

IDENTIFICATION

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PRODUCT CODE:	MAINDEC-8E-D2AB-D-(D)
PRODUCT TEST:	PDP-8/E TELETYPE AND KLB ASYNCHRONOUS DATA CONTROL TESTS
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1. ABSTRACT  
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THIS PROGRAM CONSISTS OF A PACKAGE OF TEST PROGRAMS FOR TESTING THE KL8 LOGIC (EIA OR CURRENT) AND A TELETYPE. ONLY ONE TELETYPE MAY BE TESTED AT A TIME, THE TELETYPE TO BE TESTED CAN BE A KRS33, ASR33, KSR35, ASR35, OR KSR37.

THE TEST PROGRAMS ARE:

PRG0-BASIC TEST OF THE OUTPUT LOGIC (CURRENT)  
PRG1-BASIC TEST OF THE OUTPUT AND INPUT LOGIC (LOOP AROUND)(EIA)  
PRG2-BASIC TEST OF INPUT LOGIC (USES TTY READER)(CURRENT)  
PRG3-READER TEST  
PRG4-PRINTER TEST  
PRG5-PUNCH TEST  
PRG6-KEYBOARD TEST  
PRG7-COMBINED TEST  
PRG10-READER EXERCISER, BINARY COUNT PATTERN  
PRG11-PRINTER EXERCISER  
PRG12-BINARY COUNT TAPE GENERATOR

2. REQUIREMENTS  
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2.1 EQUIPMENT  
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- A. PDP-8/E WITH AT LEAST 4K OF MEMORY
- B. FOR EIA A JUMPER TO CONNECT INPUT TO OUTPUT, SEE TEST EQUIPMENT 7,3.
- C. KSR33, ASR33, KSR35, ASR35 TO TEST AN 110 BAUD CURRENT OPTION.

2.2 STORAGE  
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LOCATIONS 0000 THROUGH 7600 ARE USED.

3. LOADING PROCEDURE  
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THE BINARY LOADER IS USED TO LOAD THE PROGRAM, REFER TO THE BINARY LOADER DOCUMENTATION IF UNFAMILIAR WITH ITS USE.

4. USE PROCEDURE

4.1 DEVICE CODE SELECTION

BEFORE ANY PROGRAM CAN BE RUN, THE PROGRAM MUST HAVE THE FOLLOWING INFORMATION:

1. TYPE OF TELETYPE (33, 35, OR 37) IF TESTING WITH A TELETYPE
2. DEVICE CODES ASSIGNED.
3. BAUD RATE OF DEVICE

TO PROVIDE THIS INFORMATION, PROCEED AS FOLLOWS:

A. SET LOCATION 0020 TO:

1. 0000 FOR KSR OR ASR 33 TELETYPE
2. 0001 FOR KSR OR ASR 35 TELETYPE
3. 0002 FOR KSR 37 TELETYPE

B. SET LOCATION 0021 AS FOLLOWS:

1. LOAD ADDRESS 0021.
2. SET SR 0 THROUGH 5 TO THE DEVICE CODE OF THE KEYBOARD/READER TO BE TESTED,  
(EG: READER CODE OF 03, SR0-5=03,
3. SET SR 6 THROUGH 11 TO THE DEVICE CODE OF THE PRINTER/PUNCH TO BE TESTED,  
(EG: PRINTER CODE OF 04, SR6-11=04.
4. PRESS DEPOSIT.

C. SET LOCATION 0022 AS FOLLOWS:

1. LOAD ADDRESS 0022.
2. PLACE THE FOLLOWING IN THE SRI:  
0110 FOR 110 BAUD, OR  
0150 FOR 150 BAUD, OR  
0300 FOR 300 BAUD, OR  
0600 FOR 600 BAUD, OR  
1200 FOR 1200 BAUD.
3. PRESS DEPOSIT.

D. REFER TO INDIVIDUAL PROGRAM USE PROCEDURE.

4.2 PRG0 USE PROCEDURE

- 
- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
  - B. INSURE THAT TELETYPE IS ON-LINE IF ON THE KLS BEING TESTED.
  - C. INSURE THAT THERE IS PAPER IN TELEPRINTER,
  - D. LOAD ADDRESS 0200.
  - E. SET SR TO 0000.
  - F. PRESS CLEAR AND CONTINUE.
  - G. PROGRAM HALTS AT LOCATION 0236 TO PERMIT SETTING OF SR OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR=0000. PRESS CONTINUE.

PRG0 SR OPTIONS:

SR0#1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AC,  
SR1#1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR6 = SR11.  
SR2#1 LOOP PROGRAM,  
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED,

- H. PROGRAM IS EXECUTED AND HALTS AT LOCATION 0300 PROGRAM END HALT, IF NO LOOP OPTIONS ARE SET, AND IF NO ERROR OCCURRED.

4.3 PRG1 USE PROCEDURE

- 
- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
  - B. CONNECT EIA OUTPUT TO EIA INPUT, ON THE 40 PIN SIDE CONNECTOR, CONNECT-  
PIN E TO PIN M  
PIN F TO PIN J
  - C. LOAD ADDRESS 0200.
  - D. SET SR TO 0001.
  - E. PRESS CLEAR AND CONTINUE.

(4.3 CONT'D)

- F. PROGRAM HALTS AT LOCATION 0236 TO PERMIT SETTING OF SR OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR=0000. PRESS CONTINUE.

PRG1 SR OPTIONS:

SR0=1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AC.  
SR1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR6 = SR11.  
SR2=1 LOOP PROGRAM,  
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED.

- G. PROGRAM IS EXECUTED AND HALTS AT LOCATION 0300 PROGRAM END HALT, IF NO LOOP OPTIONS ARE SET, AND IF NO ERRORS OCCUR.

4.4 PRG2 USE PROCEDURE

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- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
- B. INSURE THAT TELETYPE IS ON-LINE.
- C. LOAD THE BINARY COUNT PATTERN TEST TAPE IN THE READER.
- D. TURN ON READER.
- E. LOAD ADDRESS 0200.
- F. SET SR TO 0002.
- G. PRESS CLEAR AND CONTINUE.
- H. PROGRAM HALTS AT LOCATION 0236 TO PERMIT SETTING OF SR OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR=0000. PRESS CONTINUE.

PRG2 SR OPTIONS:

SR0=1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AC.  
SR1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR6 = SR11.  
SR2=1 LOOP PROGRAM,  
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED.

- I. PROGRAM IS EXECUTED AND HALTS AT LOCATION 0300, PROGRAM END HALT, IF NO "LOOP" OPTIONS ARE SET, AND IF NO ERRORS OCCUR.

4.5

PRG3 USE PROCEDURE  
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- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE,  
REFER TO SECTION 4.1.
- B. INSURE TELETYPE IS ON-LINE.
- C. LOAD BINARY COUNT PATTERN TEST TAPE IN READER.
- D. TURN ON READER.
- E. LOAD ADDRESS 0200.
- F. SET SR TO 0003.
- G. PRESS CLEAR AND CONTINUE.
- H. PROGRAM HALTS AT LOCATION 0236 TO PERMIT SETTING OF SR  
OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH  
SR=0200. PRESS CONTINUE.

PRG3 SR OPTIONS:

SR0=1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AC.  
SR1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR6 THROUGH  
SR11.  
SR2=1 LOOP PROGRAM.  
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED.

- I. PROGRAM IS EXECUTED AND HALTS AT LOCATION 0300 PROGRAM END  
HALT, IF NO "LOOP" OPTIONS ARE SET, AND IF NO ERRORS OCCUR.

4.6

PRG4 USE PROCEDURE  
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- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE,  
REFER TO SECTION 4.1.
- B. INSURE TELETYPE IS ON LINE.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0004.



(4.6 CONT'D)

- E. PRESS CLEAR AND CONTINUE.
- F. PROGRAM HALTS AT LOCATION 0236 TO PERMIT SETTING OF SR OPTIONS, SET ANY DESIRED OPTIONS, NORMAL RUN IS WITH SR=0000, PRESS CONTINUE.

PRG4 SR OPTIONS:

SR0=1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AC,  
SR1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR6 - SR11.  
SR2=1 LOOP PROGRAM,  
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED,

- G. PROGRAM IS EXECUTED AND HALTS AT LOCATION 0300, PROGRAM END HALT IF NO "LOOP" OPTIONS ARE SET, AND IF NO ERRORS OCCUR.

4.7 PRG5 USE PROCEDURE

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- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
  - B. TURN ON TELETYPE PUNCH,
  - C. WITH TELETYPE OFF-LINE, PUNCH A SECTION OF BLANK LEADER ABOUT 6 INCHES LONG, RETURN TO ON-LINE POSITION,
  - D. LOAD LEADER IN READER, LEAVING VERY LITTLE SLACK BETWEEN PUNCH AND READER.
  - E. TURN ON READER.
  - F. LOAD ADDRESS 0200.
  - G. SET SR TO 0005.
  - H. PRESS CLEAR AND CONTINUE.
  - I. PROGRAM BEGINS EXECUTION, SET SR5 TO A 1 IF YOU WISH TO STOP ON ERROR, SR5 SET TO A 0 WILL CAUSE PROGRAM TO HALT AT END OF DATA BLOCK IF ERRORS OCCURRED, THE AC WILL CONTAIN THE ERROR COUNT.
  - J. THE PROGRAM RUNS CONTINUOUSLY, UNTIL STOPPED BY USER.

PRG6 USE PROCEDURE  
-----

- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
- B. INSURE TELETYPE IS ON-LINE.
- C. MAKE SURE THAT THE TELETYPE "PROCEED" LIGHT IS ON, IF TESTING A KSR37 KEYBOARD.
- D. LOAD ADDRESS 0200.
- E. SET SR TO 0006.
- F. PRESS CLEAR AND CONTINUE.
- G. PROGRAM TITLE IS TYPED, AND PROGRAM HALTS AT LOC 0236 TO PERMIT SETTING OF SR OPTIONS, SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR=0000, PRESS CONTINUE.

## PRG5 SR OPTIONS:

SR0=1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AQ.  
SR1=1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR6 - SR11.  
SR2=1 LOOP PROGRAM,  
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED,

- H. FOLLOW TYPED INSTRUCTIONS.
- I. WHEN PROGRAM IS COMPLETED, AND PROVIDED THAT NO SR OPTIONS PREVENT IT, THE PROGRAM STOPS AT PROGRAM END HALT AT LOC 0300.

\*\*\*NOTE\*\*\*

CORRECT OPERATION OF KEYBOARD IS VERIFIED BY USER CHECKING THAT THE PRINTED CHARACTERS MATCH WITH THE CHARACTERS KEYED.

PRG7 USE PROCEDURE  
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- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4,1.
- B. TURN ON TELETYPE PUNCH.
- C. THWTH TELETYPE OFF-LINE, PUNCH A SECTION OF BLANK LEADER ABOUT 6 INCHES LONG. RETURN TELETYPE TO ON-LINE POSITION.
- D. LOAD LEADER IN READER, LEAVING VERY LITTLE SLACK BETWEEN PUNCH AND READER.
- E. TURN ON READER.
- F. LOAD ADDRESS 0200.
- G. SET SR TO 0007.
- H. PRESS CLEAR AND CONTINUE.
- I. PROGRAM HALTS AT LOC 0236 TO PERMIT SETTING OF SR OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR=0200, TO HALT ON ERROR, PRESS CONTINUE.

PRG6 SR OPTIONS:

SR0#1 HALT AT END OF ROUTINE, ROUTINE NUMBER IN AC.  
 SR1#1 SELECT ROUTINE WHOSE NUMBER IS SET IN SR6 THROUGH SR11.  
 SR2#1 LOOP PROGRAM.  
 SR5#1 HALT ON ERROR, BAD CHARACTER IN AC.  
 SR5#0 HALT AT END OF DATA BLOCK IF ERRORS OCCURRED, ERROR COUNT IN AC.  
 SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED.

- J. PROGRAM IS EXECUTED AND HALTS AT PROGRAM END HALT AT LOC 0300 UNLESS PREVENTED FROM ENDING, BY SR OPTIONS, OR IF ERRORS OCCUR.

4.10 PRG10 USE PROCEDURE

- 
- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4,1.
  - B. INSURE THAT TELETYPE IS ON-LINE.
  - C. LOAD BINARY COUNT PATTERN TEST TAPE IN READER.
  - D. TURN ON READER.
  - E. LOAD ADDRESS 0200.
  - F. SET SR TO 0010.
  - G. PRESS CLEAR AND CONTINUE.
  - H. PROGRAM RUNS CONTINUOUSLY UNTIL STOPPED BY USER, THE FOLLOWING SR OPTIONS MAY BE SET AT ANY TIME.

SR0=1 PROGRAM HALTS WITH ACCUMULATED ERROR COUNT IN AC.  
SR3=1 PROGRAM READS TAPE AT FULL SPEED,  
SR3=0 PROGRAM READS TAPE WITH RANDOM STALLS BETWEEN  
CHARACTERS,  
SR5=1 HALT ON ERROR, PROGRAM HALTS IF READ ERROR OCCURS.  
BAD CHARACTER IS DISPLAYED IN AC.  
SR6=0 NO HALT ON ERROR.

4.11 PRG11 USE PROCEDURE

- 
- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4,1.
  - B. MAKE SURE THAT TELETYPE IS ON-LINE, AND IF KSR37, THAT KEYBOARD "PROCEED" LIGHT IS ON.
  - C. LOAD ADDRESS 0200.
  - D. SET SR TO 0011.
  - E. PRESS CLEAR AND CONTINUE.
  - F. THE PROGRAM IDENTIFIES ITSELF, AND REQUESTS DATA TO BE TYPED.
  - G. TYPE IN DATA AS FOLLOWS:
    - 1. TYPE THE 3 CHARACTERS TO BE TYPED AND A DELETE CODE (RUBOUT) IF YOUR WISH NOT TO STALL BETWEEN CHARACTERS OR,
    - 2. TYPE THE 3 CHARACTERS TO BE TYPED AND ANY OTHER CHARACTER OTHER THAN THE DELETE CODE TO STALL BETWEEN CHARACTERS.

(4,11 CONT'D)

- H. THE PROGRAM WILL CONTINUOUSLY TYPE LINES CONTAINING THE THREE DESIRED CHARACTERS.
- I. TO CHANGE THE CHARACTER TO BE TYPED, SET SR0 TO A 1. THE PROGRAM WILL REQUEST NEW DATA WHEN THE CURRENT LINE IS COMPLETED, TYPE IN THE DATA AS IN STEP G.

4.12 PRG12 USE PROCEDURE  
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- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
- B. INSURE TELETYPE IS ON-LINE.
- C. TURN OFF TELETYPE READER.
- D. LOAD BLANK TAPE IN PUNCH.
- E. TURN ON PUNCH.
- F. LOAD ADDRESS 0200.
- G. SET SR TO 0012.
- H. PRESS CLEAR AND CONTINUE.
- I. PROGRAM PUNCHES BINARY COUNT PATTERN TEST TAPE UNTIL STOPPED BY USER.

5. PROGRAM AND/OR OPERATOR ACTION

5.1 NORMAL HALTS  
-----

- LOC 0236 SR SET HALT. OCCURS TO PERMIT SETTING OF DESIRED OPTIONS. PRESS CONTINUE AFTER SETTING DESIRED OPTIONS. (PRG0,PRG1,PRG2).
- LOC 0300 PROGRAM END HALT. OCCURS AT END OF PROGRAM, IF NO "LOOP" TYPE OPTION IS SET. SET DESIRED OPTIONS AND PRESS CONTINUE. THIS HALT REOCCURS IF NO OPTIONS ARE SET. (PRG0,PRG1,PRG2,PRG3,PRG4,PRG6,PRG10).
- LOC 0324 ROUTINE END HALT. THIS HALT OCCURS AT END OF A TEST ROUTINE IF SR0 IS SET TO A 1, THE AC CONTAINS THE NUMBER OF ROUTINE JUST COMPLETED. (PRG0,PRG1,PRG2,PRG3,PRG4,PRG6,PRG10).

6. ERRORS

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6.1 ERROR HALT AND DESCRIPTION

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- LOC 1524 AN ILLEGAL BAUD RATE WAS SELECTED. RESELECT THE BAUD RATE AND RESTART PROGRAM,
- LOC 2103 PRG0, PRG1, AND PRG2 UNEXPECTED INTERRUPT ERROR HALT. A DEVICE OTHER THAN THE ONE BEING TESTED HAS CAUSED AN INTERRUPT. THE AC CONTAINS THE IOT CODE THAT DETECTED THE INTERRUPT (EG, 6031 FOR SYSTEM TELETYPE KEYBOARD). PRESS CONTINUE, THE PROGRAM WILL ATTEMPT TO CLEAR THE UNDESIRABLE FLAG. IF SUCCESSFUL, THIS HALT WILL NOT REOCCUR.
- LOC 2237 PRG0, ROUTINE 0, ERROR HALT A. SPF INSTRUCTION FAILED TO SET PRINTER FLAG OR TSF INSTRUCTION FAILED TO SKIP ON PRINTER FLAG SET. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPF AND THEN TSF CONTINUOUSLY. MANUAL RESTART
- LOC 2244 PRG0, ROUTINE 0, ERROR HALT B. CAF INSTRUCTION FAILED TO CLEAR PRINTER FLAG OR TSF INSTRUCTION SKIPPED ON NO PRINTER FLAG. PRESSING CONTINUE ENTERS SCOPE LOOP THAT SETS PRINTER FLAG WITH SPF, AND THEN CAF AND TSF ARE ISSUED. MANUAL RESTART
- LOC 2253 PRG0, ROUTINE 0, ERROR HALT C. CAF INSTRUCTION FAILED TO CLEAR AC AND/OR LINK. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES CAF WITH AC AND LINK SET. MANUAL RESTART.
- LOC 2262 PRG0, ROUTINE 0, ERROR HALT E. TCF INSTRUCTION FAILED TO CLEAR PRINTER FLAG. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TCF WITH THE PRINTER FLAG SET. MANUAL RESTART.
- LOC 2315 PRG0, ROUTINE 1, ERROR HALT B. WITH THE PRINTER FLAG SET AND THE INTERRUPT ENABLED, NO INTERRUPT OCCURED. PRESSING CONTINUE ENTERS SCOPE LOOP THAT TURNS ON INTERRUPT CONTINUOUSLY. MANUAL RESTART.
- LOC 2415 PRG0, ROUTINE 2, ERROR HALT A. KIE INSTRUCTION FAILED TO DISABLE THE TELETYPE INTERRUPT ENABLE FLIP-FLOP. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KIE CONTINUOUSLY WITH AC 11=0. MANUAL RESTART.
- LOC 2427 PRG0, ROUTINE 2, ERROR HALT B. SPI INSTRUCTION SKIPPED WITH FLAG SET AND TELETYPE INTERRUPT ENABLE FLIP-FLOP DISABLED. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPI WITH PRINTER FLAG SET AND TTY INTERRUPT DISABLED. MANUAL RESTART.

(6,1 CONT'D)

LOC 2435 PRG0, ROUTINE 2, ERROR HALT C. SRQ INSTRUCTION SKIPPED WITH PRINTER FLAG SET AND TELETYPE INTERRUPT ENABLE FLIP-FLOP DISABLED. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SRQ WITH PRINTER FLAG SET AND TTY INTERRUPT DISABLED. MANUAL RESTART.

LOC 2443 PRG0, ROUTINE 2, ERROR HALT D. KIE INSTRUCTION FAILED TO ENABLE TELETYPE INTERRUPT FLIP-FLOP. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KIE CONTINUOUSLY WITH AC11#1. MANUAL RESTART.

LOC 2456 PRG0, ROUTINE 2, ERROR HALT E. SPI INSTRUCTION FAILED TO SKIP WITH PRINTER FLAG SET AND TTY INTERRUPT ENABLE FLIP-FLOP ENABLED. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPI CONTINUOUSLY WITH PRINTER FLAG SET AND INTERRUPT ENABLED. MANUAL RESTART.

LOC 2465 PRG0, ROUTINE 2, ERROR HALT F. SRQ INSTRUCTION FAILED TO SKIP WITH PRINTER FLAG SET AND TTY INTERRUPT ENABLE FLIP-FLOP SET. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SRQ CONTINUOUSLY WITH PRINTER FLAG SET AND TTY INTERRUPT ENABLE FLIP-FLOP ENABLED. MANUAL RESTART.

LOC 2474 PRG0, ROUTINE 2, ERROR HALT G. CAF INSTRUCTION FAILED TO ENABLE TTY INTERRUPT ENABLE FLIP-FLOP. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES CAF CONTINUOUSLY. MANUAL RESTART.

LOC 2527 PRG0, ROUTINE 3, ERROR HALT A. TPC INSTRUCTION FAILED TO SET PRINTER FLAG IN TWICE THE REQUIRED TIME FOR IT TO SET. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TPC AND DELAYS, CONTINUOUSLY. MANUAL RESTART.

LOC 2534 PRG0, ROUTINE 3, ERROR HALT B. TLS FAILED TO CLEAR PRINTER FLAG. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY WITH PRINTER FLAG SET. MANUAL RESTART.

LOC 2540 PRG0, ROUTINE 3, ERROR HALT C. TLS INSTRUCTION FAILED TO SET PRINTER FLAG IN TWICE THE REQUIRED TIME FOR IT TO SET. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS AND DELAYS, CONTINUOUSLY. MANUAL RESTART.

(6.1 CONT'D)

LOC 2607

PRG0, ROUTINE 4, ERROR HALT A. PRINTER FLAG SET PRIOR TO 9 BIT TIMES. (EG, 110 BAUD 9X9.09 MSEC = 81.81 MSEC AT WHICH TIME THE FLAG MUST BE SET, NOT PRIOR TO THIS TIME). EITHER THE PDP-8/E TIMING IS TOO SLOW OR THE TTY CLOCK TOO FAST. (IS THE SLOW CYCLE JUMPER REMOVED FROM THE PROCESSOR TIMING MODULE AND IS THE CORRECT BAUD RATE SELECTED IN LOC 227). PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY. MANUAL RESTART.

LOC 2614

PRG0, ROUTINE 4, ERROR HALT B. PRINTER FLAG NOT SET AFTER 9.55 BIT TIMES. (EG, 110 BAUD 9.55X9.09 MSEC = 86.7 MSEC AT WHICH TIME THE FLAG MUST BE SET, NO LATER.) PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY. MANUAL RESTART.

LOC 2650

PRG0, ROUTINE 5, ERROR HALT A. WHEN ISSUING BACK TO BACK TLS'S, FLAG SETTING PRIOR TO 11 BIT TIMES FOR 110 BAUD OR 10 BIT TIMES FOR MORE THAN 110 BAUD. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY. MANUAL RESTART.

LOC 2652

PRG0, ROUTINE 5, ERROR HALT B. WHEN ISSUING BACK TO BACK TLS'S, FLAG TAKING LONGER THAN 11 BIT TIMES TO SET FOR 110 BAUD OR 10 BIT TIMES FOR MORE THAN 110 BAUD. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY. MANUAL RESTART.

LOC 2664

PRG0, ROUTINE 6, ERROR HALT A. WITH LINK, ION, AND INT BUS EQUAL TO ZERO, AC DID NOT EQUAL ZERO AFTER ISSUING GTF. NO SCOPE LOOP. MANUAL RESTART.

LOC 2671

PRG0, ROUTINE 6, ERROR HALT B. GTF INSTRUCTION CLEARED THE LINK. NO SCOPE LOOP. MANUAL RESTART.

LOC 2675

PRG0, ROUTINE 6, ERROR HALT C. GTF INSTRUCTION FAILED TO BRING LINK INTO AC 0. NO SCOPE LOOP. MANUAL RESTART.

LOC 2706

PRG0, ROUTINE 6, ERROR HALT D. GTF INSTRUCTION FAILED TO BRING INT BUS INTO AC 2. NO SCOPE LOOP. MANUAL RESTART.

LOC 2720

PRG0, ROUTINE 6, ERROR HALT E. GTF INSTRUCTION CLEARED ION. NO SCOPE LOOP. MANUAL RESTART.

LOC 2725

PRG0, ROUTINE 6, ERROR HALT F. GTF INSTRUCTION FAILED TO BRING ION INTO AC 4. NO SCOPE LOOP. MANUAL RESTART.

LOC 2744

PRG0, ROUTINE 7, ERROR HALT A. RTF INSTRUCTION FAILED TO RESET LINK WITH AC 0=0. NO SCOPE LOOP. MANUAL RESTART.



(6.1 CONT'D)

LOC 2750 PRG0, ROUTINE 7, ERROR HALT B. RTF INSTRUCTION  
FAILED TO SET LINK WITH AC0=1. NO SCOPE LOOP.  
MANUAL RESTART.

LOC 2753 PRG0, ROUTINE 7, ERROR HALT C. RTF INSTRUCTION  
FAILED TO TURN THE INTERRUPT ON. NO SCOPE LOOP.  
MANUAL RESTART.

LOC 3025 PRG1, ROUTINE 1, ERROR HALT A. RECEIVER FLAG NOT  
SETTING UPON COMPLETION OF ISSUING A TLS OR KSF  
FAILED TO SKIP ON RECEIVER FLAG SET. PRESSING  
CONTINUE ENTERS SCOPE LOOP THAT CLEARS THE  
RECEIVER FLAG AND ISSUES A TLS AND WAITS TWICE THE  
TIME FOR THE FLAG TO SET AND THEN ISSUES A KSF.  
MANUAL RESTART.

LOC 3053 PRG1, ROUTINE 2, ERROR HALT A. SAME AS PRG1,  
ROUTINE 1, ERROR HALT A.

LOC 3062 PRG1, ROUTINE 2, ERROR HALT B. KSF INSTRUCTION  
FAILED TO SKIP ON RECEIVER FLAG. PRESSING  
CONTINUE ENTERS SCOPE LOOP THAT ISSUES KSF  
CONTINUOUSLY. MANUAL RESTART.

LOC 3113 PRG1, ROUTINE 3, ERROR HALT A. SAME AS PRG1,  
ROUTINE 1, ERROR HALT A.

LOC 3122 PRG1, ROUTINE 3, ERROR HALT B. KSF INSTRUCTION  
SKIPPED ON RECEIVER FLAG NOT SET. PRESSING  
CONTINUE ENTERS SCOPE LOOP THAT ISSUES KSF WITH  
NO RECEIVER FLAG SET CONTINUOUSLY. MANUAL RESTART.

LOC 3160 PRG1, ROUTINE 4, ERROR HALT A. THE READER FLAG  
FAILED TO CAUSE AN INTERRUPT. PRESSING CONTINUE  
ENTERS SCOPE LOOP THAT TURNS THE INTERRUPT ON  
CONTINUOUSLY. MANUAL RESTART.

LOC 3230 PRG1, ROUTINE 5, ERROR HALT A. SRQ INSTRUCTION  
FAILED TO SKIP ON READER FLAG SET AND TELETYPE  
INTERRUPT ENABLE FLIP-FLOP ENABLED. PRESSING  
CONTINUE ENTERS SCOPE LOOP THAT ISSUES SRQ  
CONTINUOUSLY WITH TTY ENABLED AND READER FLAG  
SET. MANUAL RESTART.

LOC 3235 PRG1, ROUTINE 5, ERROR HALT B. SPI INSTRUCTION  
FAILED TO SKIP ON READER FLAG SET AND TELETYPE  
INTERRUPT ENABLE FLIP-FLOP ENABLED. PRESSING  
CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPI CONTINUOUSLY  
WITH TTY ENABLED AND READER FLAG SET. MANUAL  
RESTART.

LOC 3242 PRG1, ROUTINE 5, ERROR HALT C. CAF INSTRUCTION  
FAILED TO CLEAR THE READER FLAG. PRESSING  
CONTINUE ENTERS SCOPE LOOP THAT ISSUES CAF  
CONTINUOUSLY WITH THE RECEIVER FLAG SET. MANUAL

(6,1 CONT'D)

LOC 3257 PRG1, ROUTINE 5, ERROR HALT D. SRQ INSTRUCTION SKIPPED WITH NO RECEIVER FLAG SET. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SRQ INSTRUCTION CONTINUOUSLY. MANUAL RESTART.

LOC 3264 PRG1, ROUTINE 5, ERROR HALT E. SPI INSTRUCTION SKIPPED WITH NO RECEIVER FLAG SET. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPI CONTINUOUSLY WITH NO RECEIVER FLAG SET. MANUAL RESTART.

LOC 3310 PRG1, ROUTINE 6, ERROR HALT A. RECEIVER FLAG NOT SETTING AT THE END OF 10 BIT TIMES FOR A NON 110 BAUD DEVICE OR 11 BIT TIMES FOR A 110 BAUD DEVICE. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES T16 CONTINUOUSLY TO SET RECEIVER FLAG. MANUAL RESTART.

LOC 3366 PRG1, ROUTINE 7 OR 10, ERROR HALT. DATA SENT DOES NOT COMPARE WITH THE DATA RECEIVED. MQ CONTAINS DATA THAT WAS SENT. AC CONTAINS THE DATA THAT WAS RECEIVED. PRESSING CONTINUE ENTERS SCOPE LOOP THAT SENDS THE DATA IN THE MQ. MANUAL RESTART.

LOC 3424 PRG1, ROUTINE 11, ERROR HALT A. KRS INSTRUCTION FAILED TO INCLUSIVE "OR" KBRD BUFFER WITH AC. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KRS CONTINUOUSLY. MANUAL RESTART.

LOC 3464 PRG1, ROUTINE 12, ERROR HALT A. KRB INSTRUCTION FAILED TO "JAM TRANSFER" THE KBRD BUFFER INTO THE AC. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KRB CONTINUOUSLY. MANUAL RESTART.

LOC 3474 PRG1, ROUTINE 12, ERROR HALT B. KRB INSTRUCTION FAILED TO CLEAR THE READER FLAG. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KRB CONTINUOUSLY WITH THE RECEIVER FLAG SET. MANUAL RESTART.

LOC 3524 PRG1 OR PRG2, ROUTINES 0, ERROR HALT. KCC INSTRUCTION FAILED TO CLEAR THE AC. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KCC CONTINUOUSLY WITH AC=7777. MANUAL RESTART.

LOC 3543 PRG2, ROUTINE 1, ERROR HALT. AFTER ISSUING A KCC INSTRUCTION AND WAITING TWICE THE AMOUNT OF TIME REQUIRED FOR THE RECEIVER FLAG TO SET, IT WAS NOT SET. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT REPEATS THE TEST. MANUAL RESTART.

LOC 3562 PRG2, ROUTINE 2, ERROR HALT A. SAME AS PRG 2, ROUTINE 1, ERROR HALT.

(6,1 CONT'D)

LOC 3564 PRG2, ROUTINE 2, ERROR HALT B. WITH RECEIVER FLAG SET, KSF COMMAND FAILED TO SKIP. PRESSING CONTINUE ENTERS SCOPE LOOP THAT SKIPS ON FLAG CONTINUOUSLY, MANUAL RESTART.

LOC 3621 PRG2, ROUTINE 3, ERROR HALT A. SAME AS PRG 2, ROUTINE 1, ERROR HALT.

LOC 3623 PRG2, ROUTINE 3, ERROR HALT B. KCC FAILED TO RESET, OR KSF INSTRUCTION SKIPPED WITH FLAG=0. PRESSING CONTINUE ENTERS SCOPE LOOP THAT CLEARS THE FLAG AND SKIPS ON THE FLAG CONTINUOUSLY. MANUAL RESTART.

LOC 3657 PRG2, ROUTINE 4, ERROR HALT, WITH READER FLAG=1 AND INTERRUPT ENABLED, NO INTERRUPT OCCURRED. PRESSING CONTINUE ENTERS SCOPE LOOP THAT TURNS INTERRUPT ON CONTINUOUSLY. MANUAL RESTART.

LOC 3706 PRG2, ROUTINE 5, ERROR HALT. TIMING ERROR, FLAG NOT=1 103 MSEC AFTER KCC INSTRUCTION, PRESSING CONTINUE ENTERS SCOPE LOOP THAT READS TAPE CONTINUOUSLY, MANUAL RESTART.

LOC 3747 PRG2, ROUTINE 6, ERROR HALT A. REREAD ERROR, A REREAD OF THE RBRD BUFFER DID NOT MATCH WITH THE ORIGINAL READ, NEW CHARACTER IS DISPLAYED IN AC. PRESS CONTINUE.

