COMMAND (I0T012) CLEARS THE FLAG. DONE 500 TIMES.
- RTN6 CHECKS THAT RFC COMMAND (I0T014) CLEARS THE FLAG. DONE 500 TIMES.
- RTN7 CHECKS ABILITY TO READ ALL 0'S CHARACTER. DONE 500 TIMES.
- RTN10 CHECKS FOR UNEXPECTED INTERRUPTS, AND THEN CHECKS THAT READER IS ABLE TO INTERRUPT.
- RTN11 THIS ROUTINE CHECKS THAT THE "STOP DELAY" IS NOT LESS THAN 10 MS. OR MORE THAN 250 MS. THE TEST SEQUENCE IS:

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- A. RFC (FETCH CHARACTER)
- B. WAIT FOR FLAG 1 (SHOULD BE SET IMMEDIATELY)
- C. DELAY 19 MS. (STOP DELAY SHOULD FIRE 6 MS AFTER STEP A.)
- D. RFC (FETCH CHARACTER. CLEAR FLAG.)
- E. DELAY 19 MS.
- F. SKIP ON FLAG. (IF SKIP OCCURS, THE "STOP DELAY" DID NOT FIRE, OR IS TOO SHORT).
- G. DELAY ADDITIONAL 212 MILLISECONDS.
- H. SKIP ON FLAG. (IF NO SKIP OCCURS, THE "STOP DELAY" IS TOO LONG.) TEST IS DONE 200 TIMES.

9.2 PRG1 - BASIC PUNCH AND PUNCH CONTROL LOGIC TEST

THIS PROGRAM CONTAINS NINE ROUTINES NUMBERED FROM 0 TO 10 (OCTAL).

- RTN0 CHECKS THAT PSF COMMAND (I0T021) DOES NOT SKIP WITH FLAG = 0.
- RTN1 CHECKS THAT PSF COMMAND (I0T021) SKIPS WITH FLAG = 1. DONE 4095 TIMES.
- RTN2 CHECKS THAT PCF COMMAND (I0T022) IS ABLE TO CLEAR THE FLAG. DONE 500 TIMES.
- RTN3 CHECKS FOR SKIP WITH INTERRUPT OFF. (DONE 2047 TIMES)
- RTN4 CHECKS THAT INTERRUPT ENABLE CAN BE CLEARED FOR PUNCH. (DONE 4095 TIMES)
- RTN5 TEST DONE 500 TIMES. VISUAL CHECK OF TAPE REQUIRED. CHECKS THAT PCF COMMAND (I0T022) IS ABLE TO CLEAR THE PUNCH BUFFER. THE TEST SEQUENCE IS:
  - A. ALL 1'S TO PUNCH BUFFER, AND PUNCH (PLS).
  - B. IMMEDIATELY CLEAR THE PUNCH BUFFER BY ISSUING PCF COMMAND. NO HOLES SHOULD BE PUNCHED EXCEPT FOR FEED-HOLE.
- RTN6 TEST IS DONE 500 TIMES. VISUAL CHECK OF TAPE REQUIRED. ROUTINE LOADS PUNCH BUFFER WITH 125 (8) AND PUNCHES. ALTERNATE HOLES SHOULD BE PUNCHED.
- RTN7 TEST IS DONE 500 TIMES. VISUAL CHECK OF TAPE REQUIRED. ROUTINE LOADS PUNCH BUFFER WITH 252(8) AND PUNCHES. ALTERNATE HOLES SHOULD BE PUNCHED.



- RTN10 CHECKS FOR UNEXPECTED INTERRUPTS, AND THEN CHECKS THAT PUNCH IS ABLE TO INTERRUPT.
- 9.3 PRG2 - READER TEST  
THE READER IS TESTED USING A SPECIAL BINARY COUNT PATTERN TEST TAPE. THE PROGRAM IS CONTINUOUS RUNNING. ERRORS ARE INDICATED BY PRINTOUTS. NORMAL TEST MODE IS WITH RANDOM STALLS AFTER EVERY CHARACTER GROUP READ. SR6 = 1 GIVES FULL SPEED TESTING. SR7 = 1 LOCKS PROGRAM ON CURRENT STALL. (SR6 MUST BE 0). PROGRAM RESYNCS AFTER 5 ERRORS. THE LENGTH OF A CHARACTER GROUP IS RANDOM, BUT DOES NOT EXCEED 15 CHARACTERS.
- 9.4 PRG3 - PUNCH TEST, SPECIAL BINARY COUNT PATTERN  
THIS CONTINUOUS RUNNING PROGRAM PUNCHES SPECIAL BINARY COUNT PATTERN. NORMAL TEST MODE IS WITH RANDOM STALLS AFTER EVERY CHARACTER PUNCHED. SR6 = 1 GIVES FULL SPEED PUNCHING. SR7 = 1 LOCKS PROGRAM ON THE CURRENT STALL. (SR6 MUST BE 0).
- 9.5 PRG4 - PUNCH VERIFY, BINARY COUNT PATTERN  
THIS PROGRAM READS AND CHECKS THE TAPE PUNCHED DURING EXECUTION OF PRG3. ERRORS ARE INDICATED BY ERROR PRINTOUTS.
- 9.6 PRG5 - PUNCH TEST, RANDOM CHARACTERS  
THIS CONTINUOUS RUNNING PROGRAM PUNCHES RANDOM CHARACTERS. NORMAL TEST MODE IS WITH RANDOM STALLS AFTER EVERY CHARACTER PUNCHED. SR6 = 1 GIVES FULL SPEED PUNCHING. SR7 = 1 LOCKS PROGRAM ON THE CURRENT STALL. (SR6 MUST BE 0).
- 9.7 PRG6 - PUNCH VERIFY, RANDOM CHARACTERS  
THIS CONTINUOUS RUNNING PROGRAM READS AND CHECKS THE TAPE PUNCHED DURING EXECUTION OF PRG5. ERRORS ARE INDICATED BY ERROR PRINTOUTS.
- 9.8 PRG7 - COMBINED READER - PUNCH TEST  
THIS CONTINUOUS RUNNING PROGRAM PUNCHES AND READ - CHECKS SPECIAL BINARY COUNT PATTERN. THE READER AND PUNCH WORK IN THE INTERRUPT MODE. NORMAL TEST MODE IS WITH RANDOM STALLS AFTER EVERY CHARACTER PUNCHED. SR6 = 1 GIVES FULL SPEED PUNCHING AND READING. SR7 = 1 LOCKS PROGRAM ON THE CURRENT STALL. (SR6 MUST BE 0.) THE READER RESYNCS ITSELF AUTOMATICALLY AFTER 5 ERRORS.
- 9.9 PRG10 - READ AMPLIFIER ADJUSTMENT LOOP  
THIS CONTINUOUS RUNNING PROGRAM USES A 1'S AND 0'S TEST TAPE LOOP, AND PROVIDES A MEANS OF DETERMINING THE UPPER AND LOWER LIMITS OF CORRECT OPERATION OF THE READ AMPLIFIER OF THE PAPER TAPE READER. AFTER OBTAINING THE LIMITS THE POT CAN BE SET TO THE MIDDLE POSITION. READ ERRORS ARE INDICATED BY ERROR PRINT-

