

IDENTIFICATION

PRODUCT CODE:

MAINDEC-08-DHKLD-A-D
(FORMERLY MAINDEC-08E-DZAC)

PRODUCT TEST:

PDP-8/E TELETYPE AND KLB ASYNCHRONOUS
DATA CONTROL TESTS

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MAINTAINER:

DIAGNOSTIC GROUP

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1. ABSTRACT

THIS PROGRAM CONSISTS OF A PACKAGE OF TEST PROGRAMS FOR TESTING THE K18 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, KSR33, ASR35, OR KSR37.

THE TEST PROGRAMS ARE:

PRG0-BASIC TEST OF THE OUTPUT LOGIC (CURRENT AND EIA)
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

2:1 EQUIPMENT

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

LOCATIONS 0000 THROUGH 7600 ARE USED;

3. LOADING PROCEDURE

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 33
- 2; DEVICE CODES ASSIGNED;
- 3; BAUD RATE OF DEVICE 110

TO PROVIDE THIS INFORMATION, PROCEED AS FOLLOWS:

A; SET LOCATION 0020 TO 1

- 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 KEY-BOARD/READER TO BE TESTED;
(LEG: READER CODE OF 03, SR0=5=03.
- 3; SET SR 6 THROUGH 11 TO THE DEVICE CODE OF THE PRINTER/PUNCH TO BE TESTED;
(LEG: 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 SR:
0110 FOR 110 BAUD; OR
0150 FOR 150 BAUD; OR
0300 FOR 300 BAUD; OR
0600 FOR 600 BAUD; OR
1200 FOR 1200 BAUD; OR
2400 FOR 2400 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 KL8 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.

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

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

- 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=0000. 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. ROUTINE NUMBER TO BE SELECTED. SR6 THROUGH SR11
- 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

- 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

- 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;

4.8 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 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. 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 KEYPED.

4.9 PRG7 USE PROCEDURE

- 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 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.
- SR3=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

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.

9. PROGRAM AND/OR OPERATOR ACTION

9.1 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

6.1 ERROR HALT AND DESCRIPTION

- LOC 1526 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 ICF 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 OCCURRED. 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 INTER-
RUPT 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.

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 PROCES-OR 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 2654
 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 THEN 110 BAUD. PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY, MANUAL RESTART.

LOC 2656
 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 2670
 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 2675
 PRG0, ROUTINE 6, ERROR HALT B, GTF INSTRUCTION CLEARED THE LINK, NO SCOPE LOOP, MANUAL RESTART.

LOC 2701
 PRG0, ROUTINE 6, ERROR HALT C, GTF INSTRUCTION FAILED TO BRING LINK INTO AC 0, NO SCOPE LOOP, MANUAL RESTART.

LOC 2732
 PRG0, ROUTINE 6, ERROR HALT D, GTF INSTRUCTION FAILED TO BRING INT BUS INTO AC 2, NO SCOPE LOOP, MANUAL RESTART.

LOC 2724
 PRG0, ROUTINE 6, ERROR HALT E, GTF INSTRUCTION CLEARED ION, NO SCOPE LOOP, MANUAL RESTART.

LOC 2731
 PRG0, ROUTINE 6, ERROR HALT F, GTF INSTRUCTION FAILED TO BRING ION INTO AC 4, NO SCOPE LOOP, MANUAL RESTART.

LOC 2750
 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 2754 PRG0, ROUTINE 7, ERROR HALT B; RTF INSTRUCTION
FAILED TO SET LINK WITH AC0=1; NO SCOPE LOOP,
MANUAL RESTART;

LOC 2757 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
RESTART.

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 T1S 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 INCLUDE "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.

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 "HOLD" 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.

LOC 4107

PRG2, ROUTINE 10, ERROR HALT B, SRQ INSTRUCTION SKIPPED WITH THE TELETYPE INTERRUPT ENABLE FLIP-FLOP DISABLED AND READER FLAG SET. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES SRQ CONTINUOUSLY WITH READER FLAG SET AND TTY DISABLED. MANUAL RESTART.

LOC 4115

PRG2, ROUTINE 10, ERROR HALT C, SPI INSTRUCTION SKIPPED WITH THE TELETYPE INTERRUPT ENABLE FLIP-FLOP DISABLED AND READER FLAG SET. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES SPI CONTINUOUSLY WITH READER FLAG SET AND TTY DISABLED. MANUAL RESTART.

LOC 4123

PRG2, ROUTINE 10, ERROR HALT D, KIE INSTRUCTION FAILED TO ENABLE THE TELETYPE INTERRUPT ENABLE FLIP-FLOP WITH AC1111. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES KIE WITH AC1111 CONTINUOUSLY. MANUAL RESTART.

LOC 4135

PRG2, ROUTINE 10, ERROR HALT E, SRQ INSTRUCTION FAILED TO SKIP WITH THE READER FLAG SET AND TTY INTERRUPT ENABLED. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES SRQ WITH READER FLAG SET AND TTY ENABLED. MANUAL RESTART.

LOC 4144

PRG2, ROUTINE 10, ERROR HALT F, SPI INSTRUCTION FAILED TO SKIP WITH THE READER FLAG SET AND TTY INTERRUPT ENABLED. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES SPI WITH READER FLAG SET AND TTY ENABLED. MANUAL RESTART.

LOC 4206

PRG2, ROUTINE 11, ERROR HALT A, CAF INSTRUCTION FAILED TO CLEAR AC AND/OR LINK. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES CAF CONTINUOUSLY WITH AC AND LINK SET. MANUAL RESTART.

LOC 4215

PRG2, ROUTINE 11, ERROR HALT B, CAF INSTRUCTION FAILED TO CLEAR THE READER FLAG. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES CAF CONTINUOUSLY WITH READER FLAG SET. MANUAL RESTART.

LOC 4224

PRG2, ROUTINE 11, ERROR HALT C, CAF INSTRUCTION FAILED TO ENABLE THE TELETYPE INTERRUPT ENABLE FLIP-FLOP. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES CAF CONTINUOUSLY. MANUAL RESTART.

LOC 4276

PRG2, ROUTINE 12, ERROR HALT A, KRB INSTRUCTION FAILED TO CLEAR THE READER FLAG. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES KRB CONTINUOUSLY WITH READER FLAG SET. MANUAL RESTART.

LOC 4303

PRG2, ROUTINE 12, ERROR HALT B, KRB INSTRUCTION FAILED. SET READER FLAG BY 103 MSEC AFTER KRB WAS ISSUED. PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES KRB CONTINUOUSLY. MANUAL RESTART.

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 SR0=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

7.1 EXECUTION TIME (MINUTES:SECONDS)

	110 EIA	150 EIA	300 EIA	600 EIA	1200 EIA	2400 EIA
PRG01	1132	1103	0132	0117	019	015
PRG11	N/A	3125	1126	0144	0123	0112
PRG21	2147	N/A	N/A	N/A	N/A	N/A
PRG31	18100	N/A	N/A	N/A	N/A	N/A
PRG41	20100	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	40100	N/A	N/A	N/A	N/A	N/A
PRG101	CONTINUOUS	N/A	N/A	N/A	N/A	N/A
PRG111	USER DEP.	N/A	N/A	N/A	N/A	N/A
PRG121	CONTINUOUS	N/A	N/A	N/A	N/A	N/A

7.2 TEST TAPES

IF A BINARY COUNT TEST TAPE IS NOT AVAILABLE ON SITE, USE PRG12 TO GENERATE A BINARY COUNT TEST TAPE. FOR CONVENIENCE OF USE, A TAPE LOOP SHOULD BE MADE, MAKING SURE THAT THE PATTERN IS MATCHED AT THE SPICE POINT.

7.3 TEST EQUIPMENT

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 (EIA AND CURRENT)

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

- RTN0
CHECKS THE ABILITY OF I
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 I
KIE TO DISABLE TTY INTERRUPT ENABLE FLIP-FLOP,
SPI TO NOT SKIP WITH NO TTY INTERRUPT REQUEST,
SRG TO NOT SKIP WITH NO TTY INTERRUPT REQUEST,
KIE TO ENABLE TTY INTERRUPT ENABLE FLIP-FLOP,
SPI TO SKIP ON A TTY INTERRUPT REQUEST,
SRG 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 I
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 I
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 I
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 PIN 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 T1S 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 I

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.
 2400 BAUD = 4.16 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.

RTN111 CHECKS THAT KRS CAN "INCLUSIVE OR" READER BUFFER WITH
 AC. TEST IS DONE 500 TIMES.

RTN121 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 (CURRENT)

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

RTN01 CHECKS THAT KCC COMMAND IS ABLE TO CLEAR THE AC, TEST IS DONE 1000 TIMES.

RTN11 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.

RTN21 WITH FLAG SET, CHECKS THAT KSF COMMAND SKIPS RELIABLY, DONE 500 TIMES.

RTN31 CHECKS THAT KSF COMMAND DOES NOT SKIP WITH FLAG RESET, DONE 500 TIMES.

RTN41 CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT, AND THEN CHECKS THAT READER IS CAPABLE OF INTERRUPTING.

RTN51 TIMING TEST.

RTN61 READS A CHARACTER FROM TAPE AND SAVES IT, IT THEN REREADS THE TTI STATISTICALLY 1000 TIMES TO CHECK FOR CONSISTENT READING FROM TTI, 256 CHARACTERS ARE READ IN THIS MANNER.

RTN71 CHECKS THAT KCR DOES NOT CLEAR AC AND SETS READER FLAG, BIT DOES NOT SET READER RUN, DONE 100 TIMES.

RTN101 CHECKS THAT KIE WILL ENABLE AND DISABLE TTY INTERRUPT F.F. AND THAT SRQ AND SPI WILL AND WILL NOT SKIP, DONE 1000 TIMES

RTN111 CHECKS THAT CAP WILL ENABLE TTY INTERRUPT F.F. AND THAT IT WILL CLEAR AC, LINK, AND READER FLAG, DONE 100 TIMES.

RTN121 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 "1" FOLLOWED BY CHARACTERS 1-.

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 " "
RTN81	MNO " "
RTN91	PQR " "
RTN101	STU " "
RTN111	VWX " "
RTN121	YZ " "
RTN131	123 " "
RTN141	456 " "
RTN151	789 " "
RTN161	! " #
RTN171	\$ % &
RTN181	' ()
RTN191	* + ,
RTN201	- . /
RTN211	! " #
RTN221	\$ % &
RTN231	' ()
RTN241	* + ,
RTN251	- . /
RTN261	! " #
RTN271	\$ % &
RTN281	' ()
RTN291	* + ,
RTN301	- . /
RTN311	! " #
RTN321	\$ % &
RTN331	' ()
RTN341	* + ,
RTN351	- . /
RTN361	! " #
RTN371	\$ % &
RTN381	' ()
RTN391	* + ,
RTN401	- . /
RTN411	YZ AND CODE 340

RTN421 TYPES LINE OF 4 CHARACTERS WHOSE CODE IS 373, 374, 375, AND 376 (KSR37 ONLY).

RTN431 TYPES 2 LINES OF ALL CHARACTERS; FIRST LINE IS TYPED AT FULL SPEED, AND THE 2ND LINE WITH RANDOM STALLS BETWEEN CHARACTERS.

RTN441 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 W7W LEFT ARROW;

RTN451 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 AST35 WORST CASE PATTERN USED IS 'L?C?C

RTN461 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 G, CAPITAL A; SWING DASH,
CAPITAL A; LOWER CASE G.

RTN471 TAB TEST; EXECUTED FOR 37 OR 35 TELETYPE ONLY, THE
TEST IS RUN AFTER ROUTINE 3.

RTN501 BACKSPACE TEST; EXECUTED FOR KSR37 TELETYPE ONLY.
THIS TEST IS RUN AFTER ROUTINE 47.

PRGS - PUNCH TEST

6.6

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 EQUIVALENCE TEST, THE OCTAL EQUIVALENT OF ANY CHARACTERS KEYED IS TYPED, READED 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.)
- E) 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
 RTN101 PUNCH/PRINT AND READ CHECK BLOCK OF YZ0
 RTN111 PUNCH/PRINT AND READ CHECK BLOCK OF 123
 RTN121 PUNCH/PRINT AND READ CHECK BLOCK OF 456
 RTN131 PUNCH/PRINT AND READ CHECK BLOCK OF 789
 RTN141 PUNCH/PRINT AND READ CHECK BLOCK OF !"#
 RTN151 PUNCH/PRINT AND READ CHECK BLOCK OF \$%&
 RTN161 PUNCH/PRINT AND READ CHECK BLOCK OF '()
 RTN171 PUNCH/PRINT AND READ CHECK BLOCK OF *+
 RTN201 PUNCH/PRINT AND READ CHECK BLOCK OF -./
 RTN211 PUNCH/PRINT AND READ CHECK BLOCK OF :;<
 RTN221 PUNCH/PRINT AND READ CHECK BLOCK OF >?@
 RTN231 PUNCH/PRINT AND READ CHECK BLOCK OF [^\
 RTN241 PUNCH/PRINT AND READ CHECK BLOCK OF _`
 RTN251 PUNCH/PRINT AND READ CHECK BLOCK OF {~
 RTN261 PUNCH/PRINT AND READ CHECK BLOCK OF ASR33 PRINTER
 RTN271 WORST CASE PATTERN (*M/)
 RTN301 PUNCH/PRINT AND READ CHECK BLOCK OF ASR35 PRINTER
 PUNCH/PRINT AND READ CHECK BLOCKS OF SPACE;
 RUBOUT (DATA) ALL 1'S, ALL 1/S, ALL 0'S).

PRINTABLE CHARACTERS

8.9 PRG10 = 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 PRG11 = 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 PRG12 = TAPE GENERATOR = BINARY COUNT PATTERN

PUNCHES BINARY COUNT PATTERN TEST TAPE;

/PDP-8/E TELETYPE CONTROL TEST, MAINDEC=08-DHKLD=A=L
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/PROGRAMMER: ED FORTMILLER

/PRG0=BASIC OUTPUT CONTROL LOGIC TEST (CURRENT AND EIA)
/PRG1=BASIC OUTPUT AND INPUT LOGIC TEST (EIA - 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.

/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
/2400 BAUD 10 BITS @ .416 MSEC = 4.167 MSEC

6001 /TURN INTRRRUPT ON;
6002 /TURN INTRRRUPT OFF;
6003 /SKIP IF INTRRRUPT REQUEST;
6004 /GET INTRRRUPT FLAGS
6005 /RESTORE INTRRRUPT FLAGS AND TURN INTRRRUPT ON
6006 /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTRRRUPT
6007 /CLEAR KBRD FLAG BUT DO NOT SET RDR RUN
6008 /SKIP IF KEYBOARD/READER FLAG = 1;
6009 /CLEAR AC AND KBRD/READER FLAG; SET READER RUN;
6010 /READ KEYBOARD/READER BUFFER STATIC
6011 /ENABLE TTY INTRRRUPT WHEN AC11 EQUALS 1
6012 /CLEAR AC, READ KEYBOARD BUFFER; CLEAR
6013 /KEYBOARD FLAGS.
6014 /SET PRINTER FLAG
6015 /SKIP IF TELEPRINTER/PUNCH FLAG = 1;
6016 /CLEAR TELEPRINTER/PUNCH FLAG;
6017 /LOAD TELEPRINTER/PUNCH BUFFER
6018 /SELECT AND PRINT.
6019 /SKIP IF TTY INTRRRUPT
6020 /LOAD TELEPRINTER/PUNCH BUFFER;
6021 /SELECT AND PRINT AND CLEAR
6022 /TELEPRINTER/PUNCH FLAG.
6040 /SWAP BYTES IN AC;
6041
6042
6044
6045 SPI=6045
6046 TLS=6046

7002 BSW=7002
7200 CLA=7200
7402 HLT=7402
W.H.H.

7604
7421
7621
7701

LAS=7604
MQL=7421
CAM=7621
ACL=7701

/LOAD MQ FROM AC THEN CLEAR AC;
/CLEAR AC AND MQ;
/LOAD MQ INTO AC;

```

0000 OPEN=0
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
4564 UTCF=JMS I [XTCF
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
4577 BLOCKABEND
6601 BLOCK1=BLOCKA+2
6711 BLOCKB=BLOCKA+112
6722 BLKBB=BLOCKA+123
6713 BLOCK2=BLOCKA+114
6724 BLK2=BLOCKA+125
7023 BLOCKC=BLOCKA+224
7034 BLKCC=BLOCKA+235
7577 DBLK=BLOCKA+1000
7631 M147=147
0304 RRRP=0304

```

/PROGRAM MODIFIABLE;

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

/-103 DECIMAL;

```

0000 *0
0000 0000
0001 JMP 1
0002 2
0003 3
0005 *5
0005 5402
0006 0000
0016 *16
0016 0016
0020 OPEN
0020 /AUTO INDEX.
0020 TTYTYP; OPEN
0021 TTYIOT; RRRP
0304

```

/CONSTANT TO DETERMINE IOT CODE


```

/PRESET FOR 03 READER AND 04 PUNCH;
/TO CHANGE IOT CODE SET THIS LOCATION
/TO "RRPP" WHERE RP IS FOR
/THE READER AND PP IS FOR THE PUNCH,
/CONSTANT TO DETERMINE DELAY
/PRESET FOR 110 BAUD;
/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;
/2400 FOR 2400 BAUD;
/**THE ABOVE ARE THE ONLY LEGAL BAUD RATES**

```

0022 0110 BAUDRT, 110

```

0023 0000 KSTART, OPEN
0024 0000 DELAYM, OPEN
0025 0263 CHAIN, CHAINN
0026 1365 KBFLAG, KFLAG
0027 0474 DLCONT, DLCONT
0030 2012 S100I, S100I
0031 2000 S4000, S4000I
0032 2005 S200I, S200I
0033 2126 TLCALL, TLCALLI
0034 2134 TLC37, TLC37I
0035 2144 FBFI, FBFI
0036 0000 PRGNUM, OPEN
0037 2200 PRGTAB, PRGTAB
0040 3000 PRG1, PRG1
0041 3503 PRG2, PRG2
0042 4307 PRG3, PRG3
0043 4434 PRG4, PRG4
0044 5274 PRG5, PRG5
0045 5340 PRG6, PRG6
0046 5465 PRG7, PRG7
0047 5691 PRG10, PRG10
0048 5722 PRG11, PRG11
0049 5764 PRG12, PRG12
0050 0000 OPEN, OPEN
0051 0000 TEMP1, TEMP1
0052 0000 CURTST, CURTST
0053 0000 RTNNO, RTNNO
0054 0000 NXTST, NXTST
0055 0000 MSCTR, MSCTR
0056 0000 MILCTR, MILCTR
0057 0000 MILI, MILI
0062 0000 CTRA, CTRA
0063 0000 CTRB, CTRB
0064 0000 STLID, STLID
0065 0530 SYNC, SYNC

```

```

/WORK
/LOCATIONS
/FCR CURRENT TEST ADDRESS
/FCR CURRENT TEST NUMBER
/FCR 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;
/7767 FOR 2400 BAUD;
/COUNTER A;
/COUNTER B;
/ENTRY TO SYNC TAPE RTN;

```

INPATT, IBIN /ENTRY TO INITIATE PATTERN
 GETPT, GTBIN /ENTRY TO GET PATTERN CHAR;
 CHECK, CHCK
 PFLAG, 0
 UOUT, OUT
 UTPLN3, TYPLN3
 UPUNCH, PUNCH
 UMOVE, MOVVE
 RBUSY, 0
 AC, 0
 LINK, 0
 BLKCNT, 0
 DELAYS, 0
 ERRCR, 0
 UTEMP, 0
 UTEMP1, 0
 UTEMP2, 0
 CR, 215
 LF, 212
 DLYMSK, 277
 WTS6A, OPEN

0066 0436
 0067 0444
 0070 0513
 0071 0000
 0072 1271
 0073 1615
 0074 2112
 0075 0600
 0076 0000
 0077 0000
 0100 0000
 0101 0000
 0102 0000
 0103 0000
 0104 0000
 0105 0000
 0106 0000
 0107 0215
 0110 0212
 0111 0277
 0112 0000

/CARRIAGE RETURN
 /LINE FEED

/CONTROL ROUTINE
 *200

START, SKP CLA
 HLT
 CAM SETRND
 JMS SETAUD
 JMS STBAUD
 BORET, LAS AND C17
 TAD C=12
 SMA SZA
 JMP START+1
 LAS AND C17
 DCA PRGNUM
 TAD PRGNUM
 TAD CPRGTAB
 DCA TEMP
 TAD I TEMP
 DCA PRGADR
 JMS DVCSEL
 SLD002, LAS AND C7760
 MTON
 CLA IAC
 MINT
 JMS I UMOVE
 5
 1
 -2
 JMP I ,+1
 PRGADR, OPEN