LOC 3752 PRG2, ROUTINE 6, ERROR HALT B. FOLLOW UP HALT, TO PRG2, ROUTINE 6, ERROR HALT A, THE "OLD" CHARACTER IS DISPLAYED IN THE AC, PRESSING CONTINUE ENTERS SCOPE LOOP THAT READS THE TELETYPE BUFFER CONTINUOUSLY, MANUAL RESTART.

LOC 3756 PRG2, ROUTINE 6, ERROR HALT C. KRS INSTRUCTION FAILED TO "INCLUSIVE OR" KBRD BUFFER WITH AC. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KRS CONTINUOUSLY WITH AC=7777. MANUAL RESTART.

LOC 4015 PRG2, ROUTINE 7, ERROR HALT A. KCR INSTRUCTION CLEARED THE AC. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KCR CONTINUOUSLY WITH AC=7777. MANUAL RESTART.

LOC 4021 PRG2, ROUTINE 7, ERROR HALT B. KCR INSTRUCTION FAILED TO CLEAR READER RUN, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KCR CONTINUOUSLY WITH READER RUN SET. MANUAL RESTART.

LOC 4073 PRG2, ROUTINE 10, ERROR HALT A. KIE INSTRUCTION FAILED TO DISABLE TELETYPE INTERRUPT ENABLE FLIP-FLOP. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES KIE WITH AC=0 CONTINUOUSLY. MANUAL RESTART.



(6.1 CONT'D)

LOC 4305 PRG2, ROUTINE 12, ERROR HALT C, KRB INSTRUCTION  
FAILED TO READ THE CORRECT DATA OFF OF TAPE. PRESS  
CONTINUE TO TRY TEST AGAIN, MANUAL RESTART.

LOC 4337 PRG3, ROUTINE 0, ERROR HALT A, READ ERROR, BAD  
CHARACTER IN AC. PRESS CONTINUE.

LOC 4342 PRG3, ROUTINE 0, ERROR HALT B, FOLLOW UP HALT.  
EXPECTED CHARACTER IN AC, PRESSING CONTINUE  
RESUMES TEST.

LOC 4371 PRG3, ROUTINE 1, ERROR HALT A, READ ERROR,  
BAD CHARACTER IN AC. PRESS CONTINUE.

LOC 4374 PRG3, ROUTINE 1, ERROR HALT B, FOLLOW UP HALT.  
EXPECTED CHARACTER IN AC, PRESSING CONTINUE  
RESUMES TEST.

LOC 4427 PRG3, ROUTINE 2, ERROR HALT A, READ ERROR,  
BAD CHARACTER IN AC. PRESS CONTINUE.

LOC 4432 PRG3, ROUTINE 2, ERROR HALT B, FOLLOW UP HALT.  
EXPECTED CHARACTER IN AC, PRESSING CONTINUE  
RESUMES TEST.

LOC 5415 PRG6, ROUTINE 0, KSF COMMAND FAILED TO SKIP ON  
KEYBOARD FLAG. PRESS CONTINUE TO ENTER SCOPE  
LOOP THAT SKIPS ON FLAG CONTINUOUSLY.

LOC 5707 PRG10, READ ERROR HALT A, BAD CHARACTER IN AC.  
PRESS CONTINUE. HALT OCCURS IF SR5=1.

LOC 5712 PRG10, READ ERROR HALT B, FOLLOW UP HALT TO  
PRG10 READ ERROR HALT A, EXPECTED CHARACTER  
IS DISPLAYED IN AC, TO PROCEED, PRESS CONTINUE.

LOC 5717 PRG10, ERROR COUNT HALT, HALT OCCURS WHENEVER  
SR0 IS SET TO A 1. THE AC THEN CONTAINS THE  
ACCUMULATED ERROR COUNT, IF ANY. TO PROCEED,  
PRESS CONTINUE.

7. MISCELLANEOUS

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7.1 EXECUTION TIME (MINUTES:SECONDS)

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	110 CURRENT	110 EIA	150 EIA	300 EIA	600 EIA	1200 EIA
PRG01	1:31	1:31	1:03	2:32	3:21	3:9
PRG11	N/A	4:30	3:30	1:45	1:00	2:30
PRG21	2:47	N/A	N/A	N/A	N/A	N/A
PRG31	18:00	N/A	N/A	N/A	N/A	N/A
PRG41	20:00	N/A	N/A	N/A	N/A	N/A
PRG51	CONTINUOUS	N/A	N/A	N/A	N/A	N/A
PRG61	USER DEP.	N/A	N/A	N/A	N/A	N/A
PRG71	40:00	N/A	N/A	N/A	N/A	N/A
PRG10:	CONTINUOUS	N/A	N/A	N/A	N/A	N/A
PRG11:	USER DEP.	N/A	N/A	N/A	N/A	N/A
PRG12:	CONTINUOUS	N/A	N/A	N/A	N/A	N/A

7.2 TEST TAPES

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MAINDEC-00-D2G3-PY BINARY COUNT PATTERN TEST TAPE IS PROVIDED WITH THIS PROGRAM. FOR CONVENIENCE OF USE, A TAPE LOOP SHOULD BE MADE, MAKING SURE THAT THE PATTERN IS MATCHED AT THE SPLICE POINT.

7.3 TEST EQUIPMENT

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FOR TESTING OF THE EIA LOGIC THE INPUT MUST BE CONNECTED TO THE OUTPUT ON THE 40 PIN SIDE CONNECTOR WITH JUMPERS,  
 PIN E TO PIN M  
 PIN F TO PIN J

8. PROGRAM DESCRIPTION

8.1 PRG0 - BASIC OUTPUT LOGIC TESTS

THIS PROGRAM CONTAINS 8 ROUTINES NUMBERED FROM 0-7 (OCTAL)

- RTN0: CHECKS THE ABILITY OF:  
SPF TO SET PRINTER FLAG,  
TSF TO SKIP ON PRINTER FLAG SET,  
CAF TO CLEAR PRINTER FLAG, AC, AND LINK,  
TCF TO CLEAR PRINTER FLAG,  
TSF TO NOT SKIP ON PRINTER FLAG 0,  
TEST IS DONE 100 TIMES.
- RTN1: CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT  
AND THEN CHECKS THAT THE PRINTER FLAG IS CAPABLE OF  
INTERRUPTING. TEST IS DONE 4000 TIMES.
- RTN2: CHECKS THE ABILITY OF:  
KIE TO DISABLE TTY INTERRUPT ENABLE FLIP-FLOP,  
SPI TO NOT SKIP WITH NO TTY INTERRUPT REQUEST,  
SRQ TO NOT SKIP WITH NO TTY INTERRUPT REQUEST,  
KIE TO ENABLE TTY INTERRUPT ENABLE FLIP-FLOP,  
SPI TO SKIP ON A TTY INTERRUPT REQUEST,  
SRQ TO SKIP ON A TTY INTERRUPT REQUEST,  
CAF TO ENABLE TTY INTERRUPT ENABLE FLIP-FLOP,  
TEST IS DONE 4000 TIMES.
- RTN3: CHECKS THE ABILITY OF:  
TPC TO SET THE PRINTER FLAG,  
TLS TO CLEAR THE PRINTER FLAG,  
TLS TO SET THE PRINTER FLAG,  
TEST IS DONE 100 TIMES.
- RTN4: PRINTER TIMING TEST:  
CHECKS THAT THE FLAG IS NOT SET JUST PRIOR TO  
9 BIT TIMES AND THAT THE FLAG IS SET AT 9.5 BIT TIMES.  
TEST IS DONE 100 TIMES.
- RTN5: PRINTER TIMING TEST:  
AFTER ISSUING A TLS AND WAITING FOR THE FLAG  
TO SET ANOTHER TLS IS ISSUED AND THE FLAG IS  
CHECKED JUST PRIOR TO 11 BIT TIMES FOR 110 BAND  
AND 10 BIT TIMES FOR NON 110 BAND - THE FLAG  
SHOULD NOT BE SET. THE FLAG IS CHECKED AGAIN 1/2  
BIT TIME LATER AND THE FLAG SHOULD BE SET AT THIS  
TIME. TEST IS DONE 100 TIMES.
- RTN6: TEST OF GTF INSTRUCTION. TEST IS DONE 4000 TIMES.
- RTN7: TEST OF RTF INSTRUCTION. TEST IS DONE 4000 TIMES.

PRG1 - BASIC EIA INPUT AND OUTPUT LOGIC TESTS  
-----

- NOTE1: ON THE 40 SIN SIDE CONNECTOR: PIN E MUST BE CONNECTED TO PIN M, PIN F MUST BE CONNECTED TO PIN J.
- RTN01: CHECKS THAT KCC WILL CLEAR THE AC, TEST IS DONE 100 TIMES.
- RTN11: TLS IS USED TO SEND DATA AND KSF CHECKS TO SEE IF THE RECEIVER FLAG SET UPON COMPLETION OF RECEIVING THE DATA, TEST IS DONE 100 TIMES.
- RTN21: TEST OF KSF TO SKIP ON RECEIVER FLAG CONSISTENTLY, TEST IS DONE 4000 TIMES.
- RTN31: TEST OF KSF TO NOT SKIP ON NO RECEIVER FLAG, TEST IS DONE 500 TIMES.
- RTN41: CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT AND THAT THE READER FLAG WILL INTERRUPT, TEST IS DONE 1000 TIMES.
- RTN51: CHECKS THE ABILITY OF:  
  
SRQ TO SKIP ON A READER INTERRUPT  
SPI TO SKIP ON A READER INTERRUPT  
CAF TO CLEAR KBRD/READER FLAG.  
SRQ TO NOT SKIP ON NO READER FLAG  
SPI TO NOT SKIP ON NO READER FLAG  
TEST IS DONE 100 TIMES.
- RTN61: CHECKS THAT THE READER FLAG SETS NO LATER THAN THE REQUIRED TIME FOR IT TO SET.  
  
110 BAUD = 100 MSEC.  
150 BAUD = 66.7 MSEC.  
300 BAUD = 33.3 MSEC.  
600 BAUD = 16.7 MSEC.  
1200 BAUD = 8.33 MSEC.  
TEST IS DONE 100 TIMES.
- RTN71: CHECKS DATA HANDLING CAPABILITIES BY SENDING A NUMBER FOLLOWED BY ITS COMPLEMENT, TEST IS DONE 512 TIMES.
- RT101: CHECKS DATA HANDLING CAPABILITIES BY SENDING RANDOM NUMBERS, TEST IS DONE 512 TIMES.
- RTN11: CHECKS THAT KRS CAN "INCLUSIVE OR" READER BUFFER WITH AC, TEST IS DONE 500 TIMES.
- RTN12: CHECKS THAT KRB WILL "JAM TRANSFER" RECEIVER BUFFER TO AC, AND THAT KRB WILL CLEAR READER FLAG, TEST IS DONE 500 TIMES.



PRG2 - BASIC INPUT LOGIC TESTS  
-----

THIS PROGRAM CONTAINS 11 ROUTINES NUMBERED FROM 0 TO 12 (OCTAL).

- RTN0: CHECKS THAT KCC COMMAND IS ABLE TO CLEAR THE AC. TEST IS DONE 1000 TIMES.
- RTN1: ISSUES KCC, WAITS 200MS AND CHECKS THAT FLAG IS SET. A FAILURE TO SKIP INDICATES THAT THE FLAG IS NOT SET, OR THAT KSF COMMAND FAILED TO SKIP.
- RTN2: WITH FLAG SET, CHECKS THAT KSF COMMAND SKIPS RELIABLY, DONE 500 TIMES.
- RTN3: CHECKS THAT KSF COMMAND DOES NOT SKIP WITH FLAG RESET. DONE 500 TIMES.
- RTN4: CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT, AND THEN CHECKS THAT READER IS CAPABLE OF INTERRUPTING.
- RTN5: TIMING TEST.
- RTN6: READS A CHARACTER FROM TAPE AND SAVES IT. IT THEN REREADS THE TTI STATICALLY 1000 TIMES TO CHECK FOR CONSISTENT READING FROM TTI. 256 CHARACTERS ARE READ IN THIS MANNER.
- RTN7: CHECKS THAT KCR DOES NOT CLEAR AC AND SETS READER FLAG, BIT DOES NOT SET READER RUN, DONE 100 TIMES.
- RTN10: CHECKS THAT KIE WILL ENABLE AND DISABLE TTY INTERRUPT F,F. AND THAT SRQ AND SPI WILL AND WILL NOT SKIP, DONE 1000 TIMES
- RTN11: CHECKS THAT CAF WILL ENABLE TTY INTERRUPT F,F. AND THAT IT WILL CLEAR AC, LINK, AND READER FLAG, DONE 100 TIMES.
- RTN12: CHECKS THAT KRB CAN CLEAR THE READER FLAG AND THAT KRB CAN SET THE FLAG. ALSO KRB IS CHECKED FOR READING DATA. TEST IS DONE 256 TIMES.

8.4 PRG3 - READER TEST

-----

THIS PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM 0 TO 2.

RTN0: READS 4095 CHARACTERS OF BINARY COUNT PATTERN. FULL SPEED.

RTN1: READS 2000 CHARACTERS OF BINARY COUNT PATTERN WITH RANDOM STALLS BETWEEN CHARACTERS.

RTN2: READS 100 RANDOM LENGTH CHARACTER BLOCKS. FIXED STALL BETWEEN CHARACTERS IN A BLOCK. THE STALL CHANGES FOR EACH BLOCK AND IS DETERMINED AT RANDOM.

8.5 PRG4 - PRINTER TEST

-----

THIS PROGRAM CONTAINS 41 ROUTINES NUMBERED FROM 0 TO 50 (OCTAL).

RTN0: CARRIAGE RETURN TEST. CHECKS ABILITY OF CARRIAGE RETURN TO PRINT POSITION 1 FROM ALL OTHER PRINT POSITIONS. NO PRINTING SHOULD OCCUR IN ANY PRINT POSITION OTHER THAN POSITION 1.

RTN1: RIGHT MARGIN TEST. THIS TEST SHOWS WHEN THE RIGHT MARGIN IS NOT CORRECTLY ADJUSTED. THE TEST PRINTS 16 GROUPS OF ---I FOLLOWED BY CHARACTERS I.

RTN2: SPACE TEST. THE TEST PRINTS / IN ALTERNATE POSITIONS OF THE LINE. AFTER A DOUBLE CARRIAGE RETURN IT SCAPES TO THE BLANK POSITIONS AND PRINTS A LEFT SLANT SLASH. A DOUBLE CARRIAGE RETURN IS ISSUED AFTER PRINTING EACH LEFT SLANT SLASH.

RTN3: LINE FEED TEST. THE TEST PRINTS A LEFT SLANT SLASH FOLLOWED BY A LINE FEED, FOLLOWED BY A RANDOM DELAY UNTIL 81 SLASHES HAVE BEEN PRINTED. THE RESULT SHOULD APPEAR TO BE A LEFT SLANTED LINE FROM POSITION 1 TO 81. VERTICAL SPACING VARIATIONS SHOULD BE APPARENT IF ADJUSTMENT IS REQUIRED.

(8,5 CONT'D)

ROUTINES 4 THROUGH 41 TYPES LINES CONTAINING 3 CHARACTERS AT FULL SPEED AS FOLLOWS:

RTN41: ABC (CAPITALS)  
RTN51: DEF "  
RTN61: GHI "  
RTN71: JKL "  
RTN10: MNO "  
RTN11: PQR "  
RTN12: STU "  
RTN13: VWX "  
RTN14: YZ "  
RTN15: 123  
RTN16: 456  
RTN17: 789  
RTN20: !"#  
RTN21: \$%&  
RTN22: '()  
RTN23: \*+  
RTN24: -./  
RTN25: :;<  
RTN26: =>?  
RTN27: @[\   
RTN30: ]^ AND LEFT ARROW  
RTN31: ABC (LOWER CASE) (KSR37 ONLY)  
RTN32: DEF " "  
RTN33: GHI " "  
RTN34: JKL " "  
RTN35: MNO " "  
RTN36: PQR " "  
RTN37: STU " "  
RTN40: VWX " "  
RTN41: YZ AND CODE 340 "  
  
RTN42: TYPES LINE OF 4 CHARACTERS WHOSE CODE IS 373, 374, 375, AND 376 (KSR37 ONLY).  
  
RTN43: TYPES 2 LINES OF ALL CHARACTERS, FIRST LINE IS TYPED AT FULL SPEED, AND THE 2ND LINE WITH RANDOM STALLS BETWEEN CHARACTERS.  
  
RTN44: TYPES 12 LINES OF ASR33 PRINTER WORST CASE PATTERN, ALTERNATE LINES ARE TYPED WITH RANDOM STALLS BETWEEN CHARACTERS. ROUTINE RUNS ONLY IF KSR33 OR ASR33 IS PRESENT.  
  
THE ASR33 WORST CASE PATTERN USED IS 'LEFT ARROW W/W LEFT ARROW.

(8.5 CONT'D)

RTN45: TYPES 12 LINES OF ASR35 PRINTER WORST CASE PATTERN. ALTERNATE LINES ARE TYPED WITH RANDOM STALLS BETWEEN CHARACTERS. ROUTINE RUNS ONLY IF KSR35 OR ASR35 IS PRESENT.

THE ASR35 WORST CASE PATTERN USED IS '[?C?['

RTN46: TYPES 12 LINES OF KSR37 PRINTER WORST CASE PATTERN. ALTERNATE LINES ARE TYPED WITH RANDOM STALLS BETWEEN CHARACTERS. ROUTINE RUNS ONLY IF KSR37 IS PRESENT.

THE KSR 37 WORST CASE PATTERN USED IS:

CAPITAL N, LOWER CASE Q, CAPITAL A, SWING DASH,  
CAPITAL A, LOWER CASE Q.

RTN47: TAB TEST, EXECUTED FOR 37 OR 35 TELETYPE ONLY. THE TEST IS RUN AFTER ROUTINE 3.

RTN50: BACKSPACE TEST, EXECUTED FOR KSR37 TELETYPE ONLY. THIS TEST IS RUN AFTER ROUTINE 47.

8.6

PRG5 - PUNCH TEST  
-----

THIS PROGRAM TESTS THE PUNCH WITH A SPECIAL BINARY COUNT PATTERN. EVERY BINARY COUNT CHARACTER PUNCHED IS FOLLOWED BY ITS 1'S COMPLEMENT CHARACTER.

THE TEST SEQUENCE IS AS FOLLOWS:

- A) PUNCH LEADER (CODE 376)
- B) PUNCH SYNC CHARACTER (CODE 377)
- C) PUNCH DATA BLOCK AT FULL SPEED (512 CHARACTERS)
- D) PUNCH TRAILER (CODE 376)
- E) SYNC THE READER
- F) READ AND CHECK DATA BLOCK
- G) PUNCH LEADER (CODE 376)
- H) PUNCH SYNC CHARACTER (CODE 377)
- I) PUNCH DATA BLOCK WITH STALLS, (512 CHARACTERS)
- J) PUNCH TRAILER (CODE 376)
- K) SYNC THE READER
- L) READ AND CHECK DATA BLOCK
- M) REPEAT. (GO TO STEP A)

8.7 PRG6 - KEYBOARD TEST  
-----

THIS PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM 0 TO 2.

RTN0: CHECKS THAT KSF COMMAND SKIPS WHEN FLAG=1. TEST IS DONE 1000 TIMES.

RTN1: ECHO TEST, ANY CHARACTERS READ FROM KEYBOARD ARE TYPED, CORRECT OPERATION VERIFICATION IS DONE VISUALLY BY USER, READING A RUBOUT CHARACTER ENDS THE TEST.

RTN2: OCTAL EQUIVALENCES TEST, THE OCTAL EQUIVALENT OF ANY CHARACTERS KEYED IS TYPED, READING A RUBOUT ENDS THE TEST.

8.8 PRG7 - COMBINED READER, PRINT, PUNCH TEST  
-----

THIS PROGRAM CONTAINS 25 ROUTINES NUMBERED FROM 0 TO 32 (OCTAL), ALL ROUTINES USE THE FOLLOWING TEST SEQUENCE:

- A) FILL CORE WITH DATA TO BE PUNCHED/PRINTED.
- B) PUNCH LEADER,
- C) PUNCH SYNC CHARACTER,
- D) PUNCH DATA BLOCK (NO DELAY BETWEEN CHARACTERS.)
- D) SYNC THE READER,
- F) READ/CHECK DATA BLOCK (RANDOM DELAY BETWEEN CHARACTERS).
- G) PUNCH DATA BLOCK (RANDOM DELAY BETWEEN CHARACTERS),
- H) READ DATA BLOCK (NO DELAY BETWEEN CHARACTERS).
- I) PUNCH TRAILER,
- J) WAIT FOR READER TO COMPLETE READING DATA BLOCK.
- K) END OF TEST SEQUENCE.

(8.8 CONT'D)

RTN01: PUNCH/PRINT AND READ CHECK BLOCK OF ABC  
RTN11: PUNCH/PRINT AND READ CHECK BLOCK OF DEF  
RTN21: PUNCH/PRINT AND READ CHECK BLOCK OF GHI  
RTN31: PUNCH/PRINT AND READ CHECK BLOCK OF JKL  
RTN41: PUNCH/PRINT AND READ CHECK BLOCK OF MNO  
RTN51: PUNCH/PRINT AND READ CHECK BLOCK OF PQR  
RTN61: PUNCH/PRINT AND READ CHECK BLOCK OF STU  
RTN71: PUNCH/PRINT AND READ CHECK BLOCK OF VWX  
RTN10: PUNCH/PRINT AND READ CHECK BLOCK OF YZ0  
RTN11: PUNCH/PRINT AND READ CHECK BLOCK OF 123  
RTN12: PUNCH/PRINT AND READ CHECK BLOCK OF 456  
RTN13: PUNCH/PRINT AND READ CHECK BLOCK OF 789  
RTN14: PUNCH/PRINT AND READ CHECK BLOCK OF !"#  
RTN15: PUNCH/PRINT AND READ CHECK BLOCK OF \$%&  
RTN16: PUNCH/PRINT AND READ CHECK BLOCK OF '()  
RTN17: PUNCH/PRINT AND READ CHECK BLOCK OF \*\*,  
RTN20: PUNCH/PRINT AND READ CHECK BLOCK OF -./  
RTN21: PUNCH/PRINT AND READ CHECK BLOCK OF :;<  
RTN22: PUNCH/PRINT AND READ CHECK BLOCK OF =>?  
RTN23: PUNCH/PRINT AND READ CHECK BLOCK OF @C%  
RTN24: PUNCH/PRINT AND READ CHECK BLOCK OF ]^`  
RTN25: PUNCH/PRINT AND READ CHECK BLOCK OF ALL PRINTABLE CHARACTERS  
RTN26: PUNCH/PRINT AND READ CHECK BLOCK OF ASR33 PRINTER  
WORST CASE PATTERN (cW/)  
RTN27: PUNCH/PRINT AND READ CHECK BLOCK OF ASR35 PRINTER  
WORST CASE PATTERN, ( [?@)  
RTN30: PUNCH/PRINT AND READ CHECK BLOCKS OF SPACE,  
RUBOUT (DATA: ALL 1'S, ALL 1'S, ALL 0'S).

8.9 PRG7 - READER EXERCISER, BINARY COUNT PATTERN  
-----

THE PROGRAM READS AND CHECKS A BINARY COUNT PATTERN TEST TAPE, WITH PROGRAM RUNNING SETTING SR0 TO A 1 CAUSES PROGRAM TO HALT AND DISPLAY THE ACCUMULATED ERROR COUNT IN AC. SR3 SET TO A 1 GIVES FULL SPEED READING, SR3 SET TO A 0 CAUSES STALLS BETWEEN CHARACTERS. SR5 SET TO A 1 WILL HALT THE PROGRAM WHEN AN ERROR OCCURS. THE BAD CHARACTER IS THEN DISPLAYED IN THE AC. PRESSING CONTINUE DISPLAYS THE EXPECTED CHARACTER.

8.10 PRG10 - PRINTER EXERCISER  
-----

THIS PROGRAM CONTINUOUSLY TYPES LINES OF ANY 3 CHARACTERS KEYED BY USER, ON PROGRAM REQUEST THE USER KEYS IN THE 3 CHARACTERS TO BE TYPED, FOLLOWED BY A DELETE CODE IF FULL SPEED TYPING IS DESIRED, OR BY ANY OTHER CHARACTER IF RANDOM STALLS AFTER EACH CHARACTER ARE DESIRED.

8.11 PRG11 - TAPE GENERATOR - BINARY COUNT PATTERN  
-----

PUNCHES BINARY COUNT PATTERN TEST TAPE.

/PDP-8/E TELETYPE CONTROL TEST, (KL8)

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/
/PRG0-BASIC OUTPUT CONTROL LOGIC TEST
/PRG1-BASIC OUTPUT AND INPUT LOGIC TEST (LOOP AROUND)
/PRG2-BASIC INPUT CONTROL LOGIC TEST - (USES READER)
/PRG3-READER TEST
/PRG4-PRINTER TEST
/PRG5-PUNCH TEST
/PRG6-KEYBOARD TEST
/PRG7-COMBINED TEST
/PRG10-READER EXERCISER, BINARY COUNT PATTERN.
/PRG11-PRINTER EXERCISER.
/PRG12-TAPE GENERATOR, BINARY COUNT PATTERN.

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/BIT TIME TABLE:

/0110 BAUD 11 BITS @ 9.09 MSEC = 100 MSEC
/0150 BAUD 10 BITS @ 6.67 MSEC = 66.7 MSEC
/0300 BAUD 10 BITS @ 3.33 MSEC = 33.33 MSEC
/0600 BAUD 10 BITS @ 1.67 MSEC = 16.67 MSEC
/1200 BAUD 10 BITS @ .833 MSEC = 8.33 MSEC

\*\*\*\*\*

6001 ION=6001 /TURN INTRRRUPT ON.
6002 IOF=6002 /TURN INTERRUPT OFF.
6003 SRQ=6003 /SKIP IF INTERRUPT REQUEST.
6004 GTF=6004 /GET INTERRUPT FLAGS
6005 RTF=6005 /RESTORE INTERRUPT FLAGS AND TURN INTERRUPT ON
6007 CAF=6007 /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT
6030 KCR=6030 /CLEAR KBRD FLAG BUT DO NOT SET RDR RUN
6031 KSF=6031 /SKIP IF KEYBOARD/READER FLAG = 1.
6032 KCC=6032 /CLEAR AC AND KBRD/READER FLAG, SET READER RUN.
6034 KRS=6034 /READ KEYBOARD/READER BUFFER STATIC
6035 KIE=6035 /ENABLE TTY INTERRUPT WHEN AC11 EQUALS 1
6036 KRB=6036 /CLEAR AC, READ KEYBOARD BUFFER, CLEAR
/KEYBOARD FLAGS.
6040 SPF=6040 /SET PRINTER FLAG
6041 TSF=6041 /SKIP IF TELEPRINTER/PUNCH FLAG = 1.
6042 TCF=6042 /CLEAR TELEPRINTER/PUNCH FLAG.
6044 TPC=6044 /LOAD TELEPRINTER/PUNCH BUFFER
/SELECT AND PRINT.
6045 SPI=6045 /SKIP IF TTY INTERRUPT
6046 TLS=6046 /LOAD TELEPRINTER/PUNCH BUFFER,
/SELECT AND PRINT AND CLEAR
/TELEPRINTER/PUNCH FLAG.
7002 BSW=7002 /SWAP BYTES IN AC.
7421 MQL=7421 /LOAD MQ FROM AC THEN CLEAR AC.
7621 CAM=7621 /CLEAR AC AND MQ.
7701 ACL=7701 /LOAD MQ INTO AC.
0000 OPEN=0 /PROGRAM MODIFIABLE.

```

4577 SETLOC=JMS I [STCTR
4576 DELAY=JMS I [DLYMS
4575 CRLF=JMS I [CRLF
4574 MOVE=JMS I [MOVE
4573 TYPE=JMS I [TYPSTG
6117 MTON=6117
6127 MTRS=6127
6115 MINT=6115
4572 UKSF=JMS I [XKSF
4571 UKCC=JMS I [XKCC
4570 UKRS=JMS I [XKRS
4567 UKRB=JMS I [XKRB
4566 UTSF=JMS I [XTSF
4565 UTCF=JMS I [XTCF
4564 UTPC=JMS I [XTPC
4563 UTLS=JMS I [XTLS
4562 UKCR=JMS I [XKCR
4561 UKIE=JMS I [XKIE
4560 USPF=JMS I [XSPF
4557 USPI=JMS I [XSPI
4556 STALL=JMS I [STAL
4555 CKSR37=JMS I [CK37
4554 CKSR33=JMS I [CK33
4553 CKSR35=JMS I [CK35
6377 BLOCKA=END
6601 BLOCK1=BLOCKA+2
6711 BLOCKB=BLOCKA+112
6722 BLKBB=BLOCKA+123
6713 BLOCK2=BLOCKA+114
6724 BLK2=BLOCKA+123
7023 BLOCKC=BLOCKA+224
7034 BLKCC=BLOCKA+235
7577 DBLK=BLOCKA+1000
7631 M147=-147
0304 RRPP=0304

```

```

/DC02. MULTIPLE TTY ON.
/DC02. MULTIPLE TTY READ STATUS.
/DC02. MULTIPLE TTY INTERRUPT CONTROL.

```

/-103 DECIMAL.

```

0000 *0
0000 0000
0001 5001 JMP 1
0002 0002 2
0003 0003 3
0005 *5
0005 5402 JMP I 2
0006 0000 0
0016 *16
0016 0000 OPEN
0020 *20
0020 0000 TTYTYP, OPEN
0021 0304 TTYIOT, RRPP

```

/AUTO INDEX.

```

/CONSTANT TO DETERMINE IOT CODE
/PRESET FOR 23 READER AND 24 PUNCH,
/TO CHANGE IOT CODE SET THIS LOCATION
/TO: "RRPP" WHERE RR IS FOR
/THE READER AND PP IS FOR THE PUNCH.
/CONSTANT TO DETERMINE DELAY
/PRESET FOR BAUD.

```

0022 0110 BAUDRY, 110



/TO SELECT BAUD RATE DEPOSIT THE FOLLOWING:  
 /0110 FOR 110 BAUD.  
 /0150 FOR 150 BAUD.  
 /0300 FOR 300 BAUD.  
 /0600 FOR 600 BAUD.  
 /1200 FOR 1200 BAUD.  
 /\*\*THE ABOVE ARE THE ONLY LEGAL BAUD RATES\*\*

0023 0000 KSTART, OPEN  
 0024 0000 DELAYM, OPEN  
 0025 0263 CHAIN, CHAINN  
 0026 1365 K0FLAG, KFLAG  
 0027 0474 DLCNT1, DLCNT  
 0030 2012 S100, S100I  
 0031 2000 S4000, S4000I  
 0032 2005 S200, S200I  
 0033 2126 TLCALL, TLCALI  
 0034 2134 TLC37, TLC37I  
 0035 2144 FBF, FBF I  
 0036 0000 PRGNUM, OPEN  
 0037 2200 PRGTAB, PRG0  
 0040 3000 PRG1  
 0041 3503 PRG2  
 0042 4307 PRG3  
 0043 4434 PRG4  
 0044 5274 PRG5  
 0045 5340 PRG6  
 0046 5465 PRG7  
 0047 5651 PRG10  
 0050 5722 PRG11  
 0051 5764 PRG12  
 0052 0000 TEMP, OPEN  
 0053 0000 TEMP1, OPEN  
 0054 0000 CURTST, OPEN  
 0055 0000 RTNNO, OPEN  
 0056 0000 NXTST, OPEN  
 0057 0000 MSCTR, OPEN  
 0060 0000 MILCTR, OPEN  
 0061 0000 MIL1, OPEN

/USER PROGRAM START.

/CHAIN RTN ENTRY.

/WORK  
 /LOCATIONS  
 /FOR CURRENT TEST ADDRESS  
 /FOR CURRENT TEST NUMBER  
 /FOR NEXT TEST ADDRESS  
 /MILLISECONDS COUNTER

/7372 FOR 110 BAUD.  
 /7522 FOR 150 BAUD.  
 /7652 FOR 300 BAUD.  
 /7726 FOR 600 BAUD.  
 /7754 FOR 1200 BAUD.

