

IDENTIFICATION

PRODUCT CODE:	MAINDEC-08-DHKLD-A-D (FORMERLY MAINDEC-8E-D2AC)
PRODUCT TEST:	PDP-8/E TELETYPE AND KLB ASYNCHRONOUS DATA CONTROL TESTS
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MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	ED FORTMILLER

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1. ABSTRACT

THIS PROGRAM CONSISTS OF A PACKAGE OF TEST PROGRAMS FOR TESTING THE KLB LOGIC (EIA OR CURRENT) AND A TELETYPE, ONLY ONE TELETYPE MAY BE TESTED AT A TIME, THE TELETYPE TO BE TESTED CAN BE A KRS33, ASR33, KSR35, ASR35, OR KSR37.

THE TEST PROGRAMS ARE:

PRG0-BASIC TEST OF THE OUTPUT LOGIC (CURRENT 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
2. DEVICE CODES ASSIGNED,
3. BAUD RATE OF DEVICE

TO PROVIDE THIS INFORMATION, PROCEED AS FOLLOWS:

A. SET LOCATION 0020 TO:

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

B. SET LOCATION 0021 AS FOLLOWS:

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

C. SET LOCATION 0022 AS FOLLOWS:

1. LOAD ADDRESS 0022.
2. PLACE THE FOLLOWING IN THE 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 ONLINE IF ON THE KLS BEING TESTED.
- C. INSURE THAT THERE IS PAPER IN TELEPRINTER.
- D. LOAD ADDRESS 0200.
- E. SET SR TO 0000.
- F. PRESS CLEAR AND CONTINUE.
- G. PROGRAM HALTS AT LOCATION 0236 TO PERMIT SETTING OF SR OPTIONS. SET ANY DESIRED OPTIONS. NORMAL RUN IS WITH SR=0000. PRESS CONTINUE.

PRG0 SR OPTIONS:

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

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

4.3

PRG1 USE PROCEDURE

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

(4,3 CONT'D)

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

PRG1 SR OPTIONS:

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

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

4,4

PRG2 USE PROCEDURE

- 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;
SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED.

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

4.6

PRG4 USE PROCEDURE

- 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.

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 KEYED.

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.
 - SR5=1 HALT ON ERROR, BAD CHARACTER IN AC.
 - SR5=0 HALT AT END OF DATA BLOCK IF ERRORS OCCURRED, ERROR COUNT IN AC.
 - SR6 THROUGH SR11 ROUTINE NUMBER TO BE SELECTED.
- J. PROGRAM IS EXECUTED AND HALTS AT PROGRAM END HALT AT LOC 0300 UNLESS PREVENTED FROM ENDING, BY SR OPTIONS, OR IF ERRORS OCCUR.

4.10

PRG10 USE PROCEDURE

- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
- B. INSURE THAT TELETYPE IS ON-LINE.
- C. LOAD BINARY COUNT PATTERN TEST TAPE IN READER,
- D. TURN ON READER,
- E. LOAD ADDRESS 0200.
- F. SET SR TO 0010.
- G. PRESS CLEAR AND CONTINUE.
- H. PROGRAM RUNS CONTINUOUSLY UNTIL STOPPED BY USER, THE FOLLOWING SR OPTIONS MAY BE SET AT ANY TIME.
 - SR0=1 PROGRAM HALTS WITH ACCUMULATED ERROR COUNT IN AC;
 - SR3=1 PROGRAM READS TAPE AT FULL SPEED,
 - SR3=0 PROGRAM READS TAPE WITH RANDOM STALLS BETWEEN CHARACTERS;
 - SR5=1 HALT ON ERROR, PROGRAM HALTS IF READ ERROR OCCURS, BAD CHARACTER IS DISPLAYED IN AC,
 - SR6=0 NO HALT ON ERROR.

4.11

PRG11 USE PROCEDURE

- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4.1.
- B. MAKE SURE THAT TELETYPE IS ON-LINE, AND IF KSR37, THAT KEYBOARD "PROCEED" LIGHT IS ON.
- C. LOAD ADDRESS 0200.
- D. SET SR TO 0011.
- E. PRESS CLEAR AND CONTINUE.
- F. THE PROGRAM IDENTIFIES ITSELF, AND REQUESTS DATA TO BE TYPED.
- G. TYPE IN DATA AS FOLLOWS:
 - 1. TYPE THE 3 CHARACTERS TO BE TYPED AND A DELETE CODE (RUBOUT) IF YOUR WISH NOT TO STALL BETWEEN CHARACTERS OR,
 - 2. TYPE THE 3 CHARACTERS TO BE TYPED AND ANY OTHER CHARACTER OTHER THAN THE DELETE CODE TO STALL BETWEEN CHARACTERS,

(4,11 CONT'D)

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

4,12 PRG12 USE PROCEDURE

-
- A. PERFORM DEVICE SELECTION IF NOT PREVIOUSLY DONE, REFER TO SECTION 4,1,
 - B. INSURE TELETYPE IS ON-LINE,
 - C. TURN OFF TELETYPE READER,
 - D. LOAD BLANK TAPE IN PUNCH,
 - E. TURN ON PUNCH,
 - F. LOAD ADDRESS 0200,
 - G. SET SR TO 0012,
 - H. PRESS CLEAR AND CONTINUE,
 - I. PROGRAM PUNCHES BINARY COUNT PATTERN TEST TAPE UNTIL STOPPED BY USER.

5. PROGRAM AND/OR OPERATOR ACTION

5,1 NORMAL HALTS

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

6, ERRORS

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 TCF WITH THE PRINTER FLAG SET, MANUAL RESTART,
- LOC 2315 PRG0, ROUTINE 1, ERROR HALT B, WITH THE PRINTER FLAG SET AND THE INTERRUPT ENABLED, NO INTERRUPT OCCURED, PRESSING CONTINUE ENTERS SCOPE LOOP THAT TURNS ON INTERRUPT CONTINUOUSLY, MANUAL RESTART,
- LOC 2415 PRG0, ROUTINE 2, ERROR HALT A, KIE INSTRUCTION FAILED TO DISABLE THE TELETYPE INTERRUPT ENABLE FLIP-FLOP, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KIE CONTINUOUSLY WITH AC 11=0, MANUAL RESTART,
- LOC 2427 PRG0, ROUTINE 2, ERROR HALT B, SPI INSTRUCTION SKIPPED WITH FLAG SET AND TELETYPE INTERRUPT ENABLE FLIP-FLOP DISABLED, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPI WITH PRINTER FLAG SET AND TTY INTERRUPT DISABLED, MANUAL RESTART,

(6,1 CONT'D)

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

LOC 2443 PRGØ, 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 PRGØ, 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 PRGØ, 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 PRGØ, 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 PRGØ, 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 PRGØ, 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 PRGØ, ROUTINE 3, ERROR HALT C, TLS INSTRUCTION FAILED TO SET PRINTER FLAG IN TWICE THE REQUIRED TIME FOR IT TO SET, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS AND DELAYS, CONTINUOUSLY, MANUAL RESTART;

(6.1 CONT'D)

LOC 2607 PRG0, ROUTINE 4, ERROR HALT A, PRINTER FLAG SET PRIOR TO 9 BIT TIMES, (EG, 110 BAUD: 9X9.09 MSEC = 81.81 MSEC AT WHICH TIME THE FLAG MUST BE SET, NOT PRIOR TO THIS TIME), EITHER THE PDP-8/E TIMING IS TOO SLOW OR THE TTY CLOCK TOO FAST, (IS THE SLOW CYCLE JUMPER REMOVED FROM THE PROCESSOR TIMING MODULE AND IS THE CORRECT BAUD RATE SELECTED IN LOC 227); PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY, MANUAL RESTART.