/INCORRECT PROGRAM NUMBER
 /CLEAR AC AND MQ.
 /SET UP RANDOM NUMBERS
 /SET UP LOC M111 FOR SELECTED BAUD RATE.
 /READ SR
 /PROGRAM MASK = 17
 /PROGRAM LIMIT = 12
 /VALID PROGRAM NUMBER?
 /NO.
 /YES, READ SR,
 /SAVE PROGRAM NUMBER;
 /DEVELOP PROGRAM START
 /ADDRESS AND STORE AT
 /PRGADR,
 /PERFORM IOT SELECTION
 /SELECT DC02 UNIT
 /ENABLE DC02 INTERRUPT
 /INITIALIZE
 /INTERRUPT,
 /AREA,

0236	SRSET,	HLT CLA	
0237	GETRDY,	CLA	
0240		TAD KSTART	/SET ADDRESS OF 1ST ROUTINE
0241		DCA NXTST	/STORE AT NXTST
0242		JMS FORWD	
0243		LAS	/READ SR
0244		RAL	
0245		SMA CLA	/ROUTINE SELECT? (SR1)
0246		JMP I CURTST	/NO. START WITH 1ST RTN
0247		LAS	/YES
0250		AND C77	/SR 6=11 ENABLE MASK;
0251		CIA	
0252		TAD RTNNO	
0253		SNA CLA	/IS IT THIS RTN?
0254		JMP I CURTST	/YES, GO DO IT
0255		TAD NXTST	/NO
0256		IAC	/IS THIS LAST TRN?
0257		SZA CLA	/NO
0260		JMP GETRDY+3	
0261	INCRTN,	HLT GETRDY	/YES, INCORRECT ROUTINE NO.
0262		JMP GETRDY	
0263	CHAINN,	JMS SHALT	
0264		LAS	/HALT? (SR0)
0265		RTL	/READ SR
0266		SEL CLA	/SELECT ROUTINE? (SR1)
0267		JMP GETRDY	/YES
0270		TAD NXTST	
0271		IAC	
0272		SZA CLA	/LAST ROUTINE?
0273		JMP GETRDY+3	/NO,
0274		LAS	
0275		RTL	
0276		SPA CLA	/LOOP PROGRAM? (SR2)
0277		JMP GETRDY	/YES
0300	PRGEND,	HLT	/END OF PROGRAM HALT
0301		JMP CHAINN	
0302	FORWD,	0	
0303		CLA CLL	/GET NEXT RTN NO
0304		TAD I NXTST	/STORE AT RTNNO
0305		DCA RTNNO	
0306		ISZ NXTST	
0307		TAD NXTST	/SET CURRENT
0310		DCA TEMP	/RTN NUMBER
0311		ISZ NXTST	
0312		TAD NXTST	/SET CURRENT
0313		DCA CURTST	/RTN ADDR,
0314		TAD I TEMP	/SET NEXT
0315		DCA NXTST	/RTN ADDR,
0316		JMP I FORWD	/EXIT
0317	SHALT,	0	
0320		LAS	/READ SR
0321		SMA CLA	/HALT? (SR0)

0322 5717 JMP I SHALT
 0323 1055 TAD RTNCC
 0324 7402 HLT
 0325 5717 JMP I SHALT
 /UNCONDITIONAL HALT (SR0 = 1)
 /EXIT,

STCTR,
 0326 0000
 0327 7200
 0330 1726
 0331 3052
 0332 2326
 0333 1726
 0334 3452
 0335 2326
 0336 5726
 /GET CTR ADDR
 /AND SAVE AT TEMP
 /GET COUNT AND
 /STORE PER C(TEMP)
 /EXIT

DLYMS,
 0337 0000
 0340 7300
 0341 1024
 0342 3057
 0343 1061
 0344 3060
 0345 2060
 0346 5345
 0347 2057
 0350 5343
 0351 5737
 0352 0000
 0353 7200
 0354 1020
 0355 7650
 0356 2352
 0357 5752
 /GET MS COUNT
 /STORE IN MSCTR
 /GET CONSTANT
 /STORE IN MILCTR
 /DELAY FINISHED?
 /DONE DELAYING
 /EXIT
 /SUB TO CHECK FOR 33 TTY

CK33,
 0360 0000
 0361 7240
 0362 1020
 0363 7650
 0364 2360
 0365 5760
 /SUB TO CHECK FOR 35 TTY
 /GET TTY TYPE
 /33?
 /YES,

CK35,
 0366 0000
 0367 7344
 0370 1020
 0371 7650
 0372 2366
 0373 5766
 0375 6000
 0376 1513
 0377 1740
 0400
 /SUB TO CHECK FOR 37 TTY
 /=2
 /GET TTY TYPE,
 /37?
 /YES,

PAGE

RGNA,
 0400
 0401 7300
 /RANDOM NUMBER SUB A,
 /PAGE
 /OPEN
 /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
0411 7006 RTL
0412 3216 DCA RP2A
0413 1215 TAD RP1A
0414 5600 JMP I RGNA
0415 1233 /EXIT RGNA SUB,
0416 7622 RP1A,
RP2A,

```

```

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

```

```

0436 0000 /SUBROUTINE TO INITIALIZE BINARY COUNT PATTERN
0437 7200 IBIN, 0
0440 3242 CLA PT0
0441 5636 DCA PT0
0442 0000 JMP I IBIN
0443 0000 /EXIT
PT0, 0
PT1, 0

```

```

0444 0000 /SUBROUTINE TO PROVIDE NEXT BINARY COUNT PATTERN CHARACTER (IN AC)
0445 7200 GTBIN, 0
0446 1242 CLA
0447 3243 TAD PT0
0450 1243 DCA PT1
0451 7001 TAD PT1
0452 0145 IAC
0453 3242 AND [377]
0454 1243 DCA PT0
0455 5644 TAD PT1
JMP I GTBIN
/EXIT

```

```

0456 0000 /SUBROUTINE TO GENERATE RANDOM CHARACTER COUNT; (NOT MORE THAN 77(8))
0457 4200 CHRNT, 0
0460 0146 JMS RGNB
0461 7450 /GO GENERATE RANDOM NUMBER
SNA /REMOVE HIGH ORDER 6 BITS

```

```

0462 5257 JMP CHRCNT+1
0463 7041 CIA
0464 3273 DCA SCNT
0465 1656 TAD I CHRCNT
0466 3052 DCA TEMP
0467 1273 TAD SCNT
0470 3452 DCA I TEMP
0471 2256 ISZ CHRCNT
0472 5656 JMP I CHRCNT
0473 0000 SCNT, OPEN
    
```

```

0474 0000 /SUBROUTINE TO GENERATE RANDOM DELAY COUNT (NOT MORE THAN 3777(8));
0475 4200 DLGNT, 0
0476 0111 JMS RGNA
0477 7450 AND OLYMSK
0500 5275 SNA
0501 7041 JMP DLGNT+1
0502 3024 CIA
0503 5674 DCA DELAYM
    JMP I DLGNT
    
```

/TABLE FOR BAUD RATES:

```

0504 7670 BAUTAB, -110
0505 7630 -150
0506 7500 -300
0507 7200 -600
0510 6600 -1200
0511 5400 -2400
0512 0000 OPEN
    
```

```

0513 0000 /SUBROUTINE TO COMPARE C(AC) TO CONTENTS STORED AT CALL+1
0514 3327 CHCK, 0
0515 1713 DCA WCHK
0516 7041 TAD I CHCK
0517 1327 CIA
0520 2313 TAD WCHK
0521 7640 ISZ CHCK
0522 5325 SEA CLA
0523 2313 JMP +3
0524 5713 ISZ CHCK
0525 1327 JMP I CHCK
0526 5713 TAD WCHK
0527 0000 JMP I CHCK
    
```

```

0530 0000 /SYNC ON TAPE SUBROUTINE
0531 4577 SYNK, 0
0532 0550 SETLOC
0533 7400 CTSK
0534 4571 -400
0535 4572 UKCC
0536 5335 UKSF
0537 4570 JMP +1
    UKRS
    
```

/2'S COMPLEMENT IT

/STORE AT SPECIFIED ADDRESS
/SET UP EXIT
/EXIT

/GO GENERATE RANDOM NUMBER
/MASK OUT UNDESIRED BITS.
/ZERO?
/YES, GET ANOTHER NUMBER
/2'S COMPLEMENT IT
/EXIT

/FUTURE.

/STORE AC AT WCHK
/GET COMPARE DATA
/2'S COMPLEMENT IT
/ADD C(WCHK)
/SET UP FOR UNEQUAL EXIT
/EQUAL (AC = 0)
/NO
/YES, SET UP FOR EQUAL EXIT
/EQUAL EXIT
/RESTORE AC
/UNEQUAL EXIT

/SET COUNT OF
/256 (DEC) IN
/CTSK
/CLEAR AC AND FLAG
/READY?
/NO, TEST AGAIN
/YES, READ

```

0540 1144 TAD I=377
0541 7640 SZA CLA /377?
0542 7410 SKP
0543 5730 JMP I SYNK /YES, EXIT
0544 2350 ISZ CTRK /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 CTRK, /CHAR COUNTER
0551 0000 STAL,
0552 7200 CLA
0553 1064 TAD STLID /STALL?
0554 7700 SMA CLA /NO, EXIT
0555 5751 JMP I STAL /YES SET STALL COUNT
0556 4274 JMS DLCNT /STALL
0557 4576 DELAY /EXIT
0560 5751 JMP I STAL
0561 0000 OPEN CTRK,

```

```

0562 0000 OPEN CTRK,
0563 7200 CLA
0564 1762 TAD I CRALF
0565 3361 DCA CRCTR
0566 2362 ISZ CRALF
0567 4573 TYPE
0570 6250 CARLF
0571 2361 ISZ CRCTR
0572 5367 JMP I=3
0573 5762 JMP I CRALF
0600 PAGE

```

PAGE /SUBROUTINE TO MOVE VARIABLE LENGTH DATA FIELDS

```

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

```

0624 0000 TADDR, 0
0625 0000 MCTR, 0

0626 0000 /TYPE CHARACTER STRING SUBROUTINE
0627 7200 TYPSTG, 0

0628 1626 CLA
0629 3314 TAD I TYPSTG
0630 3314 DCA TEMO
0631 3314 /GET AND STORE
0632 2226 DCA FLAG
0633 1714 /INITIAL ADDRESS
0634 7002 /CLEAR FLAG;
0635 4243 /SET UP EXIT
0636 1714 /PICK UP DATA
0637 1714 TSC2
0638 4243 /GO TYPE 1ST CHARACTER
0639 4243 TAD I TEMO
0640 2314 /PICK UP DATE
0641 2314 JMS TSC2
0642 5234 /GO TYPE 2ND CHARACTER
0643 0000 /EVEN STRING ADDRESS
0644 0146 /GO BACK FOR MORE
0645 3315 AND I77
0646 1316 DCA TEMR
0647 7640 TAD FLAG
0648 5260 SEA CLA
0649 1315 JMS TYPSP
0650 7450 TAD TEMR
0651 5256 SNA I+3
0652 4271 JMS PRINT
0653 5643 JMP I TSC2
0654 2316 /YES, SET FLAG;
0655 5643 /NO, PRINT IT;
0656 5643 /RETURN;
0657 3316 /SET "SPECIAL" FLAG;
0658 1315 /EXIT
0659 7450 DCA FLAG
0660 5626 /CLEAR FLAG;
0661 1315 /TEST FOR 0;
0662 7450 /0?
0663 1377 /IGNORE IT;
0664 7650 SNA
0665 5626 JMP I TSC2
0666 1315 TAD TEMR
0667 5254 JMP TYPAT

0668 0000 OPEN
0669 1376 TAD (=45
0670 7640 SEA CLA
0671 5300 JMP I+4
0672 1107 TAD CR
0673 4474 JMS I UPUNCH
0674 5671 JMP I PRINT
0675 1315 TAD TEMR
0676 1375 TAD (=43
0677 7640 SEA CLA
0678 5306 JMP I+3
0679 1110 TAD LF
0680 5276 JMP PRINT+5
0681 1315 TAD TEMR
0682 1374 TAD (=40

0683 0000 /IS IT 45?
0684 1376 /NO.
0685 7640 /YES, PRINT CR
0686 5300 /IS IT 43?
0687 1110 /NO.
0688 5276 /YES, TYPE LF

0710	7510	SPA				
0711	1143	TAD C100				
0712	1142	TAD C240				
0713	5276	JMP PRINT+5				
0714	0000	OPEN				
0715	0000	OPEN				
0716	0000	OPEN				
0717	0000	OPEN				
0720	6031	KSF				/SUB TO ISSUE KSF,
0721	5717	JMP I XKSF				/KSF
0722	2317	ISZ XKSF				/NO SKIP
0723	5717	JMP I XKSF				/SKIP
0724	0000	OPEN				/SUB TO ISSUE KCC,
0725	6032	KCC				/EXIT
0726	5724	JMP I XKCC				/KCC SKIPPED,
0727	7402	HLT				
0730	0000	OPEN				/SUB TO ISSUE KRS,
0731	6034	KRS				/EXIT
0732	5730	JMP I XKRS				/KRS SKIPPED,
0733	7402	HLT				
0734	0000	OPEN				/SUB TO ISSUE KRB,
0735	6036	KRB				/EXIT
0736	5734	JMP I XKRB				/KRB SKIPPED,
0737	7402	HLT				
0740	0000	OPEN				/SUB TO ISSUE ISF,
0741	6041	TSF				/TSF
0742	5740	JMP I XTSF				/NO SKIP,
0743	2340	ISZ XTSF				/SKIP,
0744	5740	JMP I XTSF				
0745	0000	OPEN				/SUB TO ISSUE TCF,
0746	6042	TCF				/EXIT
0747	5745	JMP I XTCF				/TCF SKIPPED,
0750	7402	HLT				
0751	0000	OPEN				/SUB TO ISSUE TLS
0752	6046	TLS				/EXIT
0753	5751	JMP I XTLS				/TLS SKIPPED,
0754	7402	HLT				
0755	0000	OPEN				/SUB TO ISSUE KCR,
0756	6030	KCR				/EXIT
0757	5755	JMP I XKCR				/KCR SKIPPED,
0760	7402	HLT				
0761	0000	OPEN				/SUB TO ISSUE KIE,
0762	6035	KIE				/EXIT,
0763	5761	JMP I XKIE				/KIE SKIPPED,
0764	7402	HLT				

2765 0000 XSPI, OPEN /SUB TO ISSUE SPI,
 2766 6045 SPI /
 2767 5765 JMP I XSPI /NO SKIP
 2770 2365 ISZ XSPI
 2771 5765 JMP I XSPI /EXIT

2774 7740
 2775 7735
 2776 7733
 2777 7701
 1000

PAGE

1000
 0000
 1001 4574
 1002 0107
 1003 6577
 1004 7776
 1005 4555
 1006 5220
 1007 4574
 1010 0107
 1011 6722
 1012 7776
 1013 4574
 1014 0107
 1015 7034
 1016 7776
 1017 5600

PAGE
 STBF,

OPEN /SUB TO SET UP BUFFER AREA;
 MOVE /CRLF TO BLOCKA;
 CR
 BLOCKA
 -2
 CKSR37 /KSR37?
 JMP ST33B /NO.
 MOVE /CRLF TO BLKBB
 CR
 BLKBB
 -2
 MOVE /CRLF TO BLKCC,
 CR
 BLKCC
 -2
 JMP I STBF /EXIT STBF

ST33B,

1020 4574
 1021 0107
 1022 6711
 1023 7776
 1024 4574
 1025 0107
 1026 7023
 1027 7776
 1030 5600

MOVE
 CR
 BLOCKB
 -2
 MOVE
 CR
 BLOCKC
 -2
 JMP I STBF

/CRLF TO BLOCKB,
 /CRLF TO BLOCKC,
 /EXIT STBF

FBF3,

1031 0000
 1032 7200
 1033 1631
 1034 3237
 1035 2231
 1036 4574
 1037 0000
 1040 6601
 1041 7775
 1042 4555
 1043 5255
 1044 4574
 1045 6601

OPEN
 CLA
 TAD I FBF3
 DCA I FBF3
 ISZ FBF3
 MOVE
 OPEN
 BLOCK1
 -3
 CKSR37
 JMP FBF33
 MOVE
 BLOCK1

/SUB TO FILL CHAR BUFFER WITH
 /3 CHARACTERS SPECIFIED AT CALL+1;
 /37?
 /NO.
 /YES.

```

1046 6604
1047 7662
1050 4574
1051 6601
1052 6724
1053 7657
1054 5631
1055 4574
1056 6601
1057 6604
1060 7673
1061 4574
1062 6601
1063 6713
1064 7670
1065 5631

BLOCK1*3
-116
MOVE
BLOCK1
BLK2
-121
JMP I FBF3
MOVE
BLOCK1
BLOCK1*3
-105
MOVE
BLOCK1
BLOCK2
-110
JMP I FBF3

FBF33,
/EXIT FBF3,

FBALL,
OPEN
CKSR37
JMP FBA33
MOVE
A
BLOCK1
-121
MOVE
BLOCK1
BLK2
-121
JMP I FBALL
MOVE
BLOCK1
-77
MOVE
A
BLOCK1*77
-11
MOVE
BLOCK1
BLOCK2
-110
JMP I FBALL

FBA33,
/EXIT FBALL,

FW336,
0
MOVE
A33WP6
BLOCK1
-6
MOVE
BLOCK1
BLOCK1*6
-102
MOVE
BLOCK1
BLOCK2

```

/FILL BUFFER WITH ALL CHARACTERS
/KSR37?
/NO.
/YES.

/MOVE 6 CHARACTERS ARS33 PRINTER
/WORST CASE PATTERN TO
/BLOCK1
/FILL BLOCKS WITH PATTERN

```

1133 7670      -110
1134 5717      JMP I FW336      /EXIT

FW356,
1135 0000
1136 4574      MOVE
1137 6073      A35WP6
1140 6601      BLOCK1
1141 7772      -6
1142 4574      MOVE
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

FW376,
1153 0000      OPEN
1154 4574      MOVE
1155 6101      A37WP6
1156 6601      BLOCK1
1157 7772      -6
1160 4574      MOVE
1161 6601      BLOCK1
1162 6607      BLOCK1*6
1163 7665      -113
1164 5753      JMP I FW376      /EXIT

XSPF,
1165 0000      OPEN
1166 6040      SPF
1167 5765      JMP I XSPF
1170 7402      HLT

XTPC,
1171 0000      OPEN
1172 6044      TPC
1173 5771      JMP I XTPC
1174 7402      HLT

PAGE
1200

/PUNCH 70 (CODE 376) CHARACTERS SUBROUTINE
PLTLR, 0
1200 0000      SETLOC
1201 4577      P70CTR
1202 1211      -106
1203 7672      TAD (376)
1204 1377      JMS I UPUNCH
1205 4474      ISZ P70CTR
1206 2211      JMP I=3
1207 5204      JMP I PLTLR
1210 5600      P70CTR, 0
1211 0000

```

/MOVE 6 CHARACTER ASR35 PRINTER
/WORST CASE PATTERN TO BLOCK1.
/FILL BUFFER WITH PATTERN
/MOVE 6 CHARACTER KSR37 PRINTER
/WORST CASE PATTERN TO BLOCK1.
/FILL BUFFER WITH PATTERN
/SUB TO ISSUE SPF
/EXIT
/SPF SKIPPED,
/SUB TO ISSUE IPC
/EXIT
/IPC SKIPPED,
/SET P70CTR TO =70
/GET 376 CODE
/GO PUNCH IT
/ALL CHARACTERS PUNCHED?
/NO, REPEAT,
/YES, EXIT,

```

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

1216 0000 /SYNC READER SUBROUTINE
1217 4577 /RSYNC, 0
1220 1232 SETLOC /SET RSCTR TO =145
1221 7557 RSCTR
-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, 0

1233 6036 RSSERV, KRB /READ
1234 1144 TAD [=377 /ADD MINUS RUBOUT
1235 7640 SZA CLA /IS IT A RUBOUT?
1236 5245 JMP ,+7 /NO,
1237 3076 DCA RBUSY /YES, CLEAR READER BUSY,
1240 7300 CLA CLL
TAD LINK
1241 1100 RAL
1242 7004 TAD AC
1243 1077 JMP I 0 /RESTORE LINK
1244 5400 ISZ RSCTR /RESTORE AC
1245 2232 JMP I UOUT /RETURN
1246 5472 HLT CLA /145 CHARACTER READ?
1247 7602 SETLOC /NO,
1250 4577 RSCTR /YES, NO SYNC,
-221 /SET RSCTR TO =145
1251 1232 JMP I UOUT /RETURN
1252 7557 /SAVE AC
1253 5472 /SAVE LINK
/SAVE LINK
/PUNCH/PRINTER?
/NO,
/YES, CLEAR FLAG,
/CLEAR PFLAG
/RETURN
/READER/KYBD?
/NO ERROR,
/GO SERVICE READER
/UNEXPECTED INTERRUPT