/COUNTER A,  
 /COUNTER B.

0062 0000 CTRA, OPEN  
 0063 0000 CTRB, OPEN  
 0064 0000 STLID, OPEN  
 0065 0530 SYNC, SYNK  
 0066 0436 INPATT, IBIN  
 0067 0444 GETPT, GTBIN  
 0070 0513 CHECK, CHCK  
 0071 0000 PFLAG, 0  
 0072 1271 UOUT, OUT  
 0073 1615 UTPLN3, TYPLN3  
 0074 2112 UPUNCH, PUNCH  
 0075 0600 UMOVE, MOVVE

/ENTRY TO SYNC TAPE RTN.  
 /ENTRY TO INITIATE PATTERN  
 /ENTRY TO GET PATTERN CHAR.

```

0076 0000 RBUSY, 0
0077 0000 AC, 0
0100 0000 LINK, 0
0101 0000 BLKCNT, 0
0102 0000 DELAYS, 0
0103 0000 ERRCR, 0
0104 0000 UTEMP, 0
0105 0000 UTEMP1, 0
0106 0000 UTEMP2, 0
0107 0215 CR, 215 /CARRIAGE RETURN
0110 0212 LF, 212 /LINE FEED
0111 0277 DLYMSK, 277
0112 0000 WTS6A, OPEN

```

## /CONTROL ROUTINE

```

0200 7610 *200
0201 7402 START, SKP CLA
0202 7621 HLT /INCORRECT PROGRAM NUMBER
0203 4777 CAM /CLEAR AC AND HQ.
0204 4776 JMS SETRND /SET UP RANDOM NUMBERS
0205 7604 JMS STBAUD /SET UP LOG MIL1 FOR SELECTED BAUD RATE.
0206 0152 BORET, LAS /READ SR
0207 1191 AND [17 /PROGRAM MASK = 17
0210 7540 TAD [-12 /PROGRAM LIMIT = -12
0211 5201 SMA SEA /VALID PROGRAM NUMBER?
0212 7604 JMP START+1 /NO.
0213 0152 LAS /YES, READ SR.
0214 3036 AND [17
0215 1036 DCA PRGNUM /SAVE PROGRAM NUMBER.
0216 1190 TAD PRGNUM /DEVELOP PROGRAM START
0217 3032 TAD [PRGTAB /ADDRESS AND STORE AT
0220 1452 DCA TEMP /PRGADR.
0221 3235 TAD I TEMP
0222 4775 DCA PRGADR
0223 7604 JMS DVCSEL /PERFORM IOT SELECTION
0224 0147 SLDC02, LAS /SELECT DC02 UNIT
0225 6117 AND [7760
0226 7201 MTON
0227 6115 CLA IAC
0230 4475 MINT /ENABLE DC02 INTERRUPT
0231 0005 JMS I UMOVE /INITIALIZE
0232 0001 5 /INTERRUPT.
0233 7776 1 /AREA.
0234 5635 -2
0235 0000 JMP I ,+1
0236 7602 PRGADR, OPEN
0237 7200 SRSET, HLT CLA
0240 1023 GETRDY, CLA
0241 3036 TAD KSTART /SET ADDRESS OF 1ST ROUTINE
0242 4302 DCA NXTST /STORE AT NXTST
0243 7604 JMS FORWD
0244 7004 LAS /READ SR
0245 7500 RAL
SMA /ROUTINE SEI? (SR1)

```

0246	5454	JMP I CURTST	/NO, START WITH 1ST RTN
0247	7604	LAS	/YES
0250	0146	AND E77	/SR 6-11 ENABLE MASK.
0251	7041	CIA	
0252	1055	TAD RTNNO	
0253	7650	SNA CLA	/IS IT THIS RTN?
0254	5454	JMP I CURTST	/YES, GO DO IT
0255	1056	TAD NXTST	/NO
0256	7001	IAC	/IS THIS LAST TRN?
0257	7640	SZA CLA	/NO
0260	5242	JMP GETRDY+3	
0261	7402	INCRTN, HLT	/YES, INCORRECT ROUTINE NO.
0262	5237	JMP GETRDY	
0263	4317	CHAINN, JMS SHALT	/HALT? (SR0)
0264	7604	LAS	/READ SR
0265	7006	RTL	
0266	7630	SZL CLA	/SELECT ROUTINE? (SR1)
0267	5237	JMP GETRDY	/YES
0270	1056	TAD NXTST	
0271	7001	IAC	
0272	7640	SZA CLA	/LAST ROUTINE?
0273	5242	JMP GETRDY+3	/NO.
0274	7604	LAS	
0275	7006	RTL	
0276	7710	SPA CLA	/LOOP PROGRAM? (SR2)
0277	5237	JMP GETRDY	/YES
0300	7402	PRGEND, HLT	/END OF PROGRAM HALT
0301	5263	JMP CHAINN	
0302	0000	FORWD, 0	
0303	7300	CLA CLL	
0304	1456	TAD I NXTST	/GET NEXT RTN NO
0305	3055	DCA RTNNO	/STORE AT RTNNO
0306	2056	ISZ NXTST	
0307	1056	TAD NXTST	/SET CURRENT
0310	3052	DCA TEMP	/RTN NUMBER
0311	2056	ISZ NXTST	
0312	1056	TAD NXTST	/SET CURRENT
0313	3054	DCA CURTST	/RTN ADDR.
0314	1452	TAD I TEMP	/SET NEXT
0315	3056	DCA NXTST	/RTN ADDR.
0316	5702	JMP I FORWD	/EXIT
0317	0000	SHALT, 0	
0320	7604	LAS	/READ SR
0321	7700	SMA CLA	/HALT? (SR0)
0322	5717	JMP I SHALT	
0323	1055	TAD RTNNO	
0324	7402	HLT	/UNCONDITIONAL HALT (SR2 = 1)
0325	5717	JMP I SHALT	/EXIT.
0326	0000	STCTR, 0	
0327	7200	CLA	
0330	1726	TAD I STCTR	/GET CTR ADDR

0331	3052		DCA TEMP	/AND SAVE AT TEMP
0332	2326		ISZ STCTR	
0333	1726		TAD I STCTR	/GET COUNT AND
0334	3452		DCA I TEMP	/STORE PER C(TEMP)
0335	2326		ISZ STCTR	
0336	5726		JMP I STCTR	/EXIT
0337	0000	DLYMS,	0	
0340	7300		CLA CLL	
0341	1024		TAD DELAYM	/GET MS COUNT
0342	3057		DCA MSCTR	/STORE IN MSCTR
0343	1061		TAD MIL1	/GET CONSTANT
0344	3060		DCA MILCTR	/STORE IN MILCTR
0345	2060		ISZ MILCTR	/DELAY FINISHED?
0346	5345		JMP ,=1	
0347	2057		ISZ MSCTR	/DONE DELAYING
0350	5343		JMP ,=5	
0351	5737		JMP I DLYMS	/EXIT
0352	0000	CK33,	OPEN	/SUB TO CHECK FOR 33 TTY
0353	7200		CLA	
0354	1020		TAD TTYTYP	/GET TTY TYPE
0355	7650		SNA CLA	/33?
0356	2352		ISZ CK33	/YES.
0357	5752		JMP I CK33	
0360	0000	CK35,	OPEN	/SUB TO CHECK FOR 35 TTY
0361	7240		CLA CMA	
0362	1020		TAD TTYTYP	/GET TTY TYPE
0363	7650		SNA CLA	/35?
0364	2340		ISZ CK35	/YES.
0365	5760		JMP I CK35	
0366	0000	CK37,	OPEN	/SUB TO CHECK FOR 37 TTY
0367	7344		CLA CLL CMA RAL	/-2
0370	1020		TAD TTYTYP	/GET TTY TYPE.
0371	7650		SNA CLA	/37?
0372	2366		ISZ CK37	/YES.
0373	5766		JMP I CK37	
0375	0000			
0376	0504			
0377	1742			
	0400		PAGE	
	0400	RGNA,	PAGE	
0400	0000		OPEN	/RANDOM NUMBER SUB A.
0401	7300		CLA CLL	
0402	1215		TAD RP1A	
0403	7006		RTL	
0404	1216		TAD RP2A	
0405	3215		DCA RP1A	
0406	1215		TAD RP1A	
0407	7006		RTL	
0410	1216		TAD RP2A	
1411	7006		RTL	

```

0412 3216          DCA RP2A
0413 1215          TAD RP1A
0414 5600          JMP I RGNA        /EXIT RGNA SUB.
0415 1233          RP1A, 1233
0416 7622          RP2A, 7622
    
```

```

0417 0000          RGNB, OPEN          /RANDOM NUMBER SUB B.
0420 7300          CLA CLL
0421 1234          TAD RP1B
0422 7006          RTL
0423 1235          TAD RP2B
0424 3234          DCA RP1B
0425 1234          TAD RP1B
0426 7006          RTL
0427 1235          TAD RP2B
0430 7006          RTL
0431 3235          DCA RP2B
0432 1234          TAD RP1B
0433 5617          JMP I RGNB        /EXIT RGNB SUB
0434 1233          RP1B, 1233
0435 7622          RP2B, 7622
    
```

/SUBROUTINE TO INITIALIZE BINARY COUNT PATTERN

```

0436 0000          IBIN, 0
0437 7200          CLA          /SET PT0 = 0
0440 3242          DCA PT0
0441 5636          JMP I IBIN        /EXIT
0442 0000          PT0, 0
0443 0000          PT1, 0
    
```

/SUBROUTINE TO PROVIDE NEXT BINARY COUNT PATTERN CHARACTER (IN AC)

```

0444 0000          GTBIN, 0
0445 7200          CLA
0446 1242          TAD PT0        /GET PT0
0447 3243          DCA PT1        /STORE AT PT1
0450 1243          TAD PT1        /GET PT1
0451 7001          IAC          /INCREMENT ACCUMULATOR
0452 0145          AND [377        /LIMIT TO 8 BITS
0453 3242          DCA PT0        /STORE AT PT0
0454 1243          TAD PT1        /GET PT1
0455 5644          JMP I GTBIN        /EXIT
    
```

/SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT. (NOT MORE THAN 77(8))

```

0456 0000          CHRCNT, 0
0457 4200          JMS RGNA        /GO GENERATE RANDOM NUMBER
0460 0146          AND [77        /REMOVE HIGH ORDER 6 BITS
0461 7450          SNA
0462 5257          JMP CHRCNT+1
0463 7041          CIA          /2'S COMPLEMENT IT
0464 3273          DCA SCNT
0465 1656          TAD I CHRCNT
0466 3052          DCA TEMP
0467 1273          TAD SCNT
0470 3452          DCA I TEMP        /STORE AT SPECIFIED ADDRESS
0471 2256          ISZ CHRCNT        /SET UP EXIT
    
```

0472 5856 JMP I CHCNT /EXIT  
 0473 0000 SCNT, OPEN

/SUBROUTINE TO GENERATE RANDOM DELAY COUNT (NOT MORE THAN 3777(8)).  
 DLCNT, 2  
 0474 0000  
 0475 4200 JMS RGNA /GO GENERATE RANDOM NUMBER  
 0476 0111 AND DLYMSK /MASK OUT UNDESIRED BITS.  
 0477 7450 SNA /ZERO?  
 0500 5275 JMP DLCNT+1 /YES, GET ANOTHER NUMBER  
 0501 7041 CIA /2'S COMPLEMENT IT  
 0502 3024 DCA DELAYM  
 0503 5674 JMP I DLCNT /EXIT

/SUBROUTINE TO ASSIST IN SETTING UP M1L1 FOR DELAYS.  
 STBAUD, OPEN  
 0504 0000  
 0505 4777 JMS SETBAU /GO TO SETBAU  
 0506 7630 -150 / 150 BAUD,  
 0507 7500 -300 / 300 BAUD,  
 0510 7200 -600 / 600 BAUD,  
 0511 6600 -1200 /1200 BAUD,  
 0512 7670 -110 / 110 BAUD.

/SUBROUTINE TO COMPARE C(AC) TO CONTENTS STORED AT CALL+1  
 CHCK, 0  
 0513 0000  
 0514 3327 DCA WCHK /STORE AC AT WCHK  
 0515 1713 TAD I CHCK /GET COMPARE DATA  
 0516 7041 CIA /2'S COMPLEMENT IT  
 0517 1327 TAD WCHK /ADD C(WCHK)  
 0520 2313 ISZ CHCK /SET UP FOR UNEQUAL EXIT  
 0521 7640 SEA CLA /EQUAL (AC = 0)  
 0522 5325 JMP ,+3 /NO  
 0523 2313 ISZ CHCK /YES, SET UP FOR EQUAL EXIT  
 0524 5713 JMP I CHCK /EQUAL EXIT  
 0525 1327 TAD WCHK /RESTORE AC  
 0526 5713 JMP I CHCK /UNEQUAL EXIT  
 0527 0000 WCHK, 0

/SYNC ON TAPE SUBROUTINE  
 SYNK, 0  
 0530 0000  
 0531 4577 SETLOC /SET COUNT OF  
 0532 0550 CTSK /-256 (DEC) IN  
 0533 7400 -400 /CTSK  
 0534 4571 SYNKA, UKCC /CLEAR AC AND FLAG  
 0535 4572 UKSF /READY?  
 0536 5338 JMP , -1 /NO, TEST AGAIN  
 0537 4570 UKRS /YES, READ  
 0540 1144 TAD I -377  
 0541 7640 SEA CLA /377?  
 0542 7410 SKP  
 0543 5730 JMP I SYNK /YES, EXIT  
 0544 2390 ISZ CTSK /BUMP CHAR CTR +1  
 0545 5334 JMP SYNKA /GO READ AGAIN  
 0546 7402 HLT /256 CHARS READ, CAN'T SYNC  
 0547 5331 JMP SYNK+1 /GO TO SRST

```

0550 0000 CTSK, 0 /CHAR COUNTER
0551 0000 STAL, OPEN
0552 7200 CLA
0553 1064 TAD STLID
0554 7700 SMA CLA /STALL?
0555 5751 JMP I STAL /NO, EXIT
0556 4274 JMS DLONT /YES SET STALL COUNT
0557 4576 DELAY /STALL
0560 5751 JMP I STAL /EXIT
0561 0000 CRCTR, OPEN
    
```

```

0562 0000 CRALF, OPEN
0563 7200 CLA
0564 1762 TAD I CRALF
0565 3361 DCA CRCTR
0566 2362 ISZ CRALF
0567 4573 TYPE
0570 4250 CARLF
0571 2361 ISZ CRCTR
0572 5367 JMP .-3
0573 5762 JMP I CRALF
0577 1513
0600 PAGE
    
```

```

0600 PAGE
/SUBROUTINE TO MOVE VARIABLE LENGTH DATA FIELDS
MOVVE, 0
0601 7200 CLA
0602 1600 TAD I MOVVE /GET "FROM ADDR" AND
0603 3223 DCA FADDR /STORE AT FADDR
0604 2200 ISZ MOVVE
0605 1600 TAD I MOVVE /GET "TO ADDR" AND
0606 3224 DCA TADDR /STORE AT TADDR.
0607 2200 ISZ MOVVE
0610 1600 TAD I MOVVE /GET "MOVE COUNT" AND
0611 3225 DCA MCTR /STORE AT MCTR,
0612 2200 ISZ MOVVE /SET UP FOR EXIT.
0613 7200 MOVEA, CLA
0614 1623 TAD I FADDR /GET "FROM" WORD
0615 3624 DCA I TADDR /STORE AT "TO" LOCATION
0616 2223 ISZ FADDR /+1 TO "FROM" ADDR
0617 2224 ISZ TADDR /+1 TO "TO" ADDR.
0620 2225 ISZ MCTR /ALL WORDS MOVED?
0621 5213 JMP MOVEA /NO, GO MOVE AGAIN
0622 5600 JMP I MOVVE /YES, EXIT
0623 0000 FADDR, 0
0624 0000 TADDR, 0
0625 0000 MCTR, 0
    
```

```

/TYPE CHARACTER STRING SUBROUTINE
0626 0000 TYPSTG, 0
0627 7200 CLA
0630 1626 TAD I TYPSTG /GET AND STORE
0631 3314 DCA TEMQ /INITIAL ADDRESS
    
```

0632	3316		DCA FLAG	/CLEAR FLAG,
0633	2226		ISZ TYPSTG	/SET UP EXIT
0634	1714	TSC1,	TAD I TEMQ	/PICK UP DATA
0635	7002		BSW	
0636	4243		JMS TSC2	/GO TYPE 1ST CHARACTER
0637	1714		TAD I TEMQ	/PICK UP DATE
0640	4243		JMS TSC2	/GO TYPE 2ND CHARACTER
0641	2314		ISZ TEMQ	/EVEN STRING ADDRESS
0642	5234		JMP TSC1	/GO BACK FOR MORE
0643	0000	TSC2,	0	
0644	0146		AND E77	/MASK OFF 6 BITS
0645	3315		DCA TEMR	/SAVE CHARACTER
0646	1316		TAD FLAG	/TEST "SPECIAL" FLAG.
0647	7640		SEA CLA	
0650	5200		JMP TYPSP	/SET TYPE SPECIAL
0651	1315		TAD TEMR	/NO, REGULAR CHARACTER
0652	7450		SNA	/ZERO?
0653	5256		JMP .+3	/YES, SET FLAG.
0654	4271	TYPAT,	JMS PRINT	/NO, PRINT IT.
0655	5643		JMP I TSC2	/RETURN.
0656	2316		ISZ FLAG	/SET "SPECIAL" FLAG.
0657	5643		JMP I TSC2	/EXIT
0660	3316	TYPSP,	DCA FLAG	/CLEAR FLAG.
0661	1315		TAD TEMR	/TEST FOR 0.
0662	7450		SNA	/0?
0663	5643		JMP I TSC2	/IGNORE IT.
0664	1377		TAD (-77	
0665	7650		SNA CLA	/???
0666	5626		JMP I TYPSTG	/YES, EXIT CODE.
0667	1315		TAD TEMR	
0670	5254		JMP TYPAT	
0671	0000	PRINT,	OPEN	
0672	1376		TAD (-45	
0673	7640		SEA CLA	/IS IT 45?
0674	5300		JMP .+4	/NO.
0675	1107		TAD CR	/YES, PRINT CR
0676	4474		JMS I UPUNCH	
0677	5671		JMP I PRINT	
0700	1315		TAD TEMR	
0701	1375		TAD (-43	
0702	7640		SEA CLA	/IS IT 43?
0703	5306		JMP .+3	/NO.
0704	1110		TAD LF	/YES, TYPE LF
0705	5276		JMP PRINT+5	
0706	1315		TAD TEMR	
0707	1374		TAD (-40	
0710	7510		SPA	
0711	1143		TAD [100	
0712	1142		TAD [240	
0713	5276		JMP PRINT+5	
0714	0000	TEMQ,	OPEN	
0715	0000	TEMR,	OPEN	
0716	0000	FLAG,	OPEN	



0717	0000	XKSF,	OPEN	/SUB TO ISSUE KSF,
0720	6031		KSF	/KSF
0721	5717		JMP I XKSF	/NO SKIP
0722	2317		ISZ XKSF	/SKIP
0723	5717		JMP I XKSF	
0724	0000	XKCC,	OPEN	/SUB TO ISSUE KCC,
0725	6032		KCC	
0726	5724		JMP I XKCC	/EXIT
0727	7402		HLT	/KCC SKIPPED,
0730	0000	XKRS,	OPEN	/SUB TO ISSUE KRS,
0731	6034		KRS	
0732	5730		JMP I XKRS	/EXIT
0733	7402		HLT	/KRS SKIPPED,
0734	0000	XKRB,	OPEN	/SUB TO ISSUE KRB,
0735	6036		KRB	
0736	5734		JMP I XKRB	/EXIT
0737	7402		HLT	/KRB SKIPPED,
0740	0000	XTSF,	OPEN	/SUB TO ISSUE TSF,
0741	6041		TSF	/TSF
0742	5740		JMP I XTSF	/NO SKIP,
0743	2340		ISZ XTSF	/SKIP,
0744	5740		JMP I XTSF	
0745	0000	XTCF,	OPEN	/SUB TO ISSUE TCF,
0746	6042		TCF	
0747	5745		JMP I XTCF	/EXIT
0750	7402		HLT	/TCF SKIPPED,
0751	0000	XTLS,	OPEN	/SUB TO ISSUE TLS
0752	6046		TLS	
0753	5751		JMP I XTLS	/EXIT
0754	7402		HLT	/TLS SKIPPED,
0755	0000	XKCR,	OPEN	/SUB TO ISSUE KCR,
0756	6030		KCR	
0757	5755		JMP I XKCR	/EXIT
0760	7402		HLT	/KCR SKIPPED,
0761	0000	XKIE,	OPEN	/SUB TO ISSUE KIE,
0762	6035		KIE	
0763	5761		JMP I XKIE	/EXIT,
0764	7402		HLT	/KIE SKIPPED,
0765	0000	XSPI,	OPEN	/SUB TO ISSUE SPI,
0766	6045		SPI	/
0767	5765		JMP I XSPI	/NO SKIP
0770	2365		ISZ XSPI	
0771	5765		JMP I XSPI	/EXIT
0774	7740			
0775	7735			

0776 7733  
 0777 7701  
 1000

PAGE

1000	0000	PAGE		
1001	4574	STBF,	OPEN	/SUB TO SET UP BUFFER AREA.
1002	0107		MOVE	/CRLF TO BLOCKA.
1003	6577		CR	
1004	7776		BLOCKA	
1005	4555		=2	
1006	5220		CKSR37	/KSR37?
1007	4574		JMP ST33B	/NO.
1010	0107		MOVE	/CRLF TO BLKBB
1011	6722		CR	
1012	7776		BLKBB	
1013	4574		=2	
1014	0107		MOVE	/CRLF TO BLKCC.
1015	7034		CR	
1016	7776		BLKCC	
1017	5600		=2	
			JMP I STBF	/EXIT STBF
1020	4574	ST33B,	MOVE	/CRLF TO BLOCKB.
1021	0107		CR	
1022	6711		BLOCKB	
1023	7776		=2	
1024	4574		MOVE	/CRLF TO BLOCKC.
1025	0107		CR	
1026	7023		BLOCKC	
1027	7776		=2	
1030	5600		JMP I STBF	/EXIT STBF.
1031	0000	FBF3,	OPEN	/SUB TO FILL CHAR BUFFER WITH
1032	7200		CLA	/3 CHARACTERS SPECIFIED AT CALL+1.
1033	1631		TAD I FBF3	
1034	3237		DCA ,+3	
1035	2231		ISZ FBF3	
1036	4574		MOVE	
1037	0000		OPEN	
1040	6601		BLOCK1	
1041	7775		=3	
1042	4555		CKSR37	/37?
1043	5255		JMP FBF33	/NO.
1044	4574		MOVE	/YES.
1045	6601		BLOCK1	
1046	6604		BLOCK1+3	
1047	7662		=116	
1050	4574		MOVE	
1051	6601		BLOCK1	
1052	6724		BLK2	
1053	7657		=121	
1054	5631		JMP I FBF3	/EXIT FBF3.
1055	4574	FBF33,	MOVE	

1056	6601	BLOCK1	
1057	6604	BLOCK1+3	
1060	7673	=125	
1061	4574	MOVE	
1062	6601	BLOCK1	
1063	6713	BLOCK2	
1064	7670	=110	
1065	5631	JMP I FBF3	/EXIT FBF3,
1066	0000	FBALL,	OPEN
1067	4555	CKSR37	/FILL BUFFER WITH ALL CHARACTERS
1070	5302	JMP FBA33	/KSR37?
1071	4574	MOVE	/NO.
1072	6107	A	/YES.
1073	6601	BLOCK1	
1074	7657	=121	
1075	4574	MOVE	
1076	6601	BLOCK1	
1077	6724	BLK2	
1100	7657	=121	
1101	5666	JMP I FBALL	/EXIT FBALL.
1102	4574	FB A33,	MOVE
1103	6107	A	
1104	6601	BLOCK1	
1105	7701	=77	
1106	4574	MOVE	
1107	6107	A	
1110	6700	BLOCK1+77	
1111	7767	=11	
1112	4574	MOVE	
1113	6601	BLOCK1	
1114	6713	BLOCK2	
1115	7670	=110	
1116	5666	JMP I FBALL	/EXIT FBALL
1117	0000	FW336,	0
1120	4574	MOVE	/MOVE 6 CHARACTERS ARS33 PRINTER
1121	6065	A33WP6	/WORST CASE PATTERN TO
1122	6601	BLOCK1	/BLOCK1
1123	7772	=6	
1124	4574	MOVE	/FILL BLOCKS WITH PATTERN
1125	6601	BLOCK1	
1126	6607	BLOCK1+6	
1127	7676	=102	
1130	4574	MOVE	
1131	6601	BLOCK1	
1132	6713	BLOCK2	
1133	7670	=110	
1134	5717	JMP I FW336	/EXIT
1135	0000	FW356,	0
1136	4574	MOVE	/MOVE 6 CHARACTER ASP35 PRINTER
1137	6073	A35WP6	/WORST CASE PATTERN TO BLOCK1
1140	6601	BLOCK1	
1141	7772	=6	

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1142 4574          MOVE          /FILL BUFFER WITH PATTERN
1143 6601          BLOCK1
1144 6607          BLOCK1+6
1145 7676          =102
1146 4574          MOVE
1147 6601          BLOCK1
1150 6713          BLOCK2
1151 7670          =110
1152 5735          JMP I FW356      /EXIT

1153 0000          FW376, OPEN        /MOVE 6 CHARACTER KSR37 PRINTER
1154 4574          MOVE          /WORST CASE PATTERN TO BLOCK1.
1155 6101          A37WP6
1156 6601          BLOCK1
1157 7772          =6
1160 4574          MOVE          /FILL BUFFER WITH PATTERN
1161 6601          BLOCK1
1162 6607          BLOCK1+6
1163 7665          =113
1164 5753          JMP I FW376      /EXIT

1165 0000          XSPF,  OPEN        /SUB TO ISSUE SPF
1166 6040          SPF
1167 5765          JMP I XSPF      /EXIT
1170 7402          HLT           /SPF SKIPPED.

1171 0000          XTPC,  OPEN        /SUB TO ISSUE TPC
1172 6044          TPC
1173 5771          JMP I XTPC      /EXIT
1174 7402          HLT           /TPC SKIPPED.

          1200          PAGE

          1200          PAGE
/PUNCH 70 (CODE 376) CHARACTERS SUBROUTINE
PLTLR, 0
1200 0000          SETLOC          /SET P70CTR TO -70
1201 4577          P70CTR
1202 1211          =106
1203 7672          TAD (376        /GET 376 CODE
1204 1377          JMS I UPUNCH    /GO PUNCH IT
1205 4474          ISZ P70CTR      /ALL CHARACTERS PUNCHED?
1206 2211          JMP .-3         /NO, REPEAT,
1207 5204          JMP I PLTLR     /YES, EXIT,
1210 5600          P70CTR, 0
1211 0000