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- OUTS. DROPPING OF THE READER FLAG BY OVERDRIVING OF THE FEED-HOLE AMPLIFIER IS INDICATED BY 3 BELLS FROM THE TELETYPE. THE READER IS THEN RESTARTED.
- 9.10 PRG11 - PUNCH ANY CHARACTER IN SR LOOP  
THIS PROGRAM LOOP CONTINUOUSLY PUNCHES THE CODE SET IN SR4 THROUGH SR11. SR SWITCHES MAY BE CHANGED WHILE RUNNING.
- 9.11 PRG12 - ONES AND ZEROS PUNCH LOOP  
THIS PROGRAM PUNCHES 1'S AND 0'S CONTINUOUSLY. NORMAL MODE IS WITH RANDOM STALLS AFTER EVERY CHARACTER PUNCHED. SR6 = 1 GIVES FULL SPEED PUNCHING. SR7 = 1 LOCKS PROGRAM ON CURRENT STALL. (SR6 MUST BE 0)
- 9.12 PRG13 - READER SPEED PRINT LOOP  
THIS PROGRAM TYPES THE READER SPEED MEASURED OVER A 30 OR 300 SECOND PERIOD. THE USER CONTROLS THE MEASURING TIME WITH THE AID OF A WATCH WITH SWEEP SECOND HAND.
- 9.13 PRG14 - PUNCH SPEED PRINT LOOP  
THIS PROGRAM TYPES THE PUNCH SPEED MEASURED OVER A 60 SECOND PERIOD. THE USER CONTROLS THE MEASURING TIME WITH THE AID OF A WATCH WITH SWEEP SECOND HAND.
- 9.14 PRG15 - READ X, STALL Y MS LOOP  
THIS PROGRAM LOOP IS INTENDED AS AN AID IN ADJUSTING THE PAPER TAPE READER. THE USER SETS IN SR0 THROUGH SR4 THE NUMBER OF CHARACTERS TO BE READ (RANGE: 1 TO 37 OCTAL) AND IN SR5 THROUGH SR11 THE NUMBER OF MS TO STALL AFTER READING THE CHARACTERS (RANGE: 1 TO 177 OCTAL). THIS LOOP IS USEFUL IN ADJUSTING CLOCK TIMING, STROBE, ETC.
- 10.0 LISTING





0272	7006	RTL	CLA	ROUTINE SELECT (SR1)
0273	7630	SZL	CLA	/YES
0274	6243	JMS	GETRDY	
0275	1117	TRO	NXTST	
0276	7001	IAC		
0277	7640	SZA	CLA	LAST ROUTINE?
0300	6246	JMS	GETRDY+3	/NO
0301	7277	READSR	OSR	
0302	7208	RTL	CLA	LOOP PROGRAM? (SR2)
0303	7277	JMS	GETRDY	/YES
0304	7277	JMS	GETRDY	/END OF PROGRAM HALT
0305	7277	JMS	GETRDY	
0306	7277	JMS	GETRDY	
0307	7277	JMS	GETRDY	
0308	7277	JMS	GETRDY	
0309	7277	JMS	GETRDY	
0310	7277	JMS	GETRDY	
0311	7277	JMS	GETRDY	
0312	7277	JMS	GETRDY	
0313	7277	JMS	GETRDY	
0314	7277	JMS	GETRDY	
0315	7277	JMS	GETRDY	
0316	7277	JMS	GETRDY	
0317	7277	JMS	GETRDY	
0318	7277	JMS	GETRDY	
0319	7277	JMS	GETRDY	
0320	7277	JMS	GETRDY	
0321	7277	JMS	GETRDY	
0322	7277	JMS	GETRDY	
0323	7277	JMS	GETRDY	
0324	7277	JMS	GETRDY	
0325	7277	JMS	GETRDY	
0326	7277	JMS	GETRDY	
0327	7277	JMS	GETRDY	
0328	7277	JMS	GETRDY	
0329	7277	JMS	GETRDY	
0330	7277	JMS	GETRDY	
0331	7277	JMS	GETRDY	
0332	7277	JMS	GETRDY	
0333	7277	JMS	GETRDY	
0334	7277	JMS	GETRDY	
0335	7277	JMS	GETRDY	
0336	7277	JMS	GETRDY	
0337	7277	JMS	GETRDY	
0338	7277	JMS	GETRDY	
0339	7277	JMS	GETRDY	
0340	7277	JMS	GETRDY	
0341	7277	JMS	GETRDY	
0342	7277	JMS	GETRDY	
0343	7277	JMS	GETRDY	
0344	7277	JMS	GETRDY	
0345	7277	JMS	GETRDY	
0346	7277	JMS	GETRDY	
0347	7277	JMS	GETRDY	
0348	7277	JMS	GETRDY	
0349	7277	JMS	GETRDY	
0350	7277	JMS	GETRDY	
0351	7277	JMS	GETRDY	
0352	7277	JMS	GETRDY	
0353	7277	JMS	GETRDY	
0354	7277	JMS	GETRDY	
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0362	7277	JMS	GETRDY	
0363	7277	JMS	GETRDY	
0364	7277	JMS	GETRDY	
0365	7277	JMS	GETRDY	
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0371	7277	JMS	GETRDY	
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0373	7277	JMS	GETRDY	
0374	7277	JMS	GETRDY	
0375	7277	JMS	GETRDY	
0376	7277	JMS	GETRDY	
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0378	7277	JMS	GETRDY	
0379	7277	JMS	GETRDY	
0380	7277	JMS	GETRDY	
0381	7277	JMS	GETRDY	
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0383	7277	JMS	GETRDY	
0384	7277	JMS	GETRDY	
0385	7277	JMS	GETRDY	
0386	7277	JMS	GETRDY	
0387	7277	JMS	GETRDY	
0388	7277	JMS	GETRDY	
0389	7277	JMS	GETRDY	
0390	7277	JMS	GETRDY	
0391	7277	JMS	GETRDY	
0392	7277	JMS	GETRDY	
0393	7277	JMS	GETRDY	
0394	7277	JMS	GETRDY	
0395	7277	JMS	GETRDY	
0396	7277	JMS	GETRDY	
0397	7277	JMS	GETRDY	
0398	7277	JMS	GETRDY	
0399	7277	JMS	GETRDY	
0400	7277	JMS	GETRDY	