LOC 2614 PRG0, ROUTINE 4, ERROR HALT B, PRINTER FLAG NOT SET AFTER 9.55 BIT TIMES, (EG, 110 BAUD 9.55X9.09 MSEC = 86.7 MSEC AT WHICH TIME THE FLAG MUST BE SET, NO LATER,) PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES TLS CONTINUOUSLY, MANUAL RESTART.

LOC 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 THAN 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 2712 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 ACC#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 TFS OR KSF
FAILED TO SKIP ON RECEIVER FLAG SET, PRESSING
CONTINUE ENTERS SCOPE LOOP THAT CLEARS THE
RECEIVER FLAG AND ISSUES A TFS 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;

(6,1 CONT'D)

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

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

LOC 3310 PRG1, ROUTINE 6, ERROR HALT A, RECEIVER FLAG NOT SETTING AT THE END OF 10 BIT TIMES FOR A NON 110 BAUD DEVICE OR 11 BIT TIMES FOR A 110 BAUD DEVICE, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES 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 INCLUSIVE "OR" KBRD BUFFER WITH AC, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KRS CONTINUOUSLY, MANUAL RESTART,

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

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

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

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

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

(6,1 CONT'D)

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

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

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

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

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

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

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

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

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

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

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

(6,1 CONT'D)

LOC 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 AC11=1, PRESSING CONTINUE ENTERS A SCOPE LOOP THAT ISSUES KIE WITH AC11=1 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,

(6:1 CONT'D)

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

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

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

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

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

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

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

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

LOC 5707 PRG10, READ ERROR HALT A, BAD CHARACTER IN AC, PRESS CONTINUE, HALT OCCURS IF SR3=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 CURRENT	110 EIA	150 EIA	300 EIA	600 EIA	1200 EIA	2400 EIA
PRG01	1132	1132	1103	0132	0117	019	015
PRG11	N/A	4130	3125	1128	0144	0123	0112
PRG21	2147	N/A	N/A	N/A	N/A	N/A	N7A
PRG31	18100	N/A	N/A	N/A	N/A	N/A	N7A
PRG41	20100	N/A	N/A	N/A	N/A	N/A	N7A
PRG51	CONTINUOUS	N/A	N/A	N/A	N/A	N/A	N7A
PRG61	USER DEP.	N/A	N/A	N/A	N/A	N/A	N7A
PRG71	40100	N/A	N/A	N/A	N/A	N/A	N7A
PRG101	CONTINUOUS	N/A	N/A	N/A	N/A	N/A	N7A
PRG111	USER DEP.	N/A	N/A	N/A	N/A	N/A	N7A
PRG121	CONTINUOUS	N/A	N/A	N/A	N/A	N/A	N7A

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 SPLICE 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 (OCTAL)

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

PRG1 - BASIC EIA INPUT AND OUTPUT LOGIC TESTS

- NOTE: ON THE 40 PIN SIDE CONNECTOR: PIN E MUST BE CONNECTED TO PIN M, PIN F MUST BE CONNECTED TO PIN J.
- RTN0: CHECKS THAT KCC WILL CLEAR THE AC, TEST IS DONE 100 TIMES,
- RTN1: TLS IS USED TO SEND DATA AND KSF CHECKS TO SEE IF THE RECEIVER FLAG SET UPON COMPLETION OF RECEIVING THE DATA, TEST IS DONE 100 TIMES,
- RTN2: TEST OF KSF TO SKIP ON RECEIVER FLAG CONSISTENTLY, TEST IS DONE 4000 TIMES,
- RTN3: TEST OF KSF TO NOT SKIP ON NO RECEIVER FLAG, TEST IS DONE 500 TIMES,
- RTN4: CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT AND THAT THE READER FLAG WILL INTERRUPT, TEST IS DONE 1000 TIMES,
- RTN5: CHECKS THE ABILITY OF
 SRQ TO SKIP ON A READER INTERRUPT
 SPI TO SKIP ON A READER INTERRUPT
 CAF TO CLEAR KBRD/READER FLAG,
 SRQ TO NOT SKIP ON NO READER FLAG
 SPI TO NOT SKIP ON NO READER FLAG
 TEST IS DONE 100 TIMES,
- RTN6: 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,
- RTN7: CHECKS DATA HANDLING CAPABILITIES BY SENDING A NUMBER FOLLOWED BY ITS COMPLEMENT, TEST IS DONE 512 TIMES,
- RT10: CHECKS DATA HANDLING CAPABILITIES BY SENDING RANDOM NUMBERS, TEST IS DONE 512 TIMES,
- RTN11: CHECKS THAT KRS CAN "INCLUSIVE OR" READER BUFFER WITH AC, TEST IS DONE 500 TIMES,
- RTN12: CHECKS THAT KRB WILL "JAM TRANSFER" RECEIVER BUFFER TO AC, AND THAT KRB WILL CLEAR READER FLAG, TEST IS DONE 500 TIMES,

PRG2 - BASIC INPUT LOGIC TESTS (CURRENT)

THIS PROGRAM CONTAINS 13 ROUTINES NUMBERED FROM 0 TO 12 (OCTAL).

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

8,4

PRG3 - READER TEST

THIS PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM 0 TO 2,

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

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

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

8,5

PRG4 - PRINTER TEST

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

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

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

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

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

(8,5 CONT'D)

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

RTN4: ABC (CAPITALS)
RTN5: DEF "
RTN6: GHI "
RTN7: JKL "
RTN10: MNO "
RTN11: PQR "
RTN12: STU "
RTN13: VWX "
RTN14: YZ "
RTN15: 123
RTN16: 456
RTN17: 789
RTN20: !"#
RTN21: \$%&
RTN22: '()
RTN23: *+
RTN24: -./
RTN25: :;<
RTN26: =>?
RTN27: @[\
RTN30:]^ AND LEFT ARROW
RTN31: ABC (LOWER CASE) (KSR37 ONLY)
RTN32: DEF " "
RTN33: GHI " "
RTN34: JKL " "
RTN35: MNO " "
RTN36: PQR " "
RTN37: STU " "
RTN40: VWX " "
RTN41: YZ AND CODE 340 "

RTN42: TYPES LINE OF 4 CHARACTERS WHOSE CODE IS 373, 374, 375, AND 376 (KSR37 ONLY),

RTN43: TYPES 2 LINES OF ALL CHARACTERS, FIRST LINE IS TYPED AT FULL SPEED, AND THE 2ND LINE WITH RANDOM STALLS BETWEEN CHARACTERS,