1254 3077 INTSVC, DCA AC
1255 7010 RAR
1256 3100 DCA LINK
1257 6041 TSF
1260 5264 JMP ,+4
1261 6042 TCF
1262 3071 DCA PFLAG
1263 5271 JMP OUT
1264 6031 KSF
1265 5270 JMP ,+3
1266 5667 JMP I ,+1
1267 0000 VCTR, 0
1270 7402 HLT
1271 7300 CLA CLL
1272 1100 TAD LINK

```

1273 7004 /RESTORE LINK
 1274 1077 /RESTORE AC,
 1275 6001 /ENABLE INTERRUPT
 1276 5400 /RETURN

1277 0000 /PUNCH SETUP
 1300 4577 /SET DATA ADDR
 1301 1342
 1302 6577 /SET BLOCK LENGTH
 1303 4574
 1304 0101
 1305 1341
 1306 7777
 1307 5677 /EXIT

PSTUP, 0
 SETLOC
 PADDR
 BLOCKA
 MOVE
 BLKCNT
 PCTR
 -1
 JMP I PSTUP /EXIT

PDCR, 0 /PUNCH DATA CHAR SUB;
 CLA I PADDR /GET DATA
 ISZ PADDR /UPDATE PADDR,
 JMS I UPUNCH /GO PUNCH/PRINT DATA
 JMP I PDCR /EXIT

PBLK, 0 /PUNCH DATA BLOCK FULL SPEED
 JMS PSTUP /GO PUNCH CHARACTER
 JMS PDCR /ALL CHARS PUNCHED?
 ISZ PCTR /NO, REPEAT
 JMP I=2 /YES, EXIT
 JMP I PBLK

PBLKR, 0 /PUNCH DATA BLOCK RANDOM STALLS;
 JMS PSTUP /GO DO SET UP
 JMS RGNB /GET A RANDOM NUMBER
 AND OLYMSK /REMOVE EXCESS BITS
 SNA /ZERO?
 JMP I=3 /YES, GET ANOTHER NUMBER
 CIA /NO, 2'S COMPLEMENT IT,
 DCA DELAY /PUT NUMBER IN DELAY
 DELAY /DELAY,
 JMS PDCR /GO PUNCH CHARACTER
 ISZ PCTR /ALL CHARS PUNCHED?
 JMP I PBLKR+2 /NO, REPEAT
 JMP I PBLKR /YES, EXIT,
 0
 0

PCTR, 0 /WAIT FOR RDR NOT BUSY SUB;
 PADDR, 0
 RRDY, 0 /FETCH RBUSY,
 CLA /READER BUSY?
 TAD RBUSY /YES, TRY AGAIN
 SEA CLA /NO,EXIT
 JMP I=2
 JMP I RRDY

RSTUP, 0 /WAIT FOR RDR NOT BUSY
 JMS RRDY /SET RBUSY INDICATOR
 ISZ RBUSY

1343 0000
 1344 7200
 1345 1076
 1346 7640
 1347 5345
 1350 5743
 1351 0000
 1352 4343
 1353 2076

```

1354 4577 SETLOC /SET DATA ADDR
1355 1416 RADDR
1356 6577 BLOCKA
1357 4574 MOVE /SET DATA BLOCK LENGTH
1360 0101 BLKCNT
1361 1417 RBCTR
1362 7777 -1
1363 3775 DCA ERRCTR /CLEAR ERROR COUNTER
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
1400 1400 PAGE

```

```

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

```

```

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

```

```

1420 7200 /READER SERVICE ROUTINES
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 TAD I RADDR /GET EXPECTED CHARACTER
1431 3235 DCA SB /STORE AT SB

```

```

1432 2216      ISZ RADDR      /UPDATE RADDR
1433 6036      KRB           /READ CHARACTER
1434 4470      JMS I CHECK  /GO CHECK IT,
1435 2000      0
1436 5240      JMP ERROR     /ERROR
1437 5256      JMP RUDONE    /GOOD,

1440 3103      DCA ERRCR   /STORE BAD CHARACTER
1441 2775      ISZ ERRCTR   /INCREMENT ERROR COUNTER
1442 5245      JMP I+3
1443 7240      CLA CMA
1444 3775      DCA ERRCTR   /OFLOW, 7777 TO AC
1445 7604      LAS         /RESTORE TO 7777,
1446 0143      AND [100    /READ SR
1447 7650      SNA CLA
1448 5256      JMP RUDONE    /HALT ON ERROR?(SR5)
1449 1103      TAD ERRCR   /NO,
1450 7402      HLT
1451 7402      CLA         /YES, GET BAD CHARACTER
1452 7200      CLA         /ERROR HALT: BAD CHAR IN AC
1453 1235      TAD SB
1454 1235      HLT
1455 7402      HLT
1456 2217      ISZ RBCTR   /GOOD CHAR IN AC
1457 5472      JMP I UOUT  /ALL DONE?
1458 7200      CLA         /NO, TO MAINLINE
1459 1775      TAD ERRCTR   /YES,
1460 7650      SNA CLA     /GET C(ERRCTR)
1461 5266      JMP I+3     /ANY ERRORS?
1462 1775      TAD ERRCTR   /NO,
1463 7402      HLT        /YES,
1464 7300      CLA CLL     /NUMBER OF ERRORS IN AC.
1465 3076      DCA RBUZY   /CLEAR RBUZY INDICATOR
1466 1100      TAD LINK
1467 7004      RAL
1468 1077      TAD AC
1469 5400      JMP I 0
1470 0000      DLMR, 0
1471 7300      CLA CLL     /GET AND STORE MSEC
1472 1102      DCA RCTRA   /DELAY COUNT
1473 3311      JMP I, +1
1474 5701      I+1
1475 1502      TAD MILL1
1476 1061      DCA RCTRB   /GET AND STORE
1477 3312      ISZ RCTRB   /1MS CONSTANT
1478 5304      JMP I+1     /DELAYED 1 MS?
1479 2311      ISZ RCTRA   /NO,
1480 5300      JMP I+7     /YES, DONE DELAYING?
1481 5674      JMP I DLMR    /NO,
1482 0000      RCTRA, 0
1483 0000      RCTRB, 0
1484 0000
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```

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


```

1514 1141 TAD C=6
1515 3346 DCA NTST
1516 1374 TAD (BAUTAB-1
1517 3010 DCA 10
1520 1022 TAD BAUDRT
1521 1410 TAD I 10
1522 7650 SNA CLA
1523 5330 JMP
1524 2346 ISZ NTST
1525 5320 JMP I-5
1526 7602 HLT CLA

1527 5326 JMP I-1
1530 1346 TAD NTST
1531 7040 CMA
1532 1373 TAD (BAUCON
1533 3061 DCA MIL1
1534 1461 TAD I MIL1
1535 3061 DCA MIL1
1536 5713 JMP I STBAUD

/GET USER DEFINED BAUD RATE,
/GET A RATE FROM TABLE,
/DO THEY MATCH?
/YES, GO SET DELAY ROUTINE,
/NO, KEEP A COUNT,
/NO TRY NEXT ONE,
/ILLEGAL BAUD RATE: RESET BAUDRT AND
/RESTART PROGRAM AT 0200,
/NO CONTINUE ALLOWED,
/GET COUNT AND,
/COMPLEMENT IT,
/ADD TABLE ADDRESS
/
/
/
/EXIT,

```

/TABLE OF CONSTANTS FOR THE BAUD RATE,

```

1537 7767 BAUCON, 7767 /2400
1540 7754 7754 /1200
1541 7726 7726 /600
1542 7652 7652 /300
1543 7522 7522 /150
1544 7372 7372 /110
1545 0000 OPEN /FUTURE

```

/PUNCH TEST NORMAL TEST SEQUENCE ROUTINE

```

1546 0000 NTST, 0
1547 7200 CLA /CLEAR RBUSY
1550 3076 DCA RBUSY /SELECT PUNCH MODE
1551 1746 TAD I NTST
1552 3355 DCA NTSTA /PUNCH LEADER
1553 4772 JMS PLTLR /PUNCH SYNC CHARACTER
1554 4771 JMS PSYNC
1555 0000 0
1556 4770 JMS RSYNC /SYNC READER
1557 4200 JMS ROBLK /READ DATA BLOCK
1560 4772 JMS PLTLR /PUNCH TRAILER
1561 4767 JMS RRDY /WAIT FOR RDR NOT BUSY
1562 5425 JMP I CHAIN /CHAIN

```

RM33A, TEXT /-----I@?/

```

1563 5555
1564 5555
1565 1100
1566 7700

1567 1343
1570 1216

```

1571 1212
1572 1200
1573 1537
1574 0503
1575 5721
1576 0400
1577 1351
1600

PAGE

1600
1600 0000
1601 7200
1602 3076
1603 4777
1604 4776
1605 4775
1606 4774
1607 4773
1610 4772
1611 4771
1612 4770
1613 4770
1614 5425

PAGE
/COMBINED TEST NORMAL TEST SEQUENCE
CNTST, 0
CLA RBUSY /CLEAR RBUSY
DCA RBUSY /PUNCH LEADER
JMS PLTLR /PUNCH SYNC CHARACTER
JMS PSYNC /PUNCH DATA BLOCK (NO STALLS)
JMS PBLK /SYNC READER
JMS RSYNC /READ DATA BLOCK (STALLS)
JMS RDBLKR /PUNCH DATA BLOCK (STALLS)
JMS PBLKR /READ DATA BLOCK (NO STALLS)
JMS RDBLK /PUNCH TRAILER
JMS PLTLR /WAIT FOR READER NOT BUSY
JMS RRDY /CHAIN
JMP I CHAIN

1615 0000
1616 7200
1617 3064
1620 1615
1621 3224
1622 2215
1623 4767
1624 0000
1625 4227
1626 5615

/TYPE LINE OF 3 CHARACTERS (NO DELAY)
TYPLN3, 0
CLA STLID /CLEAR STLID
TAD I TYPLN3 /SET AND STORE
DCA #3 /ADDRESS OF DATA
ISZ TYPLN3 /GO FILL BUFFER WITH 3 CHARACTERS
JMS FBFB3
JMS TYPLN /GO TYPE LINE
JMP I TYPLN3 /EXIT

1627 0000
1630 4555
1631 1140
1632 1137
1633 3247
1634 4577
1635 1646
1636 6577
1637 4556
1640 1646
1641 4474
1642 2246
1643 2247
1644 5237
1645 5627

/TYPE LINE OF ASCII PRINTABLE CHARACTERS
TYPLN, 0
CKSR37 /KSR37
TAD I11 /NO
TAD I=125 /YES
DCA TCTR /#76, OR #85
SETLOC /SET FETCH TO ADDRESS
FETCH /OF BLOCKA,
BLOCKA
STALL
TYPEA,
TAD I FETCH /YES, SET CHARACTER
JMS I UPUNCH /GO PRINT CHARACTER
ISZ FETCH /SET UP FOR NEXT CHARACTER
ISZ TCTR /DONE?
JMP I TYPEA /NO, REPEAT
JMP I TYPLN /YES, EXIT

1646	0000	FETCH;	0
1647	0000	TCTR,	0
1650	0000	ASCCN;	0
1651	1650		TAD I ASCCN
1652	3304		DCA WASC
1653	2250		ISZ ASCCN
1654	1650		TAD I ASCCN
1655	3305		DCA SASC
1656	2250		ISZ ASCCN
1657	1366		TAD (7700
1660	0704		AND I WASC
1661	7102		BSW CLL
1662	4271		JMS CNV
1663	2305		ISZ SASC
1664	1366		TAD (7700
1665	7040		CMA
1666	0704		AND I WASC
1667	4271		JMS CNV
1670	5650		JMP I ASCCN
1671	0000	CNV,	0
1672	3306		DCA ASCT
1673	1306		TAD ASCT
1674	7006		RTL
1675	7004		RAL
1676	0365		AND (707
1677	1306		TAD ASCT
1700	0365		AND (707
1701	1364		TAD (6060
1702	3705		DCA I SASC
1703	5671		JMP I CNV
1704	0000	WASC,	0
1705	0000	SASC,	0
1706	0000	ASCT,	0
1707	0000	SINPT,	OPEN
1710	7200		CLA
1711	3314		DCA SPT0
1712	3316		DCA SPIND
1713	5707		JMP I SINPT
1714	0000	SPT0,	OPEN
1715	0000	SPT1,	OPEN
1716	0000	SPIND,	OPEN
1717	0000	SGET,	OPEN
1720	7320		CLA STL
1721	2316		ISZ SPIND
1722	7340		CLA CMA CLL
1723	3316		DCA SPIND
1724	1314		TAD SPT0
1725	7420		SNL
1726	5331		JMP ;+3
1727	7041		CIA
1730	7410		SKP
1731	7040		CMA
1732	3314		DCA SPT0

/SUB TO INITIALIZE SGET SUB.

/ZERO SPT0
/ZERO SPIND
/EXIT

/"SPECIAL" BINARY COUNT
/PATTERN SUBROUTINE.

```

1733 1145      TAD C377
1734 0314      AND SPT0
1735 3315      DCA SPT1
1736 1315      TAD SPT1
1737 5717      JMP I SGET
                /EXIT SGET SUB;

```

/SUBROUTINE TO INITIALIZE RANDOM NUMBER GENERATORS:

```

1740 0000      SETRND, OPEN
1741 1363      TAD (1233
1742 3762/     DCA RP1A
1743 1363      TAD (1233
1744 3761/     DCA RP1B
1745 1360      TAD (7622
1746 3757/     DCA RP2A
1747 1360      TAD (7622
1750 3756/     DCA RP2B
1751 5740      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

```

PAGE

/ROUTINE TO SET CTRA EQUAL TO =7640 (=4000 DECIMAL):

```

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

```

/ROUTINE TO SET DELAY TO =310 (=200 DECIMAL):

```

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

```

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

```

2012 0000 S1001, 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.
    
```

/ROUTINE TO DETERMINE DEVICE CAUSING UNEXPECTED INTERRUPT;

```

2017 0000 INTFND, OPEN
2020 7200 CLA
2021 6031 INTKSF, SKP /KEYBOARD/READER?
2022 7410 SKP /NO,
2023 4276 JMS HLT0 /GO BOLT AND DISPLAY IOT
2024 6041 TSF /TTY PRINTER/PUNCH?
2025 7410 SKP /NO,
2026 4276 JMS HLT0 /GO BOLT AND DISPLAY IOT
2027 6011 RSF /H.S. READER?
2030 7410 SKP /NO,
2031 4276 JMS HLT0 /HALT AND DISPLAY IOT
2032 6021 PSF /H.S. PUNCH?
2033 7410 SKP /NO,
2034 4276 JMS HLT0 /HALT AND DISPLAY IOT
2035 6401 JMS HLT0 /HALT AND DISPLAY IOT
2036 7410 SKP /PT08/LT08 UNIT 1 IN?
2037 4276 JMS HLT0 /NO,
2040 6411 JMS HLT0 /HALT AND DISPLAY IOT
2041 7410 SKP /PT08/LT08 UNIT 1 OUT?
2042 4276 JMS HLT0 /NO,
2043 6421 JMS HLT0 /HALT AND DISPLAY IOT
2044 7410 SKP /PT08/LT08 UNIT 2 IN?
2045 4276 JMS HLT0 /NO,
2046 6431 JMS HLT0 /HALT AND DISPLAY IOT
2047 7410 SKP /PT08/LT08 UNIT 2 OUT?
2050 4276 JMS HLT0 /NO,
2051 6441 JMS HLT0 /HALT AND DISPLAY IOT
2052 7410 SKP /PT08/LT08 UNIT 3 IN?
2053 4276 JMS HLT0 /NO,
2054 6451 JMS HLT0 /HALT AND DISPLAY IOT
2055 7410 SKP /PT08/LT08 UNIT 3 OUT?
2056 4276 JMS HLT0 /NO,
2057 6461 JMS HLT0 /HALT AND DISPLAY IOT
2060 7410 SKP /PT08/LT08 UNIT 4 IN?
2061 4276 JMS HLT0 /NO,
2062 6471 JMS HLT0 /HALT AND DISPLAY IOT
2063 7410 SKP /PT08/LT08 UNIT 4 OUT?
2064 4276 JMS HLT0 /NO,
2065 6111 JMS HLT0 /HALT AND DISPLAY IOT
2066 7410 SKP /PT08/LT08 UNIT 5 OR DC02 IN?
2067 4276 JMS HLT0 /NO,
2070 6121 JMS HLT0 /HALT AND DISPLAY IOT
    
```

```

2071 5275 JMP I+4
2072 4276 JMS HLTD
2073 7777 7777
2074 7777 7777
2075 4276 JMS HLTD
2076 0000 OPEN
2077 1276 TAD HLTD
2100 1311 TAD M3
2101 3276 DCA HLTD
2102 1676 TAD I HLTD
2103 7402 HLT
2104 7001 IAC
2105 3306 DCA I+1
2106 0000 OPEN
2107 7200 CLA
2110 5617 JMP I INTFND
2111 7775 M3 -3 /EXIT

```

```

/NO,
/HAJT AND DISPLAY IOT
/DON'T KNOW WHAT DEVICE
/CAUSED THE INTERRUPT.
/HAJT AND DISPLAY ALL I'S;

```

```

/GET IOT THAT CAUSED SKIP
/AND HALT. IOT IN AC.

```

```

2112 0000 PUNCH, OPEN
2113 2071 ISE PFLAG /SET PFLAG,
2114 6046 TLS /PUNCH/PRINT,
2115 7200 CLA
2116 1071 TAD PFLAG /GET C(PFLAG),
2117 7650 SNA CLA /FLAG RESET?
2120 5323 JMP OUT2 /YES
2121 6041 TSF /NO, FLAG UP?
2122 5316 JMP I+4 /NO,
2123 6042 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 IYIS.

```

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

```

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

```

2134 0000 TLC37I, OPEN
2135 1734 TAD I TLC37I
2136 3342 DCA I+4 /GET FIRST LETTER TO BE TYPED
2137 4555 CKSR37 /SAVE IT.
2140 5425 JMP I CHAIN /IS IT A "37"?
2141 4473 JMS I UTPLN3 /NO, CHAIN
2142 0000 OPEN /YES, GO TYPE LETTER + NEXT 2
2143 5425 JMP I CHAIN /FIRST LETTER TO BE TYPED,
/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 I+2
2150 4777 JMS FBF3
2151 0000 OPEN
2152 4776 JMS CNTST
/SAVE IT
/GO FILL A BUFFER
/WITH THIS +NEXT 2 CHAR
/GO TO COMBINED TEST SEQUENCE
    
```

/ROUTINE TO CONTROL TYPING A LINE WITHOUT STALLS
/AND THEN ONE WITH STALLS;

```

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

/SUBROUTINE TO MARK TAB POSITIONS,

```

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

2175 1627 PAGE
2176 1600
2177 1031

/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
2201 0023 KSTART
2202 2205 P0T50
2203 5604 JMP I I+1
2204 0236 SRSET
/SET KSTART TO INITIAL
/ROUTINE ADDRESS,
/GO START TEST
    
```

/TEST 0 CHECKS THE ABILITY OF

```

/SPF TO SET THE PRINTER FLAG, SET,
/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
2206 2270
2207 4432

```

```

POTS0, 0
POTS1
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
2211 4560
2212 4566
2213 5237
2214 7360
2215 6007
2216 4576
2217 4566
2220 7410
2221 5244
2222 7420
2223 7440
2224 5253
2225 4560
2226 4566
2227 5237
2230 4565
2231 4566
2232 7610
2233 5262
2234 2062
2235 5211
2236 5425

```

```

POTS0A, USPF
UTSF
JMS I S100
POTS0B, CLA CMA CLL CML
P0E0A
DELAY
UTSF
SKP
JMP
SNL
SEA
JMP
USPF
UTSF
POTS0C, P0E0B
P0E0C
POTS0D, USPF
UTSF
POTS0E, UTCF
UTSF
SKP CLA
JMP
ISZ
JMP
JMP I

```

```

/SET UP TO DO TEST 100 TIMES.
/SET PRINTER FLAG
/FLAG SET?
/NO, SPF OR TSF FAILED
/AC AND LINK & 1
/YES, NOW CLEAR IT,
/GO DELAY
/FLAG SET?
/NO, CONTINUE TEST
/YES, CAP OR TSF FAILED
/LINK SET?
/NO, AC SET?
/YES, CAF FAILED TO CLEAR AC AND/OR LINK
/SET PRINTER FLAG
/PRINTER FLAG SET?
/NO, SPF OR TSF FAILED
/YES, CLEAR PRINTER FLAG
/PRINTER FLAG SET?
/NO, OK.
/YES, TCF FAILED TO CLEAR PRINTER FLAG.
/DONE TEST 100 TIMES?
/NO, REPEAT TEST
/YES, CHAIN NOW

```

```

/ERROR HLTS FOR POTS0.

```

```

2237 7402

```

```

P0E0A, HLT
/SCOPE LOOP,
USPF
UTSF
JMP
JMP

```

```

/SPF FAILED TO SET PRINTER FLAG
/OR TSF FAILED TO SKIP.
/SET PRINTER FLAG
/IS IT SET?
/NO, REPEAT.
/YES, REPEAT.