/PUNCH SYNC CHARACTER SUBROUTINE (RUBOUT)
PSYNC, 0
1212 0000          CLA CMA        /SET AC TO 7777
1213 7240          JMS I UPUNCH    /PUNCH A RUBOUT
1214 4474          JMP I PSYNC     /EXIT.
1215 5612

```

/SYNC READER SUBROUTINE

1216	0000	RSYNC,	Ø	
1217	4577		SETLOC	/SET RSCTR TO -145
1220	1232		RSCTR	
1221	7557		-221	
1222	4343		JMS RRDY	/WAIT FOR READER NOT BUSY
1223	7240		CLA CMA	/READER NOT BUSY.
1224	3076		DCA RBUSY	/SET READER BUSY INDICATOR
1225	4577		SETLOC	/SET READER INTERRUPT
1226	1267		VCTR	/SERVICE RETURN ADDRESS.
1227	1233		RSSERV	
1230	6001		ION	/ENABLE INTERRUPT
1231	5616		JMP I RSYNC	/EXIT
1232	0000	RSCTR,	Ø	
1233	6036	RSSERV,	KRB	/READ
1234	1144		TAD [-377	/ADD MINUS RUBOUT
1235	7640		SEA CLA	/IS IT A RUBOUT?
1236	5245		JMP ,+7	/NO.
1237	3076		DCA RBUSY	/YES, CLEAR READER BUSY.
1240	7300		CLA CLL	
1241	1100		TAD LINK	
1242	7004		RAL	/RESTORE LINK
1243	1077		TAD AC	/RESTORE AC
1244	5400		JMP I Ø	/RETURN
1245	2232		ISZ RSCTR	/145 CHARACTER READ?
1246	5472		JMP I UOUT	/NO.
1247	7602		HLT CLA	/YES, NO SYNC.
1250	4577		SETLOC	/SET RSCTR TO -145
1251	1232		RSCTR	
1252	7557		-221	
1253	5472		JMP I UOUT	/RETURN
1254	3077	INTSVC,	DCA AC	/SAVE AC
1255	7010		RAR	
1256	3100		DCA LINK	/SAVE LINK
1257	6041	INTSF,	TSF	/PUNCH/PRINTER?
1260	5264		JMP ,+4	/NO.
1261	6042	INTCF,	TCF	/YES, CLEAR FLAG.
1262	3071		DCA PFLAG	/CLEAR PFLAG
1263	5271		JMP OUT	/RETURN
1264	6031	INKSF,	KSF	/READER/KYBD?
1265	5270		JMP ,+3	/NO ERROR.
1266	5667		JMP I ,+1	/GO SERVICE READER
1267	0000	VCTR,	Ø	
1270	7402		HLT	/UNEXPECTED INTERRUPT
1271	7300	OUT,	CLA CLL	
1272	1100		TAD LINK	
1273	7004		RAL	/RESTORE LINK
1274	1077		TAD AC	/RESTORE AC.
1275	6001		ION	/ENABLE INTERRUPT
1276	5400		JMP I Ø	/RETURN
1277	0000	PSTUP,	Ø	/PUNCH SETUP
1300	4577		SETLOC	/SET DATA ADDR
1301	1342		PADDR	

1302	6577		BLOCKA	
1303	4574		MOVE	/SET BLOCK LENGTH
1304	0101		BLKCNT	
1305	1341		PCTR	
1306	7777		-1	
1307	5677		JMP I PSTUP	/EXIT
1310	0000	PDCR,	0	/PUNCH DATA CHAR SUB.
1311	7200		CLA	
1312	1742		TAD I PADDR	/GET DATA
1313	2342		ISZ PADDR	/UPDATE PADDR.
1314	4474		JMS I UPUNCH	/GO PUNCH/PRINT DATA
1315	5710		JMP I PDCR	/EXIT
1316	0000	PBLK,	0	/PUNCH DATA BLOCK FULL SPEED
1317	4277		JMS PSTUP	
1320	4310		JMS PDCR	/GO PUNCH CHARACTER
1321	2341		ISZ PCTR	/ALL CHARS PUNCHED?
1322	5320		JMP ,-2	/NO. REPEAT
1323	5716		JMP I PBLK	/YES. EXIT
1324	0000	PBLKR,	0	/PUNCH DATA BLOCK RANDOM STALLS.
1325	4277		JMS PSTUP	/GO DO SET UP
1326	4776		JMS RGNB	/GET A RANDOM NUMBER
1327	0111		AND OLYMSK	/REMOVE EXCESS BITS
1330	7450		SNA	/ZERO?
1331	5326		JMP ,-3	/YES. GET ANOTHER NUMBER
1332	7041		CIA	/NO. 2'S COMPLEMENT. IT.
1333	3024		DCA DELAYM	/PUT NUMBER IN DELAYM
1334	4576		DELAY	/DELAY.
1335	4310		JMS PDCR	/GO PUNCH CHARACTER
1336	2341		ISZ PCTR	/ALL CHARS PUNCHED?
1337	5326		JMP PBLKR+2	/NO. REPEAT
1340	5724		JMP I PBLKR	/YES. EXIT.
1341	0000	PCTR,	0	
1342	0000	PADDR,	0	
1343	0000	RRDY,	0	/WAIT FOR RDR NOT BUSY SUB.
1344	7200		CLA	
1345	1076		TAD RBUSY	/FETCH RBUSY.
1346	7640		SZA CLA	/READER BUSY?
1347	5345		JMP ,-2	/YES. TRY AGAIN
1350	5743		JMP I RRDY	/NO.EXIT
1351	0000	RSTUP,	0	
1352	4343		JMS RRDY	/WAIT FOR RDR NOT BUSY
1353	2076		ISZ RBUSY	/SET RBUSY INDICATOR
1354	4577		SETLOC	/SET DATA ADDR
1355	1416		RADDR	
1356	6577		BLOCKA	
1357	4574		MOVE	/SET DATA BLOCK LENGTH
1360	3101		BLKCNT	
1361	1417		RBCTR	
1362	7777		-1	
1363	3775		DCA ERRCTR	/CLEAR ERRO. JUNTER

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1364 5751      JMP I RSTUP      /EXIT.

                /ROUTINE TO SET KEYBOARD FLAG.

1365 0000      KFLAG, OPEN
1366 4571      UKCC
1367 4572      UKSF
1370 5367      JMP .-1
1371 5765      JMP I KFLAG      /EXIT WITH KEYBOARD FLAG SET.

1375 5721
1376 0417
1377 0376
                PAGE
                1400

                PAGE
1400 0000      ROBLK, 0      /READ DATA BLOCK, FULL SPEED
1401 4777      JMS RSTUP      /GO DO SETUP
1402 4577      SETLOC      /SET READER SERVICE
1403 1267      VCTR      /ADDRESS,
1404 1430      RDSRV
1405 6001      ION      /ENABLE INT,
1406 5600      JMP I ROBLK

1407 0000      ROBLKR, 0      /READ DATA BLOCK, RANDOM STALLS
1410 4777      JMS RSTUP      /GO DO SETUP,
1411 4577      SETLOC      /SET READER SERVICE
1412 1267      VCTR      /ADDRESS,
1413 1420      RDRSRV
1414 6001      ION      /ENABLE INT,
1415 5607      JMP I ROBLKR      /EXIT
1416 0000      RADDR, 0
1417 0000      RBCTR, 0

                /READER SERVICE ROUTINES
1420 7200      RDRSRV, CLA
1421 4776      JMS RGNA      /GET A RANDOM NUMBER
1422 0111      AND DLYMSK      /REMOVE EXCESS BITS
1423 7450      SNA      /ZERO?
1424 5221      JMP .-3      /YES, GET ANOTHER NUMBER
1425 7041      CIA      /NO. 2'S COMPLEMENT IT.
1426 3102      DCA DELAYS      /STORE RANDOM NUMBER IN DELAYS.
1427 4274      JMS DLMSR      /STALL,
1430 1616      RDSRV, TAD I RADDR      /GET EXPECTED CHARACTER
1431 3235      DCA SB      /STORE AT SB
1432 2216      ISZ RADDR      /UPDATE RADDR
1433 6036      IN0, KRB      /READ CHARACTER
1434 4470      JMS I CHECK      /GO CHECK IT,
1435 0000      SB, 0
1436 5240      JMP ERROR      /ERROR
1437 5256      JMP RUDONE      /GOOD.

1440 3103      ERROR, DCA ERRCR      /STORE BAD CHARACTER

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1441 2775'   ISZ ERRCTR   /INCREMENT ERROR COUNTER
1442 5245   JMP ,+3
1443 7240   CLA CMA         /OFLOW, 7777 TO AC
1444 3775'   DCA ERRCTR   /RESTORE TO 7777,
1445 7604   LAS         /READ SR
1446 0143   AND C100
1447 7650   SNA CLA   /HALT ON ERROR?(SR5)
1450 5256   JMP RUDONE /NO.
1451 1103   TAD ERRCR  /YES, GET BAD CHARACTER
1452 7402   HLT         /ERROR HALT, BAD CHAR IN AC
1453 7200   CLA
1454 1235   TAD SB
1455 7402   HLT         /GOOD CHAR IN AC
1456 3217   RUDONE, ISZ RRCTR /ALL DONE?
1457 5472   JMP I UOUT  /NO, TO MAINLINE
1460 7200   CLA         /YES.
1461 1775'   TAD ERRCTR  /GET C(ERRCTR)
1462 7650   SNA CLA   /ANY ERRORS?
1463 5206   JMP ,+3     /NO.
1464 1775'   TAD ERRCTR  /YES.
1465 7402   HLT         /NUMBER OF ERRORS IN AC.
1466 7300   CLA CLL
1467 5076   DCA RBUSY  /CLEAR RBUSY INDICATOR
1470 1100   TAD LINK
1471 7004   RAL         /RESTORE LINK
1472 1077   TAD AC     /TO MAINLINE
1473 5400   JMP I 0

1474 0000   DLMSR, 0
1475 7300   CLA CLL
1476 1102   TAD DELAYS /GET AND STORE MSEC
1477 3311   DCA RCTRA  /DELAY COUNT
1500 5701   JMP I ,+1
1501 ,+1
1502 1061   TAD MIL1  /GET AND STORE
1503 3312   DCA RCTRB  /1MS CONSTANT
1504 2312   ISZ RCTRB  /DELAYED 1 MS?
1505 5304   JMP ,=1     /NO.
1506 2311   ISZ RCTRA  /YES, DONE DELAYING?
1507 5300   JMP ,=7     /NO.
1510 5674   JMP I DLMSR  /YES, EXIT
1511 0000   RCTRA, 0
1512 0000   RCTRB, 0

/SUBROUTINE TO SET LOCATION FOR THE PARTICULAR SELECTED BAUD RATE.

1513 0000   SETBAU, OPEN /
1514 1374   TAD (=5   /7773
1515 3052   DCA TEMP   /STORE IT IN TEMP.
1516 1022   TAD BAUDRT /GET DEPOSITED BAUD RATE.
1517 1713   TAD I SETBAU /GET A RATE FROM THE TABLE.
1520 7650   SNA CLA   /ARE THEY EQUAL?
1521 5327   JMP LOBAUD /YES, GO SET LOC MIL1 FOR THAT BAUD RATE.
1522 2052   ISZ TEMP   /NO. +1 TO P
1523 7610   SKP CLA   /SKIP
    
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1524	7402		HLT	/ILLEGAL BAUD RATE. RESET BAUDRT AND RESTART
				/PROGRAM AT 0200.
1525	2313		ISZ SETBAU	/+1 TO SETBAU IN ORDER TO PULL NEXT BAUD RATE
				/FROM THE TABLE OF BAUD RATES.
1526	5316		JMP SETBAU+3	/SEE IF NEXT BAUD RATE IS THE ONE,
1527	1373	LOBAUD,	TAD (-406	/110 BAUD CONSTANT FOR THE DELAY
1530	3061		DCA MIL1	/STORE IT.
1531	2052		ISZ TEMP	/+1 TO TEMP. WAS THIS THE BAUD RATE?
1532	7610		SKP CLA	/SKIP
1533	5772		JMP BDRET	/YES, EXIT WITH AC=0.
1534	1141		TAD (-24	/1200 BAUD CONSTANT FOR THE DELAY.
1535	3061		DCA MIL1	/STORE IT.
1536	2052		ISZ TEMP	/WAS THIS THE SELECTED RATE?
1537	7610		SKP CLA	/NO.
1540	5772		JMP BDRET	/YES, EXIT WITH MIL1 SET AND AC=0
1541	7240		CLA CMA	/AC = -1
1542	1061		TAD MIL1	/GET BACK MIL1.
1543	7104		CLL RAL	/MULTIPLY BY 2
1544	5335		JMP ,-7	/SEE IF NEXT BAUD RATE IS THE ONE.

/PUNCH TEST NORMAL TEST SEQUENCE ROUTINE

1545	0000	NTST,	0	
1546	7200		CLA	/CLEAR RBUSY
1547	3076		DCA RBUSY	
1550	1745		TAD I NTST	/SELECT PUNCH MODE
1551	3354		DCA NTSTA	
1552	4771		JMS PLTLR	/PUNCH LEADER
1553	4770		JMS PSYNC	/PUNCH SYNC CHARACTER
1554	0000	NTSTA,	0	
1555	4767		JMS RSYNC	/SYNC READER
1556	4200		JMS RDBLK	/READ DATA BLOCK
1557	4771		JMS PLTLR	/PUNCH TRAILER
1560	4766		JMS RRDY	/WAIT FOR RDR NOT BUSY
1561	5425		JMP I CHAIN	/CHAIN

1562	5555	RM33A,	TEXT	'----10?'
1563	5555			
1564	1100			
1565	7700			

1566	1343
1567	1216
1570	1212
1571	1200
1572	0205
1573	7372
1574	7773
1575	5721
1576	0400
1577	1351
	1600

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1600          PAGE
/COMBINED TEST NORMAL TEST SEQUENCE
1600 0000 CNTST, 0
1601 7200 CLA /CLEAR RBUSY
1602 3076 DCA RBUSY
1603 4777 JMS PLTLR /PUNCH LEADER
1604 4776 JMS PSYNC /PUNCH SYNC CHARACTER
1605 4775 JMS PBLK /PUNCH DATA BLOCK (NO STALLS)
1606 4774 JMS RSYNC /SYNC READER
1607 4773 JMS RDBLKR /READ DATA BLOCK (STALLS)
1610 4772 JMS PBLKR /PUNCH DATA BLOCK (STALLS)
1611 4771 JMS RDBLK /READ DATA BLOCK (NO STALLS)
1612 4777 JMS PLTLR /PUNCH TRAILER
1613 4770 JMS RRDY /WAIT FOR READER NOT BUSY
1614 5425 JMP I CHAIN /CHAIN

/TYPE LINE OF 3 CHARACTERS (NO DELAY)
1615 0000 TYPLN3, 0
1616 7200 CLA
1617 3064 DCA STLID /CLEAR STLID
1620 1615 TAD I TYPLN3 /SET AND STORE
1621 3224 DCA ,+3 /ADDRESS OF DATA
1622 2215 ISZ TYPLN3
1623 4767 JMS FBFS /GO FILL BUFFER WITH 3 CHARACTERS
1624 0000 0
1625 4227 JMS TYPLN /GO TYPE LINE
1626 5615 JMP I TYPLN3 /EXIT

/TYPE LINE OF ASCII PRINTABLE CHARACTERS
1627 0000 TYPLN, 0
1630 4555 CKSR37 /KSR37
1631 1140 TAD E11 /NO.
1632 1137 TAD E-125 /YES.
1633 3247 DCA TCTR /-76, OR -85
1634 4577 SETLOC /SET FETCH TO ADDRESS
1635 1646 FETCH /OF BLOCKA.
1636 6577 BLOCKA
1637 4556 TYPEA: STALL
1640 1646 TAD I FETCH /YES, SET CHARACTER
1641 4474 JMS I UPUNCH /GO PRINT CHARACTER
1642 2246 ISZ FETCH /SET UP FOR NEXT CHARACTER
1643 2247 ISZ TCTR /DONE?
1644 5237 JMP TYPEA /NO, REPEAT
1645 5627 JMP I TYPLN /YES, EXIT.
1646 0000 FETCH, 0
1647 0000 TCTR, 0

ASCCN, 0
1650 0000
1651 1650 TAD I ASCCN
1652 3306 DCA WASC
1653 2250 ISZ ASCCN
1654 1650 TAD I ASCCN
1655 3307 DCA SASC
1656 2250 ISZ ASCCN
1657 1366 TAD (7700

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1660 0706      AND I WASC
1661 7112      RTR CLL
1662 7012      RTR
1663 7012      RTR
1664 4273      JMS CNV
1665 2307      ISZ SASC
1666 1366      TAD (7700
1667 7040      CMA
1670 0706      AND I WASC
1671 4273      JMS CNV
1672 5650      JMP I ASCCN
1673 0000      CNV, 0
1674 3310      DCA ASCT
1675 1310      TAD ASCT
1676 7006      RTL
1677 7004      RAL
1700 0365      AND (707
1701 1310      TAD ASCT
1702 0365      AND (707
1703 1364      TAD (6060
1704 3707      DCA I SASC
1705 5673      JMP I CNV
1706 0000      WASC, 0
1707 0000      SASC, 0
1710 0000      ASCT, 0

1711 0000      SINPT, OPEN      /SUB TO INITIALIZE SGET SUB.
1712 7200      CLA
1713 3316      DCA SPT0      /ZERO SPT0
1714 3320      DCA SPIND    /ZERO SPIND
1715 5711      JMP I SINPT    /EXIT
1716 0000      SPT0, OPEN
1717 0000      SPT1, OPEN
1720 0000      SPIND, OPEN
1721 0000      SGET, OPEN      /"SPECIAL" BINARY COUNT
1722 7320      CLA STL      /PATTERN SUBROUTINE.
1723 2320      ISZ SPIND
1724 7340      CLA CMA CLL
1725 3320      DCA SPIND
1726 1316      TAD SPT0
1727 7420      SNL
1730 5333      JMP ,+3
1731 7041      CIA
1732 7410      SKP
1733 7040      CMA
1734 3316      DCA SPT0
1735 1145      TAD (377
1736 0316      AND SPT0
1737 3317      DCA SPT1
1740 1317      TAD SPT1
1741 5721      JMP I SGET      /EXIT SGET SUB.

/SUBROUTINE TO INITIALIZE RANDOM NUMBER GENERATORS.

1742 0000      SETRND, OPEN

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1743	1363	TAD (1233	
1744	3762'	DCA RP1A	
1745	1363	TAD (1233	
1746	3761'	DCA RP1B	
1747	1360	TAD (7622	
1750	3757'	DCA RP2A	
1751	1360	TAD (7622	
1752	3756'	DCA RP2B	
1753	5742	JMP I SETRND	/EXIT, AC=0

1756 0435  
 1757 0416  
 1760 7622  
 1761 0434  
 1762 0415  
 1763 1233  
 1764 6060  
 1765 0707  
 1766 7700  
 1767 1031  
 1770 1343  
 1771 1400  
 1772 1324  
 1773 1407  
 1774 1216  
 1775 1316  
 1776 1212  
 1777 1200  
 2000

PAGE

/ROUTINE TO SET CTRA EQUAL TO -7640 (-4000 DECIMAL).

2000	0000	S4000I, OPEN	
2001	4577	SETLOC	/SET COUNT OF
2002	0062	CTRA	/-4000 DECIMAL
2003	0140	-7640	/IN CTRA,
2004	5600	JMP I S4000I	/EXIT, AC=0.

/ROUTINE TO SET DELAYM TO -310, (-200 DECIMAL).

2005	0000	S200I, OPEN	
2006	4577	SETLOC	/SET COUNT OF
2007	0024	DELAYM	/-200 DECIMAL
2010	7470	-310	/IN DELAYM,
2011	5605	JMP I S200I	/EXIT WITH AC=0.

/ROUTINE TO SET CTRA EQUAL TO -144 (-100 DECIMAL).

2012	0000	S100I, OPEN	
2013	4577	SETLOC	/SET COUNT OF
2014	0062	CTRA	/-100 DECIMAL
2015	7634	-144	/IN CTRA,

2016 5612 JMP I S1001 /EXIT, AC=0.

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/ROUTINE TO DETERMINE DEVICE CAUSING UNEXPECTED INTERRUPT.
2017 0000 INTFND, OPEN
2020 7200 CLA
2021 6031 INTKSF, KSF /KEYBOARD/READER?
2022 7410 SKP /NO.
2023 4276 JMS HLTD /GO BOLT AND DISPLAY IOT
2024 6041 INTTSF, TSF /TTY PRINTER/PUNCH?
2025 7410 SKP /NO.
2026 4276 JMS HLTD /GO BOLT AND DISPLAY IOT
2027 6011 RSF /H.S. READER?
2030 7410 SKP /NO.
2031 4276 JMS HLTD /HALT AND DISPLAY IOT
2032 6021 PSF /H.S. PUNCH?
2033 7410 SKP /NO.
2034 4276 JMS HLTD /HALT AND DISPLAY IOT
2035 6401 6401 /PT08/LT08 UNIT 1 IN?
2036 7410 SKP /NO.
2037 4276 JMS HLTD /HALT AND DISPLAY IOT
2040 6411 6411 /PT08/LT08 UNIT 1 OUT?
2041 7410 SKP /NO.
2042 4276 JMS HLTD /HALT AND DISPLAY IOT
2043 6421 6421 /PT08/LT08 UNIT 2 IN?
2044 7410 SKP /NO.
2045 4276 JMS HLTD /HALT AND DISPLAY IOT
2046 6431 6431 /PT08/LT08 UNIT 2 OUT?
2047 7410 SKP /NO.
2050 4276 JMS HLTD /HALT AND DISPLAY IOT
2051 6441 6441 /PT08/LT08 UNIT 3 IN?
2052 7410 SKP /NO.
2053 4276 JMS HLTD /HALT AND DISPLAY IOT
2054 6451 6451 /PT08/LT08 UNIT 3 OUT?
2055 7410 SKP /NO.
2056 4276 JMS HLTD /HALT AND DISPLAY IOT
2057 6461 6461 /PT08/LT08 UNIT 4 IN?
2060 7410 SKP /NO.
2061 4276 JMS HLTD /HALT AND DISPLAY IOT
2062 6471 6471 /PT08/LT08 UNIT 4 OUT?
2063 7410 SKP /NO.
2064 4276 JMS HLTD /HALT AND DISPLAY IOT
2065 6111 6111 /PT08/LT08 UNIT 5 OR DC02 IN?
2066 7410 SKP /NO.
2067 4276 JMS HLTD /HALT AND DISPLAY IOT
2070 6121 6121 /PT08/LT08 UNIT 5 OR DC02 OUT?
2071 5275 JMP ,+4 /NO.
2072 4276 JMS HLTD /HALT AND DISPLAY IOT
2073 7777 7777 /DON'T KNOW WHAT DEVICE
2074 7777 7777 /CAUSED THE INTERRUPT.
2075 4276 JMS HLTD /HALT AND DISPLAY ALL 1'S.
2076 0000 HLTD, OPEN
2077 1276 TAD HLTD
2100 1311 TAD M3
2101 3276 DCA HLTD

```

```

2102 1676      TAD I  HLTD      /GET IOT THAT CAUSED SKIP
2103 7402      HLT              /AND HALT, IOT IN AC.
2104 7001      JAC
2105 3306      DCA ,+1
2106 0000      OPEN
2107 7200      CLA
2110 5617      JMP I  INTFND      /EXIT
2111 7775      M3,    =3

```

```

2112 0000      PUNCH, OPEN
2113 2071      ISZ PFLAG      /SET PFLAG,
2114 6046      OUT0,  TLS      /PUNCH/PRINT,
2115 7200      CLA
2116 1071      TAD PFLAG      /GET C(PFLAG),
2117 7650      SNA CLA      /FLAG RESET?
2120 5323      JMP OUT2
2121 6041      OUT1,  TSF      /NO, FLAG UP?
2122 5316      JMP ,=4      /NO,
2123 6042      OUT2,  TCF      /YES, CLEAR PRINTER FLAG.
2124 3071      DCA PFLAG      /CLEAR PFLAG,
2125 5712      JMP I PUNCH      /EXIT, AC=0,

```

/ROUTINE TO CONTROL THE CHARACTERS TO BE TYPED ON ALL TTY'S.

```

2126 0000      TLCALI, OPEN
2127 1726      TAD I TLCALI      /GET FIRST LETTER TO BE TYPED
2130 3332      DCA ,+2      /SAVE IT.
2131 4473      JMS I UTPLN3      /GO TYPE SAVED LETTER + NEXT 2.
2132 0000      OPEN      /FIRST LETTER TO BE TYPED.
2133 5425      JMP I CHAIN      /CHAIN

```

/ROUTINE TO CONTROL THE CHARACTER TO BE TYPED ON A "37".

```

2134 0000      TLC37!, OPEN      /GET FIRST LETTER TO BE TYPED
2135 1734      TAD I TLC37!
2136 3342      DCA ,+4      /SAVE IT.
2137 4555      CKSR37      /IS IT A "37"?
2140 5425      JMP I CHAIN      /NO, CHAIN
2141 4473      JMS I UTPLN3      /YES, GO TYPE LETTER + NEXT 2
2142 0000      OPEN      /FIRST LETTER TO BE TYPED.
2143 5425      JMP I CHAIN      /CHAIN

```

/CONTROL ROUTINE TO FILL A BUFFER WITH CHARACTERS.

```

2144 0000      FBFI,    OPEN      /GET DATA
2145 7300      CLA CLL
2146 1744      TAD I FBFI
2147 3351      DCA ,+2      /SAVE IT
2150 4777      JMS FBFI3      /GO FILL A BUFFER-
2151 0000      OPEN      /WITH THIS +NEXT 2 CHAR
2152 4776      JMS CNTST      /GO TO COMBINED TEST SEQUENCE

```

/ROUTINE TO CONTROL TYPING A LINE W. OUT STALLS

/AND THEN ONE WITH STALLS.

```

2153 0000 WOSWS, OPEN
2154 3064 DCA STLI0 /ZERO STALL INDICATOR.
2155 4775 JMS TYPLN /TYPE LINE WITHOUT STALLS
2156 7240 CLA CMA /7777
2157 3064 DCA STLI0 /SET STALL INDICATOR
2160 4775 JMS TYPLN /TYPE LINE WITH STALLS
2161 5753 JMP I WOSWS /EXIT.
    
```

/SUBROUTINE TO MARK TAB POSITIONS.

```

2162 0000 MTABP, OPEN
2163 3062 DCA CTRA
2164 4573 TYPE /MARK TAB POSITIONS
2165 6300 TBMRK
2166 4573 TYPE
2167 6306 TBMRK1
2170 2062 ISZ CTRA
2171 5366 JMP , -3
2172 5762 JMP I MTABP /EXIT.
    
```

```

2175 1627
2176 1600
2177 1031
2200 PAGE
    
```

/PROGRAM 0, BASIC TEST OF THE OUTPUT LOGIC.  
 /THE INSTRUCTIONS TESTED ARE:  
 / SPF SET PRINTER FLAG,  
 / TSF SKIP IF PRINTER FLAG IS SET,  
 / TCF CLEAR PRINTER FLAG,  
 / CAF CLEAR FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT.  
 / TPC CHECK THAT PRINTER FLAG WILL SET,  
 / TLS CHECK THAT IT CLEARS PRINTER FLAG AND SETS PRINTER FLAG.

```

2200 4577 PRG0, SETLOC /SET KSTART TO INITIAL
2201 0023 KSTART /ROUTINE ADDRESS.
2202 2205 POTS0
2203 5604 JMP I ,+1 /GO START TEST
2204 0236 SRSET
    
```

/TEST 0 CHECKS THE ABILITY OF  
 /SPF TO SET THE PRINTER FLAG,  
 /TSF TO SKIP ON PRINTER FLAG SET,  
 /CAF TO CLEAR PRINTER FLAG, AC, AND LINK,  
 /TCF TO CLEAR PRINTER FLAG,  
 /TSF TO NOT SKIP ON PRINTER FLAG EQUAL TO ZERO.

```

2205 0000 POTS0, 0
2206 2270 POTS1
2207 4432 JMS I S200 /SET DELAYM TO DELAY TWICE
    
```

/10 BIT TIMES FOR AN NON 110  
 /BAUD DEVICE AND TWICE 11 BIT  
 /TIMES FOR AN 110 BAUD DEVICE.  
 /SEE BIT TIME TABLE AT BEGINNING  
 /OF PROGRAM,

```

2210 4430          JMS I S100          /SET UP TO DO TEST 100 TIMES.
2211 4560 P0TS0A, USPF          /SET PRINTER FLAG
2212 4566          UTSP          /FLAG SET?
2213 5237          JMP P0E0A          /NO, SPF OR TSF FAILED
2214 7360 P0TS0B, CLA CMA CLL CML      /AC AND LINK = 1
2215 6007          CAF          /YES, NOW CLEAR IT.
2216 4576          DELAY          /GO DELAY
2217 4566          UTSP          /FLAG SET?
2220 7410          SKP          /NO, CONTINUE TEST
2221 5244          JMP P0E0B          /YES, CAF OR TSF FAILED
2222 7420 P0TS0C, SNL          /LINK SET?
2223 7440          SEA          /NO, AC SET?
2224 5233          JMP P0E0C          /YES, CAF FAILED TO CLEAR AC AND/OR LINK
2225 4560 P0TS0D, USPF          /SET PRINTER FLAG
2226 4566          UTSP          /PRINTER FLAG SET?
2227 5237          JMP P0E0A          /NO, SPF OR TSF FAILED
2230 4565 P0TS0E, UTCF          /YES, CLEAR PRINTER FLAG
2231 4566          UTSP          /PRINTER FLAG SET?
2232 7610          SKP CLA          /NO, OK.
2233 5262          JMP P0E0E          /YES, TCF FAILED TO CLEAR PRINTER FLAG.
2234 2062          ISZ CTRA          /DONE TEST 100 TIMES?
2235 5211          JMP P0TS0A          /NO, REPEAT TEST
2236 5425          JMP I CHAIN          /YES, CHAIN NOW

          /ERROR HLTS FOR P0TS0.

2237 7402 P0E0A, HLT          /SPF FAILED TO SET PRINTER FLAG
          /OR TSF FAILED TO SKIP.
          /SCOPE LOOP, PRESS CONTINUE TO ENTER.
2240 4560          USPF          /SET PRINTER FLAG
2241 4566          UTSP          /IS IT SET?
2242 5240          JMP P0E0A+1      /NO, REPEAT.
2243 5240          JMP P0E0A+1      /YES, REPEAT.

2244 7402 P0E0B, HLT          /CAF FAILED TO CLEAR PRINTER FLAG
          /OR TSF SKIPPED.
          /SCOPE LOOP, PRESS CONTINUE TO ENTER.
2245 4560          USPF          /SET PRINTER FLAG
2246 6007          CAF          /CLEAR FLAGS
2247 4576          DELAY          /DELAY
2250 4566          UTSP          /FLAG SET?
2251 5245          JMP P0E0B+1      /NO, REPEAT.
2252 5245          JMP P0E0B+1      /YES, REPEAT.

2253 7402 P0E0C, HLT          /CAF FAILED TO CLEAR AC AND/OR LINK
          /SCOPE LOOP, PRESS CONTINUE TO ENTER
2254 7360          CLA CMA CLL CML /LINK AND AC SET
2255 6007          CAF          /CLR

```



```

2256 7420 SNL /LINK SET?
2257 7440 SZA /AC CLEAR
2260 5254 JMP P0E0C+1 /AC OR LINK SET. REPEAT
2261 5254 JMP P0E0C+1 /REPEAT.

2262 7402 P0E0E, HLT /TCF FAILED TO CLEAR PRINTER FLAG
/SCOPE LOOP. PRESS CONTINUE TO /OR TCF SKIPPED.
ENTER.
2263 4560 USPF /SET PRINTER FLAG
2264 4565 UTCF /CLEAR PRINTER FLAG
2265 4566 UTSF /FLAG SET?
2266 5263 JMP P0E0E+1 /NO, REPEAT.
2267 5263 JMP P0E0E+1 /YES, REPEAT.

```

/THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT  
/AND THEN CHECKS THAT THE PUNCH/PRINTER FLAG CAN CAUSE AN INTERRUPT.

```

2270 0001 P0TS1, 1
2271 2327 P0TS2
2272 4577 SETLOC /SET INTERRUPT RETURN
2273 0002 2 /TO P0E1A.
2274 2304 P0E1A
2275 6007 P0TS1A, CAF /ATTEMPT TO CLEAR ALL FLAGS
2276 4560 USPF /SET PRINTER FLAG
2277 4565 UTCF /CLEAR PRINTER FLAG
2300 6001 ION /ENABLE INTERRUPT
2301 7000 NOP /
2302 6002 IOF /DISABLE INTERRUPT
2303 5306 JMP ,+3
2304 4777 P0E1A, JMS INTFND /UNEXPECTED INTERRUPT
2305 5275 JMP P0TS1A /TRY AGAIN
2306 4431 JMS I 54000 /SET UP TO DO TEST 4000 TIMES.
2307 4577 SETLOC /SET INTERRUPT RETURN
2310 0002 2 /TO P0TS1C
2311 2324 P0TS1C
2312 4560 USPF /SET PRINTER FLAG
2313 6001 P0TS1B, ION /ENABLE INTERRUPT
2314 7000 NOP /NO INTERRUPT
2315 7402 P0E1B, HLT /PRINTER FLAG FAILED TO INTERRUPT
/OR INTERRUPT MALFUNCTION
2316 4577 SETLOC /SET INTERRUPT RETURN
2317 0002 2 / TO P0TS1C-1
2320 2323 P0TS1C-1
2321 6001 ION /ENABLE INTERRUPT (SCOPE LOOP)
2322 7000 NOP /INTERRUPT
2323 5321 JMP ,=2
2324 2062 P0TS1C, ISZ CTRA /DONE 4000 TIMES?
2325 5313 JMP P0TS1B /NO, REPEAT TEST.
2326 5425 JMP I CHAIN /YES, CHAIN

```

/TEST 2 CHECKS THE ABILITY OF:  
 /KIE TO DISABLE TTY INTERRUPT ENABLE FLIP FLOP.  
 /SPI TO NOT SKIP WITH NO TTY INTERRUPT REQUEST.  
 /SRQ TO NOT SKIP WITH NO TTY INTERRUPT REQUEST.  
 /KIE TO ENABLE TTY INTERRUPT ENABLE FLIP FLOP.  
 /SPI TO SKIP ON A TTY INTERRUPT REQUEST.  
 /SRQ TO SKIP ON A TTY INTERRUPT REQUEST.  
 /CAF TO ENABLE TTY INTERRUPT ENABLE FLIP FLOP.