RTN44: TYPES 12 LINES OF ASR33 PRINTER WORST CASE PATTERN, ALTERNATE LINES ARE TYPED WITH RANDOM STALLS BETWEEN CHARACTERS, ROUTINE RUNS ONLY IF KSR33 OR ASR33 IS PRESENT,

THE ASR33 WORST CASE PATTERN USED IS ^LEFT ARROW W^W LEFT ARROW,

(8,5 CONT'D)

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

THE AST35 WORST CASE PATTERN USED IS /C?C?E

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

THE KSR 37 WORST CASE PATTERN USED IS:

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

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

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

8,6

PRG5 - PUNCH TEST

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

THE TEST SEQUENCE IS AS FOLLOWS:

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

8,7

PRG6 = KEYBOARD TEST

THIS PROGRAM CONTAINS 3 ROUTINES NUMBERED FROM 0 TO 2,

- RTN0: CHECKS THAT KSF COMMAND SKIPS WHEN FLAG=1, TEST IS DONE 1000 TIMES,
- RTN1: ECHO TEST, ANY CHARACTERS READ FROM KEYBOARD ARE TYPED, CORRECT OPERATION VERIFICATION IS DONE VISUALLY BY USER, READING A RUBOUT CHARACTER ENDS THE TEST,
- RTN2: OCTAL 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,)
- D) SYNC THE READER,
- F) READ/CHECK DATA BLOCK (RANDOM DELAY BETWEEN CHARACTERS),
- G) PUNCH DATA BLOCK (RANDOM DELAY BETWEEN CHARACTERS),
- H) READ DATA BLOCK (NO DELAY BETWEEN CHARACTERS),
- I) PUNCH TRAILER,
- J) WAIT FOR READER TO COMPLETE READING DATA BLOCK,
- K) END OF TEST SEQUENCE,

(8,8 CONT'D)

RTN01 PUNCH/PRINT AND READ CHECK BLOCK OF ABC
RTN11 PUNCH/PRINT AND READ CHECK BLOCK OF DEF
RTN21 PUNCH/PRINT AND READ CHECK BLOCK OF GHI
RTN31 PUNCH/PRINT AND READ CHECK BLOCK OF JKL
RTN41 PUNCH/PRINT AND READ CHECK BLOCK OF MNO
RTN51 PUNCH/PRINT AND READ CHECK BLOCK OF PQR
RTN61 PUNCH/PRINT AND READ CHECK BLOCK OF STU
RTN71 PUNCH/PRINT AND READ CHECK BLOCK OF VWX
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 @[\n
RTN241 PUNCH/PRINT AND READ CHECK BLOCK OF]^_`
RTN251 PUNCH/PRINT AND READ CHECK BLOCK OF ALL PRINTABLE CHARACTERS
RTN261 PUNCH/PRINT AND READ CHECK BLOCK OF ASR33 PRINTER
WORST CASE PATTERN (-W?)
RTN271 PUNCH/PRINT AND READ CHECK BLOCK OF ASR35 PRINTER
WORST CASE PATTERN, (?C)
RTN301 PUNCH/PRINT AND READ CHECK BLOCKS OF SPACE,
RUBOUT (DATA) ALL 1'S, ALL 1'S, ALL 0'S).

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
/COPYRIGHT 1971,1972 DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS, 01754
/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 = 109 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 ION=6001 /TURN INTRRRRUPT ON;
6002 IOF=6002 /TURN INTERRUPT OFF,
6003 SRQ=6003 /SKIP IF INTERRUPT REQUEST,
6004 GTF=6004 /GET INTERRUPT FLAGS
6005 RTF=6005 /RESTORE INTERRUPT FLAGS AND TURN INTERRUPT ON
6007 CAF=6007 /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT
6030 KCR=6030 /CLEAR KBRD FLAG BUT DO NOT SET RDR RUN
6031 KSF=6031 /SKIP IF KEYBOARD/READER FLAG = 1,
6032 KCC=6032 /CLEAR AC AND KBRD/READER FLAG, SET READER RUN;
6034 KRS=6034 /READ KEYBOARD/READER BUFFER STATIC
6035 KIE=6035 /ENABLE TTY INTERRUPT WHEN AC11 EQUALS 1
6036 KRB=6036 /CLEAR AC, READ KEYBOARD BUFFER, CLEAR
/KEYBOARD FLAGS,
/SET PRINTER FLAG
6040 SPF=6040 /SKIP IF TELEPRINTER/PUNCH FLAG = 1,
6041 TSF=6041 /CLEAR TELEPRINTER/PUNCH FLAG,
6042 TCF=6042 /LOAD TELEPRINTER/PUNCH BUFFER
6044 TPC=6044 /SELECT AND PRINT,
/SKIP IF TTY INTERRUPT
/LOAD TELEPRINTER/PUNCH BUFFER,
/SELECT AND PRINT AND CLEAR
/TELEPRINTER/PUNCH FLAG,
7002 BSW=7002 /SWAP BYTES IN AC,
7200 CLA=7200
7402 HLT=7402

7604 LAS=7604
7421 MQL=7421 /LOAD MQ FROM AC THEN CLEAR AC;
7621 CAM=7621 /CLEAR AC AND MQ;
7701 ACL=7701 /LOAD MQ INTO AC;
0000 OPEN=0 /PROGRAM MODIFIABLE;
4577 SETLOC=JMS I [STCTR
4576 DELAY=JMS I [DLYMS
4575 CRLF=JMS I [CRLF
4574 MOVE=JMS I [MOVVE
4573 TYPE=JMS I [TYPSTG
6117 MTON=6117 /DC02; MULTIPLE TTY ON;
6127 MTRS=6127 /DC02; MULTIPLE TTY READ STATUS.
6115 MINT=6115 /DC02; MULTIPLE TTY INTERRUPT CONTROL.
4572 UKSF=JMS I [XKSF
4571 UKCC=JMS I [XKCC
4570 UKRS=JMS I [XKRS
4567 UKRB=JMS I [XKRB
4566 UTSF=JMS I [XTSF
4565 UTCF=JMS I [XTCF
4564 UTPC=JMS I [XTPC
4563 UTLS=JMS I [XTLS
4562 UKCR=JMS I [XKCR
4561 UKIE=JMS I [XKIE
4560 USPF=JMS I [XSPF
4557 USP=JMS I [XSP
4556 STALL=JMS I [STAL
4555 CKSR37=JMS I [CK37
4554 CKSR33=JMS I [CK33
4553 CKSR15=JMS I [CK35
6577 BLOCKA=END
6601 RLOCK1=BLOCKA+2
6711 RLOCKB=BLOCKA+112
6722 RLOCKB=BLOCKA+123
6713 RLOCK2=BLOCKA+114
6724 RLOCK2=BLOCKA+125
7023 RLOCKC=BLOCKA+224
7034 RLOCKC=BLOCKA+235
7577 DBLK=BLOCKA+1000
7631 M147=147 /-103 DECIMAL;
0304 RPPP=0304