```

```

2240 4560
2241 4566
2242 5240
2243 5240

```

```

P0E0A+1
P0E0A+1

```

```

2244 7402

```

```

P0E0B, HLT
/SCOPE LOOP,
USPF
CAF

```

```

/CAF FAILED TO CLEAR PRINTER FLAG
/OR TSF SKIPPED.
/SET PRINTER FLAG
/CLEAR FLAGS

```

```

2245 4560
2246 6007

```



```

2247 4576 DELAY /DELAY
2250 4566 UTSP /FLAG SET?
2251 5245 JMP /NO, REPEAT.
2252 5245 JMP P0E0B+1 /YES, REPEAT.
2253 7402 P0E0C1 /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 /CLEAR
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 P0E0E1 /TCF FAILED TO CLEAR PRINTER FLAG
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2263 4560 USPF /OR TCF SKIPPED.
2264 4565 UTCF /SET PRINTER FLAG
2265 4566 UTSP /CLEAR PRINTER FLAG
2266 5263 JMP P0E0E+1 /FLAG SET?
2267 5263 JMP P0E0E+1 /NO, REPEAT.
/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 P0YS1, 1
2271 2327 P0TS2
2272 4577 SETLOC
2273 0002 2
2274 2304 P0E1A
2275 6007 CAF
2276 4560 USPF
2277 4565 UTCF
2300 6001 ION
2301 7000 NOP
2302 6002 IOF
2303 5306 JMP
2304 4777 /
2305 5275 JMS INTFND
2306 4431 JMP P0TS1A
2307 4577 JMS I S4000
2310 0002 SETLOC 2
2311 2324 P0TS1C
2312 4560 USPF
2313 6001 ION
2314 7000 NOP
2315 7402 P0E1B, HLT
2316 4577 SETLOC
2317 0002 2
2320 2323 P0TS1C+1
/SET INTERRUPT RETURN
/TO P0E1A.
/ATTEMPT TO CLEAR ALL FLAGS
/SET PRINTER FLAG
/CLEAR PRINTER FLAG
/ENABLE INTERRUPT
/
/DISABLE INTERRUPT
/UNEXPECTED INTERRUPT
/TRY AGAIN
/SET UP TO DO TEST 4000 TIMES,
/SET INTERRUPT RETURN
/TO P0TS1C
/SET PRINTER FLAG
/ENABLE INTERRUPT
/NO INTERRUPT
/PRINTER FLAG FAILED TO INTERRUPT
/OR INTERRUPT MALFUNCTION
/SET INTERRUPT RETURN
/ TO P0TS1C+1

```

```

2321 6001 ION
2322 7000 NOP
2323 5321 JMP
2324 2062 POTS1C, ISZ
2325 5313 JMP
2326 5425 JMP I CHAIN
        CTR A
        POTS1B
        CHAIN
/ENABLE INTERRUPT (SCOPE LOOP)
/INTERRUPT
/DONE 4000 TIMES?
/NO, REPEAT TEST.
/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;
/CAF TO ENABLE TTY INTERRUPT ENABLE FLIP FLOP;

```

```

POTS2, 2
        POTS3
        JMS I $4000
POTS2A, SETLOC
        2
        P0E2A
        CAF
        UKIE
        USPF
        ION
        NOP
        USPI
POTS2B, SKP
        CLA
        P0E2B
        JMP
        SRQ
POTS2C, SKP
        CLA
        P0E2C
        JMP
        SETLOC
POTS2D, 2
        POTS2E
        USPF
        CLA IAC
        UKIE
        ION
        NOP
        JMP
        P0E2D
/SET UP TO DO TEST 4000 TIMES;
/SET INTERRUPT RETURN
/TO P0E2A
/CLEAR EVERYTHING AND ENABLE INT ENABLE F.F.;
/DISABLE INTERRUPT ENABLE FF
/SET PRINTER FLAG;
/TURN INTERRUPT ON;
/SKIP IF TTY INTERRUPT REQUEST
/USPI SKIPPED
/SKIP IF INTERRUPT REQUEST
/SRQ SKIPPED
/SET INTERRUPT RETURN
/TO POTS2E;
/SET PRINTER FLAG
/AC11 R 1;
/ENABLE TTY INTERRUPT ENABLE F.F.;
/INTERRUPT AT END OF THIS INSTRUCTION
/KIE FAILED TO ENABLE TTY INTERRUPT F.F.;

```

```

PAGE
POTS2E, USPI
POTS2F, SRQ
        JMP
        SRQ
        JMP
        P0E2E
        P0E2F

```

```

2404 7300 POTS2G, CLA CLL
2405 4561 UKIE
2406 6007 CAF
2407 4560 USPF
2410 4557 USPI
2411 5274 JMP P0E2G
2412 2062 ISZ CTRA
2413 5777 JMP POTS2A
2414 5425 JMP I CHAIN
/AC + LINK = 0
/DISABLE TTY INTERRUPT ENABLE F,F;
/CLEAR EVERYTHING AND ENABLE TTY INTERRUPT F,F;
/SET PRINTER FLAG;
/SKIP IF INTERRUPT REQUEST
/CAF FAILED TO ENABLE TTY INTERRUPT ENABLE F,F;
/DONE 4000 TIMES?
/NO, REPEAT TEST
/CHAIN

```

```

/ERROR HLTS FOR POTS2;
P0E2A, HLT
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
SETLOC
2
P0E2A+1
CAF
UKIE
USPF
ION
NOP
JMP P0E2A+1
/REPEAT TEST;
/KIE FAILED TO DISABLE TTY INTERRUPT
/ENABLE FLIP-FLOP;
/SET INTERRUPT RETURN
/TO P0E2A+1
/CLEAR
/DISABLE TTY INTERRUPT ENABLE F,F;
/SET PRINTER FLAG
/TURN INTERRUPT ON;
/REPEAT TEST;

```

```

P0E2B, HLT CLA
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
UKIE
USPF
USPI
JMP P0E2B+1
JMP P0E2B+1
P0E2C, HLT CLA
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
UKIE
USPF
SRQ
JMP P0E2C+1
JMP P0E2C+1
/SPI SKIPPED WITH FLAG SET
/AND INTERRUPT ENABLE DISABLED;
/DISABLE INTERRUPT ENABLE
/SET PRINTER FLAG
/SKIP IF TTY INT REQUEST;
/REPEAT;
/REPEAT;
/SRQ SKIPPED WITH FLAG SET
/AND INTERRUPT ENABLE DISABLED;
/DISABLE INTERRUPT ENABLE
/SET PRINTER FLAG
/SKIP IF INTERRUPT REQUEST
/REPEAT;
/REPEAT;

```

```

P0E2D, HLT
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
SETLOC
2
P0E2D+4
UKIE
CLA IAC
UKIE
USPF
ION
NOP
/KIE FAILED TO ENABLE TTY INTERRUPT F,F;
/SET INTERRUPT RETURN
/TO P0E2D+4
/DISABLE TTY
/ACII = 1
/ENABLE TTY
/SET PRINTER FLAG
/TURN INTERRUPT ON

```

```

2455 5247      JMP      P0E2D+4      /REPEAT
2456 7402      P0E2E; HLT          /SPI FAILED TO SKIP,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
CLA IAC          /AC11 = 1
UKIE            /ENABLE TTY
USPF           /SET PRINTER FLAG
USPI          /SKIP IF INTERRUPT REQUEST
JMP           /REPEAT.
JMP           /REPEAT.

```

```

2465 7402      P0E2F; HLT          /SRQ FAILED TO SKIP,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
CLA IAC          /AC11 = 1
UKIE            /ENABLE TTY
USPF           /SET PRINTER FLAG
SRQ           /SKIP IF INTERRUPT REQUEST
JMP           /REPEAT.
JMP           /REPEAT.

```

```

2474 7402      P0E2G; HLT          /CAF FAILED TO ENABLE TTY INTERRUPT
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
CLA CLL          /CLEAR
UKIE            /DISABLE TTY,
CAF            /ENABLE TTY INTERRUPT ENABLE F,F,
USPF           /SET PRINTER FLAG
USPI          /TTY INTERRUPT REQUEST?
JMP           /NO, REPEAT.
JMP           /YES, REPEAT.

```

```

2504 0003      P0TS3; 3
2505 2544      P0TS4
2506 4430      JMS I S100
2507 4432      JMS I S200

/SET UP TO DO TEST 100 TIMES.
/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
/PRINT
/DELAY TWICE MAX TIME
/FLAG SET. IT SHOULD BE,
/FLAG NOT SET.
/CLEAR + SET PRINTER FLAG.
/NO, OK

P0TS3A; UTCF
2510 4565      UTPC
2511 4564      DELAY
2512 4576      UTSF
2513 4566      JMP P0E3A
2514 5327      UTL
P0TS3B; UTL
2515 4563      UTSF
2516 4566      SKP CLA
2517 7610

```

```

2520 5334 JMP P0E3B
2521 4576 P0TS3C, DELAY
2522 5366 UTSF
2523 5340 JMP P0E3C
2524 2062 ISZ CTRA
2525 5310 JMP P0TS3A
2526 5425 JMP I CHAIN

2527 7602 P0E3A, HLT CLA
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
UTCF
UTPC CLEAR PRINTER FLAG
DELAY SET FLAG BY BEGINNING OF 10TH BIT
JMP ,=3 WAIT
REPEAT.

2534 7602 P0E3B, HLT CLA
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
USPF
UTLS CLEAR PRINTER FLAG
JMP ,=2

2540 7602 P0E3C, HLT CLA
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
UTLS CLEAR PRINTER FLAG
DELAY SET PRINTER FLAG
JMP P0E3C+1

2544 0004 /PUNCH, 4
P0TS4, PRINTER TIMING TEST.

2545 2616 P0TS5
2546 4430 JMS I S100
2547 4577 P0TS4A, SETLOC
2550 0024 DELAY
2551 7657 -121
2552 1022 TAD BAUDRT
2553 1136 TAD C=110
2554 7650 SNA CLA
2555 5360 JMP ,+3
2556 1135 TAD C=130
2557 3024 DCA DELAY
2560 4563 UTLS
2561 4576 DELAY
2562 4566 UTSF
2563 7410 SKP
2564 5776/ JMP P0E4A
2565 4577 P0E4B, SETLOC
2566 0024 DELAY
2567 7771 -7
2570 4576 DELAY
2571 4566 UTSF
2572 5775/ JMP P0E4B
2573 5774/ JMP P0TS4C
2574 2600

```

```

/YES
/DELAY TWICE BAUD RATE;
/FLAG SET?
/NO
/YES, DONE 100 TIMES
/NO, DO TEST AGAIN
/EXIT,

/TPC FAILED TO SET PRINTER FLAG,
/CLEAR PRINTER FLAG
/SET FLAG BY BEGINNING OF 10TH BIT
/WAIT
/REPEAT.

/UTS FAILED TO CLEAR PRINTER FLAG,
/ENTER,
/SET PRINTER FLAG
/CLEAR PRINTER FLAG AT TP3;

/UTLS FAILED TO SET PRINTER FLAG,
/ENTER,
/PRINT
/DELAY TWICE BAUD RATE;
/REPEAT.

/SET UP TO DO TEST 100 TIMES,
/SET DELAY
/TO -81 (DEC)

/GET BAUD RATE;
/ADD A -110 TO IT,
/IS IT 110 BAUD WE'RE WORKING WITH?
/YES, LEAVE DELAY ALONE,
/NO, CHANGE DELAY TO -88 (DEC),
/DELAY NOW SET TO -88 DECIMAL,
/PRINT
/DELAY A LITTLE LESS THAN 9 BIT TIMES
/FLAG SET
/NO, OK
/YES,
/SET DELAY
/TO -7 (DEC)
/DELAY SO WE'RE PAST THE 9,5 BIT TIME POINT
/FLAG SET?
/NO
/CROSS PAGE

```

```

2575 2614
2576 2607
2577 2332
2600

2600 4577
2601 0024
2602 7761
2603 4576
2604 2062
2605 5777
2606 5425

                POTS4C, SETLOC
                DELAYM
                -17
                DELAY
                ISZ
                JMP I
                CTR A
                POTS4A
                CHAIN

/DELAY SO WE'RE PAST THE END.
/DONE 100 TIMES?
/NO, DO TEST AGAIN
/CHAIN
    
```

```

2607 7602
                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,
                UTLS
                UTSF
                JMP
                JMP
                I=1
                I=3

                START PRINTER
                FLAG SET
                NO, CHECK AGAIN
                REPEAT
    
```

```

2610 4563
2611 4566
2612 5211
2613 5210

2614 7602
                P0E4B, HLT
                CLA
                FLAG NOT SETTING IN REQUIRED TIME;
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
                P0E4A+1
                GO TO SCOPE LOOP;
    
```

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

```

2616 0005
2617 2660
2620 4430
2621 4563
2622 4566
2623 5222
2624 4577
2625 0024
2626 7636
2627 1022
2630 7104
2631 7710
2632 2024
2633 4563
2634 4576
2635 4566
2636 7610
2637 5254
2640 4577
2641 0024
2642 7774
2643 4576
2644 4566
2645 5256

                POTS5, 5
                P0T6
                JMS I S100
                UTLS
                UTSF
                JMP I=1
                SETLOC
                DELAYM
                -142
                TAD
                RAL CLL
                SPA CLA
                ISZ
                UTLS
                DELAY
                UTSF
                SKP CLA
                JMP P0E5A
                SETLOC
                DELAYM
                -4
                DELAY
                UTSF
                JMP P0E5B

                POTS5A,
                FLAG SET?
                SET DELAYM TO
                -98 DECIMAL,
                GET BAUD RATE,
                MOVE INTO POSITION TO DETERMINE IF 2400,
                IS IT 2400?
                YES, INCREMENT DELAYM SO AS TO DELAY LESS;
                PRINT
                DELAY
                FLAG SET?
                NO, OK,
                YES, ERROR,
                SET DELAYM TO
                -4 DECIMAL,
                DELAY
                FLAG NOW SET?
                NO, ERROR,
    
```

```

2646 4576 DELAY
2647 4576 DELAY
2650 4576 DELAY
2651 2062 ISE CTR
2652 5221 JMP P0TS5A-3
2653 5425 JMP I CHAIN
          /TEST DONE?
          /NO; REPEAT,
          /YES; CHAIN,

```

```

2654 7402 P0E5A; HLT          /FLAG SETTING TO SOON;
          /SCOPE LOOP, PRESS CONTINUE TO ENTER,
          JMP P0E4A+1
2655 5210

```

```

2656 7402 P0E5R; HLT          /FLAG NOT SETTING SOON ENOUGH;
          /SCOPE LOOP, PRESS CONTINUE TO ENTER,
          JMP P0E5A+1
2657 5255

```

/TEST OF GTF; TEST IS DONE
/4000 TIMES;

```

2660 0006 P0T6; 6
2661 2736 P0T7
2662 4431 JMS I 94000          /SET UP TO DO TEST 4000 TIMES;
2663 6007 CMA          /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT;
2664 7040 CMA
2665 6004 GTF          /GET INTERRUPT FLAGS
2666 0335 AND K5200          /MASK,
2667 7440 SZA
2670 7402 HLT          /GTF FAILED,
2671 7360 CLA CMA CLL CML          /SET LINK AND AC,
2672 6004 GTF          /GET INTERRUPT FLAGS; (AC SHOULD EQUAL 4000);
2673 0335 AND K5200          /MASK,
2674 7420 SNL
2675 7402 HLT          /GTF CLEARED LINK,
2676 7104 CLA CMA CLL CML          /AC SHOULD EQUAL ZERO, LINK SHOULD EQUAL 1);
2677 7430 SEL
2700 7440 SZA
2701 7402 HLT
2702 6007 CAF          /GTF DID NOT GET LINK,
2703 4560 USPF          /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT;
2704 6004 GTF          /SET PRINTER FLAG,
2705 0335 AND K5200          /GET INTERRUPT FLAGS;
2706 7006 RTL          /MASK,
2707 7004 RAL          /PUT INTERRUPT BUS - (AC SHOULD EQUAL 1000)
2710 7430 SZA          /-FLAG INTO LINK, (AC SHOULD EQUAL ZERO);
2711 7440 SZA          /IS LINK 1?
2712 7402 HLT          /IS AC ZERO?
2713 4577 SETLOC          /GTF FAILED TO GET INTERRUPT BUS,
2714 0002 2          /SET INTERRUPT RETURN LOCATION
2715 2725 P0T6F          /TO P0T6F,
2716 6007 CAF          /CLEAR ALL FLAGS;
2717 6001 ION          /TURN INTERRUPT ON
2720 6004 GTF          /GET INTERRUPT FLAGS;
2721 0335 AND K5200

```

```

2722 4560 /SET PRINTER FLAG,
2723 7000 /(INTERRUPT),
2724 7402 /GTF CLEARED ION,
2725 7102 /PUT ION = (AC SHOULD EQUAL 0002);
2726 7012 /FLAG INTO LINK, (AC SHOULD EQUAL 0000).
2727 7430 /LINK 1?
2730 7440 /AC ZERO?
2731 7402 /GTF FAILED TO GET ION,
2732 2062 /TEST DONE?
2733 5263 /NO, REPEAT,
2734 5425
2735 5200 K5200, 5200

```

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

```

2736 0007
2737 7777
2740 4431 JMS I S4000
2741 4577 SETLOC
2742 0002
2743 2760 P0T7C+3
2744 7320 CLA CLL CML
2745 6005 RTF
2746 7420 SNL
2747 7440 SZA
2750 7402 HLT
2751 7330 CLA CLL CML RAR
2752 6005 RTF
2753 7420 SNL
2754 7402 HLT
2755 4560 USPF
2756 7000 NOP
2757 7402 HLT
2760 2062 ISE CTRA
2761 5344 JMP P0T7A
2762 5425 JMP I CHAIN

```

```

/SET UP TO DO TEST 4000 TIMES;
/SET INTERRUPT RETURN
/TO P0T7C+3,
/AC EQUALS ZERO, LINK EQUALS 1;
/RESTORE FLAGS,
/LINK SET?
/AC ZERO?
/RTF FAILED TO RESTORE LINK,
/AC EQUALS 4000
/RESTORE FLAGS, (LINK),
/LINK RESTORED?
/RTF FAILED TO RESTORE LINK,
/SET PRINTER FLAG,
/(INTERRUPT),
/RTF DID NOT SET ION,
/TEST DONE?
/NO, REPEAT,

```

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 PITS0

```


3003 5604
3004 0236

JMP I 1-1
SRSET

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

3005 0000
3006 3010
3007 4777

P1TS0, 0
P1TS1 P2TS0A
JMS

/ISSUE T1S AND THEN KCC, WAIT TWICE 10 OR 11 BIT TIMES
/(SEE TABLE AT BEGINNING OF PROGRAM) FOR FLAG TO SET.
/SKIP ON FLAG, FAILURE TO SKIP INDICATES THE THE
/FLAG IS NOT SET, OR KSF FAILURE, TEST IS DONE 100
/TIMES.

3010 0001
3011 3034
3012 4430
3013 4432

P1TS1, 1
P1TS2
JMS I S100
JMS I S200

/SET UP TO DO TEST 100 TIMES.
/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.

3014 4571
3015 4563
3016 4576
3017 4572
3020 5225
3021 2062
3022 5214
3023 6007
3024 5425

P1TS1A, UKCC
UTLS
DELAY
UKSF
JMP P1E1A
ISE CTRA
JMP P1TS1A
CAF
JMP I CHAIN

/CLEAR AC AND KBRD FLFLAG;
/SEND,
/DELAY TWICE 10 OR 11 BIT TIMES.
/FLAG SET?
/NO,
/YES, TEST DONE 100 TIMES?
/NO, REPEAT,
/CLEAR
/CHAIN.

3025 7602
3026 4571
3027 4563
3030 4576
3031 4572
3032 5226
3033 5226

P1E1A, HLT CLA
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
UKCC
UTLS
DELAY
UKSF
JMP
JMP

/FLAG NOT SET OR KSF FAILURE;
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
/DELAY TWICE 10 OR 11 BIT TIMES
/FLAG SET?
/NO, REPEAT
/YES, REPEAT,

3034 0002
3035 3066
3036 4432

P1TS2, 2
P1TS3
JMS I S200

/ISSUE T1S 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;
/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,

```

3037 4431      JMS I S4000
3040 4571      UKCC
3041 4563      UTLS
3042 4576      DELAY
3043 4565      UTCF
3044 4572      UKSF
3045 5253      JMP P1E2A
3046 4572      UKSF
3047 5262      JMP P1E2B
3050 2062      ISZ CTRA
3051 5246      JMP P1TS2B
3052 5425      JMP I 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 T1S AND THEN KCC, WAIT TWICE MAXIMUM BIT RATE FOR
/FLAG TO SET, RESET FLAG (T1S AND THEN KCC) AND SKIP ON FLAG
/500 TIMES TO VERIFY NO SKIP OCCURS WITH FLAG = 0,
    
```

```

3066 0003      P1TS3, 3
3067 3126      P1TS4
3070 4577      SETLOG
3071 0062      CTRA
3072 7014      -764
3073 4432      JMS I S200
    
```

```

/SET COUNT OF
/=500 (DEC)
/IN CTRA,
/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 AC AND KBRD FLAG.
/SEND,
/DELAY TWICE 10 OR 11 BIT TIMES
/FLAG SET,
    