0416	0417	+I		
0417	1106	TAD	MILI	GET I MS CONSTANT
0420	3121	DCA	MILCTR	STORE IN MILCTR
0421	3121	ISZ	MILCTR	/DELAYED 1 MSEC?
0422	3121	JMP	-1	
0423	3120	ISZ	MSCTR	/DONE DELAYING?
0424	3121	JMP	-5	
0425	3121	JMP	I DLYMS	EXIT
0426	3121	JMP	I DLYMS	EXIT
0427	3121	JMP	I DLYMS	EXIT
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0503	3121	JMP	I DLYMS	EXIT
0504	3121	JMP	I DLYMS	EXIT
0505	3121	JMP	I DLYMS	EXIT
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331 0502 3210 3210
332 0503 0765 0765
333 0504 5432 5432
334 0505 2107 2107
335 0506 7654 7654
336 0507 4321 4321
337 0510 1076 1076
338 0511 7257 7257
339 0512 0000 0000
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344 0513 0000 /SUBROUTINE TO GENERATE RANDOM DELAY COUNT
345 0514 4427 /DLCNT. 0
346 0515 0174 /JMS I RANDNO /GO GENERATE RANDOM NUMBER
347 0516 7041 /AND I177 /MASK OUT UNDESIED BITS.
348 0517 3021 /CIA /2'S COMPLEMENT IT
349 0520 5713 /DCA DELAYM /EXIT
350
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352
353 0521 0000 /SUBROUTINE TO COMPARE C(AC) TO CONTENTS STORED AT CALL+1
354 0522 3335 /CHK. 0
355 0523 1721 /DCA WCHK /STORE AC AT WCHK
356 0524 7041 /TAD I CHCK /GET COMPARE DATA
357 0525 1335 /CIA /2'S COMPLEMENT IT
358 0526 2321 /TAD WCHK /ADD C(WCHK)
359 0527 7640 /ISZ CHCK /SET UP FOR UNEQUAL EXIT
360 0530 5333 /SZA CLA /EQUAL (AC = 0)
361 0531 2321 /JMP +3 /NO
362 0532 5721 /ISZ CHCK /YES. SET UP FOR EQUAL EXIT
363 0533 1335 /JMP I CHCK /EQUAL EXIT
364 0534 5721 /TAD WCHK /RESTORE AC
365 0535 0000 /JMP I CHCK /UNEQUAL EXIT
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369 0536 0000 /SUBROUTINE TO MOVE VARIABLE LENGTH DATA FIELDS
370 0537 7200 /MOVE. 0
371 0540 1736 /CLA /GET "FROM ADDR" AND
372 0541 3361 /DCA FADDR /STORE AT FADDR
373 0542 2336 /ISZ MOVE
374 0543 1736 /TAD I MOVE /GET "TO ADDR" AND
375 0544 3362 /DCA TADDR /STORE AT TADDR.
376 0545 2336 /ISZ MOVE
377 0546 1736 /TAD I MOVE /GET "MOVE COUNT" AND
378 0547 3363 /DCA MCTR /STORE AT MCTR.
379 0550 2336 /ISZ MOVE /SET UP FOR EXIT.
380 0551 7200 /MOVEA. CLA
381 0552 1761 /TAD I FADDR /GET "FROM" WORD
382 0553 3762 /DCA I TADDR /STORE AT "TO" LOCATION
383 0554 2361 /ISZ FADDR /+1 TO "FROM" ADDR
384 0555 2362 /ISZ TADDR /+1 TO "TO" ADDR
385 0556 2363 /ISZ MCTR /ALL WORDS MOVED?
386 0557 5351 /JMP MOVEA /NO. GO MOVE AGAIN
387 0560 5736 /JMP I MOVE /YES. EXIT

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M02

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386 0561 0000 FADDR. 0
387 0562 0000 TADDR. 0
388 0563 0000 MCTR. 0
389
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391 0600 PAGE
392 0601 CRLF. 0
393 0602 0000 /CRLF SUBROUTINE
394 0603 0000 /TAD I CRLF /GET NUMBER OF CRLF'S
395 0604 0000 /AND SAVE
396 0605 0000 /ISZ CRLF
397 0606 0000 /JMS I XTPST /GO CRLF
398 0607 0000 /DCA CTR /ALL DONE?
399 0608 0000 /MTR /NO
400 0609 0000 /I CRLF /YES. EXIT.
401 0610 0000 /CR
402 0611 0000 /LF
403 0612 0000 /END CODE
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003

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PAGE 1000
ASCCN, 0000 /SUBROUTINE TO CONVERT
      0001 /A WORD TO PRINTABLE ASCII
      0002 1600
      0003 3237
      0004 2200
      0005 1600
      0006 3240
      0007 2200
      0010 1162
      0011 0637
      0012 7112
      0013 7012
      0014 7012
      0015 4224
      0016 2240
      0017 1162
      0020 7040
      0021 0637
      0022 4224
      0023 5600
      0024 0000
      0025 3241
      0026 1241
      0027 7006
      0030 7004
      0031 0161
      0032 1241
      0033 0161
      0034 1160
      0035 3640
      0036 5624
      0037 0000
      0040 0000
      0041 0000
      0042 0000
      0043 7200
      0044 1642
      0045 3021
      0046 2242
      0047 5642
      0050 0000
      0051 4452
      0052 0030
      0053 1471
      0054 4452
      0055 0116
      0056 1474
      0057 1650
      0060 3710
      0061 4447
      0062 1466
      0063 2250
      0064 1650
  
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003

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      0065 7450
      0066 5272
      0067 3271
      0070 4447
      0071 0000
      0072 4475
      0073 0157
      0074 7650
      0075 7402
      0076 4475
      0077 0157
      0080 7650
      0081 5447
      0082 4475
      0083 0157
      0084 7650
      0085 3271
      0086 3271
      0087 3271
      0088 5650
      0090 1476
      0091 0000
      0092 7200
      0093 1711
      0094 3222
      0095 3222
      0096 3222
      0097 3222
      0098 3222
      0099 3222
      0100 0000
      0101 7200
      0102 1717
      0103 3123
      0104 3123
      0105 3123
      0106 3123
      0107 3123
      0108 0000
      0109 0000
      0110 4475
      0111 0000
      0112 7200
      0113 1711
      0114 3222
      0115 3222
      0116 3222
      0117 3222
      0118 3222
      0119 0000
      0120 7200
      0121 1717
      0122 3123
      0123 3123
      0124 3123
      0125 3123
      0126 0000
      0127 4475
      0128 0155
      0129 7640
      0130 5725
      0131 5725
      0132 4475
      0133 0154
      0134 7640
      0135 7410
      0136 4475
      0137 1021
      0140 7440
      0141 4502
      0142 5725
      0143 0000
      0144 4471
      0145 0000
      0146 5355
      0147 2343
      0150 5743
      0151 3131
      0152 4452
      0153 1145
  
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936	2011	2036	POT1		
937			/CHECKS	THAT FLAG=1 250MS. AFTER RFC (IOT014), INDICATING THAT	
938			/READER	IS ADVANCING.	
939	2012	4477	SETA		/-200 TO CTRA
940	2013	7470	-310		
941	2014	4501	SETDLM		/-250 TO DELAY
942	2015	7406	-372		
943	2016	6014	POT0A,	RFC	/CLEAR FLAG, FETCH CHAR (IOT014)
944	2017	4502	DELAY		/DELAY 75 MS
945	2020	6011	RSF		/SKIP IF FLAG=1 (IOT011)
946	2021	5225	JMP POE0		
947	2022	2122	ISZ CTRA		/DON?
948	2023	5216	JMP POT0A		/NO, REPEAT
949	2024	5425	JMP I CHAIN		/YES, CHAIN
950	2025	4451	JMS I UERROR		/GO TO ERROR SUBROUTINE
951	2026	4040	NOSUF		/NO PRINTOUT SUFFIX
952	2027	0000	NONE		/NO PRINTOUT
953	2030	5222	JMP POT0A+4		/CONTINUE TEST
954	2031	4501	SETDLM		/SCOPE LOOP
955	2032	7764	-14		
956	2033	6014	RFC		/FETCH CHAR (IOT014)
957	2034	4502	DELAY		/DELAY 12 MS.
958	2035	5233	JMP .-2		
959	2036	0001	POT1,	1	
960	2037	2064	POT2		
961			/WITH FLAG=1, SKIP ON FLAG 4095	TIMES TO CHECK FOR RELIABLE SKIPPING	
962	2040	4477	SETA		/-4095 TO CTRA
963	2041	0001	-7777		
964	2042	6014	RFC		/FETCH CHAR (IOT014)
965	2043	6011	RSF		/SKIP ON FLAG (IOT011)
966	2044	5243	JMP .-1		/REPEAT
967	2045	6011	POT1A,	RSF	/SKIP ON FLAG (IOT011)
968	2046	5252	JMP POE1		/ERROR
969	2047	2122	ISZ CTRA		/DONE 4095 TIMES?
970	2050	5245	JMP POT1A		/NO, REPEAT TEST
971	2051	5425	JMP I CHAIN		/YES, CHAIN
972	2052	4451	JMS I UERROR		/GO TO ERROR SUBROUTINE
973	2053	4040	NOSUF		/NO PRINTOUT SUFFIX
974	2054	0000	NONE		/NO PRINTOUT
975	2055	5244	JMP POT1A+2		/CONTINUE TEST