0000 *0
0000 0000
0001 5001 JMP 1
0002 0002 2
0003 0003 3
0005 *5
0005 5402 JMP I 2
0006 0000 0
0016 *16
0016 0000 OPEN /AUTO INDEX,
0020 *20
0020 0000
0021 0304 TTYIOT, RPPP /CONSTANT TO DETERMINE IOT CODE

0022	0110	BAUDRT, 110		/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**
0023	0000	KSTART, OPEN		/USER PROGRAM START.
0024	0000	DELAYM, OPEN		
0025	0263	CHAIN, CHAINN		/CHAIN RTN ENTRY,
0026	1365	KBFLAG, KFLAG		
0027	0474	DLCNT1, DLCNT		
0030	2012	S100, S100I		
0031	2000	S4000, S4000I		
0032	2005	S200, S200I		
0033	2126	TLCALL, TLCALI		
0034	2134	TLC37, TLC37I		
0035	2144	FBF, FBFI		
0036	0000	PRGNUM, OPEN		
0037	2200	PRGTAB, PRG0		
0040	3000			PRG1
0041	3503			PRG2
0042	4307			PRG3
0043	4434			PRG4
0044	5274			PRG5
0045	5340			PRG6
0046	5465			PRG7
0047	5651			PRG10
0050	5722			PRG11
0051	5764			PRG12
0052	0000	TEMP, OPEN		/WORK
0053	0000	TEMP1, OPEN		/LOCATIONS
0054	0000	CURTST, OPEN		/FOR CURRENT TEST ADDRESS
0055	0000	RTNNO, OPEN		/FOR CURRENT TEST NUMBFR
0056	0000	NXTST, OPEN		/FOR NEXT TEST ADDRESS
0057	0000	MSCTR, OPEN		/MILLISECONDS COUNTER
0060	0000	MILCTR, OPEN		
0061	0000	MIL1, OPEN		/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;
0062	0000	CTRA, OPEN		
0063	0000	CTRB, OPEN		
0064	0000	STLID, OPEN		
0065	0530	SYNC, SYNK		/ENTRY TO SYNC TAPE RTN,

0066	0436	INPATT, IBIN		/ENTRY TO INITIATE PATTERN
0067	0444	GETPT, GTBIN		/ENTRY TO GET PATTERN CHAR,
0070	0513	CHECK, CHCK		
0071	0000	PFLAG, 0		
0072	1271	UOUT, OUT		
0073	1615	UTPLN3, TYPLN3		
0074	2112	UPUNCH, PUNCH		
0075	0600	UMOVE, MOVVE		
0076	0000	RBUSY, 0		
0077	0000	AC, 0		
0100	0000	LINK, 0		
0101	0000	BLKCNT, 0		
0102	0000	DELAYS, 0		
0103	0000	ERRCR, 0		
0104	0000	UTEMP, 0		
0105	0000	UTEMP1, 0		
0106	0000	UTEMP2, 0		
0107	0215	CR, 215		/CARRIAGE RETURN
0110	0212	LF, 212		/LINE FEED
0111	0277	DLYMSK, 277		
0112	0000	WTS6A, OPEN		
	0200	/CONTROL ROUTINE		
	*200			
0200	7610	START, SKP CLA		
0201	7402	HLT		/INCORRECT PROGRAM NUMBER
0202	7621	CAM		/CLEAR AC AND MQ,
0203	4777/	JMS SETRND		/SET UP RANDOM NUMBERS
0204	4776/	JMS STBAUD		/SET UP LOC MIL1 FOR SELECTED BAUD RATE,
0205	7604	BDRET, LAS		/READ SR
0206	0152	AND [17		/PROGRAM MASK = 17
0207	1151	TAD [+12		/PROGRAM LIMIT = +12
0210	7540	SMA SZA		/VALID PROGRAM NUMBER?
0211	5201	JMP START+1		/NO,
0212	7604	LAS		/YES, READ SR,
0213	0152	AND [17		
0214	3036	DCA PRGNUM		/SAVE PROGRAM NUMBER,
0215	1036	TAD PRGNUM		/DEVELOP PROGRAM START
0216	1150	TAD [PRGTAB		/ADDRESS AND STORE AT
0217	3052	DCA TEMP		/PRGADR,
0220	1452	TAD I TEMP		
0221	3235	DCA PRGADR		
0222	4775/	JMS DVCSEL		/PERFORM IOT SELECTION
0223	7604	SLDC02, LAS		/SELECT DC02 UNIT
0224	0147	AND [7760		
0225	6117	HTON		
0226	7201	CLA IAC		
0227	6115	HINT		/ENABLE DC02 INTERRUPT
0230	4475	JMS I UMOVE		/INITIALIZE
0231	0005	5		/INTERRUPT,
0232	0001	1		/AREA,
0233	7776	-2		
0234	5635	JMP I '+1		
0235	0000	PRGADR, OPEN		


```

0236 7602 SRSET, HLT CLA
0237 7200 GETRDY, CLA
0240 1023 TAD KSTART /SET ADDRESS OF 1ST ROUTINE
0241 3056 DCA NXTST /STORE AT NXTST
0242 4302 JMS FORWD
0243 7604 LAS /READ SR
0244 7004 RAL
0245 7700 SMA CLA /ROUTINE SELECT? (SR1)
0246 5454 JMP I CURTST /NO, START WITH 1ST RT
0247 7604 LAS /YES
0250 0146 AND [77 /SR 6-11 ENABLE MASK,
0251 7041 CIA
0252 1055 TAD RTNNO
0253 7650 SNA CLA /IS IT THIS RTN?
0254 5454 JMP I CURTST /YES, GO DO IT
0255 1056 TAD NXTST /NO
0256 7001 IAC /IS THIS LAST RTN?
0257 7640 SZA CLA /NO
0260 5242 JMP GETRDY+3
0261 7402 INCRN, HLT /YES, INCORRECT ROUTINE NO,
0262 5237 JMP GETRDY

0263 4317 CHAINN, JMS SHALT /HALT? (SR0)
0264 7604 LAS /READ SR
0265 7006 RTL
0266 7630 SZL CLA /SELECT ROUTINE? (SR1)
0267 5237 JMP GETRDY /YES
0270 1056 TAD NXTST
0271 7001 IAC
0272 7640 SZA CLA /LAST ROUTINE?
0273 5242 JMP GETRDY+3 /NO,
0274 7604 LAS
0275 7006 RTL
0276 7710 SPA CLA /LOOP PROGRAM? (SR2)
0277 5237 JMP GETRDY /YES
0280 7402 PRGEND, HLT /END OF PROGRAM HALT
0281 5263 JMP CHAINN

0302 0000 FORWD, 0
0303 7300 CLA CLL
0304 1456 TAD I NXTST /GET NEXT RTN NO
0305 3055 DCA RTNNO /STORE AT RTNNO
0306 2056 ISZ NXTST
0307 1056 TAD NXTST /SET CURRENT
0310 3052 DCA TEMP /RTN NUMBER
0311 2056 ISZ NXTST
0312 1056 TAD NXTST /SET CURRENT
0313 3054 DCA CURTST /RTN ADDR,
0314 1452 TAD I TEMP /SET NEXT
0315 3056 DCA NXTST /RTN ADDR,
0316 5702 JMP I FORWD

0317 0000 SHALT, 0
0320 7604 LAS /READ SR
0321 7700 SMA CLA /HALT? (SR0)

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

0326 0000 STCTR, 0
0327 7200 CLA
0330 1726 TAD I STCTR /GET CTR ADDR
0331 3052 DCA TEMP /AND SAVE AT TEMP
0332 2326 ISZ STCTR
0333 1726 TAD I STCTR /GET COUNT AND
0334 3452 DCA I TEMP /STORE PER C(TEMP)
0335 2326 ISZ STCTR
0336 5726 JMP I STCTR /EXIT

0337 0000 DLYMS, 0
0340 7300 CLA CLL
0341 1024 TAD DELAYM /GET MS COUNT
0342 3057 DCA MSCTR /STORE IN MSCTR
0343 1061 TAD MIL1 /GET CONSTANT
0344 3060 DCA MILCTR /STORE IN MILCTR
0345 2060 ISZ MILCTR /DELAY FINISHED?
0346 5345 JMP ,=1
0347 2057 ISZ MSCTR /DONE DELAYING
0350 5343 JMP ,=5
0351 5737 JMP I DLYMS /EXIT
0352 0000 CK33, OPEN /SUB TO CHECK FOR 33 TTY
0353 7200 CLA
0354 1020 TAD TTYTYP /GET TTY TYPE
0355 7650 SNA CLA /33?
0356 2352 ISZ CK33 /YES,
0357 5752 JMP I CK33

0360 0000 CK35, OPEN /SUB TO CHECK FOR 35 TTY
0361 7240 CLA CMA
0362 1020 TAD TTYTYP /GET TTY TYPE
0363 7650 SNA CLA /35?
0364 2360 ISZ CK35 /YES,
0365 5760 JMP I CK35

0366 0000 CK37, OPEN /SUB TO CHECK FOR 37 TTY
0367 7344 CLA CLL CMA RAL /=2
0370 1020 TAD TTYTYP /GET TTY TYPE,
0371 7650 SNA CLA /37?
0372 2366 ISZ CK37 /YES,
0373 5766 JMP I CK37
0375 6000
0376 1513
0377 1740
0400 0400 PAGE
0401 7300 RGNA, OPEN /RANDOM NUMBER SUB A,
CLA CLL