```

```

3074 4571      P1TS3A, UKCC
3075 4563      UTLS
3076 4576      DELAY
3077 4572      UKSF
    
```

```

3100 5313 JMP PIE3A /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 PIE3B /YES.
3106 4566 UTSF /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 PIE3A; HLT CLA /FLAG NOT SET OR KSF FAILED,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
UTLS /SEND
3114 4563 UKCC /CLEAR AC AND KBRD FLAG
3115 4571 DELAY
3116 4576 UKSF
3117 4572 JMP ,=4
3120 5314 JMP ,=4
3121 5320

```

```

3122 7602 PIE3B; HLT CLA /KSF SKIPPED ON NO FLAG.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
UTLS
3123 4563 JMS I KBFLAG
3124 4426 JMP PIE3B+i
3125 5323

```

/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 P1TS5
3127 3200 SETLOC /SET INTERRUPT RETURN
3130 4577 2 /TO PIE4A
3131 0002 /
3132 3143 PIE4A /SEND
3133 4563 P1TS4A; UTLS
3134 4426 JMS I KBFLAG
3135 4565 UTCF
3136 4571 UKCC /CLEAR PRINTER FLAG.
3137 6001 ION /CLEAR READER FLAG
3140 7000 NOP /TURN INTERRUPT ON;
3141 6002 IOF /TURN INTERRUPT OFF.
3142 5345 JMP ,+3 /SKIP OVER,
3143 4776 / 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 /SEND
3153 4563 UTLS
3154 4426 JMS I KBFLAG
3155 4565 UTCF /CLEAR PRINTER FLAG.
3156 6001 ION /INTERRUPT ON;

```

```

3157 7000 NOP
3160 7402 HLT
      /SHOULD INTERRUPT
      /READER FLAG FAILED TO INTERRUPT OR
      /INTERRUPT SYSTEM MALFUNCTION,
      /SET INTERRUPT RETURN
3161 4577 SETLOC
3162 0002 2
3163 3166 P1TS4C=1
      /SCOPE LOOP, PRESS CONTINUE TO ENTER,
      /ON
3164 6001 NOP
3165 7000 NOP
3166 5364 JMP ,=2
3167 2062 P1TS4C, ISZ CTRA
3170 5353 JMP P1TS4B
3171 6007 CAF
3172 5425 JMP I CHAIN
      /DONE 1000 TIMES YET?
      /NO, REPEAT
      /EXIT
      /EXIT,
3176 2017 PAGE
3177 3513
3200 3200

```

/TEST 5 CHECKS THE ABILITY OF
/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
3203 6007 CAF
3204 4563 P1TS5A, UTLS
3205 4426 JMS I KBFLAG
3206 4565 UTCF
3207 6003 SRQ P1E5A
3210 5230 JMP P1E5A
3211 4557 P1TS5B, USPI
3212 5235 JMP P1E5B
3213 6007 P1TS5C, CAF
3214 4572 UKSF
3215 7610 SKP CLA
3216 5242 JMP P1E5C
3217 6003 SRQ CLA
3220 7610 SKP CLA
3221 5257 JMP P1E5D
3222 4557 P1TS5E, USPI
3223 7610 SKP CLA
3224 5264 JMP P1E5E
3225 2062 ISZ CTRA
3226 5204 JMP P1TS5A
3227 5425 JMP I CHAIN
3230 7602 P1E5A, HLT CLA
      /SET UP TO DO TEST 100 TIMES,
      /CLEAR AND ENABLE INTERRUPT ENABLE FF
      /SEND
      /CLEAR PRINTER FLAG,
      /INTERRUPT REQUEST?
      /NO,
      /YES, TTY INTERRUPT REQUEST?
      /NO,
      /YES, CLEAR FLAG,
      /FLAG SET?
      /NO, OK
      /FLAG SET FOR SOME REASON,
      /INTERRUPT REQUEST,
      /NO, OK
      /TTY INTERRUPT REQUEST PRESENT?
      /NO, OK
      /TEST DONE 100 TIMES?
      /NO, REPEAT,
      /CHAIN,
      /SRQ FAILED TO SKIP ON KBRD, FLAG;

```

```

3231 4250
3232 6003
3233 5231
3234 5233

/SCOPE LOOP, PRESS CONTINUE TO ENTER,
JMS P1E5
SRQ
JMP I:=2
JMP I:=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 I:=2
3241 5240 JMP I:=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+I
3247 5243 JMP P1E5C+I

```

```

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+I
3263 5260 JMP P1E5D+I

```

```

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

```

```

/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 DELAY
3275 0024 DELAY /TO -103 DECIMAL

```

```

3276 7631 M147 /SEND
3277 4563 P1TS6A, UTLS /RECEIVE
3300 4571 UKCC /DELAY 10=11 BIT TIMES
3301 4576 DELAY /CLEAR TELEPRINTER FLAG
3302 4565 UTCF /KBRD FLAG SET?
3303 4572 UKSF /FLAG NOT SET
3304 5310 JMP P1E6A /DONE 100 TIMES YET?
3305 2062 ISZ CTRA
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,
UTLS
JMS I KBFLAG
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.

P1TS7, 7
3314 0007 P1T10, 7
3315 3325 SETLOC /SET COUNT OF
3316 4577 CTRA /=512 (DEC)
3317 0062 -1000 /IN CTRA,
3320 7000 JMS SINPT /INITIALIZE SPECIAL BIN COUNT,
3321 4777 JMS SGET /GET A NUMBER
3322 4776 JMS TRDATA /TRANSFER DATA AND CHECK,
3323 4337 JMP P1TS7A /REPEAT
3324 5322

/TEST OF KEYBOARD AND PUNCH BUFFERS USING RANDOM DATA,

P1T10, 10
3325 0010 P1T11 /SET COUNT OF
3326 3400 SETLOC /=512 (DEC)
3327 4577 CTRA /IN CTRA,
3330 0062 -1000 /INITIALIZE RANDOM NUMBER GENERATOR,
3331 7000 JMS SETRND /GET A RANDOM NUMBER,
3332 4775 JMS RGNB /MASK,
3333 4774 AND I397 /TRANSFER DATA AND CHECK,
3334 0145 JMS TRDATA /REPEAT
3335 4337 JMP P1T10A
3336 5333

/SUBROUTINE USED BY P1TS7 AND P1T10

TRDATA, OPEN
3337 0000 DCA HOLD1
3340 3346 TAD HOLD1
3341 1346 MQL
3342 7421 ACL
3343 7701 JMS SNDRAC
3344 4353 JMS SNDRAC
3345 1
3346 4353

```

```

3345 4470 JMS I CHECK /DID I RECEIVE WHAT I SENT?
3346 0000 OPEN /WHAT I SENT.
3347 5366 JMP PIE710 /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 I,=1 /JUST IN CASE
3361 7200 CLA
3362 4570 UKRS
3363 4566 UTSF
3364 5363 JMP I,=1
3365 5753 JMP I SNDREC /EXIT WITH RECEIVED DATA IN AC;

```

/COMMON HLT FOR P1T57 AND P1T10.

```

3366 7402 PIE710, HLT /DATA RECEIVED DOES NOT
/AGREE WITH DATA SENT.
/NO CONTAINS DATA THAT WAS SENT.
/AC CONTAINS DATA THAT WAS RECEIVED.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
ACL
JMS SNDREC /STAY IN LOOP.
JMP PIE710+1

```

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
3403 0062 CTRA
3404 7014 -764
3405 6007 P1T11A, CAF
3406 4777 JMS RGNB
3407 7421 MQL
/SET COUNT OF
/500 (DEC)
/IN CTRA.
/CLEAR THE WORLD;
/GET A RANDOM NUMBER
/STORE IT IN MQ

```

```

3410 7701 ACL /RELOAD AC
3411 4563 UTLS /
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 PIE11A /NO.
3421 2062 ISZ CTRA /DONE 500 TIMES YET?
3422 5205 JMP P1T11A /NO. REPEAT
3423 5425 JMP I CHAIN /YES CHAIN,

```

```

3424 7402 PIE11A, HLT /KRS FAILED TO "OR" KBRD WITH AC
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
CAF /MG TO AC
3425 6007 ACL
3426 7701 UTLS
3427 4563 UTSF
3430 4566 JMP ,=1
3431 5230 CLA CMA
3432 7240 UKRS
3433 4570 JMP PIE11A+1

```

/TEST OF KRB

```

3435 0012 P1T12, 12
3436 7777 JMS I S100
3437 4430 SETLOC
3440 4577 DELAYM
3441 0024 M147
3442 7631 CAF
3443 6007 TAD [252
3444 1134 UTLS
3445 4563 UTSF
3446 4566 JMP ,=1
3447 5246 CLA CMA
3450 7240 UKRB
3451 4567 CMA IAC
3452 7041 TAD [252
3453 1134 SZA
3454 7440 JMP PIE12A
3455 5264 UKSF
3456 4572 SKP CLA
3457 7610 JMP PIE12B
3460 5274 ISZ CTRA
3461 2062 JMP P1T12A
3462 5243 JMP I CHAIN
3463 5425

3464 7402 PIE12A, HLT /KRB FAILED TO JAM READER BUFFER TO AC;
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
CAF /CLEAR THE WORLD,
TAD [252
UTLS

```



```

3470 4566      UTSF
3471 5270      JMP ,=1
3472 4567      UKRB
3473 5265      JMP PIE12A+1

3474 7402      PIE12B; HLT          /KRB FAILED TO CLEAR READER FLAG,
/SCOPE LOOP.  PRESS CONTINUE TO ENTER,
CAF
3475 6007      UTLS
3476 4563      UTSF
3477 4566      JMP ,=1
3500 5277      UKRB
3501 4567      JMP PIE12B+1
3502 5275

```

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

```

PRG2, 4577      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;

```

P2TS0, 0        P2TS1
3510 0000      JMS P2TS0A
3511 3530      OPEN
3512 4313      JMS I S4000
3513 0000      CLA CMA
3514 4431      UKCC
3515 7240      SZA
3516 4571      JMP P2E0
3517 7440      ISZ CYRA
3520 5324      JMP I=5
3521 2062      JMP I CHAIN
3522 5315      HLT
3523 5425
3524 7402      P2E0,

3525 7240      CLA CMA
3526 4571      UKCC
3527 5325      JMP ,=2

/SET UP TO DO TEST 4000 TIMES;
/SET AC TO 7777
/CLEAR AC AND FLAG
/IS AC = 0?
/NO, ERROR, GO TO P2E0
/DONE? REPEAT
/NO, REPEAT
/CHAIN
/STO ERR HALT, KCC DID
/NOT RESULT IN AC = 0
/SET A TO 7777
/CLEAR AC AND FLAG
/RPEAT

```

/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.

```

P2TS1, 1        P2TS2
3530 0001      JMS I S200
3531 3545
3532 4432
/SET DELAYM TO DELAY TWICE
/10 BIT TIMES FOR AN NON 110
/BAUD DEVICE AND TWICE 11 BIT
/TIMES FOR AN 110 BAUD DEVICE;

```

```

3533 4430 P2TS1A, JMS I S100
3534 4571 P2TS1B, UKCC
3535 4576 DELAY
3536 4572 UKSF
3537 5343 JMP P2E1
3540 2062 ISZ CTRA
3541 5334 JMP P2TS1B
3542 5425 JMP I CHAIN
3543 7402 HLT
3544 5333 JMP P2TS1A

```

```

3545 0002 /ISSUE KCC, WAIT TWICE 10-11 BIT TIMES FOR FLAG TO BE SET;
3546 3600 /SKIP ON FLAG 1000 TIMES TO VERIFY CONSISTENT SKIPPING;
3547 4432 P2TS2, 2
          P2TS3
          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
3551 4571 P2TS2A, UKCC
3552 4576 DELAY
3553 4572 UKSF
3554 5362 JMP P2E2A
3555 4572 UKSF P2E2B
3556 5364 ISZ CTRA
3557 2062 JMP I=3
3560 5355 JMP I CHAIN
3561 5425 JMP I CHAIN
3562 7402 HLT
3563 5351 JMP P2TS2A
3564 7402 HLT
3565 4572 UKSF
3566 5365 JMP I=-1
3567 5365 JMP I=-2
3577 0417 PAGE
3600 3600

```

```

/SET UP TO DO TEST 4000 TIMES;
/CLEAR AC AND FLAG
/GO DELAY
/SKIP ON FLAG # 1
/DID NOT SKIP, GO TO E2A
/SKIP ON FLAG # 1
/DID NOT SKIP, GO TO E2B
/ALL DONE?
/NO, REPEAT
/CHAIN
/TS22 ERROR HALT, FLAG
/NOT SET OR KSF FAILURE.

```

```

/TS22 ERR HALT B;
/KSF FAILURE
/SKIP ON FLAG # 1
/REPEAT
/REPEAT

```

```

/ISSUE KCC, WAIT TWICE 10-11 BIT TIMES FOR FLAG TO SET;
/VERIFY THAT FLAG IS SET, RESET FLAG (KCC) AND

```

```

3600 0003 /SET DELAYM TO DELAY TWICE
3601 3630 /10 BIT TIMES FOR AN NON 110
3602 4432 /BAUD DEVICE AND TWICE 11 BIT
/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 /SET COUNT OF
3604 0062 /500 (DEC) IN
3605 7014 /CTRA
3606 4571 /CLEAR FLAG
3607 4576 /GO DELAY
3610 4572 /READY?
3611 5221 /NO, ERROR
3612 4571 /YES, RESET FLAG
3613 4572 /READY?
3614 5216 /NO, OK
3615 5223 /YES, ERROR
3616 2062 /ALL DONE TESTING?
3617 5213 /NO, REPEAT
3620 5425 /YES, CHAIN
3621 7402 /TSTS ERR HALT A, FLAG
/NOT SET OR KSF FAILURE
/TRY AGAIN
/TSTS ERR HALT B, FLAG
/FAILED TO RESET, OR KSF
/SKIPPED ERRONEOUSLY.

```

```

3622 5206 /TURN OFF READER BEFORE ENTERING
3623 7402 /SCOPE LOOP,
3624 4571 /CLEAR FLAG AND AC
3625 4572 /SKIP ON FLAG = 1
3626 5224 /REPEAT
3627 5224 /REPEAT

```

```

3630 0004 /THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT,
3631 3671 /AND THEN CHECKS THAT THE READER FLAG IS CAPABLE OF INTERRUPTING,
3632 4577 P2TS4, 4 /SET INTERRUPT RETURN
3633 0002 2 /TO P2E4A,
3634 3644 P2E4A /CLEAR PUNCH/PRINTER FLAG
3635 4565 P2TS4A, UTCF JMS I KBFLAG
3636 4426 JMS I KBFLAG
3637 4571 UKCC /CLEAR READER FLAG
3640 6001 ION /ENABLE INTERRUPT
3641 7000 NOP /TURN OFF INTERRUPT
3642 6002 IOF /JMS INTFND
3643 5246 JMP I+3 /UNEXPECTED INTERRUPT
3644 4777 P2E4A, JMS INTFND

```

```

3645 5235 JMP P2TS4A /TRY AGAIN
3646 4431 JMS I S4000 /SET UP TO DO TEST 4000 TIMES;
3647 4577 SETLOC /SET INTERRUPT RETURN
3650 0002 2 /TO P2TS4C,
3651 3666 P2TS4C
3652 4571 UKCC
3653 4572 UKSF
3654 5253 JMP ,=1 /WAIT FOR READER FLAG
3655 6001 ION /TO SET
3656 7000 NOP /ENABLE INTERRUPT
3657 7402 P2E4B, HLT /READER FLAG FAILED TO INTERRUPT,
/OR INTERRUPT SYSTEM MALFUNCTION
/SET INTERRUPT RETURN
/TO P2TS4C=1,
/SCOPE LOOP
2 SETLOC
P2TS4C=1
ION
NOP
JMP ,=2
/ P2TS4C, ISZ CTRA /DONE?
JMP P2TS4B /NO, REPEAT
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 /SET DELAYM
3673 4577 SETLOC /TO =103
3674 0024 DELAYM
3675 7631 M147
3676 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES;
3677 4571 UKCC /START READER, CLEAR PC FLAG
3700 4576 DELAY /GO DELAY 103 MILLISECONDS
3701 4572 UKSF
3702 5306 JMP P2E5
3703 2062 ISZ CTRA
3704 5277 JMP P2TS5A
3705 5425 JMP I CHAIN
3706 7402 P2E5, HLT
/TS5 ERR HALT, FLAG NOT=1
/103 MSECS AFTER KCC INSTRUCTION,
/YES, REPEAT,
3707 4426 JMS I KBFLAG
3710 5305 JMP ,=3

```

/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      /0256(DEC)
3715 7400      -420       /IN CTRA
3716 4426      P2TS6A,    JMS I KBFLAG
3717 4570      UKRS
3720 3112      DCA WTS6A  /READ CHARACTER,
3721 4577      SETLOC    /SAVE AT WTS6A,
3722 0063      CTRB      /SET COUNT OF
3723 6030      -1750     /CTRB
3724 7200      P2TS6B,    /01000 (DEC) IN
3725 4570      CLA       /READ CHARACTER,
3726 7421      UKRS      /STORE IN MQ,
3727 7701      MQL       /GET IT BACK INTO THE AC,
3730 7041      ACL       /2/S COMPLEMENT IT
3731 1112      CIA       /ADD EXPECTED CHAR,
3732 7640      TAD WTS6A /RESULT 0?
3733 5346      SZA CLA   /NO. ERROR, GO TO E6A,
3734 7240      JMP P2E6A /READ CHARACTER
3735 4570      CLA CMA
3736 7040      UKRS
3737 7440      CMA
3740 5356      SZA
3741 2063      JMP P2E6C /AC STILL 7777
3742 5324      ISZ CTRB  /NO. ERROR GO TO P2E6C,
3743 2062      JMP P2TS6B /READ CHAR 1000 TIMES?
3744 5316      ISZ CTRA  /NO. GO READ IT AGAIN,
3745 5425      JMP P2TS6A /YES, READ 256 DIFF. CHARS?
3746 7701      ACL       /NO,
3747 7402      HLT      /YES, CHAIN

3750 7200      CLA
3751 1112      TAD WTS6A /MO TO AC,
3752 7402      HLT      /TST6 ERR HALT A; AC DISPLAYS
3753 7200      CLA
3754 4570      UKRS      /INCORRECTLY READ CHAR; DEPRESS
3755 5353      JMP ,=2   /KEY CONTINUE

3756 7402      HLT      /TST6 ERR HALT B; AC DISPLAYS
3757 7200      /SCOPE LOOP, PRESS CONTINUE TO ENTER, /WHAT THE CORRECT CHAR SHOULD
3760 4570      CLA CMA   /BE.
3761 5357      UKRS      /READ CHARACTER
3762 0007      JMP P2E6C+1 /LOOP BACK
3763 4030      /KRS FAILED TO "OR" KBRD BUFFER WITH AC,

/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;
P2TS7, 7
P2T10
P2T11

```

```

3764 4430 JMS I S100
3765 4432 JMS I S200

/SET UP TO DO TEST 100 TIMES;
/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.

```

```

3766 5776 JMS I KBFLAG
3776 4000 CLA CMA
3777 2017 UKCR
4000 4562 CMA
4003 7040 SZA
4004 7440 JMP P2E7A
4005 5215 DELAY
4006 4576 UKSF
4007 4572 SKP
4010 7410 SKP P2E7B
4011 5221 ISE CTRA
4012 2062 JMP P2TS7A
4013 5200 JMP I CHAIN
4014 5425

```

```

P2TS7A, JMS I KBFLAG
CLA CMA
UKCR
CMA
SZA
JMP P2E7A
DELAY
UKSF
SKP
SKP P2E7B
ISE CTRA
JMP P2TS7A
JMP I CHAIN

```

```

P2E7A, HLT
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
CLA CMA
UKCR
JMP ,=2

```

```

P2E7B, HLT
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
JMS I KBFLAG
UKCR
DELAY
UKSF
JMP P2E7B+1
JMP P2E7B+1

```

```

4015 7402 HLT
4016 7240 /KCR CLEARED AC,
4017 4562 /SCOPE LOOP, PRESS CONTINUE TO ENTER,
4020 5216 CLA CMA
/AC=7777,
/CLEAR READER FLAG;
/AC SHOULD EQUAL ZERO/NOW;
/RESULT 0?
/NO, ERROR, GO TO P2E7A;
/GO DELAY 200 MILLISECS;
/READER FLAG SET?
/NO,
/YES, READER FLAG SET; ERROR, GO TO P2E7B;
/TEST DONE?
/NO, REPEAT.