976	2056	6014	POT15,	RFC	/START SCOPE LOOP, FETCH CHAR (IOT014)
977	2057	6011	RSF		/SKIP ON FLAG (IOT011)
978	2060	5257	JMP .-1		/REPEAT
979	2061	5011	RSF		/SKIP ON FLAG (IOT011)
980	2062	5251	JMP .-1		/REPEAT
981	2063	5251	JMP .-2		/REPEAT
982	2064	0002	POT2,	0	
983	2065	2105	POT3		
984			/CHECKS	THAT IOT011 DOES NOT SKIP WITH FLAG=0.	
985	2067	4477	SETA		/-4095 TO CTRA
986	2068	0001	-7777		
987	2069	0001	RRB		/CLEAR FLAG
988	2070	0001	REF		/SKIP ON FLAG=1(IOT011)
989	2071	0001	JMP POT20K		/OK
990	2072	0001	JMS I UERROR		/ERROR, GO TO ERROR SUB
991	2073	0001	NOSUF		/NO PRINTOUT SUFFIX
992	2074	0001	NONE		/NO PRINTOUT
993	2075	0001	JMP POT20K		/CONTINUE TEST
994	2077	0001	RSF		/START SCOPE LOOP, SKIP ON FLAG
995	2080	0001	JMP .-1		/REPEAT
996	2081	0001	JMP .-2		/REPEAT
997	2082	0001	ISZ CTRA		/DONE 4095 TIMES?
998	2083	0001	JMP POT2A		/NO, REPEAT
999	2084	0001	JMP I CHAIN		/YES, CHAIN
1000			/ROUTINE TO CHECK FOR SKIP WITH INTERRUPT DISABLED		
1001			POT3,	3	
1002	2086	0003	POT4		
1003	2087	0003	TAD (4000		
1004	2088	0003	CCA COUNT		
1005	2089	0003	TAD (7773		
1006	2090	0003	CCA CTR		
1007	2091	0003	YOP		
1008	2092	0003	CLP		
1009	2093	0003	CCA MILLI		
1010	2094	0003	ISZ MILLI		
1011	2095	0003	ISZ MILLI		
1012	2096	0003	JMP .-1		
1013	2097	0003	ISZ CTR		
1014	2098	0003	JMP .-3		
1015	2099	0003	TAD (2260		/4.55 MS CONSTANT
1016	2100	0003	CCA DELTIM		
1017	2101	0003	CAF		
1018	2102	0003	RCP		/READ
1019	2103	0003	JMS TIM		
1020	2104	0003	RSF		/SKIP IF READER FLAG SET
1021	2105	0003	JMP POE3		/FLAG DID NOT SET
1022	2106	0003	RPE		
1023	2107	0003	SRC		/SHOULD SKIP HERE IF INT REC
1024	2108	0003	JMP POE3		/REPORT ERROR
1025	2109	0003	ISZ COUNT		
1026	2110	0003	JMP POT3+4		
1027	2111	0003	JMP I CHAIN		
1028	2112	0003	JMS I UERROR		
1029	2113	0003	NOSUF		
1030	2114	0003	NONE		

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1031 0142 5311 JMP POT3+4
1032 0143 6002 POT3S, IOF
1033 0144 6011 RSF
1034 0145 5344 JMP -1
1035 0146 6011 RSF
1036 0147 5346 JMP -1
1037 0148 5346 JMP -2
1038 0149 0000 TIM, 0
1039 0150 5313 ISZ DELTIM
1040 0151 5352 JMP -1
1041 0154 5751 JMP I TIM
1042
1043 2175 2260
1044 2176 7773
1045 2177 4000
1046 2200 0004 PAGE
1047 2201 2400 /ROUTINE TO CHECK THAT INTERRUPT ENALBE CAN BE CLEARED FOR READER.
1048 2202 6002 POT4, 4
1049 2203 1234 POT5 IOF
1050 2204 3235 TAD R7770 RCNT2
1051 2205 6007 ALOOP, OCA /INIT. # OF ITERATIONS
1052 2206 6010 CAF /ENABLE INTERRUPT
1053 2207 6020 RPE
1054 2208 6014 PCE
1055 2209 6001 ION
1056 2211 6014 /READ
1057 2212 6000 RCF
1058 2213 5224 SKON
1059 2214 6003 JMP PDE4 /INTERRUPT NOT ON
1060 2215 7410 SRQ /SKIP IF INT REQ GENERATED
1061 2216 5224 SKP /NO INT REQ
1062 2217 2022 JMP PDE4 /INT REQ GENERATED
1063 2220 5205 ISZ COUNT /RELIABILITY SETUP
1064 2221 2235 POT4A, JMP ALOOP /CONTINUE
1065 2222 5205 ISZ RCNT2
1066 2223 5425 JMP I CHAIN
1067 2224 4451 POE4, JMS I UERROR
1068 2225 4040 NOSUF
1069 2226 0000 NONE
1070 2227 5425 JMP I CHAIN
1071 2230 6010 POT4S, RPE
1072 2231 4502 DELAY
1073 2232 6020 PCE
1074 2233 5230 JMP -3
1075
1076 2234 7770 R7770, 7770
1077 2235 7770 RCNT2, 7770
1078
1079 PAGE
1080 2400 0005 POT5, 5
1081 2401 2420 POT6,
1082 /CHECKS IOTD12 (RRB) FOR ABILITY TO CLEAR FLAG.
1083 2402 4477 SETA /-500 TO CTRA
1084 2403 7014 -764