```

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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 9600 JMP I RGNA /EXIT RGNA SUB,
0415 1233 RP1A, 1233
0416 7622 RP2A, 7622

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

```

```

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

```

```

/SUBROUTINE TO PROVIDE NEXT BINARY COUNT PATTERN CHARACTER (IN AC)
0444 0000 GTBIN, 0
0445 7200 CLA
0446 1242 TAD PT0 /GET PT0
0447 3243 DCA PT1 /STORE AT PT1
0450 1243 TAD PT1 /GET PT1
0451 7001 IAC /INCREMENT ACCUMULATOR
0452 0145 AND [377 /LIMIT TO 8 BITS
0453 3242 DCA PT0 /STORE AT PT0
0454 1243 TAD PT1 /GET PT1
0455 5644 JMP I GTBIN /EXIT

```

```

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

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```

0462 5257 JMP CHR CNT+1
0463 7041 CIA /2'S COMPLEMENT IT
0464 3273 DCA SCNT
0465 1656 TAD I CHR CNT
0466 3052 DCA TEMP
0467 1273 TAD SCNT
0470 3452 DCA I TEMP /STORE AT SPECIFIED ADDRESS
0471 2256 ISZ CHR CNT /SET UP EXIT
0472 5656 JMP I CHR CNT /EXIT
0473 0000 SCNT, OPEN

```

```

/SUBROUTINE TO GENERATE RANDOM DELAY COUNT (NOT MORE THAN 377(8));
0474 0000 DLCNT, 0
0475 4200 JMS RGNA /GO GENERATE RANDOM NUMBER
0476 0111 AND OLYMSK /MASK OUT UNDESIRE BITS;
0477 7450 SNA /ZERO?
0500 5275 JMP DLCNT+1 /YES, GET ANOTHER NUMBER
0501 7041 CIA /2'S COMPLEMENT IT
0502 3024 DCA DELAY
0503 5674 JMP I DLCNT /EXIT

```

/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 /FUTURE,

```

```

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

```

```

/SYNC ON TAPE SUBROUTINE
0530 0000 SYNK, 0
0531 4577 SETLOC /SET COUNT OF
0532 0550 CTSK /-256 (DEC) IN
0533 7400 -400 /CTSK
0534 4571 SYNKA, UKCC /CLEAR AC #ND FLAG
0535 4572 UKSF /READY?
0536 5335 JMP ,+1 /NO, TEST AGAIN
0537 4570 UKRS /YES, READ