```

```

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

```

```

4030 0010 P2T10, 10
4031 4153 P2T11
4032 4431 JMS I S4000
/SET UP TO DO TEST 4000 TIMES;

```

```

/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;

```

```

4033 4426 JMS I KBFLAG
4034 4577 P2T10A, SETLOC /SET INTERRUPT RETURN LOCATION
4035 2002 2 /TO P2E10A,
4036 4073 P2E10A
4037 4572 UKSF
4040 5233 JMP P2T10A+1
4041 7200 CLA
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 USPI /SKIP IF TTY INTERRUPT
4052 7410 SKP
4053 5315 JMP P2E10C /ERROR, SPI FAILED, GO TO P2E10C
4054 4577 SETLOC /SET INTERRUPT RETURN LOCATION
4055 0002 2 /TO P2T10E
4056 4064 P2T10E
4057 7201 CLA IAC
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 SRQ /SKIP IF INTERRUPT REQUEST
4065 5335 JMP P2E10E /ERROR, GO TO P2E10E
4066 4557 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 /SCOPE LOOP
4101 4426 JMS I KBFLAG
4102 7200 CLA
4103 4561 UKIE /DISABLE TTY INTERRUPT
4104 6001 ION /INTERUPT 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
4113 5310 JMP P2E10B+1 /SKIP IF INTERRUPT, (AC11=0); REQUEST, (SHOULD NOT SKIP)
/REPEAT

```

```

4114 5310      JMP P2E10B+1 /REPEAT
4115 7602 P2E10C, HLT CLA /SPI SKIPPED WITH TTY DISABLED;
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
JMS I KBFLAG
UKIE
USPI
JMP P2E10C+1 /DISABLE TTY INTERRUPT, (AC11=0);
/SKIP IF TTY INTERRUPT REQUEST (SHOULD NOT SKIP);
/REPEAT;
/REPEAT;
/REPEAT;
4123 7402 P2E10D, HLT /KIE FAILED TO ENABLE TTY INTERRUPT WITH AC11=1.
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
SETLOC /SET INTERRUPT RETURN LOCATION
2 /TO P2E10D+4;
P2E10D+4 /SCOPE LOOP);
CLA IAC /ENABLE TTY INTERRUPT;
UKIE /TURN INTERRUPT ON;
JMS I KBFLAG /REPEAT;
ION
NOP
JMP P2E10D+4
4134 5327

```

```

4135 7402 P2E10E, HLT /SRQ FAILED TO SKIP.
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
CLA IAC /SCOPE LOOP);
UKIE /ENABLE TTY INTERRUPT;
JMS I KBFLAG /SKIP IF INTERRUPT REQUEST;
SRQ /REPEAT;
JMP P2E10E+1 /REPEAT;
JMP P2E10E+1
4143 5336

```

```

4144 7402 P2E10F, HLT /SPI FAILED TO SKIP;
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
CLA IAC /SCOPE LOOP);
UKIE /ENABLE TTY INTERRUPT;
JMS I KBFLAG /SKIP IF TTY INTERRUPT;
USPI /REPEAT;
JMP P2E10F+1 /REPEAT;
JMP P2E10F+1
4152 5351

```

```

/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;
P2T11, 11
4153 0011 P2T12
4154 4233 JMS I S100
4155 4430 JMS I S200
4156 4432
/SET UP TO DO TEST 100 TIMES;
/SET DELAY TO DELAY TWICE
/10 BIT TIMES FOR AN NCN 110
/BAUD DEVICE AND TWICE 11 BIT
/TIMES FOR AN 110 BAUD DEVICE;

```


/SEE BIT TIME TABLE AT BEGINNING
/OF PROGRAM;

```

P2T11A, UKIE
4157 4561
4160 4426
4161 7360
4162 6007
4163 7420
4164 7440
4165 5776/
4166 4576
4167 4572
4170 7610
4171 5775/
4172 5774/

JMS I KBFLAG
CLA CMA CLL CML
CAF
SNL
SZA
JMP P2E11A
P2T11B, DELAY
4166 4576
4167 4572
4170 7610
4171 5775/
4172 5774/

/ERROR, GO TO P2E11A;
/GO DELAY 200 MILLI SEC.
/DID FLAG COME UP?
/YES, ERROR, GO TO P2E11B;
/CROSS PAGE
/DISABLE TTY (AC 11=0);
/AC AND LINK SET;
/CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY;

```

PAGE

```

P2T11C, JMS I KBFLAG
4200 4426
4201 4557
4202 5224

USPI
JMP P2E11C

/SKIP IF TTY INTERRUPT REQUEST;
/ERROR, GO TO P2E11C;

```

```

ISZ CTRA
4203 2062
4204 5777/
4205 5425

JMP I CHAIN
/TEST DONE?
/NO, REPEAT.

```

```

P2E11A, HLT
4206 7402

/SCOPE LOOP, PRESS CONTINUE TO ENTER;
CAF
SZA
JMP P2E11A+1
4207 7360
4210 6007
4211 7420
4212 7440
4213 5207
4214 5207

/CAF FAILED TO CLEAR AC AND LINK;
/CAF CONTINUE TO ENTER;
/SCOPE LOOP;
/CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY;
/REPEAT;
/REPEAT;

```

```

P2E11B, HLT
4215 7402

/SCOPE LOOP, PRESS CONTINUE TO ENTER;
JMS I KBFLAG
CAF
DELAY
UKSF
JMP P2E11B+1
4216 4426
4217 6007
4220 4576
4221 4572
4222 5216
4223 5216

/CAF DID NOT CLEAR FLAG OR FLAG SET AFTER BEING CLEARED.
/PRESS CONTINUE TO ENTER;
/CLEAR THE FLAG.
/GO DELAY 200 MILLISEC;
/FLAG SET?
/REPEAT
/REPEAT

```

```

P2E11C, HLT CLA
4224 7602

/SCOPE LOOP, PRESS CONTINUE TO ENTER;
UKIE
CAF
JMS I KBFLAG
4225 4561
4226 6007
4227 4426

/CAF FAILED TO ENABLE TTY;
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
/DISABLE TTY; (AC11=0)
/ENABLE TTY;

```

```

4230 4557 USPI
4231 5225 JMP P2E11C+1
4232 5225 JMP P2E11C+1
/SKIP IF INT REQUEST FROM TTY;
/REPEAT
/REPEAT;

```

/TEST OF KRB INSTRUCTION.

```

4233 0012 P2T12, 12
4234 7777 7777
4235 4577 SETLOC
4236 0062 CTRA
4237 7400 -400
4240 4577 SETLOC
4241 0024 DELAYM
4242 7631 M147
4243 4426 JMS I KBFLAG
4244 4570 UKRS
4245 3112 DCA WTS6A
4246 4426 JMS I KBFLAG
4247 1145 TAD I377
4250 4567 UKRB
4251 4572 SKP
4252 7410 JMP P2E12A
4253 5276 DCA UTEMP
4254 3104 DELAY
4255 4576 UKSF
4256 4572 JMP P2E12B
4257 5303 JMP P2E12B
4260 1112 TAD WTS6A
4261 7421 MQL
4262 7701 AGL
4263 7001 IAC
4264 3112 DCA WTS6A
4265 1112 AND I377
4266 0145 CMA IAC
4267 7041 TAD UTEMP
4270 1104 SEA CLA
4271 7640 JMP P2E12C
4272 5305 ISZ CTRA
4273 2062 JMP P2T12A
4274 5247 JMP I CHAIN
4275 5425

/SET COUNT OF
/256 DECIMAL
/IN CTRA
/SET DELAYM
/TO 103
/DECIMAL.

/GET THE CHARACTER;
/SAVE IT
/ADVANCE TAPE AND BRING NEW CHARACTER INTO BUFFER;

/READ BUFFER/CLEAR FLAG, ADVANCE TAPE
/FLAG CLEAR?
/YES, OK;
/NO, ERROR;

/DELAY 10 OR 11 BIT TIMES
/FLAG NOW SET?
/NO, ERROR;
/SET GOOD;
/MQ CONTAINS GOOD DATA
/RELOAD AC WITH GOOD FROM MQ;
/ADD ONE TO IT;
/SAVE IT
/GET IT BACK;
/KEEP DESIRED DATA;
/NEGATE IT;
/ARE THEY EQUAL.
/DONE?
/NO, REPEAT;
/YES, CHAIN;

```

```

4276 7402 P2E12A, HLT
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
JMS I KBFLAG
UKRB
DELAY
JMP P2E12A+1

```

```

4303 7402 P2E12B, HLT
/SCOPE LOOP, PRESS CONTINUE TO SET FLAG.
JMS I KBFLAG
UKRB
DELAY
JMP P2E12A+1

```

```

4305 7402 P2E12C, HLT
/SCOPE LOOP, PRESS CONTINUE TO READ CORRECT DATA.
JMS I KBFLAG
UKRB
DELAY
JMP P2E12A+1

```

4306 5235 /PRESS CONTINUE TO TRY TEST AGAIN,
 JMP P2Y12+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.

PRG3, SETLOC /SET KSTART TO INITIAL
 KSTART /ROUTINE ADDRESS,
 P3TS0 /GO START TEST
 JMP I, +1 /GO START TEST
 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
4317	4577	SETLOC
4320	0062	CTRA
4321	0001	-7777
4322	4571	UKCC
4323	4466	JMS I INPATT
4324	4467	JMS I GETPT
4325	3332	DCA S80
4326	4572	UKSF
4327	5326	JMP, "1
4330	4567	UKRB
4331	4470	JMS I CHECK
4332	0000	0
4333	5337	JMP P3E0
4334	2062	ISZ CTRA
4335	5324	JMP P3TS0A
4336	5425	JMP I CHAIN
4337	7402	HLT

/GO SYNC TAPE
 /SET COUNT OF
 /=4095(DEC) IN
 /CTRA
 /START READER
 /GO INITIALIZE PATTERN
 /GET PATTERN CHARACTER
 /STORE AT S80
 /READY?
 /NO, TEST AGAIN
 /YES, READ CHARACTER
 /GO CHECK FOR CORRECT MATCH
 /CORRECT CHAR HERE
 /ERROR, GO TO P3E0
 /OK, ALL DONE?
 /NO, REPEAT
 /YES, CHAIN
 /TST10 ERR HALT, AC CONTAINS
 /CHAR THAT DID NOT MATCH
 /AGAINST PATTERN, EPRESS
 /KEY CONTINUE

4340	7200	CLA
4341	1332	TAD S80
4342	7402	HLT
4343	5334	JMP P3T0B

/GET CORRECT CHARACTER
 /AC CONTAINS THE EXPECTED CHARACTER

/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
4347	4577	SETLOC
4350	0062	CTRA

/TO SYNC TAPE
 /SET COUNT OF
 /=2000 (DEC) IN

```

4351 4060 /CTRA
4352 4571 /START READER
4353 4466 /INITIALIZE PATTERN
4354 4467 /GET PATTERN CHARACTER
4355 3364 /STORE AT SB1
4356 4427 /GENERATE RANDOM DELAY
4357 4576 /DELAY
4360 4572 /READY?
4361 5360 /NO, TEST AGAIN
4362 4567 /YES, READ CHARACTER
4363 4470 /GO CHECK FOR CORRECT MATCH

P3TS1A,
JMS I INPATT
JMS I GETPT
DCA SB1
JMS I DLCNT1
DELAY
UKSF
JMP ,=1
UKRB
JMS I CHECK

SB1,
0 /CORRECT CHAR HERE
JMP P3E1 /ERROR, GO TO P3E1
ISZ CTRA /OK, ALL DONE?
JMP P3TS1A /NO,
JMP I CHAIN /YES, CHAIN
HLT /TST1 ERR HALT; AC CONTAINS
/CHARACTER THAT DID NOT MATCH
/AGAINST PATTERN; DEPRESS
/KEYCONTINUE

CLA /GET CORRECT CHARACTER
TAD SB1 /AC CONTAINS THE EXPECTED
HLT /CHARACTER

JMP P3T1B
PAGE

```

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

```

4400 0002 /GO SYNC TAPE
4401 7777 /SET UP TO DO TEST 100 TIMES;
4402 4465 /START READER
4403 4430 /INITIALIZE PATTERN
4404 4571 /SET RANDOM DELAY
4405 4466 /SET RANDOM CHARACTER
4406 4427 /COUNT IN CTRB
4407 4777 /GET PATTERN CHARACTER
4410 0063 /AND STORE AT SB2
4411 4467 /GO DELAY NO OF
4412 3220 /READY?
4413 4576 /NO, TEST AGAIN
4414 4572 /READ CHARACTER
4415 5214 /CHECK FOR CORRECT MATCH
4416 4567 /AGAINST SB2 CONTENTS
4417 4470 /ERROR, GO TO P3E2
4420 0000 /OK, ALL CHARS FOR GROUP DONE?
4421 5227 /NO
4422 2063
4423 5211

```

```

4351 4060 /CTRA
4352 4571 /START READER
4353 4466 /INITIALIZE PATTERN
4354 4467 /GET PATTERN CHARACTER
4355 3364 /STORE AT SB1
4356 4427 /GENERATE RANDOM DELAY
4357 4576 /DELAY
4360 4572 /READY?
4361 5360 /NO, TEST AGAIN
4362 4567 /YES, READ CHARACTER
4363 4470 /GO CHECK FOR CORRECT MATCH

```

```

SB1, 0 /CORRECT CHAR HERE
      JMP P3E1 /ERROR, GO TO P3E1
P3T1B, 15Z CTRA /OK, ALL DONE?
      JMP P3TS1A /NO,
      JMP I CHAIN /YES, CHAIN
      HLT /TST1 ERR HALT, AC CONTAINS
        /CHARACTER THAT DID NOT MATCH
        /AGAINST PATTERN, DEPRESS
        /KEYCONTINUE

```

```

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

```

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4375 5366 JMP P3T1B

```

```

4377 4157 PAGE
4400 4400

```

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

```

4400 0002 P3TS2, 2 /GO SYNC TAPE
4401 7777 7777 /SET UP TO DO TEST 100 TIMES;
4402 4465 JMS I SYNC /START READER
4403 4430 JMS I S100 /INITIALIZE PATTERN
4404 4571 UKCC /SET RANDOM DELAY
4405 4466 JMS I INPATT /SET RANDOM CHARACTER
4406 4427 JMS I DLCONT1 /COUNT IN CTRB
4407 4777 / CTRB /GET PATTERN CHARACTER
4410 0063 JMS I GETPT /AND STORE AT SB2
4411 4467 DCA SB2 /GO DELAY NO OF
4412 3220 DELAY /READY?
4413 4576 UKSF /NO, TEST AGAIN
4414 4572 JMP I=1 /READ CHARACTER
4415 5214 UKRB /CHECK FOR CORRECT MATCH
4416 4567 JMS I CHECK /AGAINST SB2 CONTENTS
4417 4470 0 /ERROR, GO TO P3E2
4420 0000 JMP P3E2 /OK, ALL CHARS FOR GROUP DONE?
4421 5227 15Z CTRB /NO
4422 2063 JMP P3TS2B
4423 5211

```

```

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 /GET CORRECT CHARACTER
4431 1220 TAD SB2 /AC CONTAINS THE EXPECTED CHARACTER
4432 7402 HLT
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 /GO START PROGRAM
4440 5641 JMP I ;+1
4441 0236 SRSET

/CARRIAGE RETURN TEST
P4TS0, 0
4442 0000 P4TS1
4443 4475 CKSR37 /KSR37?
4444 4555 TAD [11] /NO,
4445 1140 TAD (=122) /YES,
4446 1375 MQL /STORE IN MQ,
4447 7421 TYPE /PRINT TEST TITLE
4450 4573 CRTST
4451 6327 TAD [334] /GET "/" CODE
4452 1133 JMS I UPUNCH /PRINT IT
4453 4474 ACL /MQ TO AC,
4454 7701 DCA UTEMP /ALL DONE?
4455 3104 ISZ UTEMP /NO
4456 2104 SKP I CHAIN /YES, CHAIN
4457 7410 JMP I CHAIN
4460 5425 TAD UTEMP
4461 1104 DCA UTEMP1 /UTEMP TO UTEMP1
4462 3105 TAD [240] /GET "SPACE" CODE
4463 1142 JMS I UPUNCH /PRINT IT
4464 4474 ISZ UTEMP1 /SPACED NO, OF TIMES IN UTEMP1?
4465 2105 JMP (=3) /NO, SO SPACE AGAIN
4466 5263 TAD CR /YES, GET "CR" CODE,
4467 1107 JMS I UPUNCH /PRINT IT,
4470 4474 JMS I UPUNCH /DUMMY CYCLE,
4471 4474 TAD [257] /SET "/" CODE
4472 1132 JMS I UPUNCH /PRINT IT
4473 4474 JMP CRTSTA /GO TO CRTSTA
4474 5256

```

/RIGHT MARGIN TEST

```

4475 0001 P4T5I,
4476 4525 P4T52
4477 7200 CLA
4500 1131 TAD C=16
4501 7421 MQL
4502 1130 TAD CRM33B
4503 3323 DCA RMB
4504 4555 CKSR37 /KSR37?
4505 5312 JMP C=5 /NO.
4506 1127 TAD C=17 /YES.
4507 7421 MQL
4510 1126 TAD CRM37A
4511 3323 DCA RMB
4512 4573 TYPE /PRINT TEST TITLE
4513 6337 RMTST
4514 7701 ACL
4515 3104 DCA UTEMP
4516 4573 TYPE /PRINT ---- I
4517 1563 RM33A /DONE TIMES?
4520 2104 ISZ UTEMP /NO, SO DO IT AGAIN
4521 5316 JMP RMTSTA /YES, PRINT =I=
4522 4573 TYPE
4523 0000 OPEN
4524 5425 JMP I CHAIN /CHAIN

```

```

/SPACE TEST
P4T52,
0002 4525 /SPACE TEST
4526 4600 P4T53
4527 4573 TYPE /PRINT TEST TITLE
4530 6354 SPTST
4531 4555 CKSR37 /KSR37?
4532 1125 TAD C5 /NO
4533 1124 TAD C=51 /YES
4534 3104 DCA UTEMP /C=36 TO UTEMP
4535 4573 TYPE /PRINT \, SPACE
4536 6324 SPTSTC /DONE 36 TIMES?
4537 2104 ISZ UTEMP /NO, SO DO IT AGAIN,
4540 5335 JMP SPTSTA /KSR37?
4541 4555 CKSR37 /NO
4542 1123 TAD C4 /YES
4543 1122 TAD C=50 /C=36 TO UTEMP
4544 3104 DCA UTEMP /GET =1
4545 1374 TAD C=1 /AC TO UTEMP1
4546 3105 DCA UTEMP1 /UTEMP1
4547 1105 TAD UTEMP1 /TO UTEMP2
4550 3106 DCA UTEMP2 /GET "CR" CODE
4551 1107 TAD CR /PRINT IT
4552 4474 JMS I UPUNCH /DUMMY CYCLE
4553 4474 JMS I UPUNCH /GET "SPACE" CODE
4554 1142 TAD C240 /PRINT IT
4555 4474 JMS I UPUNCH /DONE SPACING?
4556 2106 ISZ UTEMP2 /NO.
4557 5354 JMP I=3 /GET "/" CODE
4560 1132 TAD C257

```

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

PAGE

/LINE FEED TEST
P4TS3, 3
4600 0003
4601 5122 P4TS47
4602 7240 CLA CMA /SET STALL
4603 3064 DCA STLD /INDICATOR
4604 4573 TYPE /PRINT TEST TITLE
4605 6366 LFTST
4606 4555 CKSR37 /KSR37?
4607 1140 TAD L11 /NO,
4610 1377 TAD (=121 /YES,

4611 3104 DCA UTEMP
4612 1133 LFTSTA, TAD C334
4613 4474 JMS I UPUNCH /GET "A" CODE
4614 1110 TAD LF UTEMP /PRINT IT
4615 4474 JMS I UPUNCH /GET "LF" CODE
4616 2104 ISZ UTEMP /PRINT IT
4617 7410 SKP I CHAIN /DONE?
4620 5425 JMP I CHAIN /NO,
4621 4556 STALL /YES, CHAIN
4622 5212 JMP LFTSTA /GO TO LFTSTA

/TYPE LINE OF CHARACTERS ABC
P4TS4, 4
4623 0004
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
P4TS5, 5
4631 0005
4632 4635 P4TS6
4633 4433 JMS I TLCALL
4634 6112 D