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1085 0104 6014 POT5A, RFC /FETCH CHAR (IOTD14)
1086 0105 6002 RSF /WAIT FOR FLAG=1
1087 0106 6005 JMP -1
1088 0107 6012 RRB CLEAR FLAG (IOTD12)
1089 0110 6001 RSF /SKIP ON FLAG=1
1090 0111 6001 JMP POT5B /OK
1091 0112 6001 JMS I UERROR /ERROR, GO TO ERROR SUB.
1092 0113 6001 NOSUF /NO PRINTOUT SUFFIX
1093 0114 6001 NONE /NO PRINTOUT
1094 0115 6001 JMP POT5B /CONTINUE TEST
1095 0116 6001 RFC POT5S, /START SCOPE LOOP, FETCH CHAR
1096 0117 6001 RSF /WAIT FOR FLAG=1
1097 0118 6001 JMP -1
1098 0119 6001 RRB /CLEAR FLAG (IOTD12)
1099 0120 6001 RSF /SKIP IF FLAG=1
1100 0121 6001 JMP -5 /NO, IOTD12 CLEARED IT, READ AGAIN
1101 0122 6001 JMP -3 /IOTD12 FAILED, REPEAT IOTD12.
1102 0123 6001 POT5B, ISZ CTRA /DONE?
1103 0124 6001 JMS POT5A /NO, REPEAT
1104 0125 6001 JMP I CHAIN /YES, CHAIN
1105
1106 0126 6001 POT6, 6
1107 0127 6001 /CHECKS THAT IOTD14 CLEARS FLAG. /-500 TO CTRA.
1108 0128 4477 SETA
1109 0129 7014 -764
1110
1111 0130 6001 POT6A, RFC /FETCH CLEAR (IOTD14)
1112 0131 6001 RSF /WAIT FOR FLAG=1.
1113 0132 6001 JMP -1
1114 0133 6001 RFC /CLEAR FLAG WITH IOTD14
1115 0134 6001 RSF /SKIP IN FLAG=1.
1116 0135 6001 JMP POT6B /OK FLAG IS 0.
1117 0136 6001 JMS I UERROR /ERROR FLAG=1, GO TO ERROR SUB.
1118 0137 6001 NOSUF /NO PRINTOUT SUFFIX
1119 0138 6001 NONE /NO PRINTOUT
1120 0139 6001 JMP POT6B /CONTINUE TEST
1121 0140 6001 DELAY /START SCOPE LOOP, DELAY 20 MS.
1122 0141 6001 RFC POT6S, /FETCH CHAR (IOTD14)
1123 0142 6001 RSF /WAIT FOR FLAG=1.
1124 0143 6001 JMP -1
1125 0144 6001 JMP -3 /GO CLEAR FLAG AND FETCH CHAR.
1126 0145 6001 POT6B, ISZ CTRA /DONE?
1127 0146 6001 JMS POT6A /NO, REPEAT
1128 0147 6001 JMP I CHAIN /YES, CHAIN
1129
1130 2500 PAGE
1131 2501 2520 POT7, 7
1132 2502 2520 /CHECKS ABILITY TO READ ALL D'S CHARACTERS.
1133 2503 4477 SETA /-500 TO CTRA
1134 2504 7014 -764
1135 2505 6001 POT7A, RFC /FETCH CHAR (IOTD14)
1136 2506 6001 RSF /WAIT FOR FLAG=1.
1137 2507 6001 JMP -1
1138 2508 6001 RRB /READ BUFFER

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1140 0000 6014 POT5A, RFC /FETCH CHAR (IOTO14)
1141 0001 6011 RSP /WAIT FOR FLAG=1
1142 0002 6012 JMB -1
1143 0003 6012 RRB /CLEAR FLAG (IOTO12)
1144 0004 6011 RSP /SKIP ON FLAG=1
1145 0005 6011 JMB POT5B /OK
1146 0006 6011 JMS I LERROR /ERROR, GO TO ERROR SUB.
1147 0007 6011 NOSUF /NO PRINTOUT SUFFIX
1148 0008 6011 NONE /NO PRINTOUT
1149 0009 6011 JMB POT5B /CONTINUE TEST
1150 0010 6014 POT5S, RFC /START SCOPE LOOP. FETCH CHAR
1151 0011 6011 RSP /WAIT FOR FLAG=1
1152 0012 6012 JMB -1
1153 0013 6011 RRB /CLEAR FLAG (IOTO12)
1154 0014 6011 RSP /SKIP IF FLAG=1
1155 0015 6011 JMB -5 /NO, IOTO12 CLEARED IT. READ AGAIN
1156 0016 6011 JMB -3 /IOTO12 FAILED, REPEAT INTO12.
1157 0017 6011 ISZ CTRA /DONE?
1158 0018 6011 JMB POT5A /NO REPEAT
1159 0019 6011 JMB I CHAIN /YES, CHAIN
1160 0020 6000
1161 0021 6011 POT7 /CHECKS THAT IOTO14 CLEARS FLAG.
1162 0022 6011 SETA -500 TO CTRA.
1163 0023 6011 RRB
1164 0024 6011 RFB /FETCH CLEAR (IOTO14)
1165 0025 6011 RSP /WAIT FOR FLAG=1.
1166 0026 6011 JMB -1
1167 0027 6011 RFC /CLEAR FLAG WITH IOTO14
1168 0028 6011 RSP /SKIP IN FLAG=1.
1169 0029 6011 JMB POT6B /OK FLAG IS 0.
1170 0030 6011 JMS I UERROR /ERROR FLAG=1, GO TO ERROR SUB.
1171 0031 6011 NOSUF /NO PRINTOUT SUFFIX
1172 0032 6011 NONE /NO PRINTOUT
1173 0033 6011 JMB POT6B /CONTINUE TEST
1174 0034 6011 DELAY /START SCOPE LOOP. DELAY 20 MS.
1175 0035 6014 POT6S, RFB /FETCH CHAR (IOTO14)
1176 0036 6011 RSP /WAIT FOR FLAG=1.
1177 0037 6011 JMB -1
1178 0038 6011 JMB -3 /GO CLEAR FLAG AND FETCH CHAR.
1179 0039 6011 ISZ CTRA /DONE?
1180 0040 6011 JMB POT6A /NO REPEAT
1181 0041 6011 JMB I CHAIN /YES, CHAIN
1182 0042 6000
1183 0043 6000 PAGE 7
1184 0044 6001 POT7, 7
1185 0045 6011 POT10 /CHECKS ABILITY TO READ ALL 0'S CHARACTERS
1186 0046 6011 SETA -500 TO CTRA
1187 0047 6011 RFB
1188 0048 6011 RFC /FETCH CHAR (IOTO14)
1189 0049 6011 RSP /WAIT FOR FLAG=1.
1190 0050 6011 JMB -1
1191 0051 6011 CLA
1192 0052 6012 RRB /READ BUFFER