```

```

0540 1144 TAD (=377
0541 7640 SZA CLA /377?
0542 7410 SKP
0543 5730 JMP I SYNK /YES, EXIT
0544 2350 ISZ CTSK /BUMP CHAR CTR +1
0545 5334 JMP SYNKA /GO READ AGAIN
0546 7402 HLT /256 CHARS READ, CAN'T SYNC
0547 5331 JMP SYNK+1 /GO TO SRST

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

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

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

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0624 0000 TADDR, 0
0625 0000 MCTR, 0

/TYPE CHARACTER STRING SUBROUTINE
0626 0000 TYPSTG, 0
0627 7200 CLA
0630 1626 TAD I TYPSTG /GET AND STORE
0631 3314 DCA TEMQ /INITIAL ADDRESS
0632 3316 DCA FLAG /CLEAR FLAG,
0633 2226 ISZ TYPSTG /SET UP EXIT
0634 1714 TSC1, TAD I TEMQ /PICK UP DATA
0635 7002 BSW
0636 4243 JMS TSC2 /GO TYPE 1ST CHARACTER
0637 1714 TAD I TEMQ /PICK UP DATE
0640 4243 JMS TSC2 /GO TYPE 2ND CHARACTER
0641 2314 ISZ TEMQ /EVEN STRING ADDRESS
0642 5234 JMP TSC1 /GO BACK FOR MORE
0643 0000 TSC2, 0
0644 2146 AND (=77 /MASK OFF 6 BITS
0645 3315 DCA TEMR /SAVE CHARACTER
0646 1316 TAD FLAG /TEST "SPECIAL" FLAG,
0647 7640 SZA CLA
0650 5260 JMP TYPSP /SET TYPE SPECIAL
0651 1315 TAD TEMR /NO, REGULAR CHARACTER
0652 7450 SNA /ZERO?
0653 5256 JMP ,+3 /YES, SET FLAG,
0654 4271 JMS PRINT /NO, PRINT IT,
0655 5643 JMP I TSC2 /RETURN,
0656 2316 ISZ FLAG /SET "SPECIAL" FLAG,
0657 5643 JMP I TSC2 /EXIT
0660 3316 TYPSP, DCA FLAG /CLEAR FLAG,
0661 1315 TAD TEMR /TEST FOR 0,
0662 7450 SNA /0?
0663 5643 JMP I TSC2 /IGNORE IT,
0664 1377 TAD (=77
0665 7650 SNA CLA /???
0666 5626 JMP I TYPSTG /YES, EXIT CODE.
0667 1315 TAD TEMR
0670 5254 JMP TYPAT

0671 0000 PRINT, OPEN
0672 1376 TAD (=45
0673 7640 SZA CLA /IS IT 45?
0674 5300 JMP ,+4 /NO,
0675 1107 TAD CR /YES, PRINT CR
0676 4474 JMS I UPUNCH
0677 5671 JMP I PRINT
0680 1315 TAD TEMR
0681 1375 TAD (=43
0682 7640 SZA CLA /IS IT 43?
0683 5306 JMP ,+3 /NO,
0684 1110 TAD LF /YES, TYPE LF
0685 5276 JMP PRINT+5
0686 1315 TAD TEMR
0687 1374 TAD (=40

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0710 7510 SPA
0711 1143 TAD [100
0712 1142 TAD [240
0713 5276 JMP PRINT+5
0714 0000 TEMQ, OPEN
0715 0000 TEMR, OPEN
0716 0000 FLAG, OPEN

0717 0000 XKSF, OPEN /SUB TO ISSUE KSF,
0720 6031 KSF /KSF
0721 5717 JMP I XKSF /NO SKIP
0722 2317 ISZ XKSF /SKIP
0723 5717 JMP I XKSF

0724 0000 XKCC, OPEN /SUB TO ISSUE KCC,
0725 6032 KCC
0726 5724 JMP I XKCC /EXIT
0727 7402 HLT /KCC SKIPPED,

0730 0000 XKRS, OPEN /SUB TO ISSUE KRS,
0731 6034 KRS
0732 5730 JMP I XKRS /EXIT
0733 7402 HLT /KRS SKIPPED,

0734 0000 XKRB, OPEN /SUB TO ISSUE KRB,
0735 6036 KRB
0736 5734 JMP I XKRB /EXIT
0737 7402 HLT /KRB SKIPPED,

0740 0000 XTSF, OPEN /SUB TO ISSUE TSF,
0741 6041 TSF /TSF
0742 5740 JMP I XTSF /NO SKIP,
0743 2340 ISZ XTSF /SKIP,
0744 5740 JMP I XTSF

0745 0000 XTCF, OPEN /SUB TO ISSUE TCF,
0746 6042 TCF
0747 5745 JMP I XTCF /EXIT
0750 7402 HLT /TCF SKIPPED,

0751 0000 XTLS, OPEN /SUB TO ISSUE TLS
0752 6046 TLS
0753 5751 JMP I XTLS /EXIT
0754 7402 HLT /TLS SKIPPED,

0755 0000 XKCR, OPEN /SUB TO ISSUE KCR,
0756 6030 KCR
0757 5755 JMP I XKCR /EXIT
0760 7402 HLT /KCR SKIPPED,

0761 0000 XKIE, OPEN /SUB TO ISSUE KIE,
0762 6035 KIE
0763 5761 JMP I XKIE /EXIT,
0764 7402 HLT /KIE SKIPPED,

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```

0765 0000 XSPI, OPEN /SUB TO ISSUE SPI,
0766 6045 SPI /
0767 5765 JMP I XSPI /NO SKIP
0770 2345 ISZ XSPI
0771 5765 JMP I XSPI /EXIT

0774 7740
0775 7735
0776 7733
0777 7701
1000 PAGE

1000 1000 PAGE
1000 0000 STBF, OPEN /SUB TO SET UP BUFFER AREA,
1001 4574 MOVE /CRLF TO BLOCKA,
1002 0107 CR
1003 6577 BLOCKA
1004 7776 -2
1005 4555 CKSR37 /KSR37?
1006 5220 JMP ST33B /NO,
1007 4574 MOVE /CRLF TO BLKBB
1010 0107 CR
1011 6722 BLKBB
1012 7776 -2
1013 4574 MOVE /CRLF TO BLKCC,
1014 0107 CR
1015 7034 BLKCC
1016 7776 -2
1017 5600 JMP I STBF /EXIT STBF

1020 4574 ST33B, MOVE /CRLF TO BLOCKB,
1021 0107 CR
1022 6711 BLOCKB
1023 7776 -2
1024 4574 MOVE /CRLF TO BLOCKC,
1025 0107 CR
1026 7023 BLOCKC
1027 7776 -2
1030 5600 JMP I STBF /EXIT STBF,

1031 0000 FBF3, OPEN /SUB TO FILL CHAR BUFFER WITH
1032 7200 CLA /3 CHARACTERS SPECIFIED AT CALL+1,
1033 1631 TAD I FBF3
1034 3237 DCA ,+3
1035 2231 ISZ FBF3
1036 4574 MOVE
1037 0000 OPEN
1040 6601 BLOCK1
1041 7775 -3
1042 4555 CKSR37 /3??
1043 5255 JMP FBF33 /NO,
1044 4574 MOVE /YES,
1045 6601 BLOCK1

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1046 6604      BLOCK1*3
1047 7662      =116
1050 4574      MOVE
1051 6601      BLOCK1
1052 6724      BLK2
1053 7657      =121
1054 5631      JMP I FBF3      /EXIT FBF3,
1055 4574      FBF33, MOVE
1056 6601      BLOCK1
1057 6604      BLOCK1*3
1060 7673      =105
1061 4574      MOVE
1062 6601      BLOCK1
1063 6713      BLOCK2
1064 7670      =110
1065 5631      JMP I FBF3      /EXIT FBF3,

1066 0000      FBALL, OPEN      /FILL BUFFER WITH ALL CHARACTERS
1067 4555      CKSR37      /KSR37?
1070 5302      JMP FBA33
1071 4574      MOVE      /YES,
1072 6107      A
1073 6601      BLOCK1
1074 7657      =121
1075 4574      MOVE
1076 6601      BLOCK1
1077 6724      BLK2
1078 7657      =121
1079 5666      JMP I FBALL      /EXIT FBALL,
1082 4574      FBA33, MOVE
1083 6107      A
1084 6601      BLOCK1
1085 7701      =77
1086 4574      MOVE
1087 6107      A
1088 6700      BLOCK1+77
1089 7767      =11
1092 4574      MOVE
1093 6601      BLOCK1
1094 6713      BLOCK2
1095 7670      =110
1096 5666      JMP I FBALL      /EXIT FBALL

1117 0000      FW336, 0
1120 4574      MOVE      /MOVE 6 CHARACTERS ARS33 PRINTER
1121 6065      A33WP6      /WORST CASE PATTERN TO
1122 6601      BLOCK1      /BLOCK1
1123 7772      =6
1124 4574      MOVE      /FILL BLOCKS WITH PATTERN
1125 6601      BLOCK1
1126 6607      BLOCK1+6
1127 7676      =102
1130 4574      MOVE
1131 6601      BLOCK1
1132 6713      BLOCK2