```

4635 0006
4636 4641
4637 4433
4640 6115

4641 0007
4642 4645
4643 4433
4644 6120

4645 0010
4646 4651
4647 4433
4650 6123

4651 0011
4652 4655
4653 4433
4654 6126

4655 0012
4656 4661
4657 4433
4660 6131

4661 0013
4662 4665
4663 4433
4664 6134

4665 0014
4666 4671
4667 4433
4670 6137

4671 0015
4672 4675
4673 4433
4674 6142

4675 0016
4676 4701
4677 4433
4700 6145

4701 0017
4702 4705
4703 4433
4704 6150

4705 0020
4706 4711
4707 4433
4710 6153

/TYPE LINE OF CHARACTERS GHI
PATS6, 6
PATS7
JMS I TLCALL
G

/TYPE LINE OF CHARACTERS JKL
PATS7, 7
PATS10
JMS I TLCALL
J

/TYPE LINE OF CHARACTERS MNO
PATS10, 10
PATS11
JMS I TLCALL
M

/TYPE LINE OF CHARACTERS PQR
PATS11, 11
PATS12
JMS I TLCALL
P

/TYPE LINE OF CHARACTERS STU
PATS12, 12
PATS13
JMS I TLCALL
S

/TYPE LINE OF CHARACTERS VMX
PATS13, 13
PATS14
JMS I TLCALL
V

/TYPE LINE OF CHARACTERS YZ0
PATS14, 14
PATS15
JMS I TLCALL
Y

/TYPE LINE OF CHARACTERS 123
PATS15, 15
PATS16
JMS I TLCALL
ONE

/TYPE LINE OF CHARACTERS 456
PATS16, 16
PATS17
JMS I TLCALL
FOUR

/TYPE LINE OF CHARACTERS 789
PATS17, 17
PATS20
JMS I TLCALL
SEVEN

/TYPE LINE OF CHARACTERS !"#
PATS20, 20
PATS21
JMS I TLCALL
C241

```

```

4711 0021
4712 4715
4713 4433
4714 6156

/TYPE LINE OF CHARACTERS $%&
P4TS21, 21
  JMS I TLCALL
  C244

/TYPE LINE OF CHARACTERS '()'
P4TS22, 22
  P4TS23
  JMS I TLCALL
  C247

/TYPE LINE OF CHARACTERS **
P4TS23, 23
  P4TS24
  JMS I TLCALL
  C252

/TYPE LINE OF CHARACTERS =,;
P4TS24, 24
  P4TS25
  JMS I TLCALL
  C255

/TYPE LINE OF CHARACTERS !|K
P4TS25, 25
  P4TS26
  JMS I TLCALL
  C272

/TYPE LINE OF CHARACTERS =>?
P4TS26, 26
  P4TS27
  JMS I TLCALL
  C275

/TYPE LINE OF CHARACTERS @ [ \
P4TS27, 27
  P4TS30
  JMS I TLCALL
  C300

/TYPE LINE OF CHARACTERS ] * AND LEFT ARROW
P4TS30, 30
  P4TS31
  JMS I TLCALL
  C335

/TYPE LINE OF SMALL A, B, AND C
P4TS31, 31
  P4TS32
  JMS I TLC37
  SA

/TYPE LINE OF SMALL D, E, AND F
P4TS32, 32
  P4TS33
  JMS I TLC37
  SD

/TYPE LINE OF SMALL G, H, AND I
P4TS33, 33
  4761 0033

```

4762 5000 P4TS34
4763 4434 JMS I TLC37
4764 6214 SG

4777 7657 PAGE
5000

5000 0034 /TYPE LINE OF SMALL J, K, AND L
5001 5004 P4TS34, 34
5002 4434 P4TS35
5003 6217 JMS I TLC37
SJ

5004 0035 /TYPE LINE OF SMALL M, N, AND O
5005 5010 P4TS35, 35
5006 4434 P4TS36
5007 6222 JMS I TLC37
SM

5010 0036 /TYPE LINE OF SMALL P, Q, AND R
5011 5014 P4TS36, 36
5012 4434 P4TS37
5013 6225 JMS I TLC37
SP

5014 0037 /TYPE LINE OF SMALL S, T, AND U
5015 5020 P4TS37, 37
5016 4434 P4TS40
5017 6230 JMS I TLC37
SS

5020 0040 /TYPE LINE OF SMALL V, W, AND X
5021 5024 P4TS40, 40
5022 4434 P4TS41
5023 6233 JMS I TLC37
SV

5024 0041 /TYPE LINE OF SMALL Y, AND Z, AND CODE 340 CHARACTER;
5025 5030 P4TS41, 41
5026 4434 P4TS42
5027 6236 JMS I TLC37
SY

5030 0042 /TYPE LINE OF CHARACTERS WHOSE CODE IS 373, 374, 375, 376;
5031 5047 P4TS42, 42
5032 4555 P4TS43
5033 5425 CKSR37 /KSR37?
5034 4574 JMP I CHAIN /NO, BYPASS TEST
5035 6241 MOVE
5036 6601 C373
5037 7774 BLOCK1
5040 4574 -4
5041 6601 MOVE
5042 6605 BLOCK1
5043 7663 BLOCK1+4
5044 3064 -115
DCA STIID

5045 4777/ JMS TYPLN
5046 5425 JMP I CHAIN

/TYPE 2 LINES OF ALL CHARACTERS, 1ST LINE NO DELAY; 2ND LINE WITH STALLS.
PATS43, 43

5047 0043 P4TS44
5050 5054 JMS FBALL
5051 4776/ JMS WOSWS
5052 4775/ JMP I CHAIN
5053 5425 /CHAIN

/TYPE 12 LINES OF ASR33 WORST CASE PATTERN; ALTERNATE LINES WITH STALLS.
PATS44, 44

5054 0044 P4TS45 /PRINT TITLE
5055 5072 TYPE /33?
5056 4573 WCRPTST /NO
5057 6412 CKSR33 /PATTERN TO BUFFER
5060 4554 JMP I CHAIN /-6 TO CTRA
5061 5425 JMS FW336
5062 4774/ SETLOC
5063 4577 CTRA
5064 0062 -6
5065 7772 P4T44A, JMS WOSWS
5066 4775/ ISZ CTRA
5067 2062 JMP P4T44A
5070 5266 JMP I CHAIN
5071 5425 /NO, REPEAT
/YES, CHAIN

/TYPE 12 LINES OF ASR35 WORST CASE PATTERN; ALTERNATE LINES WITH STALLS.
PATS45, 45

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

/TYPE 12 LINES OF KSR37 WORST CASE PATTERN; ALTERNATE LINES WITH STALLS.
PATS46, 46

5106 0046 P4TS47, 47
5107 7777 CKSR37 /37?
5110 4555 JMP I CHAIN /NO, BYPASS TEST,
5111 5425 JMS FW376 /YES, PATTERN TO BUFFER
5112 4772/ SETLOC /-6 TO CTRA
5113 4577 CTRA
5114 0062 -6
5115 7772 P4T46A, JMS WOSWS
5116 4775/ ISZ CTRA
5117 2062 JMP P4T46A
5120 5316 JMP I CHAIN
5121 5425 /ALL LINES TYPED?
/NO, REPEAT
/YES, CHAIN

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5122 0047 /KSR37; KSR35; OR ASR35 TAB TEST
5123 5231 P4TS47, 47
5124 4555 P4TS50
5125 5346 CKSR37
5126 4573 JMP TBTB /KSR37?
5127 6267 TYPE /NO.
5130 1121 TBTST /YES, TYPE TITLE
5131 4771 TAD C=11 /#9 TO CTRA
5132 1370 JMS MTABP /GO TO SUB TO MARK TAB POSITIONS.
5133 3340 DCA TBCNT /SET TAB COUNT
5134 1367 TAD C=7 /TO -10
5135 3062 DCA CTRA /YES, #7 TO 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 TBTB+3 /REPEAT
5146 4553 CKSR35 /KSR, ASR35?
5147 5425 JMP I CHAIN /NO, BYPASS TEST
5150 4573 TYPE /YES, TYPE TITLE
5151 6267 TBTST
5152 1367 TAD C=7 /#7 TO CTRA
5153 4771 JMS MTABP /GO TO SUB TO MARK TAB POSITIONS.
5154 4573 TYPE /YES.
5155 6301 TBMRK+1 /SET TAB COUNT
5156 1121 TAD C=11 /TO -9
5157 3340 DCA TBCNT
5160 5334 JMP TBTB
5161 0000 OPEN
5162 0000 SPCTR, OPEN

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5200 0000 TABCTR, OPEN
5201 0000 TAPP, OPEN
5202 1601 TAD I TABP /SET TABCTR
5203 3200 DCA TABCTR
5204 2201 ISZ TABP
5205 4575 CRLF /CRLF ONCE
5206 7777 -1

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```

5207 1777/ SPAC, TAD SPENT /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 /SPACE
5214 1142 TAD C240 /DONE SPACING?
5215 4474 JMS I UPUNCH /NO, SPACE AGAIN
5216 2776/ ISZ SPCTR /GET TAB CODE
5217 5214 JMP I=3 /OUTPUT TO TELEPRINTER
5220 1140 TAD C11 /DUMMY CYCLE.
5221 4474 JMS I UPUNCH /DUMMY CYCLE.
5222 4474 JMS I UPUNCH /GET "/" CODE
5223 4474 JMS I UPUNCH /AND TYPE IT
5224 1132 TAD C257 /DONE?
5225 4474 JMS I UPUNCH /NO, REPEAT
5226 2200 ISZ TABCTR /YES, EXIT
5227 5207 JMP SPAC
5230 5601 JMP I TABP
    
```

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/KSR37 BACKSPACE TEST;
P4TS50, 50
0050 P4TS4
5231 0050 CKSR37 /KSR37?
5232 4623 /NO
5233 4555 JMP I CHAIN /YES, TYPE TITLE
5234 5425 TYP /
5235 4573 BKSP /
5236 6253 TAD C=51 /=-41 TO CTRA
5237 1124 DCA CTRA /TYPE ALTERNATE U/S;
5240 3062 TYPE /
5241 4573 BKSP /
5242 6574 ISZ CTRA /DONE?
5243 2062 JMP I=3 /NO.
5244 5241 TAD C=47 /=-39 TO CTRA
5245 1375 DCA CTRA /BACKSPACE TWICE
5246 3062 JMS BKSPC /TYPE "*"
5247 4263 =2 /BACKSPACE THRICE
5250 7776 TAD C252 /TYPE "*"
5251 1774/ JMS I UPUNCH /BACKSPACE THRICE
5252 4474 JMS BKSPC /
5253 4263 =3 TAD C252 /TYPE "*"
5254 7775 JMS I UPUNCH /DONE 39 TIMES?
5255 1774/ ISZ CTRA /NO.
5256 4474 JMP I=5 /YES, CHAIN
5257 2062 JMS I CHAIN
5260 5253 JMP I CHAIN
5261 5425 BKSPCTR, OPEN
5262 0000 BKSPC, OPEN
5263 0000 TAD I BKSPC /GET BACKSPACE COUNT
5264 1663 DCA BKSPCTR /AND STORE AT BKSPCTR
5265 3262 ISZ BKSPC /SET UP EXIT
5266 2262 TAD C210 /GET BACKSPACE CODE
5267 1373 JMS I UPUNCH /OUTPUT TO TELEPRINTER
5270 4474
    
```

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5271 2262      ISZ BKSCTR
5272 5267      JMP I,=3
5273 5663      JMP I BKSPC

/PROGRAM 5, PUNCH TEST
PRG5,  SETLOC
2
5274 4577      /SET INTERRUPT SERVICE ADDRESS
5275 0002      /TO INTSVC
5276 1254      /SET DATA BLOCK
5277 4577      /LENGTH TO
5300 0101      /=512
5301 7000      /SET UP ADDRESS TO
5302 4571      /STORE DATA,
5303 1372      /=512 TO CTRA
5304 3104      /INITIALIZE SPECIAL COUNT PATTERN
5305 1371      /GET CHARACTER
5306 3062      /STORE IT
5307 4770      /INCREMENT POINTER,
5310 4767      /NO, REPEAT
5311 3504      /YES, CLEAR READY BUSY
5312 2104      /PUNCH LEADER
5313 2062      /PUNCH SYNC CHARACTER
5314 5310      /PUNCH DATA BLOCK FULL SPEED,
5315 4572      /PUNCH TRAILER
5316 5315      /SYNC READER
5317 7200      /READ DATA BLOCK
5320 3076      /WAIT FOR READER NOT BUSY
5321 4766      /PUNCH LEADER
5322 4765      /PUNCH SYNC CHARACTER
5323 4764      /PUNCH DATA BLOCK FULL SPEED,
5324 4766      /PUNCH TRAILER
5325 4763      /SYNC READER
5326 4762      /READ DATA BLOCK
5327 4761      /WAIT FOR READER NOT BUSY
5330 4766      /PUNCH LEADER
5331 4765      /PUNCH SYNC CHARACTER
5332 4760      /PUNCH DATA BLOCK (WITH STALLS),
5333 4766      /PUNCH TRAILER
5334 4763      /SYNC READER
5335 4762      /READ DATA BLOCK
5336 4761      /WAIT FOR READER NOT BUSY
5337 5317      /REPEAT.

/PROGRAM 6, KEYBOARD TEST
PRG6,  SETLOC
KSTART
P6T0
TYPE
KMSG1
JMP I, +1
SRSET

5340 4577      /SET KSTART TO INITIAL
5341 0023      /ROUTINE ADDRESS
5342 5400      /PRINT
5343 4573
5344 6432
5345 5746
5346 0236

5360 1324
5361 1343

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5362 1400
 5363 1216
 5364 1316
 5365 1212
 5366 1200
 5367 1717
 5370 1707
 5371 7000
 5372 6577
 5373 0210
 5374 6164
 5375 7731
 5376 5162
 5377 5161
 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.

5400 0000
 5401 5421
 5402 4431
 5403 4571
 5404 4573
 5405 6443
 5406 4572
 5407 5206
 5410 4572
 5411 5215
 5412 2062
 5413 5210
 5414 5425
 5415 7602
 5416 4572
 5417 5216
 5420 5216

P6T0,
 0
 P6T1
 JMS I 54000
 UKCC
 TYPE
 KMSG2
 UKSF
 JMP ;=1
 UKSF
 JMP P6E0
 ISZ CTRA
 JMP ;=3
 JMP I CHAIN
 P6E0,
 HLT CLA
 UKSF
 JMP ;=1
 JMP ;=2

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

5421 0001
 5422 5440
 5423 4571
 5424 4573
 5425 6454
 5426 4572
 5427 5226
 5430 4567
 5431 4563
 5432 4566
 5433 5232
 5434 1144
 5435 7440

P6T1,
 1
 P6T2
 UKCC
 TYPE
 KMSG3
 UKSF
 JMP ;=1
 UKRB
 UTLS
 UTSF
 JMP ;=1
 TAD C=377
 SEA
 P6T1A,
 1
 UKCC
 TYPE
 KMSG3
 UKSF
 JMP ;=1
 UKRB
 UTLS
 UTSF
 JMP ;=1
 TAD C=377
 SEA

/IS IT RUBOUT?

5436 5226 JMP P6T1A /NO
 5437 5425 JMP I CHAIN /YES, CHAIN

/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 UKSF
 5450 5247 JMP I,+1
 5451 4567 UKRB
 5452 3112 DCA WTS6A
 5453 4777 JMS ASCCN
 5454 0112 WTS6A
 5455 6541 OCTEGV
 5456 4573 TYPE /PRINT CHARACTER
 5457 6537 KMSG5
 5460 1112 TAD WTS6A
 5461 1144 TAD C=377
 5462 7640 SZA CLA
 5463 5247 JMP P6T2A
 5464 5425 JMP I CHAIN

/PROGRAM 7; COMBINED READER, PRINTER, PUNCH TEST,
 PRG7,
 2 SETLOC

5465 4577 INTSVC /SET DATA BLOCK LENGTH
 5466 0002 SETLOC /TO -150
 5467 1254 BLKCNT
 5470 4577 -226
 5471 0101 JMS I KBFLAG
 5472 7552 JMS STBF
 5473 4426 SETLOC /SET UP BUFFER AREA
 5474 4776 KSTART /SET KSTART TO INITIAL
 5475 4577 P7T0 /ROUTINE ADDRESS
 5476 0023 P7T0
 5477 5502 JMP I,+1 /START PROGRAM
 5500 5701 SRSET
 5501 0236

P7T0,
 0 P7T1 /DATA1 ABC
 P7T1,
 A JMS I FBF
 1 P7T2 /DATA1 DEF
 D JMS I FBF

5502 0000
 5503 5506
 5504 4435
 5505 6107
 5506 0001
 5507 5512
 5510 4435
 5511 6112

5512	0002	P7T2,	2	P7T3	JMS I FBF	/DATAI GHI
5513	5516			G		
5514	4435					
5515	6115	P7T3,	3	P7T4	JMS I FBF	/DATAI JKL
5516	0003			J		
5517	5522			4		
5520	4435	P7T4,	4	P7T5	JMS I FBF	/DATAI MNO
5521	6120			M		
5522	0004					
5523	5526					
5524	4435					
5525	6123	P7T5,	5	P7T6	JMS I FBF	/DATAI PQR
5526	0005			P		
5527	5532					
5530	4435					
5531	6126	P7T6,	6	P7T7	JMS I FBF	/DATAI STU
5532	0006			S		
5533	5536					
5534	4435					
5535	6131					
5536	0007	P7T7,	7	P7T10	JMS I FBF	/DATAI VHX
5537	5542			V		
5540	4435					
5541	6134					
5542	0010	P7T10,	10	P7T11	JMS I FBF	/DATAI YZ0
5543	5546			Y		
5544	4435					
5545	6137					
5546	0011	P7T11,	11	P7T12	JMS I FBF	/DATAI 123
5547	5552			ONE		
5550	4435					
5551	6142					
5552	0012	P7T12,	12	P7T13	JMS I FBF	/DATAI 456
5553	5556			FOUR		
5554	4435					
5555	6145					
5556	0013	P7T13,	13	P7T14	JMS I FBF	/DATAI 789
5557	5562			SEVEN		
5560	4435					
5561	6150					
5562	0014	P7T14,	14	P7T15	JMS I FBF	/DATAI !"#
5563	5566			C241		
5564	4435					
5565	6153					
5566	0015	P7T15,	15	P7T16	JMS I FBF	/DATAI \$%&
5567	5572			C244		
5570	4435					
5571	6156					
5572	0016	P7T16,	16	P7T17	JMS I FBF	/DATAI '()
5573	5600					
5574	4435					
5575	6161					
5576	1000					
5577	1650					

5600	5600	0017	P7T17:	17	PAGE	
5601	5604	P7T20				
5602	4435	JMS I FBF			/DATAI **;	
5603	6164	C252				
5604	0020	20	P7T20:			
5605	5610	P7T21				
5606	4435	JMS I FBF			/DATAI -./	
5607	6167	C255				
5610	0021	21	P7T21:			
5611	5614	P7T22				
5612	4435	JMS I FBF			/DATAI IJK	
5613	6172	C272				
5614	0022	22	P7T22:			
5615	5620	P7T23				
5616	4435	JMS I FBF			/DATAI =>?	
5617	6175	C275				
5620	0023	23	P7T23:			
5621	5624	P7T24				
5622	4435	JMS I FBF			/DATAI 0C\	
5623	6200	C300				
5624	0024	24	P7T24:			
5625	5630	P7T25				
5626	4435	JMS I FBF			/DATAI J* AND LEFT ARROW	
5627	6203	C335				
5630	0025	25	P7T25:			
5631	5634	P7T26				
5632	4777/	JMS FBALL			/DATAI ALL PRINTABLE ASCII	
5633	4776/	JMS CNTST				
5634	0026	26	P7T26:			
5635	5640	P7T27				
5636	4775/	JMS FW336			/DATAI ASR33 PRINTER WORST CASE	
5637	4776/	JMS CNTST			/PATTERN	
5640	0027	27	P7T27:			
5641	5644	P7T30				
5642	4774/	JMS FW356			/DATAI ASR35 PRINTER WORST CASE	
5643	4776/	JMS CNTST			/PATTERN	
5644	0030	30	P7T30:			
5645	7777	7777				
5646	4773/	JMS FBF3			/DATAI 1/S AND 0/S	
5647	6245	C377				
5650	4776/	JMS CNTST				
			/PROGRAM 10,		READS COUNT PATTERN,	
5651	4465	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	LAS			/READ SR	

```

5656 0120 AND C100
5657 7650 SNA CLA
5660 7040 CMA
5661 3064 DCA STLD

SRT0B,
5662 4467 JMS I GETPT
5663 3273 DCA SBSP
5664 4556 STALL
5665 4572 UKSF
5666 5265 JMP ,=1
5667 4567 UKRB
5670 3103 DCA ERROR
5671 1103 TAD ERROR
5672 4470 JMS I CHECK
5673 0000
5674 7410
5675 5313 SKP HLTST
5676 2321 JMP ERRCTR
5677 5302 JMP ,+3
5700 7240 CLA CMA
5701 3321 DCA ERRCTR
5702 7604 LAS
5703 0143 AND C100
5704 7650 SNA CLA
5705 5313 JMP HLTST
5706 1103 TAD ERROR
5707 7402 HLT
5710 7200 CLA
5711 1273 TAD SBSP
5712 7402 HLT
5713 7604 LAS
5714 7700 SNA CLA
5715 5255 JMP SRT0A
5716 1321 TAD ERRCTR
5717 7402 HLT
5720 5255 JMP SRT0A
5721 0000 ERRCTR, 0
    
```

/STALL? (SR3=0)
 /YES
 /NO
 /GET PATTERN CHAR,
 /STORE AT SBSP,
 /STALL
 /READY?
 /TEST AGAIN,
 /READ, CLEAR AC AND FLAG,
 /GO CHECK CHARACTER WORD,
 /ERROR; NO MATCH; GO INC. ERRCNT
 /OK,
 /INCREMENT ERROR COUNTER
 /OFLOW, RESET TO 7777.
 /READ SR,
 /HALT ON ERROR? (SR5)
 /NO,
 /YES, GET BAD CHAR,
 /GET GOOD CHARACTER
 /READ SR
 /HALT? (SR0)
 /NO,
 /GET ERROR COUNT
 /HALT, ERROR COUNT IN AC
 /ERROR COUNTER

```

5722 4772/ PRG11, JMS STBF
5723 4573 TYPE
5724 6546 P11MG1
5725 1371 TAD (BLOCKI-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
    
```

/PROGRAM 11, PRINTER EXERCISER, TYPES LINES OF ANY 3 CHARACTERS
 /WITH STALLS, OR FULL SPEED, KEYBOARD CONTROLLED.