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1140 0000 3236 DCA POT74B /SAVE
1141 0001 3237 TRD POT74B
1142 0002 3238 SZA CLA /RESULT 0?
1143 0003 3239 JMB POE7 /ERROR, DID NOT READ 0'S CHAR.
1144 0004 3240 ISZ CTRA /DONE?
1145 0005 3241 JMB POT7A /NO, REPEAT
1146 0006 3242 JMB I CHAIN /YES CHAIN
1147 0007 3243 JMS I UASCCN
1148 0008 3244 POT74A
1149 0009 3245 SS
1150 0010 3246 JMS I UASCCN
1151 0011 3247 POT74B
1152 0012 3248 JMB
1153 0013 3249 JMS I LERROR /GO TO ERROR SUBROUTINE
1154 0014 3249 NOSUF /NO SUFFIX
1155 0015 3249 SDWAS /PRINT S/B AND W/S.
1156 0016 3249 JMB POT7B /CONTINUE TEST
1157 0017 3249 CLA
1158 0018 3249 RRB /READ BUFFER. PC S/B 7400
1159 0019 3249 JMB -2 /REPEAT
1160 0020 3200 POT74A, 0000
1161 0021 3200 POT74B, 0000
1162 0022 3200 POT10, 10
1163 0023 3201 /CHECKS ABILITY OF READER FLAG TO CAUSE AN INTERRUPT.
1164 0024 3201 SETLCC /SET INTERRUPT RETURN TO
1165 0025 3201 RRB /PBE10A
1166 0026 3201 ACE10A
1167 0027 3201 ACC /CLEAR TTY READER FLAG.
1168 0028 3201 RFB /CLEAR TTY PRINTER FLAG.
1169 0029 3201 RSP /CLEAR PUNCH FLAG.
1170 0030 3201 RRB /CLEAR READER FLAG.
1171 0031 3201 RCB /ENABLE INTERRUPT
1172 0032 3201 RCB /NO OP.
1173 0033 3201 JMB POT10B /TURN OFF INTERRUPT
1174 0034 3201 JMS I LERROR /GO TO ERROR SUB.
1175 0035 3201 NONE /SUFFIX B
1176 0036 3201 JMB POT10A /NO PRINTOUT.
1177 0037 3201 JMB POT10A /REPEAT TEST.
1178 0038 3201 SETA -777 /REPEAT TEST.
1179 0039 3201 SETLCC /-4095 TO CTRA
1180 0040 3201 POT10E, 777
1181 0041 3201 /SET INTERRUPT RETURN
1182 0042 3201 RRB /POT10E.
1183 0043 3201 RRB
1184 0044 3201 RFB /SET INTERRUPT ENABLE
1185 0045 3201 RFB /FETCH CHAR (IOTO14)
1186 0046 3201 RFB /WAIT FOR FLAG=1.
1187 0047 3201 RFB
1188 0048 3201 RFB
1189 0049 3201 RFB
1190 0050 3201 RFB
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1198 0058 3201 RFB
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1213 0073 3201 RFB
1214 0074 3201 RFB
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1238 0098 3201 RFB
1239 0099 3201 RFB
1240 0100 3201 RFB
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1246 0106 3201 RFB
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1250 0110 3201 RFB
1251 0111 3201 RFB
1252 0112 3201 RFB
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1404 0264 3201 RFB
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1439 0299 3201 RFB
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1441 0301 3201 RFB
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1471 0331 3201 RFB
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1480 0340 3201 RFB
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1541 0401 3201 RFB
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1641 0501 3201 RFB
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1685 0545 3201 RFB
1686 0546 3201 RFB
1687 0547 3201 RFB
1688 0548 3201 RFB
1689 0549 3201 RFB
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1710 0570 3201 RFB
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1735 0595 3201 RFB
1736 0596 3201 RFB
1737 0597 3201 RFB
1738 0598 3201 RFB
1739 0599 3201 RFB
1740 0600 3201 RFB
1741 0601 3201 RFB
1742 0602 3201 RFB
1743 0603 3201 RFB
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1746 0606 3201 RFB
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1748 0608 3201 RFB
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1751 0611 3201 RFB
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1754 0614 3201 RFB
1755 0615
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2122 0003 ISZ CTR4 /DONE?
0004 JMF PIT18 /NO REPEAT
0005 JMF I CHAIN /YES CHAIN
0006 JMS I UERROR /GO TO ERROR SUBROUTINE
0007 NOSUF /NO SUFFIX
0008 NONE /NO PRINTOUT
0009 JMP PIT19 /CONTINUE TEST
0010 OLD
0011 PCF /CLEAR FLAG AND BUFFER
0012 PCF /SKIP IF FLAG=1
0013 PCF /LOAD AND PUNCH
0014 JMF /REPEAT
0015 JMF /REPEAT
0016
0017 PIT2.
0018 B
0019 B1T3
0020 /CHECKS THAT PCF (IOT022) IS ABLE TO CLEAR THE FLAG
0021 SETA -500 TO CTR4
0022 -754
0023
0024 PIT2A.
0025 CLA /CLEAR LOAD AND PUNCH
0026 PLS /WAIT FOR FLAG=1
0027 JMF -1
0028 PCF /CLEAR FLAG (IOT022)
0029 PCF /SKIP IF FLAG=1
0030 JMF PIT2B /NO SKIP OK
0031 JMS I UERROR /SKIP ERROR GO TO ERRCR SUB
0032 NOSUF
0033 NONE
0034 JMP PIT2B /CONTINUE TEST.
0035 CLA /CLEAR LOAD AND PUNCH
0036 PLS /WAIT FOR FLAG
0037 JMF -1
0038 PCF /CLEAR FLAG
0039 PCF /SKIP IF FLAG=1
0040 JMF /CLEARED
0041 JMF /NOT CLEAR.
0042 ISZ CTR4 /SAVE?
0043 JMF PIT2A /NO REPEAT
0044 JMF I CHAIN /YES CHAIN
0045
0046 /ROUTINE TO CHECK FOR SKIP WITH INTERRUPT DISABLED
0047 PIT3.
0048 B
0049 B1T4
0050 TAD (4000
0051 DCA COUNT
0052 TAD (7773
0053 DCA CTR
0054 JMF IOT
0055 CLA
0056 DCA MILLI
0057 ISZ MILLI
0058 JMF CTR -1
0059 JMF CTR -3
0060 JMF IOT (0001
0061
0062 /16 MS CONSTANT

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7100
7200
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7400
7500
7600

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E04

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3133 3134 DCA DELTIM
3134 6007 CAF
3135 6024 PPC /PUNCH
3136 4361 JMS TIM1
3137 6021 PIT3A. /SKIP IF PUNCH FLAG SET
3138 5347 JMF P1E3
3139 6010 RPE
3140 6010 SRG /SHOULD SKIP HERE FOR INT REQ
3141 6010 JMF P1E3 /REPORT ERROR
3142 6003 ISZ COUNT
3143 5347 JMF PIT3+4
3144 6010 JMF I CHAIN
3145 6010 JMS I UERROR
3146 6010 NOSUF
3147 6010 NONE
3148 6010 PIT3+4
3149 6021 PCF
3150 6002 JMF -1
3151 6021 JMF -1
3152 6021 JMF -2
3153 6002 TIM1. /44 MILLISEC TIME OUT
3154 6021 ISZ DELTIM
3155 6021 JMF -1
3156 1374 TAD (0500
3157 3134 DCA DELTIM
3158 2134 ISZ DELTIM
3159 5362 JMF -1
3160 5366 JMF -1
3161 0000 JMF I TIM1
3162 2134 /RETURN
3163 5362
3164 1374
3165 3134
3166 2134
3167 5366
3170 2134
3171 5370
3172 5761
3174 0500
3175 0001
3176 7773
3177 4000
3200 3200 PAGE
3201 0004 /ROUTINE TO CHECK THAT INTERRUPT ENABLE CAN BE CLEARED FOR PUNCH.
3202 3234 PIT4.
3203 6002 ICF
3204 1302 TAD P7770
3205 3201 DCA PCNT2
3206 6001 PLOOP. /INIT. COUNTER
3207 6010 RPE /ENABLE INTERRUPT
3208 6020 RCE
3209 6001 TON
3210 6024 PPC
3211 6024 SKON
3212 6024 JMF P1E4 /PUNCH
3213 6024 JMF P1E4 /ERROR -- NO ION
3214 6024 SRG /SKIP IF INT REQ GENERATED
3215 6024 SKP /NO INT REQ
3216 6024 JMF P1E4 /ERROR -- INT REQ GENERATED
3217 6024 ISZ COUNT /RELIABILITY SETUP

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ED READER AND PUNCH TESTS.