2327	0002	P0TS2,	2		
2330	2504		P0TS3		
2331	4431		JMS I \$4000		/SET UP TO DO TEST 4000 TIMES.
2332	4577	P0TS2A,	SETLOC		/SET INTERRUPT RETURN
2333	0002		2		/TO P0E2A
2334	2415		P0E2A		
2335	6007		CAF		/CLEAR EVERYTHING AND ENABLE INT ENABLE F.F.
2336	4561		UKIE		/DISABLE INTERRUPT ENABLE FF
2337	4560		USPF		/SET PRINTER FLAG.
2340	6001		ION		/TURN INTERRUPT ON.
2341	7000		NOP		/
2342	4557	P0TS2B,	USPI		/SKIP IF TTY INTERRUPT REQUEST
2343	7610		SKP	CLA	/
2344	5774		JMP	P0E2B	/USPI SKIPPED
2345	6003	P0TS2C,	SRQ		/SKIP IF INTERRUPT REQUEST
2346	7610		SKP	CLA	/
2347	5775		JMP	P0E2C	/SRQ SKIPPED
2350	4577	P0TS2D,	SETLOC		/SET INTERRUPT RETURN
2351	0002		2		/TO P0TS2E.
2352	2400		P0TS2E		
2353	4560		USPF		/SET PRINTER FLAG
2354	7201		CLA IAC		/AC11 = 1.
2355	4561		UKIE		/ENABLE TTY INTERRUPT ENABLE F.F.
2356	6001		ION		/TURN INTERRUPT ON.
2357	7000		NOP		/INTERRUPT AT END OF THIS INSTRUCTION
2360	5774		JMP	P0E2D	/KIE FAILED TO ENABLE TTY INTERRUPT F.F.
2374	2443				
2375	2435				
2376	2427				
2377	2017				
	2400		PAGE		
2400	4557	P0TS2E,	USPI		/TTY INTERRUPT REQUEST?
2401	5256		JMP	P0E2E	/NO, SPI FAILED TO SKIP.
2402	6003	P0TS2F,	SRQ		/IS THERE AN INTERRUPT REQUEST?
2403	5265		JMP	P0E2F	/NO, SRQ FAILED TO SKIP.
2404	7300	P0TS2G,	CLA CLL		/AC + LINK = 0
2405	4561		UKIE		/DISABLE TTY INTERRUPT ENABLE F.F.
2406	6007		CAF		/CLEAR EVERYTHING AND ENABLE TTY INTERRUPT F.F.
2407	4560		USPF		/SET PRINTER FLAG.
2410	4557		USPI		/SKIP IF INTERRUPT REQUEST
2411	5274		JMP	P0E2G	/CAF FAILED TO ENABLE TTY INTERRUPT ENABLE F.F.
2412	2062		ISZ	CTRA	/DONE 4000 TIMES?
2413	5777		JMP	P0TS2A	/NO REPEAT TEST.
2414	5425		JMP I	CHAIN	/CH

```

/ERROR HLTS FOR P0TS2.

2415 7402 P0E2A, HLT /KIE FAILED TO DISABLE TTY INTERRUPT
/ENABLE FLIP-FLOP.
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
2416 4577 SETLOC /SET INTERRUPT RETURN
2417 0002 2 /TO P0E2A+1
2420 2416 P0E2A+1
2421 6007 CAF /CLEAR
2422 4561 UKIE /DISABLE TTY INTERRUPT ENABLE F.F.
2423 4560 USPF /SET PRINTER FLAG
2424 6001 ION /TURN INTERRUPT ON.
2425 7000 NOP
2426 5216 JMP P0E2A+1 /REPEAT TEST.

2427 7602 P0E2B, HLT CLA /SPI SKIPPED WITH FLAG SET
/AND INTERRUPT ENABLE DISABLED,
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
2430 4561 UKIE /DISABLE INTERRUPT ENABLE
2431 4560 USPF /SET PRINTER FLAG
2432 4557 USPI /SKIP IF TTY INT REQUEST,
2433 5230 JMP P0E2B+1 /REPEAT,
2434 5230 JMP P0E2B+1 /REPEAT,

2435 7602 P0E2C, HLT CLA /SRQ SKIPPED WITH FLAG SET
/AND INTERRUPT ENABLE DISABLED,
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
2436 4561 UKIE /DISABLE INTERRUPT ENABLE
2437 4560 USPF /SET PRINTER FLAG
2440 6003 SRQ /SKIP IF INTERRUPT REQUEST
2441 5236 JMP P0E2C+1 /REPEAT,
2442 5236 JMP P0E2C+1 /REPEAT,

2443 7402 P0E2D, HLT /KIE FAILED TO ENABLE TTY INTERRUPT F.F.
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
2444 4577 SETLOC /SET INTERRUPT RETURN
2445 0002 2 /TO P0E2D+4
2446 2447 P0E2D+4
2447 4561 UKIE /DISABLE TTY
2450 7201 CLA IAC /AC11 = 1
2451 4561 UKIE /ENABLE TTY
2452 4560 USPF /SET PRINTER FLAG
2453 6001 ION /TURN INTERRUPT ON
2454 7000 NOP
2455 5247 JMP P0E2D+4 /REPEAT

2456 7402 P0E2E, HLT /SPI FAILED TO SKIP,
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
2457 7201 CLA IAC /AC11 = 1
2460 4561 UKIE /ENABLE TTY
2461 4560 USPF /SET PRINTER FLAG
2462 4557 USPI /SKIP IF INTERRUPT REQUEST
2463 5257 JMP P0E2E+1 /REPEAT,

```

```

2464 5257          JMP      P0E2E+1      /REPEAT.

2465 7402  P0E2F, HLT                    /SRQ FAILED TO SKIP.
          /SCOPE LOOP, PRESS CONTINUE TO ENTER,
2466 7201          CLA IAC                /AC11 = 1
2467 4561          UKIE                    /ENABLE TTY
2470 4560          USPF                    /SET PRINTER FLAG
2471 6003          SRQ                     /SKIP IF INTERRUPT REQUEST
2472 5266          JMP      P0E2F+1      /REPEAT.
2473 5266          JMP      P0E2F+1      /REPEAT.

2474 7402  P0E2G, HLT                    /CAF FAILED TO ENABLE TTY INTERRUPT
          /ENABLE FLIP FLOP.
          /SCOPE LOOP, PRESS CONTINUE TO ENTER,
2475 7300          CLA CLL                /CLEAR
2476 4561          UKIE                    /DISABLE TTY.
2477 6007          CAF                     /ENABLE TTY INTERRUPT ENABLE F.F.
2500 4560          USPF                    /SET PRINTER FLAG
2501 4557          USPI                    /TTY INTERRUPT REQUEST?
2502 5275          JMP      P0E2G+1      /NO, REPEAT.
2503 5275          JMP      P0E2G+1      /YES, REPEAT.

          /TEST 3 CHECKS THE ABILITY OF:
          /TPC TO SET THE PRINTER FLAG,
          /TLC TO CLEAR PRINTER FLAG,
          /TLC TO SET PRINTER FLAG,
2504 0003  P0TS3, 3
2505 2544          P0TS4
2506 4430          JMS I S100             /SET UP TO DO TEST 100 TIMES.
2507 4432          JMS I S200             /SET DELAY TO DELAY TWICE
          /10 BIT TIMES FOR AN NON 110
          /BAUD DEVICE AND TWICE 11 BIT
          /TIMES FOR AN 110 BAUD DEVICE.
          /SEE BIT TIME TABLE AT BEGINNING
          /OF PROGRAM.
          /CLEAR PRINTER FLAG
2510 4565  P0TS3A, UTCF                    /PRINT
2511 4564          UTPC                    /DELAY TWICE MAX TIME
2512 4576          DELAY                    /FLAG SET. IT SHOULD BE.
2513 4566          UTSP                    /FLAG NOT SET.
2514 5327          JMP P0E3A                /CLEAR + SET PRINTER FLAG.
2515 4563  P0TS3B, UTLS                    /FLAG SET?
2516 4566          UTSP                    /NO, OK
2517 7610          SKP CLA                  /YES
2520 5334          JMP      P0E3B            /DELAY TWICE BAUD RATE.
2521 4576  P0TS3C, DELAY                    /FLAG SET?
2522 4566          UTSP                    /NO
2523 5340          JMP      P0E3C            /YES, DONE 100 TIMES
2524 2062          ISZ      CTRA            /NO, DO TEST AGAIN
2525 5310          JMP      P0TS3A          /EXIT
2526 5425          JMP I CHAIN

2527 7602  P0E3A, HLT CLA                  /TPC FAILED TO SET PRINTER FLAG.

```

```

2530 4565 /SCOPE LOOP, PRESS CONTINUE TO ENTER.
2531 4564 UTCF /CLEAR PRINTER FLAG
2532 4576 UTCPC /SET FLAG BY BEGINNING OF 12TH BIT
2533 5330 DELAY /WAIT
JMP ,-3 /REPEAT.

2534 7602 P0E3B, HLT CLA /TLS FAILED TO CLEAR PRINTER FLAG.
/SCOPE LOOP, PRESS CONTINUE TO ENTER.
2535 4560 USPF /SET PRINTER FLAG
2536 4563 UTLS /CLEAR PRINTER FLAG AT TP3.
2537 5335 JMP ,=2

2540 7602 P0E3C, HLT CLA /TLS FAILED TO SET PRINTER FLAG.
/SCOPE LOOP, PRESS CONTINUE TO ENTER.
2541 4563 UTLS /PRINT
2542 4576 DELAY /DELAY TWICE BAUD RATE.
2543 5341 JMP P0E3C+1 /REPEAT.

/PUNCH, PRINTER TIMING TEST,
2544 0004 P0TS4, 4
2545 2616 P0TS5
2546 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES.
2547 4577 P0TS4A, SETLOC /SET DELAYM
2550 0024 DELAYM /TO =81 (DEC)
2551 7657 -121
2552 1022 TAD BAUDRT /GET BAUD RATE.
2553 1136 TAD [-110 /ADD A -110 TO IT.
2554 7650 SNA CLA /IS IT 110 BAUD WE'RE WORKING WITH?
2555 5360 JMP ,+3 /YES, LEAVE DELAYM ALONE.
2556 1135 TAD [-130 /NO, CHANGE DELAYM TO =88 (DEC).
2557 3024 DCA DELAYM /DELAYM NOW SET TO =88 DECIMAL.
2560 4563 UTLS /PRINT
2561 4576 DELAY /DELAY A LITTLE LESS THAN 9 BIT TIMES
2562 4566 UTSP /FLAG SET
2563 7410 SKP /NO, OK
2564 5776 JMP P0E4A /YES.
2565 4577 P0TS4B, SETLOC /SET DELAYM
2566 0024 DELAYM /TO =7 (DEC)
2567 7771 -7 /
2570 4576 DELAY /DELAY SO WE'RE PAST THE 9.5 BIT TIME POINT
2571 4566 UTSP /FLAG SET?
2572 5775 JMP P0E4B /NO
2573 5774 JMP P0TS4C /CROSS PAGE

2574 2600
2575 2614
2576 2607
2577 2332
2600 PAGE

2600 4577 P0TS4C, SETLOC
2601 0024 DELAYM
2602 7761 -17
2603 4576 DELAY /DELAY SO WE'RE PAST THE END,

```

```

2604 2062      ISZ   CTRA      /DONE 100 TIMES?
2605 5777'    JMP   POTS4A     /NO, DO TEST AGAIN
2606 5425     JMP I  CHAIN     /CHAIN

2607 7402     P0E4A, HLT   CLA      /PROCESSOR TIMING TOO SLOW OR FLAG
                               /SETTING TOO SOON, (IS THE SLOW CYCLE
                               /JUMPER REMOVED FROM THE PROCESSOR
                               /TIMING MODULE? IS THE WRONG BAUD RATE SELECTED?
                               /SCOPE LOOP, PRESS CONTINUE TO ENTER.
2610 4563      UTLS
2611 4566      UTFS      /START PRINTER
2612 5211     JMP   ,=1        /FLAG SET
2613 5210     JMP   ,=3        /NO, CHECK AGAIN
                               /REPEAT

2614 7602     P0E4B, HLT   CLA      /FLAG NOT SETTING IN REQUIRED TIME.
                               /SCOPE LOOP, PRESS CONTINUE TO ENTER.
2615 5210     JMP   P0E4A+1    /GO TO SCOPE LOOP.

```

/TEST TO CHECK THAT THE PUNCH/PRINTER FLAG SETS AT THE PROPER TIME.

```

2616 0005     POTS5,  5
2617 2634      POTS6
2620 4430      JMS I  S100
2621 4563      UTLS
2622 4566      UTFS
2623 5222     JMP   ,=1        /FLAG SET?
2624 4577     POTS5A, SETLOC  /SET DELAYM TO
2625 0024      DELAYM     /-98 DECIMAL,
2626 7636      =142      /
2627 4563      UTLS      /PRINT
2630 4576      DELAY     /DELAY
2631 4566      UTFS      /FLAG SET?
2632 7610      SKP CLA    /NO, OK,
2633 5250      JMP P0E5A    /YES, ERROR,
2634 4577     POTS5B, SETLOC  /SET DELAYM TO
2635 0024      DELAYM     /-4 DECIMAL,
2636 7774      =4        /
2637 4576      DELAY     /DELAY
2640 4566      UTFS      /FLAG NOW SET?
2641 5252     JMP P0E5B    /NO, ERROR,
2642 4576      DELAY
2643 4576      DELAY
2644 4576      DELAY
2645 2062      ISZ CTRA    /TEST DONE?
2646 5221     JMP POTS5A-3  /NO, REPEAT,
2647 5425     JMP I CHAIN  /YES, CHAIN,

2650 7402     P0E5A, HLT      /FLAG SETTING TOO SOON.
                               /SCOPE LOOP, PRESS CONTINUE TO ENTER.
2651 5210     JMP P0E4A+1

2652 7402     P0E5B, HLT      /FLAG NOT SETTING TOO SOON ENOUGH.
                               /SCOPE LOOP, PRESS CONTINUE TO ENTER.

```

2653 5251 JMP P0E5A+1

/TEST OF GTF, TEST IS DONE  
/4000 TIMES.

2654	0006	P0T6,	6	
2655	2732		P0T7	
2656	4431		JMS I S4000	/SET UP TO DO TEST 4000 TIMES.
2657	6007	P0T6A,	CAF	/CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT.
2660	7040		CMA	
2661	6004		GTF	/GET INTERRUPT FLAGS
2662	0331		AND K5200	/MASK.
2663	7440		SZA	
2664	7402	P0E6A,	HLT	/GTF FAILED.
2665	7360	P0T6B,	CLA CMA CLL CML	/SET LINK AND AC.
2666	6004		GTF	/GET INTERRUPT FLAGS. (AC SHOULD EQUAL 4000).
2667	0331		AND K5200	/MASK.
2670	7420		SNL	
2671	7402	P0E6B,	HLT	/GTF CLEARED LINK.
2672	7104	P0T6C,	CLL RAL	/AC SHOULD EQUAL ZERO, LINK SHOULD EQUAL 1).
2673	7430		SZL	
2674	7440		SZA	
2675	7402	P0E6C,	HLT	/GTF DID NOT GET LINK.
2676	6007	P0T6D,	CAF	/CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT.
2677	4560		USPF	/SET PRINTER FLAG.
2700	6004		GTF	/GET INTERRUPT FLAGS.
2701	0331		AND K5200	/MASK.
2702	7006		RTL	/PUT INTERRUPT BUS = (AC SHOULD EQUAL 1000)
2703	7004		RAL	/FLAG INTO LINK, (AC SHOULD EQUAL ZERO).
2704	7430		SZL	/IS LINK 1?
2705	7440		SZA	/IS AC ZERO?
2706	7402	P0E6D,	HLT	/GTF FAILED TO GET INTERRUPT BUS.
2707	4577	P0T6E,	SETLOC	/SET INTERRUPT RETURN LOCATION
2710	0002		2	/TO P0T6F.
2711	2721		P0T6F	
2712	6007		CAF	/CLEAR ALL FLAGS.
2713	6001		ION	/TURN INTERRUPT ON
2714	6004		GTF	/GET INTERRUPT FLAGS.
2715	0331		AND K5200	
2716	4560		USPF	/SET PRINTER FLAG.
2717	7000		NOP	/((INTERRUPT).
2720	7402	P0E6E,	HLT	/GTF CLEARED ION.
2721	7102	P0T6F,	CLL BSW	/PUT ION = (AC SHOULD EQUAL 2002).
2722	7012		RTR	/FLAG INTO LINK, (AC SHOULD EQUAL 2000).
2723	7430		SZL	/LINK 1?
2724	7440		SZA	/AC ZERO?
2725	7402	P0E6F,	HLT	/GTF FAILED TO GET ION.
2726	2062		ISZ CTRA	/TEST DONE?
2727	5257		JMP P0T6A	/NO. REPEAT.
2730	5425		JMP I CHAIN	
2731	5200	K5200,	5200	

/TEST OF RTF. TEST IS DONE  
/4000 TIMES.

2732	0007	P0T7,	7	
2733	7777		7777	
2734	4431		JMS I \$4000	/SET UP TO DO TEST 4000 TIMES.
2735	4577		SETLOC	/SET INTERRUPT RETURN
2736	0002		2	/TO P0T7C+3,
2737	2754		P0T7C+3	
2740	7320	P0T7A,	CLA CLL CML	/AC EQUALS ZERO, LINK EQUALS 1.
2741	6005		RTF	/RESTORE FLAGS,
2742	7420		SNL	/LINK SET?
2743	7440		SZA	/AC ZERO?
2744	7402	P0E7A,	HLT	/RTF FAILED TO RESTORE LINK.
2745	7330	P0T7B,	CLA CLL CML RAR	/AC EQUALS 4000
2746	6005		RTF	/RESTORE FLAGS, (LINK).
2747	7420		SNL	/LINK RESTORED?
2750	7402	P0E7B,	HLT	/RTF FAILED TO RESTORE LINK.
2751	4560	P0T7C,	USPF	/SET PRINTER FLAG.
2752	7000		NOP	/((INTERRUPT),
2753	7402	P0E7C,	HLT	/RTF DID NOT SET ION.
2754	2062		ISZ CTRA	/TEST DONE?
2755	5340		JMP P0T7A	/NO, REPEAT.
2756	5425		JMP I CHAIN	
2777	2547			
	3000			PAGE

/PROGRAM 1, LOOP AROUND INPUT TEST, OUTPUT MUST  
/BE CONNECTED TO INPUT,  
/PROGRAM CHECKS INPUT AND OUTPUT IOT'S, INTERRUPT AND TIMING.

3000	4577	PRG1,	SETLOC
3001	0023		KSTART
3002	3005		P1TS0
3003	5604		JMP I ,+1
3004	0236		SRSET

/ISSUE KCC WITH AC=7777, AC SHOULD GO TO 2.  
/AC NOT 0 INDICATES KCC FAILURE, TEST IS  
/DONE 4000 TIMES.

3005	0000	P1TS0,	0
3006	3010		P1TS1
3007	4777		JMS P2TS0A

/ISSUE T1S AND THEN KCC, WAIT TWICE OR 11 BIT TIMES  
/SEE TABLE AT BEGINNING OF PROGRAM, OR FLAG TO SET.



/SKIP ON FLAG, FAILURE TO SKIP INDICATES THE THE  
 /FLAG IS NOT SET, OR KSF FAILURE, TEST IS DONE 127  
 /TIMES.

3010 0001 P1TS1, 1  
 3011 3034 P1TS2  
 3012 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES.  
 3013 4432 JMS I S200 /SET DELAYM TO DELAY TWICE  
 /10 BIT TIMES FOR AN NON 110  
 /BAUD DEVICE AND TWICE 11 BIT  
 /TIMES FOR AN 110 BAUD DEVICE.  
 /SEE BIT TIME TABLE AT BEGINNING  
 /OF PROGRAM.

3014 4571 P1TS1A, UKCC /CLEAR AC AND KBRD FLVAG.  
 3015 4563 UTLS /SEND.  
 3016 4576 DELAY /DELAY TWICE 10 OR 11 BIT TIMES.  
 3017 4572 UKSF /FLAG SET?  
 3020 5225 JMP P1E1A /NO.  
 3021 2062 ISZ CTRA /YES, TEST DONE 100 TIMES?  
 3022 5214 JMP P1TS1A /NO, REPEAT,  
 3023 6007 CAF /CLEAR  
 3024 5425 JMP I CHAIN /CHAIN.

3025 7602 P1E1A, HLT CLA /FLAG NOT SET OR KSF FAILURE.  
 /SCOPE LOOP. PRESS CONTINUE TO ENTER.

3026 4571 UKCC  
 3027 4563 UTLS  
 3030 4576 DELAY /DELAY TWICE 10 OR 11 BIT TIMES  
 3031 4572 UKSF /FLAG SET?  
 3032 5226 JMP I-4 /NO, REPEAT  
 3033 5226 JMP I-5 /YES, REPEAT.

/ISSUE TLS AND THEN KCC. WAIT TWICE 10 OR 11 BIT TIMES  
 /{(SEE TABLE AT BEGINNING OF PROGRAM) FOR FLAG TO SET.  
 /SKIP ON FLAG 4000 TIMES TO VERIFY CONSISTENT SKIPPING.

3034 0002 P1TS2, 2  
 3035 3066 P1TS3  
 3036 4432 JMS I S200 /SET DELAYM TO DELAY TWICE  
 /10 BIT TIMES FOR AN NON 110  
 /BAUD DEVICE AND TWICE 11 BIT  
 /TIMES FOR AN 110 BAUD DEVICE.  
 /SEE BIT TIME TABLE AT BEGINNING  
 /OF PROGRAM.

3037 4431 JMS I S4000 /SET UP TO DO TEST 4000 TIMES.  
 3040 4571 P1TS2A, UKCC /CLEAR AC AND KBRD FLAG.  
 3041 4563 UTLS /SEND.  
 3042 4576 DELAY /DELAY TWICE 10 OR 11 BIT TIMES.  
 3043 4565 UTCF /CLEAR TELEPRINTER FLAG.  
 3044 4572 UKSF /KEYBOARD FLAG SET?  
 3045 5253 JMP P1E2A /NO.  
 3046 4572 P1TS2B, UKSF /YES, KEYBOARD FLAG SET?  
 3047 5262 JMP P1E2B /NO.

```

3050 2062      ISZ CTRA      /YES, DONE 4000 TIMES?
3051 5246      JMP      P1TS2B /NO, REPEAT
3052 5425      JMP I CHAIN /CHAIN

3053 7602      P1E2A, HLT CLA      /FLAG NOT SET OR KSF FAILED TO SKIP,
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
3054 4571      UKCC
3055 4563      UTLS
3056 4572      UKSF
3057 4576      DELAY
3060 5254      JMP      ,=4
3061 5260      JMP      ,=1

3062 7602      P1E2B, HLT CLA      /KSF FAILED TO SKIP,
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
3063 4572      UKSF
3064 5263      JMP      ,=1
3065 5263      JMP      ,=2

```

/ISSUE TLS AND THEN KCC, WAIT TWICE MAXIMUM BIT RATE FOR  
/FLAG TO SET, RESET FLAG (TLS AND THEN KCC) AND SKIP ON FLAG  
/500 TIMES TO VERIFY NO SKIP OCCURS WITH FLAG = 2.

```

3066 0003      P1TS3, 3
3067 3126      P1TS4
3070 4577      SETLOC      /SET COUNT OF
3071 0062      CTRA      /-500 (DEC)
3072 7014      =764      /IN CTRA,
3073 4432      JMS I S200 /SET DELAYM TO DELAY TWICE
/10 BIT TIMES FOR AN NON 110
/BAUD DEVICE AND TWICE 11 BIT
/TIMES FOR AN 110 BAUD DEVICE.
/SEE BIT TIME TABLE AT BEGINNING
/OF PROGRAM,
3074 4571      P1TS3A, UKCC      /CLEAR AND AND KBRD FLAG,
3075 4563      UTLS      /SEND,
3076 4576      DELAY      /DELAY TWICE 10 OR 11 BIT TIMES
3077 4572      UKSF      /FLAG SET,
3100 5313      JMP P1E3A /NO,
3101 4571      UKCC      /CLEAR AND AND KBRD FLAG,
3102 4563      UTLS      /YES, SEND DATA,
3103 4572      UKSF      /FLAG SET
3104 5306      JMP ,+2      /NO, OK
3105 5322      JMP P1E3B /YES,
3106 4566      UTSP      /PRINTER FLAG SET?
3107 5306      JMP ,=1      /NO, WAIT TO CONTINUE TEST.
3110 2062      ISZ CTRA      /DONE 500 TIMES?
3111 5301      JMP ,=10     /NO REPEAT TEST
3112 5425      JMP I CHAIN /CHAIN,

3113 7602      P1E3A, HLT CLA      /FLAG NOT SET OR KSF FAILED,

```

```

/SCOPE LOOP. PRESS CONTINUE TO ENTER.
3114 4563      UTLS      /SEND
3115 4571      UKCC      /CLEAR AC AND KBRD FLAG
3116 4576      DELAY
3117 4572      UKSF
3120 5314      JMP ,=4
3121 5320      JMP ,=1

3122 7602      P1E3B, HLT CLA      /KSF SKIPPED ON NO FLAG.
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
3123 4563      UTLS
3124 4426      JMS I KBFLAG
3125 5323      JMP P1E3B+1

/THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT,
/AND THEN CHECKS THAT THE READER FLAG IS CAPABLE OF INTERRUPTING,

3126 0004      P1TS4, 4
3127 3200      P1TS5
3130 4577      SETLOC      /SET INTERRUPT RETURN
3131 0002      2          /TO P1E4A
3132 3143      P1E4A
3133 4563      P1TS4A, UTLS      /SEND
3134 4426      JMS I KBFLAG
3135 4565      UTCF      /CLEAR PRINTER FLAG.
3136 4571      UKCC      /CLEAR READER FLAG
3137 6001      ION        /TURN INTERRUPT ON.
3140 7000      NOP
3141 6002      IOF        /TURN INTERRUPT OFF.
3142 5345      JMP ,+3      /SKIP OVER.
3143 4776      P1E4A, JMS INTFND /UNEXPECTED INTERRUPT.
3144 5333      JMP P1TS4A /TRY AGAIN.
3145 4577      SETLOC      /SET COUNT OF
3146 0062      CTRA      /-1000 (DEC)
3147 6030      -1750     /IN CTRA,
3150 4577      SETLOC      /SET INTERRUPT RETURN
3151 0002      2
3152 3167      P1TS4C
3153 4563      P1TS4B, UTLS      /SEND
3154 4426      JMS I KBFLAG
3155 4565      UTCF      /CLEAR PRINTER FLAG.
3156 6001      ION        /INTERRUPT ON.
3157 7000      NOP        /SHOULD INTERRUPT
3160 7402      HLT        /READER FLAG FAILED TO INTERRUPT OR
/INTERRUPT SYSTEM MALFUNCTION.

3161 4577      SETLOC      /SET INTERRUPT RETURN
3162 0002      2
3163 3166      P1TS4C=1
/SCOPE LOOP. PRESS CONTINUE TO ENTER,
3164 6001      ION
3165 7000      NOP
3166 5364      JMP ,=2

3167 2062      P1TS4C, ISZ CTRA /DONE 1000 TIMES YET?
3170 5353      JMP P1TS4B /NO, REPEAT

```

3171 6007 CAF /EXIT  
 3172 5425 JMP I CHAIN /EXIT.

3176 2017  
 3177 3513  
 3200

PAGE

/TEST 5 CHECKS THE ABILITY OF I  
 /SRQ TO SKIP ON AN INTERRUPT REQUEST,  
 /SPI TO SKIP ON A TTY INTERRUPT REQUEST,  
 /CAF TO CLEAR KBRD/READER FLAG,  
 /SRQ TO NOT SKIP ON NO INTERRUPT REQUEST,  
 /SPI TO NOT SKIP ON NO TTY INTERRUPT REQUEST.

3200 0005 P1TS5, 5  
 3201 3271 P1TS6  
 3202 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES.  
 3203 6007 CAF /CLEAR AND ENABLE INTERRUPT ENABLE FF  
 3204 4563 P1TS5A, UTLS /SEND  
 3205 4426 JMS I KBFLAG  
 3206 4565 UTCF /CLEAR PRINTER FLAG.  
 3207 6003 SRQ /INTERRUPT REQUEST?  
 3210 5230 JMP P1E5A /NO.  
 3211 4557 P1TS5B, USPI /YES, TTY INTERRUPT REQUEST?  
 3212 5235 JMP P1E5B /NO.  
 3213 6007 P1TS5C, CAF /YES, CLEAR FLAG,  
 3214 4572 UKSF /FLAG SET?  
 3215 7610 SKP CLA /NO, OK  
 3216 5242 JMP P1E5C /FLAG SET FOR SOME REASON.  
 3217 6003 P1TS5D, SRQ /INTERRUPT REQUEST?  
 3220 7610 SKP CLA /NO, OK  
 3221 5257 JMP P1E5D /  
 3222 4557 P1TS5E, USPI /TTY INTERRUPT REQUEST PRESENT?  
 3223 7610 SKP CLA /NO, OK  
 3224 5264 JMP P1E5E /  
 3225 2062 ISZ CTRA /TEST DONE 100 TIMES?  
 3226 5204 JMP P1TS5A /NO, REPEAT,  
 3227 5425 JMP I CHAIN /CHAIN.

3230 7602 P1E5A, HLT CLA /SRQ FAILED TO SKIP ON KBRD. FLAG,  
 /SCOPE LOOP. PRESS CONTINE TO ENTER,  
 3231 4250 JMS P1E5  
 3232 6003 SRQ  
 3233 5231 JMP .-2  
 3234 5233 JMP .-1

3235 7602 P1E5B, HLT CLA /SPI FAILED TO SKIP ON KBRD FLAG,  
 /SCOPE LOOP. PRESS CONTINUE TO ENTER,  
 3236 4250 JMS P1E5  
 3237 4557 USPI  
 3240 5236 JMP .-2  
 3241 5240 JMP .-1

```

3242 7602 P1E5C, HLT CLA /CAF FAILED TO CLEAR KBRD FLAG.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3243 4250 JMS P1E5
3244 6007 CAF
3245 4566 UTSF
3246 5243 JMP P1E5C+1
3247 5243 JMP P1E5C+1

```

```

3250 0000 P1E5, OPEN /ROUTINE TO SET KBRD FLAG.
3251 7201 CLA IAC
3252 4561 UKIE
3253 4563 UTLS
3254 4426 JMS I KBFLAG
3255 4565 UTCF
3256 5650 JMP I P1E5 /EXIT

```

```

3257 7602 P1E5D, HLT CLA /SRQ SKIPPED WITH NO FLAG.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3260 6007 CAF
3261 6003 SRQ
3262 5260 JMP P1E5D+1
3263 5260 JMP P1E5D+1

```

```

3264 7602 P1E5E, HLT CLA /SPI SKIPPED WITH NO FLAG.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3265 6007 CAF
3266 4557 USP!
3267 5265 JMP P1E5E+1
3270 5265 JMP P1E5E+1

```

/READER TIMING TEST, CHECKS THAT READER FLAG IS = 1 NO  
/LATER THAN THE TIME FOR THE FLAG TO SET,

```

3271 0006 P1TS6, 6
3272 3314 P1TS7
3273 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES.
3274 4577 SETLOC /SET DELAYM
3275 0024 DELAYM /TO -103 DECIMAL
3276 7631 M147 /
3277 4563 P1TS6A, UTLS /SEND
3300 4571 UKCC /RECEIVE
3301 4576 DELAY /DELAY 10-11 BIT TIMES
3302 4565 UTCF /CLEAR TELEPRINTER FLAG
3303 4572 UKSF /KBRD FLAG SET?
3304 5310 JMP P1E6A /FLAG NOT SET
3305 2062 ISZ CTRA /DONE 100 TIMES YET?
3306 5277 JMP P1TS6A
3307 5425 JMP I CHAIN /CHAIN,

```

```

3310 7602 P1E6A, HLT CLA /FLAG NOT SETTING IN REQUIRED TIME.

```

/SCOPE LOOP. PRESS CONTINUE TO ENTER.

```

3311 4563      UTLS
3312 4426      JMS I KBFLAG
3313 5311      JMP P1E6A+1

```

```

/TEST OF KEYBOARD AND PUNCH BUFFER USING
/KRS AND KCC TO RECEIVE AND TPC AND TCF
/TO SEND, A SPECIAL BINARY COUNT PATTERN
/IS USED.

```

```

3314 0007      P1TS7, 7
3315 5325      P1T10
3316 4577      SETLOC          /SET COUNT OF
3317 0062      CTRA          /-512 (DEC)
3320 7000      -1000        /IN CTRA,
3321 4777'     JMS SINPT     /INITIALIZE SPECIAL BIN COUNT.
3322 4776'     P1TS7A, JMS SGET /GET A NUMBER
3323 4337      JMS TRDATA    /TRANSFER DATA AND CHECK.
3324 5322      JMP P1TS7A     /REPEAT

```

/TEST OF KEYBOARD AND PUNCH BUFFERS USING RANDOM DATA.

```

3325 0010      P1T10, 10
3326 3400      P1T11
3327 4577      SETLOC          /SET COUNT OF
3330 0062      CTRA          /-512 (DEC)
3331 7000      -1000        /IN CTRA,
3332 4775'     JMS SETRND    /INITIALIZE RANDOM NUMBER GENERATOR,
3333 4774'     P1T10A, JMS RGNB /GET A RANDOM NUMBER,
3334 0145      AND [377      /MASK,
3335 4337      JMS TRDATA    /TRANSFER DATA AND CHECK.
3336 5333      JMP P1T10A     /REPEAT

```

/SUBROUTINE USED BY P1TS7 AND P1T10

```

3337 0000      TRDATA, OPEN
3340 3346      OCA HOLD1
3341 1346      TAD HOLD1
3342 7421      MQL          /STORE GOOD DATA IN MQ,
3343 7701      ACL          /RELOAD AC WITH THE GOOD
3344 4353      JMS SNDREC    /TRANSMIT AND RECEIVE
3345 4470      JMS I CHECK   /DID I RECEIVE WHAT I SENT?
3346 0000      HOLD1, OPEN  /WHAT I SENT,
3347 5366      JMP P1E710    /RECEIVED NOT SAME AS SENT.
3350 2062      ISZ CTRA      /DONE?
3351 5737      JMP I TRDATA  /NO,
3352 5425      JMP I CHAIN   /YES, CHAIN,

```

/ROUTINE TO SEND AND RECEIVE DATA.

```

3353 0000      SNDREC, OPEN
3354 4565      UTCF
3355 4564      UTPC
3356 4571      UKCC

```

```

3357 4572      UKSF
3360 5357      JMP ,=-1
3361 7200      CLA          /JUST IN CASE
3362 4570      UKRS
3363 4566      UTSF
3364 5363      JMP ,=-1
3365 5753      JMP I SNDREC  /EXIT WITH RECEIVED DATA IN AC.