```

```

1133 7670      =110
1134 5717      JMP I FW336      /EXIT

1135 0000      FW356, 0
1136 4574      MOVE      /MOVE 6 CHARACTER ASR35 PRINTER
1137 6073      A35WP6      /WORST CASE PATTERN TO BLOCK1
1140 6601      BLOCK1
1141 7772      =6
1142 4574      MOVE      /FILL BUFFER WITH PATTERN
1143 6601      BLOCK1
1144 6607      BLOCK1+6
1145 7676      =102
1146 4574      MOVE
1147 6601      BLOCK1
1150 6713      BLOCK2
1151 7670      =110
1152 5735      JMP I FW356      /EXIT

1153 0000      FW376, OPEN      /MOVE 6 CHARACTER KSP37 PRINTER
1154 4574      MOVE      /WORST CASE PATTERN TO BLOCK1,
1155 6101      A37WP6
1156 6601      BLOCK1
1157 7772      =6
1160 4574      MOVE      /FILL BUFFER WITH PATTERN
1161 6601      BLOCK1
1162 6607      BLOCK1+6
1163 7665      =113
1164 5753      JMP I FW376      /EXIT

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

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

1200      PAGE

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

```

```

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

/SYNC READER SUBROUTINE
1216 0000 RSYNC, 0
1217 4577 SETLOC /SET RSCTR TO -145
1220 1232 RSCTR
1221 7557 -221
1222 4343 JMS RRDY /WAIT FOR READER NOT BUSY
1223 7240 CLA CMA /READER NOT BUSY,
1224 3076 DCA RBUSY /SET READER BUSY INDICATOR
1225 4577 SETLOC /SET READER INTERRUPT
1226 1267 VCTR /SERVICE RETURN ADDRESS,
1227 1233 RSSERV
1230 6001 ION /ENABLE INTERRUPT
1231 5616 JMP I RSYNC /EXIT
1232 0000 RSCTR, 0

1233 6036 RSSERV, KR8 /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
1241 1100 TAD LINK
1242 7004 RAL /RESTORE LINK
1243 1077 TAD AC /RESTORE AC
1244 5400 JMP I 0 /RETURN
1245 2232 ISZ RSCTR /145 CHARACTER READ?
1246 5472 JMP I UOUT /NO,
1247 7602 HLT CLA /YES, NO SYNC,
1250 4577 SETLOC /SET RSCTR TO -145
1251 1232 RSCTR
1252 7557 -221
1253 5472 JMP I UOUT /RETURN

1254 3077 INTSVC, DCA AC /SAVE AC
1255 7010 RAR
1256 3100 DCA LINK /SAVE LINK
1257 6041 INTSF, TSF /PUNCH/PRINTER?
1260 5264 JMP ,+4 /NO,
1261 6042 INTCF, TCF /YES, CLEAR FLAG,
1262 3071 DCA PFLAG /CLEAR PFLAG
1263 5271 JMP OUT /RETURN
1264 6031 INKSF, KSF /READER/KYBD?
1265 5270 JMP ,+3 /NO ERROR,
1266 5667 JMP I ,+1 /GO SERVICE READER
1267 0000 VCTR, 0
1270 7402 HLT /UNEXPECTED INTERRUPT
1271 7300 OUT, CLA CLL
1272 1100 TAD LINK

```

```

1273 7004 RAL /RESTORE LINK
1274 1077 TAD AC /RESTORE AC,
1275 6001 ION /ENABLE INTERRUPT
1276 5400 JMP I 0 /RETURN

1277 0000 PSTUP, 0 /PUNCH SETUP
1300 4577 SETLOC /SET DATA ADDR
1301 1342 PADDR
1302 6577 BLOCKA
1303 4574 MOVE /SET BLOCK LENGTH
1304 0101 BLKCNT
1305 1341 PCTR
1306 7777 -1
1307 5677 JMP I PSTUP /EXIT

1310 0000 POCR, 0 /PUNCH DATA CHAR SUB,
1311 7200 CLA
1312 1742 TAD I PADDR /GET DATA
1313 2342 ISZ PADDR /UPDATE PADDR,
1314 4474 JMS I UPUNCH /GO PUNCH/PRINT DATA
1315 5710 JMP I POCR /EXIT

1316 0000 PBLK, 0 /PUNCH DATA BLOCK FULL SPEED
1317 4277 JMS PSTUP
1320 4310 JMS POCR /GO PUNCH CHARACTER
1321 2341 ISZ PCTR /ALL CHARS PUNCHED?
1322 5320 JMP ,=2 /NO, REPEAT
1323 5716 JMP I PBLK /YES, EXIT

1324 0000 PBLKR, 0 /PUNCH DATA BLOCK RANDOM STALLS,
1325 4277 JMS PSTUP /GO DO SET UP
1326 4776 JMS RGNB /GET A RANDOM NUMBER
1327 0111 AND DLYMSK /REMOVE EXCESS BITS
1330 7450 SNA /ZERO?
1331 5326 JMP ,=3 /YES, GET ANOTHER NUMBER
1332 7041 CIA /NO, 2'S COMPLEMENT IT,
1333 3024 DCA DELAYM /PUT NUMBER IN DELAYM
1334 4576 DELAY /DELAY,
1335 4310 JMS POCR /GO PUNCH CHARACTER
1336 2341 ISZ PCTR /ALL CHARS PUNCHED?
1337 5326 JMP PBLKR+2 /NO, REPEAT
1340 5724 JMP I PBLKR /YES, EXIT,
1341 0000 PCTR, 0
1342 0000 PADDR, 0

1343 0000 RRDY, 0 /WAIT FOR RDR NOT BUSY SUB,
1344 7200 CLA
1345 1076 TAD RBUSY /FETCH RBUSY,
1346 7640 SZA CLA /READER BUSY?
1347 5345 JMP ,=2 /YES, TRY AGAIN
1350 5743 JMP I RRDY /NO,EXIT

1351 0000 RSTUP, 0
1352 4343 JMS RRDY /WAIT FOR RDR NOT BUSY
1353 2076 ISZ RBUSY /SET RBUSY INDICATOR