PAL10 V142A 4-FEB-77

7710	SPA CLA	/GREATER THAN 100?
5233	JMS .+3	/NO OK
7402	HLT	/YES, ERROR. HALT
5231	JMP	/PUNCH BIN CHARACTER
4246	JMS CPCH	
1127	TAD RBSY	/READER BUSY?
7640	SZA CLA	/YES, EXIT
5503	OUT	/GET PUNCH COUNT
1132	TAD PCHCNT	/SUBTRACT SLACK COUNT
1146	TAD (-12)	/POSITIVE?
7710	SPA CLA	/NO
5503	OUT	/YES, START READER
6014	RFC	/SET READER BUSY
2127	ISZ RBSY	/EXIT.
5503	OUT	
0000	CPCH, JMS I GETPTR	/GET BIN CHAR.
4470	PLUS	/ENABLE PUNCH
6026	CLD	/CLEAR AC
7200	JMS I CPCH	/EXIT
5546	OUT	
0000	CREAD, JMS I CREAD	/READ CHARACTER
7200	OUT	/STORE IT
6012	TAD TCHKW	/GET PUNCH COUNT
3131	TAD PCHCNT	/MINUS 1
1132	TAD (-1)	/STORE IT
1146	TAD PCHCNT	
3132	TAD PCHCNT	
1132	TAD PCHCNT	
7640	SZA .+3	/0?
5267	JMS RBSY	/NO
3127	DCA I CREAD	/YES, CLEAR READER BUSY
5553	RFC	/EXIT
6014	JMS I CREAD	/FETCH NEXT CHARACTER
70	JMS CREAD	/EXIT
4253	TAD TCHKW	/READ CHARACTER
1131	SPA CLA	/IS IT 0?
7650	OUT	/YES
5503	SETLOC	/SET INTERRUPT SERVICE
4475	RVCTR	/TO RBIN.
0711	RVCTR	/TO RBIN.
3703	RVCTR	/-5 TO CTRA
4477	OUT	
7773	SKP	/READ CHARACTER
7410	JMS CREAD	/GET BINARY CHARACTER
4253	JMS I GETPT	
4467	DCA I UTSP	/GET CHARACTER READ
3462	TAD TCHKW	/GO CHECK IT
1131	JMS I UTCHK	/ERROR
4451	SKP	/NO
7410	OUT	/5 ERRORS?
5503	ISZ CTRA	/NO TO MAILLINE
2122	OUT	/YES, SET READER SERVICE
5503	SETLOC	/TO RESYNC TAPE.
4477	RVCTR	
4711	RVCTR	

HIGH SPEED READER AND PUNCH TESTS.

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K04

10:03 PAGE 2-13

SEC 0049

3716	3720	.+2		
3717	5503	OUT		/READ CHARACTER
3720	4253	JMS CREAD		
3721	1131	TAD TCHKW		/STORE
3722	3140	DCA CHR1		/SET READER SERVICE
3723	4475	SETLOC		
3724	0711	RVCTR		
3725	4477	OUT		/READ CHAR.
3726	4477	JMS CREAD		
3727	4477	TAD TCHKW		
3730	4477	DCA CHR2		/SET RDR
3731	4477	SETLOC		/SERVICE
3732	4477	RVCTR		
3733	4477	OUT		
3734	4477	OUT		
3735	4477	JMS CREAD		/READ CHAR.
3736	4477	TAD TCHKW		
3737	4477	DCA CHR3		/STORE AT CHR3
3740	4477	JMS I SYNCA		/GO SYNC
3741	4477	JMP RBINA		/SYNC ERROR, TRY AGAIN
3742	4477	SETA		/YES, -5 TO CTRA.
3743	4477	-5		
3744	7773	SETLOC		/RESTORE READER SERVICE
3745	4477	RVCTR		/TO RBIN
3746	4477	RVCTR		
3747	4477	RVCTR		/TO MAINLINE.
3750	5503	OUT		
4000	4475	PAGE		
4000	4475	PROGRAM 10, REAR AMPLIFIER ADJUSTMENT LOOP		/SET INTERRUPT SERVICE
4001	0000	PRG10, SETLOC		/TO INTSVC.
4002	0000	2		
4003	0000	INTSVC		/SET PUNCH SERVICE ADDRESS
4004	0000	SETLOC		/TO PCHCLR.
4005	0000	PVCTR		
4006	0000	PCHCLR		/SET READER SERVICE ADDRESS
4007	0000	SETLOC		/TO AMPRDR
4010	0000	RVCTR		
4011	0000	AMPRDR		
4012	0000	SETLOC		
4013	0000	ERRORA		
4014	0000	7000		
4015	0000	TAD (NOP		
4016	0000	DCA I (STALL+3		/NO TO SRMSK
4017	0000	DCA SRMSK		/GO READ CHARACTER
4018	0000	JMS AMPRD		/ZERO?
4019	0000	SZA		/NO.
4020	0000	SKP		/GO READ CHARACTER.
4021	0000	JMS AMPRD		
4022	0000	CIA		
4023	0000	TAD (PTMSK		/ALL 1'S?
4024	0000	SZA CLA		/NO, ERROR
4025	0000	JMP AMPRD		/YES, GO READ
4026	0000	JMS AMPRD		/ZERO?
4027	0000	SZA CLA		

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3240 JMP RAMPO /NO ERROR.
3241 JMP RAMPB /YES, REPEAT
3242 /CONVERT EXPECTED CHARACTER
3243 /TO PRINTABLE ASCII
3244
3245 RAMPC, /CONVERT BAD CHARACTER TO
3246 /YES, REPEAT
3247 /CONVERT EXPECTED CHARACTER TO
3248 /PRINTABLE ASCII
3249
3250 RAMPE, /GO PRINT ERROR.
3251 /TRY AGAIN.
3252
3253 RAMPF, /-75 TO DELAY
3254 /FETCH CHARACTER
3255 /ENABLE INTERRUPT
3256 /DELAY 75 /MSEC.
3257
3258 AMPRDA, /FLAG 1?
3259 /NO, FLAG DROPPED
3260 /YES,
3261 /RING BELL 3 TIMES
3262 /TRY AGAIN
3263
3264 AMPRDA, /TRY AGAIN
3265 /BELL
3266 /BELL
3267 /BELL
3268 /END CODE.
3269
3270 /PROGRAM 11, PUNCH ANY CHARACTER IN SR CONTINUOUSLY
3271 /READ SR
3272 /PUNCH CHARACTER
3273 /FLAG 1?
3274 /NO,
3275 /YES, REPEAT
3276
3277 /PROGRAM 12, PUNCH 1'S AND 0'S LOOP
3278 /SETLOC
3279 /SRASK
3280 /0075
3281 /CLA CMA

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MO4

HIGH SPEED READER AND PUNCH TESTS.      PAL10    V142A    4-FEB-77      10:03    PAGE 2-15      SEQ 005:

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4114 0153      AND (PTMSK
4115 4456      JMS I UTPCH      /PUNCH ALL 1'S
4116 4563      JMS I (STALL
4117 7200      CLA
4120 4456      JMS I UTPCH      /PUNCH ALL 0'S
4121 4563      JMS I (STALL
4122 5313      JMP PRG12A      /REPEAT.