```

/COMMON HLT FOR P1T57 AND P1T10.

```

3366 7402      P1E710, HLT          /DATA RECEIVED DOES NOT
                          /AGREE WITH DATA SENT.
                          /MQ CONTAINS DATA THAT WAS SENT.
                          /AC CONTAINS DATA THAT WAS RECEIVED.

```

/SCOPE LOOP. PRESS CONTINUE TO ENTER.

```

3367 7701      ACL
3370 4353      JMS SNDREC
3371 5367      JMP P1E710+1  /STAY IN LOOP.

```

```

3374 0417
3375 1742
3376 1721
3377 1711
3400 3400

```

PAGE

/TEST OF KRS TO DO AN "OR" BY READING  
/RANDOM DATA FROM KBRD BUFFER INTO AC  
/EQUAL TO 7777. TEST IS DONE 500 TIMES.

```

3400 0011      P1T11, 11
3401 3435      P1T12
3402 4577      SETLOC          /SET COUNT OF
3403 0062      CTRA          /=-500 (DEC)
3404 7014      =764          /IN CTRA,
3405 6007      P1T11A, CAF      /CLEAR THE WORLD,
3406 4777      JMS RGNB        /GET A RANDOM NUMBER
3407 7421      MQL           /STORE IT IN MQ
3410 7701      ACL           /RELOAD AC
3411 4563      UTL5          /
3412 4566      UTSF          /FLAG SET YET?
3413 5212      JMP ,=-1       /NO, WAIT,
3414 7240      CLA CMA        /7777 TO AC
3415 4570      UKRS          /READ KBRD BUFFER,
3416 7040      CMA          /AC SHOULD NOW EQUAL 0
3417 7440      SZA           /DOES IT = 0?
3420 5224      JMP P1E11A     /NO,
3421 2062      ISZ CTRA       /DONE 500 TIMES YET?
3422 5205      JMP P1T11A    /NO, REPEAT
3423 5425      JMP I CHAIN    /YES CHAIN,

```

```

3424 7402 P1E11A, HLT /KRS FAILED TO "OR" KBRD WITH AC
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
3425 6007 CAF
3426 7701 ACL /MQ TO AC
3427 4563 UTLS
3430 4566 UTSF
3431 5230 JMP .-1
3432 7240 CLA CMA
3433 4570 UKRS
3434 5225 JMP P1E11A+1

```

/TEST OF KRB

```

3435 0012 P1T12, 12
3436 7777 7777
3437 4430 JMS I $100
3440 4577 SETLOC /SET DELAYM
3441 0024 DELAYM /TO =103 DEC,
3442 7631 M147
3443 6007 P1T12A, CAF /CLEAR THE WORLD,
3444 1134 TAD [252 /AC =252
3445 4563 UTLS /SEND
3446 4566 UTSF /DONE SENDING YET?
3447 5246 JMP .-1 /NO
3450 7240 CLA CMA /7777
3451 4567 UKRB /CLEAR AC, FLAG AND READ BUFFER,
3452 7041 CMA IAC /CHANGE TO A NEGATIVE NUMBER
3453 1134 TAD [252 /ADD SENT DATA TO AC
3454 7440 SZA /WERE THEY EQUAL?
3455 5264 JMP P1E12A /NO
3456 4572 P1T12B, UKSF /FLAG CLEAR?
3457 7610 SKP CLA /YES
3460 5274 JMP P1E12B /NO,
3461 2062 ISZ CTRA /DONE TEST YET?
3462 5243 JMP P1T12A /NO, REPEAT
3463 5425 JMP I CHAIN /YES, CHAIN,

3464 7402 P1E12A, HLT /KRB FAILED TO JAM READER BUFFER TO AC,
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
3465 6007 CAF /CLEAR THE WORLD,
3466 1134 TAD [252
3467 4563 UTLS
3470 4566 UTSF
3471 5270 JMP .-1
3472 4567 UKRB
3473 5265 JMP P1E12A+1

3474 7402 P1E12B, HLT /KRB FAILED TO CLEAR READER FLAG,
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
3475 6007 CAF
3476 4563 UTLS
3477 4566 UTSF
3500 5277 JMP .-1
3501 4567 UKRB
3502 5275 JMP P1E12B+1

```



/PROGRAM 2, ASR 33/35 TELETYPE BASIC INPUT TESTS.  
 /PROGRAM CHECKS INPUT IOT'S, INTERRUPT, AND READER TIMING

```

3503 4577 PRG2, SETLOC /SET KSTART TO INITIAL
3504 0023 KSTART /ROUTINE ADDRESS,
3505 3510 P2TS0
3506 5707 JMP I ,+1 /GO START TEST
3507 0236 SRSET
  
```

/ISSUE KCC WITH AC=7777, AC SHOULD GO TO 0.  
 /AC NOT 0 INDICATES KCC FAILURE, TEST IS DONE 1000 TIMES.

```

3510 0000 P2TS0, 0
3511 3530 P2TS1
3512 4313 JMS P2TS0A
3513 0000 P2TS0A, OPEN
3514 4431 JMS I S4000 /SET UP TO DO TEST 4000 TIMES.
3515 7240 CLA CMA /SET AC TO 7777
3516 4571 UKCC /CLEAR AC AND FLAG
3517 7440 SZA /IS AC = 0?
3520 5324 JMP P2E0 /NO, ERROR, GO TO P2E0
3521 2062 ISZ CTRA /DONE?
3522 5315 JMP ,=5 /NO, REPEAT
3523 5425 JMP I CHAIN /CHAIN
3524 7402 P2E0, HLT /TST0 ERR HALT, KCC DID
/NOT RESULT IN AC = 0
3525 7240 CLA CMA /SET A TO 7777
3526 4571 UKCC /CLEAR AC AND FLAG
3527 5325 JMP ,=2 /REPEAT
  
```

/ISSUE KCC, WAIT TWICE 10-11 BIT TIMES FOR FLAG TO SET.  
 /SKIP ON FLAG, FAILURE TO SKIP INDICATES  
 /THAT FLAG IS NOT SET, OR KSF FAILURE.  
 /TEST IS DONE 100 TIMES.

```

3530 0001 P2TS1, 1
3531 3545 P2TS2
3532 4432 JMS I S200 /SET DELAYM TO DELAY TWICE
/10 BIT TIMES FOR AN NON 110
/BAUD DEVICE AND TWICE 11 BIT
/TIMES FOR AN 110 BAUD DEVICE.
/SEE BIT TIME TABLE AT BEGINNING
/OF PROGRAM,
  
```

```

3533 4430 P2TS1A, JMS I S100 /SET UP TO DO TEST 100 TIMES.
3534 4571 P2TS1B, UKCC /CLEAR AC AND FLAG
3535 4576 DELAY /GO DELAY
3536 4572 UKSF /SKIP ON FLAG = 1
3537 5343 JMP P2E1 /ERROR, GO TO E1
3540 2062 ISZ CTRA /ALL DONE?
3541 5334 JMP P2TS1B /NO, REPEAT
3542 5425 JMP I CHAIN /CHAIN
3543 7402 P2E1, HLT /TST1 ERROR HALT, FLAG IS NOT
/SET, OR KSF FAILED
  
```

3544 5333 JMP P2TS1A /RESTARTING TEST,

/ISSUE KCC, WAIT TWICE 10-11 BIT TIMES FOR FLAG TO BE SET,  
/SKIP ON FLAG 1000 TIMES TO VERIFY CONSISTENT SKIPPING.

3545 0002 P2TS2, 2  
3546 3600 P2TS3  
3547 4432 JMS I S200 /SET DELAYM TO DELAY TWICE  
/10 BIT TIMES FOR AN NON 110  
/BAUD DEVICE AND TWICE 11 BIT  
/TIMES FOR AN 110 BAUD DEVICE.  
/SEE BIT TIME TABLE AT BEGINNING  
/OF PROGRAM,

3550 4431 JMS I S4000 /SET UP TO DO TEST 4000 TIMES.  
3551 4571 P2TS2A, UKCC /CLEAR AC AND FLAG  
3552 4576 DELAY /GO DELAY  
3553 4572 UKSF /SKIP ON FLAG = 1  
3554 5362 JMP P2E2A /DID NOT SKIP, GO TO E2A  
3555 4572 UKSF /SKIP ON FLAG = 1  
3556 5364 JMP P2E2B /DID NOT SKIP, GO TO E2B  
3557 2062 ISZ CTRA /ALL DONE?  
3560 5355 JMP ,=3 /NO. REPEAT  
3561 5425 JMP I CHAIN /CHAIN  
3562 7402 P2E2A, HLT /TST2 ERROR HALT, FLAG  
/NOT SET OR KSF FAILURE.  
3563 5351 JMP P2TS2A  
3564 7402 P2E2B, HLT /TST2 ERR HALT B,  
/KSF FAILURE  
3565 4572 UKSF /SKIP ON FLAG = 1  
3566 5365 JMP ,=1 /REPEAT  
3567 5365 JMP ,=2 /REPEAT

3577 0417  
3600 PAGE

/ISSUE KCC, WAIT TWICE 10-11 BIT TIMES FOR FLAG TO SET,  
/VERIFY THAT FLAG IS SET, RESET FLAG (KCC) AND  
/SKIP ON FLAG 500 TIMES TO VERIFY THAT NO  
/SKIP OCCURS WITH FLAG = 0,

3600 0003 P2TS3, 3  
3601 3630 P2TS4  
3602 4432 JMS I S200 /SET DELAYM TO DELAY TWICE  
/10 BIT TIMES FOR AN NON 110  
/BAUD DEVICE AND TWICE 11 BIT  
/TIMES FOR AN 110 BAUD DEVICE.  
/SEE BIT TIME TABLE AT BEGINNING  
/OF PROGRAM,

3603 4577 SETLOC /SET COUNT  
3604 0062 CTRA /=500 (DEC)

```

3005 7014          =764          /CTRA
3006 4571      P2TS3A, UKCC          /CLEAR FLAG
3007 4576          DELAY          /GO DELAY
3010 4572          UKSF           /READY?
3011 5221          JMP P2E3A        /NO, ERROR
3012 4571          UKCC           /YES, RESET FLAG
3013 4572          UKSF           /READY?
3014 5216          JMP ,+2         /NO, OK
3015 5223          JMP P2E3B        /YES, ERROR
3016 2062          ISZ CTRA        /ALL DONE TESTING?
3017 5213          JMP ,=4         /NO, REPEAT
3020 5425          JMP I CHAIN     /YES, CHAIN
3021 7402      P2E3A, HLT          /TST3 ERR HALT A, FLAG
                                   /NOT SET OR KSF FAILURE
3022 5206          JMP P2TS3A      /TRY AGAIN
3023 7402      P2E3B, HLT          /TST3 ERR HALT B, FLAG
                                   /FAILED TO RESET, OR KSF
                                   /SKIPPED ERRONEOUSLY.

```

/TURN OFF READER BEFORE ENTERING

```

/SCOPE LOOP.
3024 4571          UKCC           /CLEAR FLAG AND AC
3025 4572          UKSF           /SKIP ON FLAG = 1
3026 5224          JMP ,=2         /REPEAT
3027 5224          JMP ,=3         /REPEAT

```

/THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT,  
/AND THEN CHECKS THAT THE READER FLAG IS CAPABLE OF INTERRUPTING.

```

3030 0004      P2TS4, 4
3031 3671          P2TS5
3032 4577          SETLOC          /SET INTERRUPT RETURN
3033 0002          2              /TO P2E4A,
3034 3644          P2E4A
3035 4565      P2TS4A, UTCF        /CLEAR PUNCH/PRINTER FLAG
3036 4426          JMS I KBFLAG
3037 4571          UKCC           /CLEAR READER FLAG
3040 6001          ION            /ENABLE INTERRUPT
3041 7000          NOP
3042 6002          IOF            /TURN OFF INTERRUPT
3043 5246          JMP ,+3
3044 4777'      P2E4A, JMS INTFND   /UNEXPECTED INTERRUPT
3045 5233          JMP P2TS4A      /TRY AGAIN
3046 4431          JMS I S4000     /SET UP TO DO TEST 4200 TIMES,
3047 4577          SETLOC          /SET INTERRUPT RETURN
3050 0002          2              /TO P2TS4C,
3051 3666          P2TS4C
3052 4571          UKCC
3053 4572          UKSF           /WAIT FOR READER FLAG
3054 5253          JMP ,=1         /TO SET
3055 6001      P2TS4B, ION        /ENABLE INTERRUPT
3056 7000          NOP
3057 7402      P2E4B, HLT        /READER FLAG FAILED TO INTERRUPT,
                                   /OR INTERRUPT SYSTEM MALFUNCTION
3060 4577          SETLOC          /SET INTERRUPT RETURN

```

```

3661 0002          2          /TO P2TS4C=1,
3662 3665          P2TS4C=1
        /SCOPE LOOP
3663 6001          JON
3664 7000          NOP
3665 5263          JMP .-2

        /
3666 2062          P2TS4C, ISZ CTRA          /DONE?
3667 5253          JMP P2TS4B          /NO, REPEAT
3670 5425          JMP I CHAIN
    
```

/READER TIMING TEST, CHECKS THAT READER FLAG IS #1 NO  
 /LATER THAN 103 MILLISECONDS AFTER KCC INSTRUCTION IS ISSUED.

```

        /
3671 0005          P2TS5, 5
3672 3711          P2TS6
3673 4577          SETLOC          /SET DELAYM
3674 0024          DELAYM          /TO -103
3675 7631          M147
3676 4430          JMS I S100          /SET UP TO DO TEST 100 TIMES.
3677 4571          P2TS5A, UKCC          /START READER, CLEAR PC FLAG
3700 4576          DELAY          /GO DELAY 103 MILLISECS
3701 4572          UKSP
3702 5306          JMP P2E5
3703 2062          ISZ CTRA
3704 5277          JMP P2TS5A
3705 5425          JMP I CHAIN
3706 7402          P2E5, HLT          /TST5 ERR HALT, FLAG NOT=1
        /TST5 MSECS AFTER KCC INSTRUCTION.

3707 4426          JMS I KBFLAG
3710 5305          JMP .-3          /YES, REPEAT.
    
```

/READ 256 DIFFERENT CHARACTERS, EACH CHARACTER IS READ 1000 TIMES  
 /TO VERIFY CONSISTENCY OF READING FROM TTI.

```

        /
3711 0006          P2TS6, 6
3712 3762          P2TS7
3713 4577          SETLOC          /SET COUNT OF
3714 0062          CTRA          /-256(DEC)
3715 7400          -400          /IN CTRA
3716 4426          P2TS6A, JMS I KBFLAG
3717 4570          UKRS          /READ CHARACTER.
3720 3112          DCA WTS6A          /SAVE AT WTS6A.
3721 4577          SETLOC          /SET COUNT OF
3722 0063          CTRB          /CTRB
3723 6030          -1750          /-1000 (DEC) IN
3724 7200          P2TS6B, CLA
3725 4570          UKRS          /READ CHARACTER.
3726 7421          MQL          /STORE IN MQ
3727 7701          ACL          /GET IT BAC TO THE AC.
3730 7041          CIA          /2'S COMPLE. IT
    
```

```

3731 1112      TAD WTS6A      /ADD EXPECTED CHAR.
3732 7640      SZA CLA        /RESULT 0?
3733 5346      JMP P2E6A      /NO. ERROR, GO TO E6A.
3734 7240      P2TS6C, CLA CMA
3735 4570      UKRS          /READ CHARACTER
3736 7040      CMA
3737 7440      SZA          /AC STILL 7777
3740 5356      JMP P2E6C      /NO. ERROR GO TO P2E6C.
3741 2063      ISZ CTRB      /READ CHAR 1200 TIMES?
3742 5324      JMP P2TS6B      /NO. GO READ IT AGAIN.
3743 2062      ISZ CTRA      /YES, READ 256 DIFF. CHARS?
3744 5316      JMP P2TS6A      /NO.
3745 5425      JMP I CHAIN     /YES, CHAIN

3746 7701      P2E6A, ACL      /MO TO AC.
3747 7402      HLT          /TST6 ERR HALT A, AC DISPLAYS
                          /INCORRECTLY READ CHAR. DEPRESS
                          /KEY CONTINUE

3750 7200      CLA
3751 1112      TAD WTS6A
3752 7402      P2E6B, HLT      /TST6 ERR HALT B, AC DISPLAYS
                          /WHAT THE CORRECT CHAR SHOULD
                          /BE.

3753 7200      CLA
3754 4570      UKRS          /READ CHARACTER
3755 5353      JMP .-2         /LOOP BACK

3756 7402      P2E6C, HLT      /KRS FAILED TO "OR" KBRD BUFFER WITH AC.
                          /SCOPE LOOP. PRESS CONTINUE TO ENTER.
3757 7240      CLA CMA
3760 4570      UKRS
3761 5357      JMP P2E6C+1

```

/ISSUE KCC, WAIT FOR FLAG TO SET. ISSUE KCR WITH  
/AC=7777 AND DELAY 200 MSECS. AC NOT 7777 OR KBRD  
/FLAG SET INDICATES A KCR FAILURE. TEST IS DONE  
/100 TIMES.

```

3762 0007      P2TS7, 7
3763 4030      P2T10
3764 4430      JMS I S100      /SET UP TO DO TEST 120 TIMES.
3765 4432      JMS I S200      /SET DELAYM TO DELAY TWICE
                          /12 BIT TIMES FOR AN NON 113
                          /BAUD DEVICE AND TWICE 11 BIT
                          /TIMES FOR AN 113 BAUD DEVICE.
                          /SEE BIT TIME TABLE AT BEGINNING
                          /OF PROGRAM.

3766 5776'     JMP P2TS7A

3776 4000
3777 2017
4000          PAGE

```

```

4000 4426 P2TS7A, JMS I KBFLAG
4001 7240 CLA CMA /AC=7777,
4002 4562 UKCR /CLEAR READER FLAG.
4003 7040 CMA /AC SHOULD EQUAL ZERO NOW.
4004 7440 SZR /RESULT 0?
4005 5215 JMP P2E7A /NO, ERROR, GO TO P2E7A.
4006 4576 P2TS7B, DELAY /GO DELAY 200 MILLISECS.
4007 4572 UKSF /READER FLAG SET?
4010 7410 SKP /NO,
4011 5221 JMP P2E7B /YES, READER FLAG SET. ERROR, GO TO P2E7B.
4012 2062 ISZ CYR /TEST DONE?
4013 5200 JMP P2TS7A /NO, REPEAT,
4014 5425 JMP I CHAIN

```

```

4015 7402 P2E7A, HLT /KCR CLEARED AC.
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4016 7240 CLA CMA /AC=7777, (SCOPE LOOP).
4017 4562 UKCR /CLEAR READER RUN, SHOULD NOT CLEAR AC.
4020 5216 JMP ,=2 /REPEAT.

```

```

4021 7402 P2E7B, HLT /KCR DID NOT CLEAR READER FLAG
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4022 4426 JMS I KBFLAG
4023 4562 UKCR /CLEAR READER RUN.
4024 4576 DELAY /GO DELAY 200 MILLISECS
4025 4572 UKSF
4026 5222 JMP P2E7B+1 /REPEAT.
4027 5222 JMP P2E7B+1 /REPEAT.

```

/ISSUE KCC, WAIT FOR FLAG TO SET, ISSUE KIE WITH  
 /AC11=0 THEN TURN THE INTERRUPT ON, AN INTERRUPT AT THIS TIME  
 /INDICATES A KIE FAILURE, WITH THE FLAG STILL SET ISSUE  
 /SRQ AND SPI, A SKIP BY EITHER INDICATES A FAILURE.  
 /ISSUE KIE WITH AC11=1 AND THE INTERRUPT ON, NO INTERRUPT  
 /INDICATES A KIE FAILURE, ISSUE SRQ AND THEN SPI, FAILURE OF  
 /EITHER TO SKIP INDICATES A FAILURE, THIS TEST IS DONE 4000 TIMES.

```

4030 0010 P2T10, 10
4031 4153 P2T11
4032 4431 JMS I S4000 /SET UP TO DO TEST 4000 TIMES.
4033 4426 JMS I KBFLAG
4034 4577 P2T10A, SETLOC /SET INTERRUPT RETURN LOCATION
4035 0002 2 /TO P2E10A,
4036 4073 P2E10A
4037 4572 UKSF
4040 5233 JMP P2T10A-1
4041 7200 CLA /AC=0
4042 4561 UKIE /DISABLE TTY INTERRUPT
4043 6001 ION /TURN INTERRUPT ON
4044 7000 NOP
4045 6002 P2T10B, IOF /TURN INTERRUPT OFF,
4046 6003 SRQ /SKIP IF INTERRUPT REQUEST.
4047 7410 SKP

```

```

4050 5307          JMP P2E10B          /ERROR, SRQ FAILED, GO TO P2E10B,
4051 4557 P2T10C, USPI          /SKIP IF TTY INTERRUPT.
4052 7410          SKP
4053 5315          JMP P2E10C          /ERROR, SPI FAILED, GO TO P2E10C,
4054 4577 P2T10D, SETLOC          /SET INTERRUPT RETURN LOCATION
4055 0002          2          /TO P2T10E
4056 4064          P2T10E
4057 7201          CLA IAC          /AC11=1
4060 4561          UKIE          /ENABLE TTY INTERRUPT.
4061 6001          ION          /TURN INTERRUPT ON.
4062 7000          NOP          / (SHOULD INTERRUPT).
4063 5323          JMP P2E10D          /ERROR, GO TO P2E10D.
4064 6003 P2T10E, SRQ          /SKIP IF INTERRUPT REQUEST.
4065 5335          JMP P2E10E          /ERROR, GO TO P2E10E.
4066 4557 P2T10F, USPI          /SKIP IF TTY INTERRUPT.
4067 5344          JMP P2E10F          /ERROR, GO TO P2E10F.
4070 2062          ISZ CTRA          /DONE?
4071 5234          JMP P2T10A          /NO, REPEAT.
4072 5425          JMP I CHAIN

4073 7402 P2E10A, HLT          /KIE FAILED TO DISABLE TTY.
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4074 4572          UKSF          /IS READER FLAG SET?
4075 4777          JMS INTFND          /NO, UNEXPECTED INTERRUPT.
4076 4577          SETLOC          /SET INTERRUPT RETURN LOCATION
4077 0002          2          /TO P2E10A+1.
4100 4074          P2E10A+1
4101 4426          JMS I KBFLAG          / (SCOPE LOOP).
4102 7200          CLA
4103 4561          UKIE          /DISABLE TTY INTERRUPT.
4104 6001          ION          /INTERRUPT ON.
4105 7000          NOP
4106 5274          JMP P2E10A+1          /REPEAT.

4107 7602 P2E10B, HLT CLA          /SRQ SKIPPED WITH TTY DISABLED.
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4110 4426          JMS I KBFLAG
4111 4561          UKIE
4112 6003          SRQ          /SKIP IF INTERRUPT, (AC11=0). REQUEST. (SHOULD NOT SKIP)
4113 5310          JMP P2E10B+1          /REPEAT
4114 5310          JMP P2E10B+1          /REPEAT

4115 7602 P2E10C, HLT CLA          /SPI SKIPPED WITH TTY DISABLED.
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4116 4426          JMS I KBFLAG
4117 4561          UKIE          /DISABLE TTY INTERRUPT, (AC11=0).
4120 4557          USPI          /SKIP IF TTY INTERRUPT REQUEST (SHOULD NOT SKIP).
4121 5316          JMP P2E10C+1          /REPEAT.
4122 5316          JMP P2E10C+1          /REPEAT.

4123 7402 P2E10D, HLT          /KIE FAILED TO ENABLE TTY INTERRUPT WITH AC11=1.
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4124 4577          SETLOC          /SET INTERRUPT RETURN LOCATION

```

```

4125 0002          2          /TO P2E10D+4,
4126 4127          P2E10D+4
4127 7201          CLA IAC      /((SCOPE LOOP),
4130 4561          UKIE        /ENABLE TTY INTERRUPT.
4131 4426          JMS I KBFLAG
4132 6001          ION         /TURN INTERRUPT ON.
4133 7000          NOP
4134 5327          JMP P2E10D+4  /REPEAT,

```

```

4135 7402          P2E10E, HLT      /SRQ FAILED TO SKIP,
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4136 7201          CLA IAC      /((SCOPE LOOP),
4137 4561          UKIE        /ENABLE TTY INTERRUPT.
4140 4426          JMS I KBFLAG
4141 6003          SRQ         /SKIP IF INTERRUPT REQUEST.
4142 5336          JMP P2E10E+1 /REPEAT,
4143 5336          JMP P2E10E+1 /REPEAT,

```

```

4144 7402          P2E10F, HLT      /SPI FAILED TO SKIP,
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4145 7201          CLA IAC      /((SCOPE LOOP),
4146 4561          UKIE        /ENABLE TTY INTERRUPT.
4147 4426          JMS I KBFLAG
4150 4557          USPI        /SKIP IF TTY INTERRUPT.
4151 5345          JMP P2E10F+1 /REPEAT,
4152 5351          JMP .-1      /REPEAT,

```

```

/ISSUE KIE WITH AC11=0 TO DISABLE TTY.
/ISSUE CAF WITH AC, LINK, AND READER FLAG SET.
/TTY NOT ENABLED, OR AC AND LINK NOT
/ZERO INDICATES A FAILURE, TEST IS DONE 100 TIMES.

```

```

4153 0011          P2T11, 11
4154 4233          P2T12
4155 4430          JMS I S100    /SET UP TO DO TEST 100 TIMES.
4156 4432          JMS I S200    /SET DELAYM TO DELAY TWICE
/10 BIT TIMES FOR AN NON 110
/BAUD DEVICE AND TWICE 11 BIT
/TIMES FOR AN 110 BAUD DEVICE.
/SEE BIT TIME TABLE AT BEGINNING
/OFF PROGRAM,

```

```

4157 4561          P2T11A, UKIE    /DISABLE TTY (AC 11=0).
4160 4426          JMS I KBFLAG
4161 7360          CLA CMA CLL CML /AC AND LINK SET,
4162 6007          CAF         /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY.
4163 7420          SNL
4164 7440          SZA
4165 5776          JMP P2E11A    /ERROR, GO TO P2E11A.
4166 4576          P2T11B, DELAY  /GO DELAY 200 MILLI SEC.
4167 4572          UKSF        /DID FLAG C UP?
4170 7610          SKP CLA

```



```

4171 5775'      JMP P2E11B      /YES, ERROR, GO TO P2E11B.
4172 5774'      JMP P2T11C      /CROSS PAGE

4174 4200
4175 4215
4176 4206
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      4200          PAGE

4200 4426      P2T11C, JMS I KBFLAG
4201 4557      USPI          /SKIP IF TTY INTERRUPT REQUEST.
4202 5224      JMP P2E11C      /ERROR, GO TO P2E11C.

4203 2062      ISZ CTRA      /TEST DONE?
4204 5777'      JMP P2T11A      /NO, REPEAT.
4205 5425      JMP I CHAIN

4206 7402      P2E11A, HLT          /CAF FAILED TO CLEAR AC AND LINK.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
4207 7360      CLA CMA CLL CML /SCOPE LOOP).
4210 6007      CAF          /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY.
4211 7420      SNL
4212 7440      SZA
4213 5207      JMP P2E11A+1      /REPEAT.
4214 5207      JMP P2E11A+1      /REPEAT.

4215 7402      P2E11B, HLT          /CAF DID NOT CLEAR FLAG OR FLAG SET AFTER BEING CLEARED.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
4216 4426      JMS I KBFLAG
4217 6007      CAF          /CLEAR THE FLAG.
4220 4576      DELAY          /GO DELAY 200 MILLISEC.
4221 4572      UKSF          /FLAG SET?
4222 5216      JMP P2E11B+1      /REPEAT
4223 5216      JMP P2E11B+1      /REPEAT

4224 7602      P2E11C, HLT CLA      /CAF FAILED TO ENABLE TTY.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
4225 4561      UKIE          /DISABLE TTY, (AC11=0)
4226 6007      CAF          /ENABLE TTY,
4227 4426      JMS I KBFLAG
4230 4557      USPI          /SKIP IF INT REQUEST FROM TTY.
4231 5225      JMP P2E11C+1      /REPEAT
4232 5225      JMP P2E11C+1      /REPEAT.

```

/TEST OF KRB INSTRUCTION,

```

4233 0012      P2T12, 12
4234 7777      7777
4235 4577      SETLOC          /SET COUNT OF
4236 0062      CTRA          /-256 DECIMAL
4237 7400      -400          /IN CTRA
4240 4577      SETLOC          /SET DELAYM

```

```

4241 0024 DELAYM /TO -103
4242 7631 M147 /DECIMAL.
4243 4426 JMS I KBFLAG
4244 4570 UKRS /GET THE CHARACTER.
4245 3112 DCA WTS6A /SAVE IT
4246 4426 JMS I KBFLAG /ADVANCE TAPE AND BRING NEW CHARACTER INTO BUFFER.
4247 1145 P2T12A, TAD C377
4250 4567 UKRB /READ BUFFER, CLEAR FLAG, ADVANCE TAPE
4251 4572 UKSF /FLAG CLEAR?
4252 7410 SKP /YES, OK.
4253 5276 JMP P2E12A /NO, ERROR.
4254 3104 DCA UTEMP
4255 4576 P2T12B, DELAY /DELAY 10 OR 11 BIT TIMES
4256 4572 UKSF /FLAG NOW SET?
4257 5303 JMP P2E12B /NO, ERROR.
4260 1112 P2T12C, TAD WTS6A /GET GOOD.
4261 7421 MQL /MQ CONTAINS GOOD DATA
4262 7701 ACL /RELOAD AC WITH GOOD FROM MQ.
4263 7001 IAC /ADD ONE TO IT.
4264 3112 DCA WTS6A /SAVE IT
4265 1112 TAD WTS6A /GET IT BACK.
4266 0145 AND C377 /KEEP DESIRED DATA.
4267 7041 CMA IAC /NEGATE IT.
4270 1104 TAD UTEMP /ADD LAST READ CHARACTER TO IT.
4271 7640 SZA CLA /ARE THEY EQUAL.
4272 5305 JMP P2E12C /NO, ERROR
4273 2062 ISE CTRA /DONE?
4274 5247 JMP P2T12A /NO, REPEAT.
4275 5425 JMP I CHAIN /YES, CHAIN.

4276 7402 P2E12A, HLT /KRB FAILED TO CLEAR READER FLAG.
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4277 4426 JMS I KBFLAG
4300 4567 UKRB
4301 4576 DELAY
4302 5277 JMP P2E12A+1

4303 7402 P2E12B, HLT /KRB FAILED TO SET FLAG.
/SCOPE LOOP. PRESS CONTINUE TO ENTER.
4304 5277 JMP P2E12A+1

4305 7402 P2E12C, HLT /KRB FAILED TO READ CORRECT DATA.
/PRESS CONTINUE TO TRY TEST AGAIN.
4306 5235 JMP P2T12+2 /TRY TEST AGAIN.

```

```

/PROGRAM 3, ASR33/35 TELETYPE READER TEST, CHECKS ABILITY OF READER
/TO CORRECTLY READ AT FULL SPEED AND WITH RANDOM STALLS.