```

5740 1144 TAD C=377
5741 7640 SZA CLA
5742 7240 CLA CMA
5743 3064 DCA STLI0
5744 4773 JMS FBF3
5745 6601 BLOCK1
5746 4770 JMS TYPLN
5747 7604 LAS
5750 7700 SMA CLA
5751 5346 JMP =3
5752 5325 JMP PRG11A
5753 0000 GKBCR, OPEN
5754 4572 UKSF
5755 5354 JMP =1
5756 4567 UKRB
5757 7421 MGL
5760 7701 ACL
5761 4474 JMS I UPUNCH
5762 7701 ACL
5763 5753 JMP I GKBCR

/STALL?
/YES,
/NO,
/SET UP LINE:
/TYPE LINE OF CHARACTERS
/READ SR,
/CHANGE DATA? (SP0=1)
/NO,
/YES,
/SUB TO GET KEYBOARD CHARACTER;
/WAIT FOR FLAG;
/READ CHARACTER,
/STORE CHARACTER;
/GET IT BACK,
/ECHO IT,
/GET CHARACTER AGAIN;
/EXIT
    
```

/PROGRAM 12, PUNCHES BINARY COUNT PATTERN;

```

5764 4466 PRG12, JMS I INPAT
5765 4467 JMS I GETPT
5766 4474 JMS I UPUNCH
5767 5365 JMP =2

/INITIALIZE BINARY COUNT PATTERN
/GET BINARY COUNT CHARACTER,
/PUNCH CHARACTER
/REPEAT,
    
```

PAGE

```

6000 0000 DVCSEL, OPEN
6001 1117 TAD CINTAB
6002 3052 DCA TEMP
6003 1021 TAD TTYIOT
6004 7012 RTR
6005 7010 RAR
6006 0116 AND C0770
6007 3104 DCA UTEMP
6010 4222 JMS DVCOM
6011 1115 TAD COUTTAB
6012 3052 DCA TEMP
6013 1021 TAD TTYIOT
6014 7006 RTL
6015 7004 RAL
6016 0116 AND C0770
6017 3104 DCA UTEMP

/DEVICE CODE SELECT ROUTINE;
/GET START ADDR OF INPUT IOT TABLE;
/AND SAVE AT TEMP;
/OBTAIN NEW INPUT IOT AND
/STORE AT UTEMP.

/PERFORM INPUT IOT SELECTION;
/GET START ADDR OF OUTPUT IOT TABLE;
/AND OBTAIN NEW OUTPUT IOT AND
/OBTAIN NEW OUTPUT IOT AND
/STORE AT UTEMP.
    
```

```

6020 4222 JMS DVCOM
6021 5600 JMP I DVCSEL
6022 0000 OPEN
6023 1452 TAD I TEMP
6024 7450 SNA
6025 5622 JMP I DVCOM
6026 3105 DCA UTEMP1
6027 1505 TAD I UTEMP1
6030 0114 AND I7007
6031 1104 TAD UTEMP
6032 3505 DCA I UTEMP1
6033 2052 ISZ TEMP
6034 5223 JMP DVCOM+1
    
```

/0?
/YES, EXIT

/REMOVE OLD DEVICE CODE;
/INSERT NEW DEVICE CODE;
/PUT BACK NEW IOT CODE;
/SET UP FOR NEXT IOT CODE;

```

INTAB, 6035 0720 XKSF+1
        6036 0725 XKCC+1
        6037 0731 XKRS+1
        6040 0735 XKRB+1
        6041 0736 XKCR+1
        6042 0762 XKIE+1
        6043 2021 INTKSF
        6044 1233 RSSERV
        6045 1264 INKSF
        6046 1433 IN0
        6047 0000 0
        6050 0741 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 /"W"
        6067 0327 /LEFT ARROW
        6070 0257 /"W"
        6071 0327 /"W"
        6072 0337 /LEFT ARROW
        6073 0247 /"W"
        6074 0333 /"C"
        6075 0277 /"?"
        6076 0303 /"C"
        6077 0277 /"?"
        6100 0333 /"C"
        6101 0316 /BIG N
    
```

/SMALL Q
/BIG A
/SWUNG DASH
/BIG A
/SMALL Q

0361
0301
0376
0301
0361

6102 0361
6103 0301
6104 0376
6105 0301
6106 0361

A, 301
302
303
D, 304
305
306
G, 307
310
311
J, 312
313
314
M, 315
316
317
P, 320
321
322
S, 323
324
325
V, 326
327
330
Y, 331
332
260
ONE, 261
262
263
FOUR, 264
265
266

6107 0301
6110 0302
6111 0303
6112 0304
6113 0305
6114 0306
6115 0307
6116 0310
6117 0311
6120 0312
6121 0313
6122 0314
6123 0315
6124 0316
6125 0317
6126 0320
6127 0321
6130 0322
6131 0323
6132 0324
6133 0325
6134 0326
6135 0327
6136 0330
6137 0331
6140 0332
6141 0260
6142 0261
6143 0262
6144 0263
6145 0264
6146 0265
6147 0266

SEVEN, 267
270
271
C241, 241
242
243
C244, 244
245
246
C247, 247
250
C252, 251
252
253
254

6150 0267
6151 0270
6152 0271
6153 0241
6154 0242
6155 0243
6156 0244
6157 0245
6160 0246
6161 0247
6162 0250
6163 0251
6164 0252
6165 0253
6166 0254

6167	0255		255
6170	0256	C255,	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	0341	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

CARLF, TEXT 1%#0?/

6250 4543
 6251 0077
 6252 0000
 6253 4543
 6254 4302

BKSP1, TEXT 1%#BACKSPACE TEST%#0?/

6255 0103
6256 1323
6257 2001
6260 0305
6261 4024
6262 0523
6263 2445
6264 4343
6265 0077
6266 0000
6267 4543
6270 4324
6271 0102
6272 4024
6273 0523
6274 2445
6275 4343
6276 0077
6277 0000
6300 4040
6301 4040
6302 4040
6303 4040
6304 5700
6305 7700
6306 4040
6307 4040
6310 4040
6311 4057
6312 0077
6313 0000
6314 5511
6315 5500
6316 7700
6317 5555
6320 5555
6321 1195
6322 1100
6323 7700
6324 3440
6325 0077
6326 0000
6327 4543
6330 4303
6331 2240
6332 2405
6333 2324
6334 4543
6335 4300
6336 7700
6337 4543
6340 4322
6341 1107
6342 1024
6343 4015

TBTST, TEXT /X#TAB TESTX#0?/

TBMRK, TEXT / /0?/

TBMRK1, TEXT / /0?/

RM33B, TEXT /- /0?/

RM37A, TEXT /- - - - /0?/

SPTSIG, TEXT / \ 0?/

CRTST, TEXT /X#CR TESTX#0?/

RMTST, TEXT /X#RIGHT MARGIN TESTX#0?/

6344 0122
6345 0711
6346 1640
6347 2405
6350 2324
6351 4543
6352 4300
6353 7700
6354 4543
6355 4323
6356 2001
6357 0305
6360 4024
6361 0523
6362 2445
6363 4343
6364 0077
6365 0000
6366 4543
6367 4314
6370 0640
6371 2005
6372 2324
6373 4543
6374 4300
6375 7700
6376 4543
6377 4303
6400 1001
6401 2201
6402 0324
6403 0522
6404 4024
6405 0523
6406 2423
6407 4543
6410 4300
6411 7700
6412 4543
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
2 4543

SPTST, TEXT /X##SPACE TESTX##0?/

LFTST, TEXT /X##LF TESTX##0?/

CHRTST, TEXT /X##CHARACTER TESTX##0?/

WCPTST, TEXT /X##WORST CASE PATTERN TESTX##0?/

KMSGI, TEXT /X##KYBD TESTX##0?/

6433 4313
6434 3102
6435 0440
6436 2405
6437 2324
6440 4543
6441 0077
6442 0000
6443 4543
6444 2022
6445 0523
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 0456
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

KMSG2, TEXT /X#PRESS A KEY#07/

KMSG3, TEXT /X#ECHO TEST/

KMSG3A, TEXT /X#CHARACTER KEYED WILL BE TYPED./

TEXT /X#RUBOUT ENDS ROUTINE;X#07/

KMSG4, TEXT /X#OCTAL EQUIVALENT TEST07/

6522 4317
6523 0324
6524 0114
6525 4005
6526 2125
6527 1126
6530 0114
6531 0516
6532 2440
6533 2405
6534 2324
6535 0077
6536 0000
6537 4543
6540 0000
6541 4040
6542 4040
6543 4543
6544 0077
6545 0000
6546 4543
6547 2022
6550 1116
6551 2405
6552 2240
6553 0530
6554 0522
6555 0311
6556 2305
6557 2245
6560 4300
6561 7700
6562 4543
6563 2431
6564 2005
6565 4011
6566 1640
6567 0401
6570 2401
6571 4072
6572 0077
6573 0000
6574 2540
6575 0077
6576 0000
6577 0000

KMSG, TEXT /X#/
OCTEQV, TEXT /X#0?/

PI1M01, TEXT /X#PRINTER EXERCISERX#0?/

PI1M02, TEXT /X#TYPE IN DATA 10?/

BKSU, TEXT /U 0?/

END, 0 /BEG OF 1000 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 0257
0133 0334
0134 0252
0135 7650
0136 7670
0137 7653
0140 0011
0141 7772
0142 0240
0143 0100
0144 7401
0145 0377
0146 0077
0147 7760
0150 0037
0151 7766
0152 0017
0153 0360
0154 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
 A33WP6 6065
 A35WP6 6073
 A37WP6 6101
 AC 0077
 ACL 7701
 ASCCN 1650
 ASCT 1706
 BAUCON 1537
 BAUDRT 0022
 BAUTAB 0504
 BDRET 0205
 BKSCTR 5262
 BKSPC 5263
 BKSPY 6253
 BLK2 6574
 BLK8 6724
 BLK88 6722
 BLKCC 7034
 BLKCNT 0101
 BLOCK1 6601
 BLOCK2 6713
 BLOCKA 6577
 BLOCKB 6711
 BLOCKC 7023
 BSH 7002
 C241 6153
 C244 6156
 C247 6161
 C252 6164
 C255 6167
 C272 6172
 C273 6175
 C300 6200
 C335 6203
 C373 6241
 C377 6249
 CAF 6007
 CAM 7621
 CARLP 6250
 CHAIN 0025
 CHAINN 0263
 CHCK 0513
 CHECK 0070
 CHRONT 0456
 CRTST 6376
 CK33 0352
 CK35 0360
 CK37 0366
 CKSR33 4554
 CKSR35 4557
 CKSR37 4559
 CLA 7200
 CNTST 1600
 CNV 1671
 CR 0107
 CRALF 0562
 CRCR 0561
 CRLF 4575
 CRTST 6327
 CRTSTA 4456
 CRTSTB 4461
 CTRA 0062
 CTRB 0063
 CTSK 0550
 CURTST 0054
 D 6112
 DBLK 7577
 DELAY 4576
 DELAYM 0024
 DELAYS 0102
 DELCNT 0474
 DLENT1 0027
 DLMSR 1474
 DLYNS 0337
 DLYNSK 0111
 DVGOM 6022
 DVGSEL 6000
 END 6577
 ERRONT 5676
 ERROR 0103
 ERRCTR 3721
 ERROR 1440
 FADR 0623
 FBA33 1102
 FBALL 1060
 FBF 0033
 FBF3 1031
 FBF33 1055
 FBFI 2144
 FETCH 1646
 FLAG 0716
 FORND 0302
 FOUR 6145
 FW336 1117
 FW336 1133
 FW376 1133
 G 6113
 GETPT 0067
 GETROD 0237
 GKBCR 3737
 GTBIN 0444
 GTF 6004
 HLT 7402

HLT0
 HLTST
 HOLD1
 IBIN
 IN0
 INCRIN
 INKSF
 INPATT
 INTAB
 INTCF
 INTFND
 INKSF
 INTSF
 INTSVC
 INTTST
 IOF
 ION
 J
 K5200
 KBELAG
 KCC
 KCR
 KFLAG
 KIE
 KMSG1
 KMSG2
 KMSG3
 KMSG3A
 KMSG4
 KMSG5
 KRB
 KRS
 KSTART
 LAS
 LE
 LEFTST
 LEFTSTA
 LINK
 M
 M147
 MS
 MCTR
 MILCTR
 MINT
 MOVE
 MOVEA
 MOVEE
 MGL
 MSCTR
 MTABP

MTON
 MTRS
 NTST
 NTSTA
 NXTST
 OCTEGV
 ONE
 OPEN
 OUT
 OUT0
 OUT1
 OUT2
 OUTTAB
 P
 P0E0A
 P0E0B
 P0E0C
 P0E0E
 P0E1A
 P0E1B
 P0E2A
 P0E2B
 P0E2C
 P0E2D
 P0E2E
 P0E2F
 P0E2G
 P0E3A
 P0E3B
 P0E3C
 P0E4A
 P0E4B
 P0E5A
 P0E6A
 P0E6B
 P0E6C
 P0E6D
 P0E6E
 P0E7A
 P0E7B
 P0E7C
 P0T6
 P0T6A
 P0T6B
 P0T6C
 P0T6D
 P0T6E
 P0T7
 P0T7A

2076
 5713
 3346
 0436
 1433
 0261
 1264
 0066
 6035
 1261
 2017
 2021
 1237
 1254
 2024
 6002
 6001
 6120
 2735
 0026
 6032
 6030
 1365
 6035
 6432
 6443
 6454
 6462
 6521
 6537
 6036
 6034
 6031
 0023
 7604
 0110
 6366
 4612
 0130
 6123
 7631
 2111
 0625
 0061
 0060
 6115
 4574
 0613
 0600
 7421
 0057
 2162

P0T7B	2751	P1T11	3400	P2E7B	4021	P4T45A	5102
P0T7C	2755	P1T11A	3405	P2T10	4030	P4T46A	5116
P0TS0	2205	P1T12	3435	P2T10A	4034	P4TS0	4442
P0TS0A	2211	P1T12A	3443	P2T10B	4045	P4TS1	4475
P0TS0B	2214	P1T12B	3456	P2T10C	4051	P4TS10	4645
P0TS0C	2222	P1TS0	3005	P2T10D	4054	P4TS11	4651
P0TS0D	2225	P1TS1	3010	P2T10E	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	4200	P4TS17	4701
P0TS2	2327	P1TS3A	3074	P2T12	4233	P4TS2	4525
P0TS2A	2332	P1TS4	3126	P2T12A	4247	P4TS20	4705
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	P4TS30	4745
P0TS3C	2521	P1TS6	3271	P2TS3	3600	P4TS31	4751
P0TS4	2547	P1TS6A	3314	P2TS3A	3606	P4TS32	4755
P0TS4A	2547	P1TS7	3314	P2TS4	3630	P4TS33	4761
P0TS4B	2565	P1TS7A	3322	P2TS4A	3635	P4TS34	5004
P0TS4C	2600	P2E0	3524	P2TS4B	3635	P4TS35	5004
P0TS5	2616	P2E1	3543	P2TS4C	3666	P4TS36	5010
P0TS5A	2624	P2E10A	4073	P2TS4D	3671	P4TS37	5014
P0TS5B	2640	P2E10B	4107	P2TS5	3677	P4TS4	4625
P11MG1	6546	P2E10C	4115	P2TS5A	3711	P4TS40	5020
P11MG2	6562	P2E10D	4123	P2TS5B	3716	P4TS41	5024
P1E11A	3424	P2E10E	4135	P2TS5C	3724	P4TS42	5030
P1E12A	3464	P2E10F	4144	P2TS5D	3734	P4TS43	5034
P1E12B	3474	P2E11A	4206	P2TS7	3762	P4TS44	5034
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	P4TS48	4631
P1E3B	3122	P2E12C	4305	P3E2	4427	P4TS49	5231
P1E4A	3143	P2E2A	3562	P3T0B	4334	P4TS50	4635
P1E5	3250	P2E2B	3564	P3T1B	4366	P4TS4	4641
P1E5A	3230	P2E3A	3621	P3T2C	4424	P4TS7	5415
P1E5B	3235	P2E3B	3623	P3TS0	4314	P6E0	5400
P1E5C	3242	P2E4A	3644	P3TS0A	4324	P6T0	5421
P1E5D	3257	P2E4B	3657	P3TS1	4344	P6T1	5426
P1E5E	3264	P2E5	3706	P3TS1A	4354	P6T2	5440
P1E6A	3310	P2E6A	3746	P3TS2	4400	P6T2A	5447
P1E710	3366	P2E6B	3752	P3TS2A	4406	P70CTR	1211
P1E7A	3325	P2E6C	3756	P3TS2B	4411	P7T0	9502
P1T10A	3333	P2E7A	4015	P4T44A	5066	P7T1	5506

P7T10	5542	PUNCH	2112	SHALT	0317	TEMR	0715
P7T11	5546	RADDR	1416	SINPT	1707	TLC37	0034
P7T12	5552	RBCTR	1417	SJ	6217	TLC37I	2134
P7T13	5556	RBUSY	0076	SLDC02	0223	TLCALI	0033
P7T14	5562	RCTRA	1511	SM	6222	TLCALL	6046
P7T15	5566	RCTRB	1512	SNDREC	3353	TLS	6044
P7T16	5572	RDBLK	1400	SP	6225	TPC	3337
P7T17	5600	RDBLKR	1407	SPAC	5207	TRDATA	0634
P7T20	5512	RDRSRV	1420	SPCNT	5161	TSC1	0643
P7T21	5604	RDSRV	1430	SPCTR	5162	TSC2	6041
P7T22	5610	RGNA	0400	SPF	6040	TSF	0021
P7T23	5614	RGNB	0417	SPI	6045	TTYIOT	0020
P7T24	5620	RM33A	1563	SPIIND	1716	TTYTYP	0634
P7T25	5624	RM33B	6314	SPT0	1715	TYPAT	4573
P7T26	5630	RM37A	6317	SPT1	6334	TYPER	1627
P7T27	5634	RMB	4523	SPTST	4535	TYPLN	1615
P7T28	5640	RMTST	6337	SPTSTA	4546	TYPLN3	0660
P7T30	5516	RMTSTA	4516	SPTSTB	6324	TYPSP	0626
P7T4	5644	RP1A	0415	SRG	6003	TYRSTG	4571
P7T5	5522	RP1B	0434	SRSET	0236	UKCC	4562
P7T6	5526	RP2A	0416	SRTOA	5655	UKCR	4241
P7T7	5532	RP2B	0435	SRTOB	5662	UKIE	4567
PADDR	1342	RRPP	1343	SS	6230	UKRB	4570
PBLK	1316	RSCTR	0304	ST33B	1020	UKRS	4572
PBLKR	1324	RSSERV	1232	STAL	0551	UKSF	0075
PCTR	1341	RSSERV	1233	STALL	4556	UNOVE	0072
PDCR	1310	RSTUP	1351	START	0200	UOUT	0074
PFLAG	0071	RSYNC	1216	STBAUD	1513	UPUNCH	4560
PLTLR	1200	RTF	6005	STBF	1000	USPF	4537
PRG0	2200	RTNNO	0055	STCTR	0326	USPI	4565
PRG1	3000	RUDONE	1456	STLID	0044	UTCF	0104
PRG10	5651	S	6131	SV	6233	UTEMP	0108
PRG11	5722	S100	0030	SY	6236	UTEMP1	0106
PRG11A	5725	S100I	2012	SYNC	0065	UTLS	4563
PRG12	5764	S200	0032	SYNKA	0534	UTPC	4564
PRG2	3503	S200I	2005	TABCTR	5201	UTPLN3	0073
PRG3	4307	S4000	0031	TABP	5201	V	4566
PRG4	4434	S4000I	2000	TABPA	5220	VCTR	6134
PRG5	5274	SA	6206	TADDR	0624	WASC	1267
PRG5A	5317	SASC	1705	TBCNT	5140	WCHK	1704
PRG6	5340	SB	1435	TBMRK1	6306	WCPTST	0527
PRG7	5465	SB0	4332	TBMRK1	6306	WOSNS	6412
PRGADR	0235	SB2	4364	TBTA	5134	WTS6A	2153
PRGEND	0300	SBSP	4420	TBTB	5146	XKCC	0112
PRGNUM	0056	SCNT	5673	TBTST	6267	XKCR	0724
PRGTAB	0057	SD	6211	TCF	6042	XKIE	0755
PRINT	0671	SETLOC	1577	TEMP	1647	XKRS	0734
PSTUP	1217	SETRND	1740	TEMP1	0052	XKSF	0730
PSYNC	1212	SEVEN	6150	TEMQ	0074		
PT0	0442	SG	6214				
PT1	0443	SGET	1717				

XSPF 1165
XSPI 0765
XTCF 0745
XTLS 0751
XTPC 1171
XTSF 0740
Y 6137

ERRORS DETECTED: 0

LINKS GENERATED: 106

RUN-TIME: 32 SECONDS

3K CORE USED