PAGE
PRG13,
4200      DCA CTRB      /CLEAR CTRB
4201      /LAS
4202      /LAS
4203      RAL      /LONG OR SHORT?
4204      CLA      /LONG
4205      TAD (-416      /SHORT
4206      TAD (-36      /STORE AT TKN
4207      DCA TKN
4210      JMS TSTRL
4211      /START READER
4212      /WAIT FOR
4213      /FLAG
4214      /INCREMENT CTRB
4215      /NO, INCREMENT CTRB
4216      /YES, INCREMENT CTRB
4217      /NOP
4220      TAD TKN      /LOAD CTRA
4221      DCA CTRA
4222      /READ SR
4223      /PRINT SPEED?
4224      /NO, CONTINUE READING
4225      /YES,
4226      /RSPD
4227      JMS TSTRPC
4230      HLT
4231      JMP PRG13
4232      TKN, OPEN

PRG14,
4233      CLA CTRB      /CLEAR CTRB
4234      DCA CTRB
4235      JMP TSTPL
4236      /PLS
4237      /PSF
4240      /JMP -1
4241      /ISZ CTRA      /60?
4242      /JMP TSTPC      /NO,
4243      /ISZ CTRB      /YES, INCREMENT CTRB
4244      /NOP
4245      /TSTPL TAD (-74      /LOAD -60 IN CTRA
4246      /DCA CTRA
4247      /LAS
4248      /SMA CLA      /READ SR
4249      /JMP TSTPP      /PRINT SPEED? (AFTER 60 SECONDS)
4250      /JMS I XTYPST      /NO, CONTINUE
4251      /RSPD      /YES,
4252      /JMS TSTRPC

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799 4114 0153 AND (PTMSK
800 4115 4456 JMS I UTPCH /PUNCH ALL 1'S
801 4116 4563 JMS I (STALL
802 4117 7200 CLA
803 4120 4456 JMS I UTPCH /PUNCH ALL 0'S
804 4121 4563 JMS I (STALL
805 4122 5313 JMP PRG12A /REPEAT.
806
807 4200 PAGE
808 4201 7200 PRG13, CLA
809 4202 3123 DCA CTRB /CLEAR CTRB
810 4202 7604 LAS /READ SR
811 4203 7104 CLL RAL
812 4204 7710 SPA CLA /LONG OR SHORT?
813 4205 1143 TAD (-416 /LONG
814 4205 1143 TAD (-36 /SHORT
815 4207 3232 DCA TKN /STORE AT TKN
816 4210 5220 JMS TSTRL
817 4211 6014 TSTRD, RFC /START READER
818 4212 6011 RSE /WAIT FOR
819 4213 6212 JMS -1 /FLAG
820 4214 3123 JMS CTRA /INCREMENT CTRA.
821 4215 3123 JMS TSTRC /NO
822 4215 3123 JMS CTRB /YES, INCREMENT CTRB
823 4217 7000 JMS -1
824 4220 1232 TSTRL, TAD TKN /LOAD CTRA
825 4221 3123 DCA CTRA
826 4223 7604 TSTRC, LAS /READ SR
827 4223 7700 SPA CLA /PRINT SPEED?
828 4224 5211 JMS TSTRD /NO CONTINUE READING
829 4225 4447 JMS I XTYPST /YES.
830 4225 1532 RSPD
831 4227 JMS TSTRPC
832 4230 7402 JMS -1
833 4231 5200 JMP PRG13
834 4232 0000 TKN, OPEN
835
836 4233 7200 PRG14, CLA
837 4234 3123 DCA CTRB /CLEAR CTRB
838 4235 3123 JMS TSTRL
839 4235 6026 TSTPP, PLS
840 4237 6021 PLS
841 4240 3123 JMS -1 /60?
842 4241 3123 JMS CTRA /NO
843 4242 3123 JMS TSTRPC /YES, INCREMENT CTRB
844 4243 3123 JMS CTRB
845 4244 7000 JMS -1
846 4245 1151 TSTPL TAD (-74 /LOAD -60 IN CTRA
847 4246 3123 DCA CTRA
848 4247 7604 TSTPC, SPA CLA /READ SR
849 4248 7700 JMS CTRA /PRINT SPEED? (AFTER 60 SECONDS)
850 4249 5235 JMS TSTPP /NO CONTINUE
851 4250 4447 JMS I XTYPST /YES.
852 4251 RSPD
853 4252 JMS TSTRPC

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1854 4255 7402 HLT
1855 4256 5233 JMP PRG14
1856
1857 4257 0000 TSTRPC, 0
1858 4260 4265 JMS BDCNV /TYPE C(CTRB) IN DECIMAL
1859 4261 0123 CTRB
1860 4262 4447 JMS I XTYPST /TYPE "CPS"
1861 4263 1532 CPS
1862 4264 3333 JMS I TSTRPC /EXIT.
1863 4265 0 BDCNV, 0 /BINARY TO DECIMAL CONVERT
1864 4266 1178 SETLOC /AND PRINT SUBROUTINE
1865 4267 5333 CNVCTR
1866 4270 -4
1867 4271 1332 TAD ADDRZA /INITIALIZE ARROW.
1868 4272 1332 DCA ARROW
1869 4273 1332 TAD I BDCNV /GET AND STORE BINARY
1870 4274 1332 ISZ BDCNV /NUMBER. STORE IT AT VALUE.
1871 4275 1332 DCA DIGIT
1872 4276 1332 TAD I DIGIT
1873 4277 3333 DCA VALUE
1874 4300 3333 DCA DIGIT /0 TO DIGIT.
1875 4301 7100 CLL
1876 4302 1000 TAD VALUE
1877 4303 1000 ARROW, TAD TENPWR
1878 4304 7402 SNL
1879 4305 5333 JMP +4
1880 4306 3333 ISZ DIGIT
1881 4307 3333 DCA VALUE
1882 4310 5333 JMP ARROW-2
1883 4311 7200 CLA
1884 4312 1332 TAD DIGIT
1885 4313 1143 TAD (-260
1886 4314 4473 JMS I UPUNCH
1887 4315 7300 CLA CLL
1888 4316 2300 ISZ ARROW
1889 4317 2300 ISZ CNVCTR
1890 4320 3333 JMP ARROW-3
1891 4321 5333 JMP I BDCNV
1892 4322 1333 ADDRZA, TAD TENPWR
1893 4323 5333 TENPWR, -1750
1894 4324 7604 -144
1895 4325 7604 -12
1896 4326 7604 -1
1897 4327 0000 VALUE, 0
1898 4330 0000 DIGIT, 0
1899 4331 0000 CNVCTR, 0
1900
1901 /PROGRAM 15. READ X CHARACTERS. STALL Y MS. LOOP UNTIL ADJUST TIMINGS.
1902 4332 7500 PRG15, HLT CLA /HALT TO GET SR
1903 4333 7500 LAS /READ SR
1904 4334 0177 AND (177 /MASK OFF EXCESS BITS
1905 4335 7500 CIA
1906 4336 3333 DCA DELAYM /STORE STALL COUNT
1907 4337 7500 LAS /READ SR
1908 4340 0177 AND (7600 /MASK OFF EXCESS BITS

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