```

```

4307 4577 PRG3, SETLOC /SET KSTART TO INITIAL
4310 0023 KSTART /ROUTINE ADDRESS.
4311 4314 P3TS0
4312 5713 JMP I ,+1 /GO START
4313 0236 SRSET

```

/READ 4095 CHARACTERS, AT FULL SPEED, MATCHING EACH CHARACTER  
 /READ AGAINST COUNT PATTERN

```

4314 0000 P3TS0, 0
4315 4344 P3TS1
4316 4465 JMS I SYNC /GO SYNC TAPE
4317 4577 SETLOC /SET COUNT OF
4320 0062 CTRA /-4095(DEC) IN
4321 0001 -7777 /CTRA
4322 4571 UKCC /START READER
4323 4466 JMS I INPATT /GO INITIALIZE PATTERN
4324 4467 P3TS0A, JMS I GETPT /GET PATTERN CHARACTER
4325 3332 DCA SB0 /STORE AT SB0
4326 4572 UKSF /READY?
4327 5326 JMP .-1 /NO. TEST AGAIN
4330 4567 UKRB /YES. READ CHARACTER
4331 4470 JMS I CHECK /GO CHECK FOR CORRECT MATCH
4332 0000 SB0, 0 /CORRECT CHAR HERE
4333 5337 JMP P3E0 /ERROR, GO TO P3E0
4334 2062 P3T0B, ISE CTRA /OK. ALL DONE?
4335 5324 JMP P3TS0A /NO. REPEAT
4336 5425 JMP I CHAIN /YES. CHAIN
4337 7402 P3E0, HLT /TST10 ERR HALT. AC CONTAINS
/CHAR THAT DID NOT MATCH
/AGAINST PATTERN. EPRESS
/KEY CONTINUE

4340 7200 CLA
4341 1332 TAD SB0 /GET CORRECT CHARACTER
4342 7402 HLT /AC CONTAINS THE EXPECTED CHARACTER
4343 5334 JMP P3T0B
  
```

/READ 2000 CHARACTERS WITH RANDOM DELAY BETWEEN CHARACTERS,  
 /MATCH EACH CHARACTER READ AGAINST COUNT PATTERN

```

4344 0001 P3TS1, 1
4345 4400 P3TS2
4346 4465 JMS I SYNC /TO SYNC TAPE
4347 4577 SETLOC /SET COUNT OF
4350 0062 CTRA /-2000 (DEC) IN
4351 4060 -3720 /CTRA
4352 4571 UKCC /START READER
4353 4466 JMS I INPATT /INITIALIZE PATTERN
4354 4467 P3TS1A, JMS I GETPT /GET PATTERN CHARACTER
4355 3364 DCA SB1 /STORE AT SB1
4356 4427 JMS I DLCNT1 /GENERATE RANDOM DELAY
4357 4576 DELAY /DELAY
4360 4572 UKSF /READY?
4361 5360 JMP .-1 /NO. TEST AGAIN
4362 4567 UKRB /YES. READ CHARACTER
4363 4470 JMS I CHECK /GO CHECK FOR CORRECT MATCH

4364 0000 SB1, 0 /CORRECT CHAR HERE
  
```

```

4365 5371          JMP P3E1          /ERROR, GO TO P3E1
4366 2062 P3T1B,  ISZ CTRA          /OK, ALL DONE?
4367 5354          JMP P3TS1A         /NO.
4370 5425          JMP I CHAIN        /YES, CHAIN
4371 7402 P3E1,   HLT          /TST1 ERR HALT, AC CONTAINS
                          /CHARACTER THAT DID NOT MATCH
                          /AGAINST PATTERN, DEPRESS
                          /KEYCONTINUE

4372 7200          CLA
4373 1364          TAD SB1          /GET CORRECT CHARACTER
4374 7402          HLT          /AC CONTAINS THE EXPECTED
                          /CHARACTER

4375 5366          JMP P3T1B

4377 4157          PAGE
      4400

```

/READ WITH RANDOM STALL BETWEEN RANDOM CHARACTER GROUPS  
/100 GROUPS READ.

```

4400 0002 P3TS2, 2
4401 7777          7777
4402 4465          JMS I SYNC          /GO SYNC TAPE
4403 4430          JMS I S100         /SET UP TO DO TEST 100 TIMES.
4404 4571          UKCC          /START READER
4405 4466          JMS I INPATT        /INITIALIZE PATTERN
4406 4427 P3TS2A, JMS I DLONT1        /SET RANDOM DELAY
4407 4777          JMS CHRCNT        /SET RANDOM CHARACTER
4410 0063          CTRB          /COUNT IN CTRB
4411 4467 P3TS2B, JMS I GETPT        /GET PATTERN CHARACTER
4412 3220          DCA SB2          /AND STORE AT SB2
4413 4576          DELAY          /GO DELAY NO OF
4414 4572          UKSF          /READY?
4415 5214          JMP .-1          /NO, TEST AGAIN
4416 4567          UKRB          /READ CHARACTER
4417 4470          JMS I CHECK        /CHECK FOR CORRECT MATCH
4420 0000 SB2,   0          /AGAINST SB2 CONTENTS
4421 5227          JMP P3E2          /ERROR, GO TO P3E2
4422 2063          ISZ CTRB          /OK, ALL CHARS FOR GROUP DONE?
4423 5211          JMP P3TS2B        /NO
4424 2062 P3T2C, ISZ CTRA          /YES, ALL GROUPS DONE?
4425 5206          JMP P3TS2A        /NO
4426 5425          JMP I CHAIN        /YES, CHAIN

4427 7402 P3E2,   HLT          /TST2 ERROR HALT, AC CONTAINS CHAR THAT
                          /DID NOT MATCH AGAINST PATTERN, DEPRESS KEY
                          /CONTINUE

4430 7200          CLA
4431 1220          TAD SB2          /GET CORRECT CHARACTER
4432 7402          HLT          /AC CONTAINS THE EXPECTED CHARACTER
4433 5224          JMP P3T2C

```

/PROGRAM 4,

```

4434 4776' PRG4,   JMS STBF      /SET UP BUFFER AREA
4435 4577       SETLOC      /SET KSTART TO INITIAL
4436 0023       KSTART      /ROUTINE ADDRESS
4437 4442       P4TS0
4440 5641       JMP I ,+1     /GO START PROGRAM
4441 0236       SRSET
/CARRIAGE RETURN TEST
4442 0000 P4TS0, 0
4443 4475       P4TS1
4444 4555       CKSR37      /KSR37?
4445 1140       TAD [11     /NO.
4446 1375       TAD [-122   /YES
4447 7421       MQL        /STORE IN MQ,
4450 4573       TYPE       /PRINT TEST TITLE
4451 6327       CRTST
4452 1133       TAD [334    /GET "\" CODE
4453 4474       JMS I UPUNCH /PRINT IT
4454 7701       ACL        /MQ TO AC.
4455 3104       DCA UTEMP
4456 2104 CRTSTA, ISZ UTEMP  /ALL DONE?
4457 7410       SKP        /NO
4460 5425       JMP I CHAIN  /YES, CHAIN
4461 1104 CRTSTB, TAD UTEMP
4462 3105       DCA UTEMP1  /UTEMP TO UTEMP1
4463 1142       TAD [240    /GET "SPACE" CODE
4464 4474       JMS I UPUNCH /PRINT IT
4465 2105       ISZ UTEMP1  /SPACED NO. OF TIMES IN UTEMP1?
4466 5263       JMP .-3     /NO, SO SPACE AGAIN
4467 1107       TAD CR      /YES, GET "CR" CODE.
4470 4474       JMS I UPUNCH /PRINT IT.
4471 4474       JMS I UPUNCH /DUMMY CYCLE.
4472 1132       TAD [257   /SET "/" CODE
4473 4474       JMS I UPUNCH /PRINT IT
4474 5256       JMP CRTSTA  /GO TO CRTSTA

```

/RIGHT MARGIN TEST

```

4475 0001 P4TS1, 1
4476 4525       P4TS2
4477 7200       CLA
4500 1131       TAD [-16
4501 7421       MQL
4502 1130       TAD [RM33B
4503 3323       DCA RMB
4504 4555       CKSR37      /KSR37?
4505 5312       JMP .+5     /NO.
4506 1127       TAD [-17   /YES.
4507 7421       MQL
4510 1126       TAD [RM37A
4511 3323       DCA RMB

```

```

4512 4573      TYPE          /PRINT TEST TITLE
4513 6337      RMTST
4514 7701      ACL
4515 3104      DCA UTEMP
4516 4573      RMTSTA, TYPE    /PRINT ---- I
4517 1562      RM33A
4520 2104      ISZ UTEMP      /DONE TIMES?
4521 5316      JMP RMTSTA     /NO, SO DO IT AGAIN
4522 4573      TYPE          /YES, PRINT -I-
4523 0000      RMB, OPEN
4524 5425      JMP I CHAIN    /CHAIN

```

```

/SPACE TEST
4525 0002      P4TS2, 2
4526 4600      P4TS3
4527 4573      TYPE          /PRINT TEST TITLE
4530 6354      SPTST
4531 4555      CKSR37       /KSR3??
4532 1125      TAD [5       /NO
4533 1124      TAD [-51      /YES
4534 3104      DCA UTEMP     /-36 TO UTEMP
4535 4573      SPTSTA, TYPE  /PRINT \, SPACE
4536 6324      SPTSTC
4537 2104      ISZ UTEMP     /DONE 36 TIMES?
4540 5335      JMP SPTSTA    /NO, SO DO IT AGAIN.
4541 4555      CKSR37       /KSR3??
4542 1123      TAD [4       /NO
4543 1122      TAD [-50      /YES
4544 3104      DCA UTEMP     /-36 TO UTEMP
4545 1374      TAD [-1       /GET -1
4546 3105      SPTSTB, DCA UTEMP1 /AC TO UTEMP1
4547 1105      TAD UTEMP1    /UTEMP1
4550 3106      DCA UTEMP2    /TO UTEMP2
4551 1107      TAD CR        /GET "CR" CODE
4552 4474      JMS I UPUNCH   /PRINT IT
4553 4474      JMS I UPUNCH   /DUMMY CYCLE
4554 1142      TAD [240      /GET "SPACE" CODE
4555 4474      JMS I UPUNCH   /PRINT IT
4556 2106      ISZ UTEMP2    /DONE SPACING?
4557 5354      JMP , -3      /NO.
4560 1132      TAD [257      /GET "/" CODE
4561 4474      JMS I UPUNCH   /PRINT IT
4562 2104      ISZ UTEMP     /DONE 36 TIMES?
4563 7410      SKP          /NO.
4564 5425      JMP I CHAIN    /YES, CHAIN
4565 7344      CLA CLL CMA RAL /-2 TO AC
4566 1105      TAD UTEMP1    /ADD C(UTEMP1)
4567 5346      JMP SPTSTB    /GO TO SPTSTB

```

```

4574 7777
4575 7656
4576 1000
4577 0456
4600

```

```

/TYPE LINE OF CHARACTERS ABC
4600 0003 P4TS3, 3
4601 5122 P4TS47
4602 7240 CLA CMA /SET STALL
4603 3064 DCA STLID /INDICATOR
4604 4573 TYPE /PRINT TEST TITLE
4605 6366 LFTST
4606 4555 CKSR37 /KSR37?
4607 1140 TAD [11 /NO.
4610 1377 TAD [-121 /YES.

```

```

4611 3104 DCA UTEMP
4612 1133 LFTSTA, TAD [334 /GET "\ " CODE
4613 4474 JMS I UPUNCH /PRINT IT
4614 1110 TAD LF /GET "LF" CODE
4615 4474 JMS I UPUNCH /PRINT IT
4616 2104 ISZ UTEMP /DONE?
4617 7410 SKP /NO.
4620 5425 JMP I CHAIN /YES, CHAIN
4621 4556 STALL
4622 5212 JMP LFTSTA /GO TO LFTSTA

```

```

/TYPE LINE OF CHARACTERS DEF
4623 0004 P4TS4, 4
4624 4631 P4TS5
4625 4573 TYPE /PRINT TITLE
4626 6376 CHRTST
4627 4433 JMS I TLCALL /PRINT LINE
4630 6107 A

```

```

/TYPE LINE OF CHARACTERS DEF
4631 0005 P4TS5, 5
4632 4635 P4TS6
4633 4433 JMS I TLCALL
4634 6112 D

```

```

/TYPE LINE OF CHARACTERS GHI
4635 0006 P4TS6, 6
4636 4641 P4TS7
4637 4433 JMS I TLCALL
4640 6115 G

```

```

/TYPE LINE OF CHARACTERS JKL
4641 0007 P4TS7, 7
4642 4645 P4TS10
4643 4433 JMS I TLCALL
4644 6120 J

```

```

/TYPE LINE OF CHARACTERS MNO
4645 0010 P4TS10, 10
4646 4651 P4TS11

```

4647	4433	JMS I TLCALL
4650	6123	M
		/TYPE LINE OF CHARACTERS PQR
4651	0011	P4TS11, 11
4652	4655	P4TS12
4653	4433	JMS I TLCALL
4654	6126	P
		/TYPE LINE OF CHARACTERS STU
4655	0012	P4TS12, 12
4656	4661	P4TS13
4657	4433	JMS I TLCALL
4660	6131	S
		/TYPE LINE OF CHARACTERS VWX
4661	0013	P4TS13, 13
4662	4665	P4TS14
4663	4433	JMS I TLCALL
4664	6134	V
		/TYPE LINE OF CHARACTERS YZ0
4665	0014	P4TS14, 14
4666	4671	P4TS15
4667	4433	JMS I TLCALL
4670	6137	Y
		/TYPE LINE OF CHARACTERS 123
4671	0015	P4TS15, 15
4672	4675	P4TS16
4673	4433	JMS I TLCALL
4674	6142	ONE
		/TYPE LINE OF CHARACTERS 456
4675	0016	P4TS16, 16
4676	4701	P4TS17
4677	4433	JMS I TLCALL
4700	6145	FOUR
		/TYPE LINE OF CHARACTERS 789
4701	0017	P4TS17, 17
4702	4705	P4TS20
4703	4433	JMS I TLCALL
4704	6150	SEVEN
		/TYPE LINE OF CHARACTERS !"#\$
4705	0020	P4TS20, 20
4706	4711	P4TS21
4707	4433	JMS I TLCALL
4710	6153	C241
		/TYPE LINE OF CHARACTERS %&
4711	0021	P4TS21, 21
4712	4715	P4TS22
4713	4433	JMS I TLCALL
4714	6156	C244
		/TYPE LINE OF CHARACTERS '()
4715	0022	P4TS22, 22
4716	4721	P4TS23
4717	4433	JMS I TLCALL
4720	6161	C247
		/TYPE LINE OF CHARACTERS **,
4721	0023	P4TS23, 23
4722	4725	P4TS24



4723	4433	JMS I TLCALL
4724	6164	C252
		/TYPE LINE OF CHARACTERS =.I
4725	0024	P4TS24, 24
4726	4731	P4TS25
4727	4433	JMS I TLCALL
4730	6167	C255
		/TYPE LINE OF CHARACTERS IJK
4731	0025	P4TS25, 25
4732	4735	P4TS26
4733	4433	JMS I TLCALL
4734	6172	C272
		/TYPE LINE OF CHARACTERS =>?
4735	0026	P4TS26, 26
4736	4741	P4TS27
4737	4433	JMS I TLCALL
4740	6175	C275
		/TYPE LINE OF CHARACTERS @ \X
4741	0027	P4TS27, 27
4742	4745	P4TS30
4743	4433	JMS I TLCALL
4744	6200	C300
		/TYPE LINE OF CHARACTERS ]+ AND LEFT ARROW
4745	0030	P4TS30, 30
4746	4751	P4TS31
4747	4433	JMS I TLCALL
4750	6203	C335
		/TYPE LINE OF SMALL A, B, AND C
4751	0031	P4TS31, 31
4752	4755	P4TS32
4753	4434	JMS I TLC37
4754	6206	SA
		/TYPE LINE OF SMALL D, E, AND F
4755	0032	P4TS32, 32
4756	4761	P4TS33
4757	4434	JMS I TLC37
4760	6211	SD
		/TYPE LINE OF SMALL G, H, AND I
4761	0033	P4TS33, 33
4762	5000	P4TS34
4763	4434	JMS I TLC37
4764	6214	SG
4777	7657	
	5000	PAGE
		/TYPE LINE OF SMALL J, K, AND L
5000	0034	P4TS34, 34
5001	5004	P4TS35
5002	4434	JMS I TLC37
5003	6217	SJ

```

5004 0035 /TYPE LINE OF SMALL M, N, AND O
P4TS35, 35
5005 5010 P4TS36
5006 4434 JMS I TLC37
5007 6222 SM
/TYPE LINE OF SMALL P, Q, AND R
5010 0036 P4TS36, 36
5011 5014 P4TS37
5012 4434 JMS I TLC37
5013 6225 SP
/TYPE LINE OF SMALL S, T, AND U
5014 0037 P4TS37, 37
5015 5020 P4TS40
5016 4434 JMS I TLC37
5017 6230 SS
/TYPE LINE OF SMALL V, W, AND X
5020 0040 P4TS40, 40
5021 5024 P4TS41
5022 4434 JMS I TLC37
5023 6233 SV
/TYPE LINE OF SMALL Y, AND Z, AND CODE 340 CHARACTER.
5024 0041 P4TS41, 41
5025 5030 P4TS42
5026 4434 JMS I TLC37
5027 6236 SY
/TYPE LINE OF CHARACTERS WHOSE CODE IS 373, 374, 375, 376.
5030 0042 P4TS42, 42
5031 5047 P4TS43
5032 4555 CKSR37 /KSR37?
5033 5425 JMP I CHAIN /NO, BYPASS TEST
5034 4574 MOVE
5035 6241 C373
5036 6601 BLOCK1
5037 7774 -4
5040 4574 MOVE
5041 6601 BLOCK1
5042 6605 BLOCK1+4
5043 7663 -115
5044 3064 DCA STLID
5045 4777 JMS TYPLN
5046 5425 JMP I CHAIN

/TYPE 2 LINES OF ALL CHARACTERS, 1ST LINE NO DELAY, 2ND LINE WITH STALLS.
5047 0043 P4TS43, 43
5050 5054 P4TS44
5051 4776 JMS FBALL /FILL BUFFER WITH ALL CHARS.
5052 4775 JMS WOSWS
5053 5425 JMP I CHAIN /CHAIN

/TYPE 12 LINES OF ASR33 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS.
5054 0044 P4TS44, 44
5055 5072 P4TS45

```

```

5056 4573 TYPE /PRINT TITLE
5057 6412 WCPTST
5060 4554 CKSR33 /33?
5061 5425 JMP I CHAIN /NO
5062 4774 JMS FW336 /PATTERN TO BUFFER
5063 4577 SETLOC /-6 TO CTRA
5064 0062 CTRA
5065 7772 -6
5066 4775' P4T44A, JMS WOSWS
5067 2062 ISZ CTRA
5070 5266 JMP P4T44A /NO, REPEAT
5071 5425 JMP I CHAIN /YES, CHAIN

```

/TYPE 12 LINES OF ASR35 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS.

```

5072 0045 P4TS43, 45
5073 5106 P4TS46
5074 4553 CKSR35 /35?
5075 5425 JMP I CHAIN /NO,
5076 4773' JMS FW356 /PATTERN TO BUFFER
5077 4577 SETLOC /-6 TO CTRA
5100 0062 CTRA
5101 7772 -6
5102 4775' P4T45A, JMS WOSWS
5103 2062 ISZ CTRA /ALL LINES TYPED?
5104 5302 JMP P4T45A /NO, REPEAT
5105 5425 JMP I CHAIN /YES, CHAIN

```

/TYPE 12 LINES OF KSR37 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS.

```

5106 0046 P4TS46, 46
5107 7777 7777
5110 4555 CKSR37 /37?
5111 5425 JMP I CHAIN /NO, BYPASS TEST.
5112 4772' JMS FW376 /YES, PATTERN TO BUFFER
5113 4577 SETLOC /-6 TO CTRA
5114 0062 CTRA
5115 7772 -6
5116 4775' P4T46A, JMS WOSWS
5117 2062 ISZ CTRA /ALL LINES TYPED?
5120 5316 JMP P4T46A /NO, REPEAT
5121 5425 JMP I CHAIN /YES, CHAIN

```

/KSR37, KSR35, OR ASR35 TAB TEST

```

5122 0047 P4TS47, 47
5123 5231 P4TS50
5124 4555 CKSR37 /KSR37?
5125 5346 JMP TBTB /NO,
5126 4573 TYPE /YES, TYPE TITLE
5127 6267 TBTST
5130 1121 TAD (-11 /-9 TO CTRA
5131 4771' JMS MTABP /GO TO SUB TO MARK TAB POSITIONS.
5132 1370 TAD (-12 /SET TAB COUNT
5133 3340 DCA TBCNT /TO -10
5134 1367 TBTA, TAD (-7 /YES, -7 TO CTRA
5135 3062 DCA CTRA

```

5136	3361		DCA SPCNT	/0 TO SPACE COUNT
5137	4766'		JMS TABP	/GO TAB AND PRINT SLASH 9 TIMES.
5140	0000	TBCNT,	OPEN	/TAB COUNT,
5141	2062		ISZ CTRA	/DONE?
5142	7410		SKP	/NO.
5143	5425		JMP I CHAIN	/YES, CHAIN
5144	2361		ISZ SPCNT	/INCREMENT SPACE COUNT
5145	5337		JMP TBTA+3	/REPEAT
5146	4553	TBTB,	CKSR35	/KSR, ASR35?
5147	5425		JMP I CHAIN	/NO, BYPASS TEST
5150	4573		TYPE	/YES, TYPE TITLE
5151	6267		TBTST	
5152	1367		TAD (-7	/-7 TO CTRA
5153	4771'		JMS MTABP	/GO TO SUB TO MARK TAB POSITIONS.
5154	4573		TYPE	/YES.
5155	6301		TBMRK+1	
5156	1121		TAD [-11	/SET TAB COUNT
5157	3340		DCA TBCNT	/TO -9
5160	5334		JMP TBTA	
5161	0000	SPCNT,	OPEN	
5162	0000	SPCTR,	OPEN	

5166 5201  
 5167 7771  
 5170 7766  
 5171 2162  
 5172 1153  
 5173 1135  
 5174 1117  
 5175 2153  
 5176 1066  
 5177 1627  
 5200

PAGE

5200	0000	TABCTR,	OPEN	
5201	0000	TABP,	OPEN	
5202	1601		TAD I TABP	/SET TABCTR
5203	3200		DCA TABCTR	
5204	2201		ISZ TABP	
5205	4575		CRLF	/CRLF ONCE
5206	7777		=1	
5207	1777'	SPAC,	TAD SPCNT	/GET SPACE COUNT
5210	7450		SNA	/0?
5211	5220		JMP TABPA	/YES, DON'T SPACE
5212	7041		CIA	/NO, NEGATE COUNT
5213	3776'		DCA SPCTR	
5214	1142		TAD [240	/SPACE
5215	4474		JMS I UPUNCH	
5216	2776'		ISZ SPCTR	/DONE SPACING?
5217	5214		JMP ,=3	/NO, SPACE AGAIN
5220	1140	TABPA,	TAD [11	/GET TAB CODE
5221	4474		JMS I UPUNCH	/OUTPUT TO TELEPRINTER
5222	4474		JMS I UPUNCH	/DUMMY CYCL
5223	4474		JMS I UPUNCH	/DUMMY CYCL

5224	1132	TAD C257	/GET "/" CODE
5225	4474	JMS I UPUNCH	/AND TYPE IT
5226	2200	ISZ TABCTR	/DONE?
5227	5207	JMP SPAC	/NO, REPEAT
5230	5601	JMP I TABP	/YES, EXIT

/KSR37 BACKSPACE TEST,  
P4TS50, 50

5231	0050	P4TS4	
5232	4623	CKSR37	/KSR37?
5233	4555	JMP I CHAIN	/NO
5234	5425	TYPE	/YES, TYPE TITLE
5235	4573	BKSPT	
5236	6253	TAD [-51	/-41 TO CTRA
5237	1124	DCA CTRA	
5240	3062	TYPE	/TYPE ALTERNATE U'S.
5241	4573	BKSU	
5242	6574	ISZ CTRA	/DONE?
5243	2062	JMP ,=3	/NO.
5244	5241	TAD (-47	/-39 TO CTRA
5245	1375	DCA CTRA	
5246	3062	JMS BKSPC	/BACKSPACE TWICE
5247	4263	=2	
5250	7776	TAD C252	/TYPE "*"
5251	1774'	JMS I UPUNCH	
5252	4474	JMS BKSPC	/BACKSPACE THRICE
5253	4263	=3	
5254	7775	TAD C252	/TYPE "*"
5255	1774'	JMS I UPUNCH	
5256	4474	ISZ CTRA	/DONE 39 TIMES?
5257	2062	JMP ,=5	/NO.
5260	5253	JMP I CHAIN	/YES, CHAIN
5261	5425	BKSCTR, OPEN	
5262	0000		

5263	0000	BKSPC, OPEN	
5264	1663	TAD I BKSPC	/GET BACKSPACE COUNT
5265	3262	DCA BKSCTR	/AND STORE AT BKSCTR
5266	2263	ISZ BKSPC	/SET UP EXIT
5267	1373	TAD (210	/GET BACKSPACE CODE
5270	4474	JMS I UPUNCH	/OUTPUT TO TELEPRINTER
5271	2262	ISZ BKSCTR	/DONE BACKSPACING?
5272	5267	JMP ,=3	/NO, REPEAT
5273	5663	JMP I BKSPC	/YES, EXIT

/PROGRAM 5, PUNCH TEST  
PRG5,

5274	4577	SETLOC	/SET INTERRUPT SERVICE ADDRESS
5275	0002	2	/TO INTSVC
5276	1254	INTSVC	
5277	4577	SETLOC	/SET DATA BLOCK
5300	0101	BLKCNT	/LENGTH TO
5301	7000	=1000	/=512
5302	4571	UKCC	

5303	1372	TAD (BLOCKA	/SET UP ADDRESS TO
5304	3104	DCA UTEMP	/STORE DATA,
5305	1371	TAD (-1000	/-512 TO CTRA
5306	3062	DCA CTRA	
5307	4770'	JMS SINPT	/INITIALIZE SPECIAL COUNT PATTERN
5310	4767'	JMS SGET	/GET CHARACTER
5311	3504	DCA I UTEMP	/STORE IT
5312	2104	ISZ UTEMP	/INCREMENT POINTER,
5313	2062	ISZ CTRA	/DONE 512 CHARACTERS?
5314	5310	JMP ,-4	/NO, REPEAT
5315	4372	UKSP	
5316	5315	JMP ,-1	
5317	7200	PRG5A, CLA	/YES, CLEAR READY BUSY
5320	3076	DCA RBUSY	
5321	4766'	JMS PLTLR	/PUNCH LEADER
5322	4765'	JMS PSYNC	/PUNCH SYNC CHARACTER
5323	4764'	JMS PBLK	/PUNCH DATA BLOCK FULL SPEED.
5324	4766'	JMS PLTLR	/PUNCH TRAILER
5325	4763'	JMS RSYNC	/SYNC READER
5326	4762'	JMS RDBLK	/READ DATA BLOCK
5327	4761'	JMS RRDY	/WAIT FOR READER NOT BUSY
5330	4766'	JMS PLTLR	/PUNCH LEADER
5331	4765'	JMS PSYNC	/PUNCH SYNC CHARACTER
5332	4760'	JMS PBLKR	/PUNCH DATA BLOCK (WITH STALLS).
5333	4766'	JMS PLTLR	/PUNCH TRAILER
5334	4763'	JMS RSYNC	/SYNC READER
5335	4762'	JMS RDBLK	/READ DATA BLOCK
5336	4761'	JMS RRDY	/WAIT FOR READER NOT BUSY
5337	5317	JMP PRG5A	/REPEAT.

/PROGRAM 6, KEYBOARD TEST

5340	4577	PRG6, SETLOC	/SET KSTART TO INITIAL
5341	0023	KSTART	/ROUTINE ADDRESS
5342	5400	P6T0	
5343	4573	TYPE	/PRINT
5344	6432	KMSG1	
5345	5746	JMP I ,+1	
5346	0236	SRSET	

5360	1324
5361	1343
5362	1400
5363	1216
5364	1316
5365	1212
5366	1200
5367	1721
5370	1711
5371	7000
5372	6577
5373	0210
5374	6164
5375	7731
5376	5162

5377 5101  
5400 PAGE

/CLEAR AC AND FLAG (KCC), WAIT FOR FLAG TO SET. WITH FLAG SET, SKIP  
/ON FLAG 4000 TIMES, KSF SHOULD SKIP EVERY TIME.

```

P6T0, 0
5400 0000
5401 5421 P6T1
5402 4431 JMS I 54000
5403 4571 UKCC /CLEAR AC AND FLAG
5404 4573 TYPE
5405 6443 KMSG2
5406 4572 UKSF /READY?
5407 3226 JMP ,=1 /WAIT
5408 4572 UKSF /READY, SKIP ON FLAG
5409 3219 JMP P6T0 /NO SKIP, ERROR
5410 2003 USE CYR /ALL DONE?
5411 3219 JMP ,=0 /NO, REPEAT
5412 3425 JMP I CHAIN /YES, CHAIN
5413 3425
5414 3425

5415 7602 P6T0, HLT CLA /KSF FAILURE
5416 4572 UKSF /SCOPE LOOP
5417 3216 JMP ,=2 /SKIPS ON FLAG
5418 3216 JMP ,=2 /CONTINUOUSLY
    
```

/ECHO TEST CHARACTER RECEIVED FROM KEYBOARD IS TYPED. THE  
/CHARACTER TYPED SHOULD MATCH CHARACTER KEYED. RUBOUT CHARACTER  
/ENDS ROUTINE.

```

P6T1, 1
5421 0001
5422 5440 P6Y2
5423 4571 UKCC /CLEAR AC AND FLAG
5424 4573 TYPE
5425 6454 KMSG3
5426 4572 P6T1A, UKSF /READY?
5427 3226 JMP ,=1 /WAIT
5428 4567 UKR0 /READ CHARACTER
5429 4563 UTLS /PRINT IT
5430 4566 UTSP /PRINTER READY?
5431 5232 JMP ,=1 /NO, WAIT
5432 1144 TAD [-377
5433 7440 SZA /IS IT RUBOUT?
5434 3226 JMP P6T1A /NO
5435 5425 JMP I CHAIN /YES, CHAIN
5436 5425
5437 5425
    
```

/OCTAL EQUIVALENT TEST, THE OCTAL EQUIVALENT OF ANY  
/CHARACTER KEYED IS PRINTED. RUBOUT ENDS ROUTINE.

```

P6T2, 2
5440 0002
5441 7777
5442 4571 UKCC /CLEAR AC AND FLAG
5443 4573 TYPE /PRINT TITLE AND
    
```

```

5444 6521      KMSG4      /INSTRUCTION
5445 4573      TYPE
5446 6462      KMSG3A
5447 4572      P6T2A, UKSF      /FLAG 17
5450 5247      JMP , -1      /NO. WAIT
5451 4567      UKRB      /YES, READ KEYBOARD
5452 3112      DCA WTS6A    /STORE CHARACTER
5453 4777      JMS ASCON    /CONVERT CHARACTER
5454 0112      WTS6A      /TO PRINTABLE OCTAL.
5455 6541      OCTEQV
5456 4573      TYPE      /PRINT CHARACTER
5457 6537      KMSG5
5460 1112      TAD WTS6A
5461 1144      TAD C-377
5462 7640      SZA CLA      /WAS IT A SUBOVI
5463 5247      JMP P6T2A    /NO.
5464 8425      JMP I CHAIN  /YES. CHAIN

```

/PROGRAM 7. COMBINED READER, PRINTER, PUNCH TEST.

```

5465 4577      PRG7, SETLOC    /SET INTERRUPT SERVICE
5466 0002      2          /ADDRESS TO INTSVC
5467 1234      INTSVC
5470 4577      SETLOC    /SET DATA BLOCK LENGTH
5471 0101      BLKCNT    /TO -150
5472 7552      -226
5473 4426      JMS I KBFLAG
5474 4776      JMS STBF    /SET UP BUFFER AREA
5475 4577      SETLOC    /SET KSTART TO INITIAL
5476 0023      KSTART    /ROUTINE ADDRESS
5477 5502      P7T0
5500 5701      JMP I , +1    /START PROGRAM
5501 0236      SRSET

```

```

5502 0000      P7T0, 0
5503 5506      P7T1
5504 4435      JMS I FBF    /DATA: ABC
5505 6107      A
5506 0001      P7T1, 1
5507 5512      P7T2
5510 4435      JMS I FBF    /DATA: DEF
5511 6112      D
5512 0002      P7T2, 2
5513 5516      P7T3
5514 4435      JMS I FBF    /DATA: GHI
5515 6115      G
5516 0003      P7T3, 3
5517 5522      P7T4
5520 4435      JMS I FBF    /DATA: JKL
5521 6120      J
5522 0004      P7T4, 4
5523 5526      P7T5
5524 4435      JMS I FBF    /DATA: MNO
5525 6123      M
5526 0005      P7T5, 5

```



5527	5532		P7T6	
5530	4435		JMS I FBF	/DATA: PQR
5531	6126		P	
5532	0006	P7T6,	6	
5533	5536		P7T7	
5534	4435		JMS I FBF	/DATA: STU
5535	6131		S	
5536	0007	P7T7,	7	
5537	5542		P7T10	
5540	4435		JMS I FBF	/DATA: VWX
5541	6134		V	
5542	0010	P7T10,	10	
5543	5546		P7T11	
5544	4435		JMS I FBF	/DATA: YZ0
5545	6137		Y	
5546	0011	P7T11,	11	
5547	5552		P7T12	
5550	4435		JMS I FBF	/DATA: 123
5551	6142		ONE	
5552	0012	P7T12,	12	
5553	5556		P7T13	
5554	4435		JMS I FBF	/DATA: 456
5555	6145		FOUR	
5556	0013	P7T13,	13	
5557	5562		P7T14	
5560	4435		JMS I FBF	/DATA: 789
5561	6150		SEVEN	
5562	0014	P7T14,	14	
5563	5566		P7T15	
5564	4435		JMS I FBF	/DATA: !"#\$
5565	6153		C241	
5566	0015	P7T15,	15	
5567	5572		P7T16	
5570	4435		JMS I FBF	/DATA: \$%&
5571	6156		C244	
5572	0016	P7T16,	16	
5573	5600		P7T17	
5574	4435		JMS I FBF	/DATA: '()
5575	6161		C247	
5576	1000			
5577	1650			
	5600		PAGE	
5600	0017	P7T17,	17	
5601	5604		P7T20	
5602	4435		JMS I FBF	/DATA: **,
5603	6164		C252	
5604	0020	P7T20,	20	
5605	5610		P7T21	
5606	4435		JMS I FBF	/DATA: -./
5607	6167		C255	
5610	0021	P7T21,	21	
5611	5614		P7T22	

```

5612 4435          JMS I FBF      /DATA: ;|<
5613 6172          C272
5614 0022      P7T22, 22
5615 5620          P7T23
5616 4435          JMS I FBF      /DATA: =>?
5617 6175          C275
5620 0023      P7T23, 23
5621 5624          P7T24
5622 4435          JMS I FBF      /DATA: @[\
5623 6200          C300
5624 0024      P7T24, 24
5625 5630          P7T25
5626 4435          JMS I FBF      /DATA: ]: AND LEFT ARROW
5627 6203          C335
5630 0025      P7T25, 25
5631 5634          P7T26
5632 4777'        JMS FBALL      /DATA: ALL PRINTABLE ASCII
5633 4776'        JMS CNTST

5634 0026      P7T26, 26
5635 5640          P7T27
5636 4775'        JMS FW336      /DATA: ASR33 PRINTER WORST CASE
5637 4776'        JMS CNTST      /PATTERN
5640 0027      P7T27, 27
5641 5644          P7T30
5642 4774'        JMS FW356      /DATA: ASR35 PRINTER WORST CASE
5643 4776'        JMS CNTST      /PATTERN
5644 0030      P7T30, 30
5645 7777        7777
5646 4773'        JMS FBF3      /DATA: 1'S AND 0'S
5647 6245        C377
5650 4776'        JMS CNTST

```

/PROGRAM 10. READS COUNT PATTERN.

```

5651 4465      PRG10, JMS I SYNC      /SYNC TAPE
5652 3321          DCA ERRCTR      /CLEAR ERROR COUNTER
5653 4466          JMS I INPATT      /INITIALIZE PATTERN.
5654 4571          UKCC              /START READER
5655 7604      SRT0A, LAS              /READ SR
5656 0120          AND [400
5657 7650          SNA CLA          /STALL? (SR3=0)
5660 7040          CMA              /YES
5661 3064          DCA STLID        /NO

5662 4467      SRT0B, JMS I GETPT      /GET PATTERN CHAR.
5663 3273          DCA SBSP          /STORE AT SBSP.
5664 4556          STALL            /STALL
5665 4572          UKSF              /READY?
5666 5265          JMP .-1          /TEST AGAIN.
5667 4567          UKRB              /READ, CLEAR AC AND FLAG.
5670 3103          DCA ERRCR
5671 1103          TAD ERRCR

```

```

5672 4470      JMS I CHECK      /GO CHECK CHARACTER WORD.
5673 0000      SBSP, 0          /
5674 7410      SKP          /ERROR, NO MATCH, GO INC. ERRCNT
5675 5313      JMP HLTST        /OK,
5676 2321      ERRCNT, ISZ ERRCTR /INCREMENT ERROR COUNTER
5677 5302      JMP ,+3
5700 7240      CLA CMA      /OFLOW, RESET TO 7777.
5701 3321      DCA ERRCTR
5702 7604      LAS          /READ SR,
5703 0143      AND I100
5704 7650      SNA CLA      /HALT ON ERROR? (SR5)
5705 5313      JMP HLTST        /NO,
5706 1103      TAD ERRCTR   /YES, GET BAD CHAR.
5707 7402      HLT
5710 7200      CLA
5711 1273      TAD SBSP     /GET GOOD CHARACTER
5712 7402      HLT
5713 7604      HLTST, LAS    /READ SR
5714 7700      SMA CLA      /HALT? (SR0)
5715 5255      JMP SRT0A     /NO,
5716 1321      TAD ERRCTR   /GET ERROR COUNT
5717 7402      HLT          /HALT, ERROR COUNT IN AC
5720 5255      JMP SRT0A
5721 0000      ERRCTR, 0    /ERROR COUNTER

```

/PROGRAM 11. PRINTER EXERCISER, TYPES LINES OF ANY 8 CHARACTERS  
/WITH STALLS, OR FULL SPEED, KEYBOARD CONTROLLED.

```

5722 4772'     PRG11, JMS STBF
5723 4573      TYPE
5724 6546      P11MG1
5725 1371     PRG11A, TAD (BLOCK1-1
5726 3016      DCA 16
5727 4573      TYPE
5730 6562      P11MG2
5731 4353      JMS GKBCR
5732 3416      DCA I 16
5733 4353      JMS GKBCR
5734 3416      DCA I 16
5735 4353      JMS GKBCR
5736 3416      DCA I 16
5737 4353      JMS GKBCR
5740 1144      TAD I=377
5741 7640      SZA CLA      /STALL?
5742 7240      CLA CMA      /YES,
5743 3064      DCA STLID    /NO,
5744 4773'     JMS FBF3     /SET UP LINE.
5745 6601      BLOCK1
5746 4770'     JMS TYPLN    /TYPE LINE OF CHARACTERS
5747 7604      LAS          /READ SR,
5750 7700      SMA CLA      /CHANGE DATA? (SR0=1)
5751 5346      JMP ,=3
5752 5325      JMP PRG11A   /YES,
5753 0000      GKBCR, OPEN  /SUB TO GET KEYBOARD CHARACTER,
5754 4572      UKSF        /WAIT FOR FLAG.

```

```

5755 5354      JMP  .-1
5756 4567      UKRB          /READ CHARACTER,
5757 7421      MQL           /STORE CHARACTER.
5760 7701      ACL           /GET IT BACK.
5761 4474      JMS I UPUNCH  /ECHO IT.
5762 7701      ACL           /GET CHARACTER AGAIN.
5763 5793      JMP I GKBCR   /EXIT
    
```

/PROGRAM 12. PUNCHES BINARY COUNT PATTERN.

```

5764 4466      PRG12, JMS I INPATT /INITIALIZE BINARY COUNT PATTERN
5765 4467      JMS I GETPT  /GET BINARY COUNT CHARACTER.
5766 4474      JMS I UPUNCH /PUNCH CHARACTER
5767 5365      JMP  .-2      /REPEAT.
    
```

```

5770 1627
5771 6600
5772 1000
5773 1031
5774 1135
5775 1117
5776 1600
5777 1066
    6000
    
```

PAGE

```

6000 0000      DVCSEL, OPEN      /DEVICE CODE SELECT ROUTINE.
6001 1117      TAD [INTAB    /GET START ADDR OF INPUT IOT TABLE,
6002 3052      DCA TEMP      /AND SAVE AT TEMP,
6003 1021      TAD TTYIOT    /OBTAIN NEW INPUT IOT AND
6004 7012      RTR           /STORE AT UTEMP.
6005 7010      RAR
6006 0116      AND [0770
6007 3104      DCA UTEMP
6010 4222      JMS DVCOM     /PERFORM INPUT IOT SELECTION,
6011 1115      TAD [OUTTAB   /GET START ADDR OF OUTPUT IOT TABLE,
6012 3052      DCA TEMP      /AND OBTAIN NEW OUTPUT IOT AND
6013 1021      TAD TTYIOT    /OBTAIN NEW OUTPUT IOT AND
6014 7006      RTL           /STORE AT UTEMP.
6015 7004      RAL
6016 0116      AND [0770
6017 3104      DCA UTEMP
6020 4222      JMS DVCOM     /PERFORM OUTPUT IOT SELECTION,
6021 5600      JMP I DVCSEL   /EXIT DVCSEL,
6022 0000      DVCOM, OPEN   /COMMON SUB TO SELECT IOT'S.
6023 1452      TAD I TEMP
6024 7450      SNA           /0?
6025 5622      JMP I DVCOM   /YES, EXIT
6026 3105      DCA UTEMP1
6027 1505      TAD I UTEMP1
6030 0114      AND [7007
6031 1104      TAD UTEMP
6032 3505      DCA I UTEMP1
6033 2052      ISZ TEMP
6034 5223      JMP DVCOM+1
    
```

/REMOVE OLD DEVICE CODE.  
 /INSERT NEW DEVICE CODE.  
 /PUT BACK NEW IOT CODE.  
 /SE       ? FOR NEXT IOT CODE.

6035	0720	INTAB,	XKSF+1	
6036	0725		XKCC+1	
6037	0731		XKRS+1	
6040	0735		XKRB+1	
6041	0756		XKCR+1	
6042	0762		XKIE+1	
6043	2021		INTKSF	
6044	1233		RSSERV	
6045	1264		INKSF	
6046	1433		IN0	
6047	0000		0	
6050	0741	OUTTAB,	XTSF+1	
6051	0746		XTCF+1	
6052	1172		XTPC+1	
6053	0752		XTLS+1	
6054	1166		XSPF+1	
6055	0766		XSPI+1	
6056	1261		INTCF	
6057	1257		INTSF	
6060	2024		INTTSF	
6061	2114		OUT0	
6062	2121		OUT1	
6063	2123		OUT2	
6064	0000		0	
6065	0247	A33WP6,	0247	/"' "
6066	0337		0337	/LEFT ARROW
6067	0327		0327	/"W"
6070	0257		0257	/"' "
6071	0327		0327	/"W"
6072	0337		0337	/LEFT ARROW
6073	0247	A35WP6,	0247	/"' "
6074	0333		0333	/"["
6075	0277		0277	/"?"
6076	0303		0303	/"C"
6077	0277		0277	/"?"
6100	0333		0333	/"["
6101	0316	A37WP6,	0316	/BIG N
6102	0361		0361	/SMALL Q
6103	0301		0301	/BIG A
6104	0376		0376	/SWUNG DASH
6105	0301		0301	/BIG A
6106	0361		0361	/SMALL Q
6107	0301	A,	301	
6110	0302		302	
6111	0303		303	
6112	0304	D,	304	
6113	0305		305	
6114	0306		306	
6115	0307	G,	307	

6116	0310		310
6117	0311		311
6120	0312	J,	312
6121	0313		313
6122	0314		314
6123	0315	M,	315
6124	0316		316
6125	0317		317
6126	0320	P,	320
6127	0321		321
6130	0322		322
6131	0323	S,	323
6132	0324		324
6133	0325		325
6134	0326	V,	326
6135	0327		327
6136	0330		330
6137	0331	Y,	331
6140	0332		332
6141	0260		260
6142	0261	ONE,	261
6143	0262		262
6144	0263		263
6145	0264	FOUR,	264
6146	0265		265
6147	0266		266
6150	0267	SEVEN,	267
6151	0270		270
6152	0271		271
6153	0241	C241,	241
6154	0242		242
6155	0243		243
6156	0244	C244,	244
6157	0245		245
6160	0246		246
6161	0247	C247,	247
6162	0250		250
6163	0251		251
6164	0252	C252,	252
6165	0253		253
6166	0254		254
6167	0255	C255,	255
6170	0256		256
6171	0257		257
6172	0272	C272,	272
6173	0273		273
6174	0274		274
6175	0275	C275,	275
6176	0276		276
6177	0277		277
6200	0300	C300,	300
6201	0333		333
6202	0334		334
6203	0335	C335,	335

6204	0336		336
6205	0337		337
6206	2341	SA,	341
6207	0342		342
6210	0343		343
6211	0344	SD,	344
6212	0345		345
6213	0346		346
6214	0347	SG,	347
6215	0350		350
6216	0351		351
6217	0352	SJ,	352
6220	0353		353
6221	0354		354
6222	0355	SM,	355
6223	0356		356
6224	0357		357
6225	0360	SP,	360
6226	0361		361
6227	0362		362
6230	0363	SS,	363
6231	0364		364
6232	0365		365
6233	0366	SV,	366
6234	0367		367
6235	0370		370
6236	0371	SY,	371
6237	0372		372
6240	0340		340
6241	0373	C373,	373
6242	0374		374
6243	0375		375
6244	0376		376
6245	0377	C377,	377
6246	0000		000
6247	0377		377
6250	4543	CARLF, TEXT	'X##?'
6251	0077		
6252	0000		
6253	4543	BKSPT, TEXT	'###BACKSPACE TESTX##?'
6254	4302		
6255	0103		
6256	1323		
6257	2001		
6260	0305		
6261	4024		
6262	2523		
6263	2445		
6264	4343		
6265	0077		
6266	0000		
6267	4543	TBTST, TEXT	'###TAB TESTX##?'
6270	4324		
6271	0102		

6272	4024		
6273	0523		
6274	2445		
6275	4343		
6276	0077		
6277	2000		
6300	4040	TBMRK, TEXT	' /0?'
6301	4040		
6302	4040		
6303	4040		
6304	5700		
6305	7700		
6306	4040	TBMRK1, TEXT	' /0?'
6307	4040		
6310	4040		
6311	4057		
6312	0077		
6313	0000		
6314	5511	RM33B, TEXT	'-I-0?'
6315	5500		
6316	7700		
6317	5555	RM37A, TEXT	'----I-I0?'
6320	5555		
6321	1155		
6322	1100		
6323	7700		
6324	3440	SPTSTC, TEXT	'\ 0?'
6325	0077		
6326	0000		
6327	4543	CRIST, TEXT	'###CR TEST###0?'
6330	4303		
6331	2240		
6332	2405		
6333	2324		
6334	4543		
6335	4300		
6336	7700		
6337	4543	RMTST, TEXT	'###RIGHT MARGIN TEST###0?'
6340	4322		
6341	1107		
6342	1024		
6343	4015		
6344	0122		
6345	0711		
6346	1640		
6347	2405		
6350	2324		
6351	4543		
6352	4300		
6353	7700		
6354	4543	SPTST, TEXT	'###SPACE TEST###0?'
6355	4323		
6356	2001		
6357	0305		
6360	4024		



6361	0523		
6362	2445		
6363	4343		
6364	0077		
6365	0000		
6366	4543	LFTST, TEXT	'###LF TEST###?'
6367	4314		
6370	0640		
6371	2405		
6372	2324		
6373	4543		
6374	4300		
6375	7700		
6376	4543	CHRTST, TEXT	'##CHARACTER TESTS##?'
6377	4303		
6400	1001		
6401	2201		
6402	0324		
6403	0522		
6404	4024		
6405	0523		
6406	2423		
6407	4543		
6410	4300		
6411	7700		
6412	4543	WCPTST, TEXT	'##WORST CASE PATTERN TEST###?'
6413	4327		
6414	1722		
6415	2324		
6416	4003		
6417	0123		
6420	0540		
6421	2001		
6422	2424		
6423	0522		
6424	1640		
6425	2405		
6426	2324		
6427	4543		
6430	4300		
6431	7700		
6432	4543	KMSG1, TEXT	'##KYBD TEST##?'
6433	4313		
6434	3102		
6435	0440		
6436	2405		
6437	2324		
6440	4543		
6441	0077		
6442	0000		
6443	4543	KMSG2, TEXT	'#PRESS A KEY##?'
6444	2022		
6445	2523		
6446	2340		
6447	0140		

6450 1305  
6451 3145  
6452 4300  
6453 7700  
6454 4543  
6455 0503  
6456 1017  
6457 4024  
6460 0523  
6461 2400  
6462 4543  
6463 0310  
6464 0122  
6465 0103  
6466 2405  
6467 2240  
6470 1305  
6471 3105  
6472 0440  
6473 2711  
6474 1414  
6475 4002  
6476 0540  
6477 2431  
6500 2005  
6501 0436  
6502 0000  
6503 4543  
6504 2225  
6505 0217  
6506 2524  
6507 4005  
6510 1604  
6511 2340  
6512 2217  
6513 2524  
6514 1116  
6515 0556  
6516 4543  
6517 4300  
6520 7700  
6521 4543  
6522 4317  
6523 0324  
6524 2114  
6525 4005  
6526 2125  
6527 1126  
6530 0114  
6531 0516  
6532 2440  
6533 2405  
6534 2324  
6535 0077  
6536 0000

KMSG3, TEXT '#ECHO TEST'

KMSG3A, TEXT '#CHARACTER KEYED WILL BE TYPED.'

TEXT '#RUBOUT ENDS ROUTINE.###?'

KMSG4, TEXT '###OCTAL EQUIVALENT TEST@?'

```

6537 4543 KMSG5, TEXT '# '
6540 2000
6541 4040 OCTEQV, TEXT '#@?'
6542 4040
6543 4543
6544 0077
6545 0000
6546 4543 P11MG1, TEXT '#PRINTER EXERCISER#@?'
6547 2022
6550 1116
6551 2405
6552 2240
6553 0530
6554 0522
6555 0311
6556 2305
6557 2245
6560 4300
6561 7700
6562 4543 P11MG2, TEXT '#TYPE IN DATA !@?'
6563 2431
6564 2005
6565 4011
6566 1640
6567 0401
6570 2401
6571 4072
6572 0077
6573 0000
6574 2540 BKSU, TEXT 'U @?'
6575 0077
6576 0000
6577 0000 END, 0 /BEG OF 100 WORD BUFFER

```

\$

```

0114 7007
0115 6050
0116 0770
0117 6035
0120 0400
0121 7767
0122 7730
0123 0004
0124 7727
0125 0005
0126 6317
0127 7761
0130 6314
0131 7762
0132 2257
0133 0334
0134 0252
0135 7650
0136 7670
0137 7653

```

0140	0011
0141	7754
0142	0240
0143	0100
0144	7401
0145	0377
0146	0077
0147	7760
0150	0037
0151	7766
0152	0017
0153	0360
0134	0352
0155	0366
0156	0551
0157	0765
0160	1165
0161	0761
0162	0755
0163	0751
0164	1171
0165	0745
0166	0740
0167	0734
0170	0730
0171	0724
0172	0717
0173	0626
0174	0600
0175	0562
0176	0337
0177	0326





A	6107	CR	0107	IN2	1433	NXTST	2256
A33WP6	6065	CRLF	0562	INCRN	2261	OCTEQV	6541
A35WP6	6073	CRCTR	0561	INKSF	1264	ONE	6142
A37WP6	6101	CRLF	4575	INPATT	0066	OPEN	2220
AC	2077	CRTST	6327	INTAB	6035	OUT	1271
ACL	7701	CRTSTA	4456	INTCF	1261	OUT2	2114
ASCCN	1650	CRTSTB	4461	INTFND	2017	OUT1	2121
ASCT	1710	CTRA	0062	INTKSF	2021	OUT2	2123
BAUDRT	0022	CTRB	0063	INTSF	1257	OUTTAB	6052
BDRET	2205	CTSK	0550	INTSVC	1254	P	6126
BKSCCTR	5262	CURTST	0054	INTTSF	2024	P0E0A	2237
BKSPC	5263	D	6112	IOF	6002	P0E0B	2244
BKSPPT	6253	DBLK	7577	ION	6001	P0E0C	2253
BKSU	6574	DELAY	4576	J	6120	P0E0E	2262
BLK2	6724	DELAYM	0024	K5200	2731	P0E1A	2304
BLK0B	6722	DELAYS	0102	KBFLAG	0026	P0E1B	2315
BLK0C	7034	DLCNT	0474	KCC	6032	P0E2A	2415
BLK0NT	0101	DLCNT1	0027	KCR	6030	P0E2B	2427
BLOCK1	6601	DLMSR	1474	KFLAG	1365	P0E2C	2435
BLOCK2	6713	DLYMS	0337	KIE	6035	P0E2D	2443
BLOCKA	6577	DLYMSK	0111	KMSG1	6432	P0E2E	2456
BLOCKB	6711	DVCOM	6022	KMSG2	6443	P0E2F	2465
BLOCKC	7023	DV0SEL	6000	KMSG3	6454	P0E2G	2474
BSW	7002	END	6577	KMSG3A	6462	P0E3A	2527
C241	6153	ERRCNT	5676	KMSG4	6521	P0E3B	2534
C244	6156	ERRCR	0103	KMSG5	6537	P0E3C	2542
C247	6161	ERRCTR	5721	KRB	6036	P0E4A	2607
C252	6164	ERROR	1440	KRS	6034	P0E4B	2614
C255	6167	FADDR	0623	KSF	6031	P0E5A	2650
C272	6172	FBA33	1102	KSTART	0023	P0E5B	2652
C275	6175	FBALL	1066	LDBAUD	1527	P0E6A	2664
C300	6200	FBF	0035	LF	0110	P0E6B	2671
C335	6203	FBF3	1031	LFTST	6366	P0E6C	2675
C373	6241	FBF33	1055	LFTSTA	4612	P0E6D	2706
C377	6245	FBFI	2144	LINK	0100	P0E6E	2720
CAF	6007	FETCH	1646	M	6123	P0E6F	2725
CAM	7621	FLAG	0716	M147	7631	P0E7A	2744
CARLF	6250	FORWD	0302	M3	2111	P0E7B	2752
CHAIN	0025	FOUR	6145	MCTR	0625	P0E7C	2753
CHAINN	0263	FW336	1117	MIL1	0061	P0T6	2654
CHCK	0513	FW356	1135	MILCTR	0060	P0T6A	2657
CHECK	0070	FW376	1153	MINT	6115	P0T6B	2665
CHRCNT	0456	G	6115	MOVE	4574	P0T6C	2672
CHRIST	6376	GETPT	0067	MOVEA	0613	P0T6D	2676
CK33	0352	GETRDY	0237	MOVVE	0600	P0T6E	2707
CK35	0360	GKBCR	5753	MQL	7421	P0T6F	2721
CK37	0366	GTBIN	0444	MSCTR	0057	P0T7	2732
CKSR33	4554	GTF	6004	MTABP	2162	P0T7A	2742
CKSR35	4553	HLTD	2076	MTON	6117	P0T7B	2745
CKSR37	4555	HLTTST	5713	MTRS	6127	P0T7C	2751
CNTST	1630	HOLD1	3346	NTST	1545	P0T80	2225
CNV	1673	IBIN	0436	NTSTA	1554	P0T80A	2211

P0TS0B	2214	P1T12B	3456	P2T10C	4051	P4TS1Z	4645
P0TS0C	2222	P1TS0	3005	P2T10D	4054	P4TS11	4651
P0TS0D	2225	P1TS1	3010	P2T12E	4064	P4TS12	4655
P0TS0E	2230	P1TS1A	3014	P2T10F	4066	P4TS13	4661
P0TS1	2270	P1TS2	3034	P2T11	4153	P4TS14	4665
P0TS1A	2275	P1TS2A	3040	P2T11A	4157	P4TS15	4671
P0TS1B	2313	P1TS2B	3046	P2T11B	4166	P4TS16	4675
P0TS1C	2324	P1TS3	3066	P2T11C	4220	P4TS17	4721
P0TS2	2327	P1TS3A	3074	P2T12	4233	P4TS2	4525
P0TS2A	2332	P1TS4	3126	P2T12A	4247	P4TS20	4725
P0TS2B	2342	P1TS4A	3133	P2T12B	4255	P4TS21	4711
P0TS2C	2345	P1TS4B	3153	P2T12C	4260	P4TS22	4715
P0TS2D	2350	P1TS4C	3167	P2TS0	3510	P4TS23	4721
P0TS2E	2400	P1TS5	3200	P2TS0A	3513	P4TS24	4725
P0TS2F	2402	P1TS5A	3204	P2TS1	3530	P4TS25	4731
P0TS2G	2404	P1TS5B	3211	P2TS1A	3533	P4TS26	4735
P0TS3	2504	P1TS5C	3213	P2TS1B	3534	P4TS27	4741
P0TS3A	2510	P1TS5D	3217	P2TS2	3545	P4TS3	4600
P0TS3B	2515	P1TS5E	3222	P2TS2A	3551	P4TS32	4745
P0TS3C	2521	P1TS6	3271	P2TS3	3600	P4TS31	4751
P0TS4	2544	P1TS6A	3277	P2TS3A	3606	P4TS32	4755
P0TS4A	2547	P1TS7	3314	P2TS4	3630	P4TS33	4761
P0TS4B	2565	P1TS7A	3322	P2TS4A	3635	P4TS34	5000
P0TS4C	2600	P2E0	3524	P2TS4B	3655	P4TS35	5004
P0TS5	2616	P2E1	3543	P2TS4C	3666	P4TS36	5010
P0TS5A	2624	P2E10A	4073	P2TS5	3671	P4TS37	5014
P0TS5B	2634	P2E10B	4107	P2TS5A	3677	P4TS4	4623
P11MG1	6546	P2E10C	4115	P2TS6	3711	P4TS40	5020
P11MG2	6562	P2E10D	4123	P2TS6A	3716	P4TS41	5024
P1E11A	3424	P2E10E	4135	P2TS6B	3724	P4TS42	5030
P1E12A	3464	P2E10F	4144	P2TS6C	3734	P4TS43	5047
P1E12B	3474	P2E11A	4206	P2TS7	3762	P4TS44	5054
P1E1A	3025	P2E11B	4215	P2TS7A	4000	P4TS45	5072
P1E2A	3053	P2E11C	4224	P2TS7B	4006	P4TS46	5106
P1E2B	3062	P2E12A	4276	P3E0	4337	P4TS47	5122
P1E3A	3113	P2E12B	4303	P3E1	4371	P4TS5	4631
P1E3B	3122	P2E12C	4305	P3E2	4427	P4TS50	5231
P1E4A	3143	P2E2A	3562	P3T0B	4334	P4TS6	4635
P1E5	3250	P2E2B	3564	P3T1B	4366	P4TS7	4641
P1E5A	3230	P2E3A	3621	P3T2C	4424	P6E0	5415
P1E5B	3235	P2E3B	3623	P3TS0	4314	P6T0	5420
P1E5C	3242	P2E4A	3644	P3TS0A	4324	P6T1	5421
P1E5D	3257	P2E4B	3657	P3TS1	4344	P6T1A	5426
P1E5E	3264	P2E5	3706	P3TS1A	4354	P6T2	5442
P1E6A	3310	P2E6A	3746	P3TS2	4400	P6T2A	5447
P1E710	3366	P2E6B	3752	P3TS2A	4426	P7CTR	1211
P1T10	3325	P2E6C	3756	P3TS2B	4411	P7T0	5502
P1T10A	3333	P2E7A	4015	P4T44A	5066	P7T1	5526
P1T11	3400	P2E7B	4021	P4T45A	5102	P7T10	5542
P1T11A	3405	P2T10	4030	P4T46A	5116	P7T11	5546
P1T12	3435	P2T10A	4034	P4TS0	4442	P7T12	5552
P1T12A	3443	P2T10B	4045	P4TS1	4475	P7T13	5556



P7T14	5562	RCTRA	1511	SLJCD2	0223	TLCALI	2126
P7T15	5566	RCTRB	1512	SM	6222	TLCALL	0233
P7T16	5572	RDBLK	1402	SNDREC	3353	TLS	6246
P7T17	5600	RDBLKR	1407	SP	6225	TPC	6244
P7T2	5512	RDRSRV	1422	SPAC	5207	TRDATA	3337
P7T20	5604	RDSRV	1430	SPCNT	5161	TSC1	2634
P7T21	5610	RGNA	0400	SPCTR	5162	TSC2	2643
P7T22	5614	RGNB	0417	SPF	6040	TSF	6241
P7T23	5620	RM33A	1562	SPI	6045	TTYIOT	2021
P7T24	5624	RM33B	6314	SPIND	1720	TTYTYP	2022
P7T25	5630	RM37A	6317	SPT0	1716	TYPAT	2654
P7T26	5634	RMB	4523	SPT1	1717	TYPE	4573
P7T27	5640	RMTST	6337	SPTST	6354	TYPEA	1637
P7T3	5516	RMTSTA	4516	SPTSTA	4535	TYPLN	1627
P7T30	5644	RP1A	0415	SPTSTB	4546	TYPLN3	1615
P7T4	5522	RP1B	0434	SPTSTC	6324	TYPSP	0660
P7T5	5526	RP2A	0416	SRQ	6003	TYPSTG	2626
P7T6	5532	RP2B	0435	SRSET	0236	UKCC	4571
P7T7	5536	RRDY	1343	SRT0A	5655	UKCR	4562
PADDR	1342	RRPP	0304	SRT0B	5662	UKIE	4561
PBLK	1316	RSCTR	1232	SS	6230	UKRB	4567
PBLKR	1324	RSSERV	1233	ST33B	1020	UKRS	4570
PCTR	1341	RSTUP	1351	STAL	0551	UKSF	4572
PDCR	1310	RSYNC	1216	STALL	4556	UMOVE	0075
PFLAG	0071	RTF	6005	START	0200	UOUT	0072
PLTLR	1200	RTNNO	0055	STBAUD	0504	UPUNCH	0074
PRG0	2200	RUDONE	1456	STBF	1002	USPF	4560
PRG1	3000	S	6131	STCTR	0326	USPI	4557
PRG10	5651	S100	0030	STLID	0064	UTCF	4565
PRG11	5722	S100I	2012	SV	6233	UTEMP	0104
PRG11A	5725	S200	0032	SY	6236	UTEMP1	0105
PRG12	5764	S200I	2005	SYNC	0065	UTEMP2	0106
PRG2	3503	S4000	0031	SYNK	0530	UTLS	4563
PRG3	4307	S4000I	2000	SYNKA	0534	UTPC	4564
PRG4	4434	SA	6206	TABCTR	5200	UTPLN3	2073
PRG5	5274	SASC	1707	TABP	5201	UTSF	4566
PRG5A	5317	SB	1435	TABPA	5220	V	6134
PRG6	5340	SB0	4332	TADDR	0624	VCTR	1267
PRG7	5465	SB1	4364	TBCNT	5140	WASC	1706
PRGADR	0235	SB2	4420	TBMRK	6300	WCHK	2527
PRGENO	0300	SBSP	5673	TBMRK1	6306	WCPTST	6412
PRGNUM	0036	SCNT	0473	TBTA	5134	WOSWS	2153
PRGIAB	0037	SD	6211	TBTB	5146	WTS6A	2112
PRINT	0671	SETBAU	1513	TBTST	6267	XKCC	2724
PSTUP	1277	SETLOC	4577	TCF	6042	XKCR	2755
PSYNG	1212	SETRND	1742	TCTR	1647	XKIE	2761
PT0	0442	SEVEN	6152	TEMP	0052	XKRB	2734
PT1	2443	SG	6214	TEMP1	0053	XKRS	2730
PUNCH	2112	SGET	1721	TEMQ	2714	XKSF	2717
RADDR	1416	SHALT	0317	TEMR	2715	XSPF	1165
RBCIR	1417	SINPT	1711	TLC37	0034	XSPI	2765
RBUSY	0076	SJ	6217	TLC37I	2134	XTCF	2745

XTLS	0751
XTPC	1171
XTSF	0740
Y	6137

ERRORS DETECTED: 0

LINKS GENERATED: 109

RUN-TIME: 34 SECONDS

3K CORE USED