```

```

1354 4577 SETLOC /SET DATA ADDR
1355 1416 RADDR
1356 6577 BLOCKA
1357 4574 MOVE /SET DATA BLOCK LENGTH
1360 0101 BLKCTR
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 PAGE
    
```

```

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

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

/READER SERVICE ROUTINES
RDRSRV, CLA
1421 4776/ JMS RGNA /GET A RANDOM NUMBER
1422 0111 AND 0LYMSK /REMOVE EXCESS BITS
1423 7450 SNA /ZERO?
1424 5221 JMP ,=3 /YES, GET ANOTHER NUMBER
1425 7041 CIA /NO, 2'S COMPLEMENT IT,
1426 3102 DCA DELAYS /STORE RANDOM NUMBER IN DELAYS,
1427 4274 JMS DLMSR /STALL,
1430 1616 RDSRV, TAD I RADDR /GET EXPECTED CHARACTER
1431 3235 DCA SB /STORE AT SB
    
```

```

1432 2216 IN0, ISZ RADDR /UPDATE RADDR
1433 6036 KRB /READ CHARACTER
1434 4470 JMS I CHECK /GO CHECK IT,
1435 0000 SB, 0
1436 5240 JMP ERROR /ERROR
1437 5256 JMP RUDONE /GOOD,

1440 3103 ERROR, DCA ERRCTR /STORE BAD CHARACTER
1441 2775/ ISZ ERRCTR /INCREMENT ERROR COUNTER
1442 5245 JMP ,+3
1443 7240 CLA CMA /OFLOW, 7777 TO AC
1444 3775/ DCA ERRCTR /RESTORE TO 7777,
1445 7604 LAS /READ SR
1446 0143 AND [100
1447 7650 SNA CLA /HALT ON ERROR?(SR5)
1450 5256 JMP RUDONE /NO,
1451 1103 TAD ERRCTR /YES, GET BAD CHARACTER
1452 7402 HLT /ERROR HALT, BAD CHAR IN AC
1453 7200 CLA
1454 1235 TAD SB
1455 7402 HLT
1456 2217 RUDONE, ISZ RBCTR /GOOD CHAR IN AC
1457 5472 JMP I UOUT /ALL DONE?
1460 7200 CLA /NO, TO MAINLINE
1461 1775/ TAD ERRCTR /YES,
1462 7650 SNA CLA /GET C(ERRCTR)
1463 5266 JMP ,+3 /ANY ERRORS?
1464 1775/ TAD ERRCTR /NO,
1465 7402 HLT /YES,
1466 7300 CLA CLL /NUMBER OF ERRORS IN AC,
1467 3076 DCA RBUSY /CLEAR RBUSY INDICATOR
1470 1100 TAD LINK
1471 7004 RAL /RESTORE LINK
1472 1077 TAD AC /TO MAINLINE
1473 5400 JMP I 0

1474 0000 DLMSR, 0
1475 7300 CLA CLL
1476 1102 TAD DELAYS /GET AND STORE MSEC
1477 3311 DCA RCTRA /DELAY COUNT
1500 5701 JMP I ,+1
1501 1502 ,+1
1502 1061 TAD M1L1 /GET AND STORE
1503 3312 DCA RCTRB /IMS CONSTANT
1504 2312 ISZ RCTRB /DELAYED 1 MS?
1505 5304 JMP ,=1 /NO,
1506 2311 ISZ RCTRA /YES, DONE DELAYING?
1507 5300 JMP ,=7 /NO,
1510 5674 JMP I DLMSR /YES, EXIT
1511 0000 RCTRA, 0
1512 0000 RCTRB, 0

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

1513 0000 STBAUD, OPEN
    
```

```

1514 1141 TAD C=6
1515 3346 DCA NTST
1516 1374 TAD (BAUTAB-1
1517 3010 DCA 10
1520 1022 TAD BAUDRT /GET USER DEFINED BAUD RATE,
1521 1410 TAD I 10 /GET A RATE FROM TABLE;
1522 7650 SNA CLA /DO THEY MATCH?
1523 5330 JMP ,+5 /YES, GO SET DELAY ROUTINE;
1524 2346 ISZ NTST /NO, KEEP A COUNT;
1525 5320 JMP ,+5 /NOW TRY NEXT ONE;
1526 7602 HLT CLA /ILLEGAL BAUD RATE; RESET BAUDRT AND
/RESTART PROGRAM AT 0200,
1527 5326 JMP ,=1 /NO CONTINUE ALLOWED;
1530 1346 TAD NTST /GET COUNT AND
1531 7040 CMA /COMPLEMENT IT;
1532 1373 TAD (BAUCON /ADD TABLE ADDRESS
1533 3061 DCA MIL1 /
1534 1461 TAD I MIL1 /
1535 3061 DCA MIL1 /
1536 5713 JMP I STBAUD /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
1551 1746 TAD I NTST /SELECT PUNCH MODE
1552 3355 DCA NTSTA
1553 4772/ JMS PLTLR /PUNCH LEADER
1554 4771/ JMS PSYNC /PUNCH SYNC CHARACTER
1555 0000 NTSTA, 0
1556 4770/ JMS RSYNC /SYNC READER
1557 4200 JMS RDBLK /READ DATA BLOCK
1560 4772/ JMS PLTLR /PUNCH TRAILER
1561 4767/ JMS RRDY /WAIT FOR RDR NOT BUSY
1562 5425 JMP I CHAIN /CHAIN

```

```

1563 5555 RM33A, TEXT /----!0?
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 1600

```

PAGE

```

1600 9000 PAGE
/COMBINED TEST NORMAL TEST SEQUENCE
1601 7200 CNTST, 0
1602 3076 CLA /CLEAR RBUSY
1603 4777/ JMS PLTLR /PUNCH LEADER
1604 4776/ JMS PSYNC /PUNCH SYNC CHARACTER
1605 4775/ JMS PBLK /PUNCH DATA BLOCK (NO STALLS)
1606 4774/ JMS RSYNC /SYNC READER
1607 4773/ JMS RDBLKR /READ DATA BLOCK (STALLS)
1610 4772/ JMS PBLKR /PUNCH DATA BLOCK (STALLS)
1611 4771/ JMS RDBLK /READ DATA BLOCK (NO STALLS)
1612 4777/ JMS PLTLR /PUNCH TRAILER
1613 4770/ JMS RRDY /WAIT FOR READER NOT BUSY
1614 5425 JMP I CHAIN /CHAIN

```

/TYPE LINE OF 3 CHARACTERS (NO DELAY)

```

1615 0000 TYPLN3, 0
1616 7200 CLA
1617 3064 DCA STLID /CLEAR STLID
1620 1615 TAD I TYPLN3 /SET AND STORE
1621 3224 DCA ,+3 /ADDRESS OF DATA
1622 2215 ISZ TYPLN3
1623 4767/ JMS FBF3 /GO FILL BUFFER WITH 3 CHARACTERS
1624 0000 0
1625 4227 JMS TYPLN /GO TYPE LINE
1626 5615 JMP I TYPLN3 /EXIT

```

/TYPE LINE OF ASCII PRINTABLE CHARACTERS

```

1627 0000 TYPLN, 0
1630 4555 CKSR37 /KSR37?
1631 1140 TAD C=11 /NO,
1632 1137 TAD C=125 /YES,
1633 3247 DCA TCTR /=76, OR =85
1634 4577 SETLOC /SET FETCH TO ADDRESS
1635 1646 FETCH /OF BLOCKA,
1636 6577 BLOCKA
1637 4556 TYPEA, STALL
1640 1646 TAD I FETCH /YES, SET CHARACTER
1641 4474 JMS I UPUNCH /GO PRINT CHARACTER
1642 2246 ISZ FETCH /SET UP FOR NEXT CHARACTER
1643 2247 ISZ TCTR /DONE?
1644 5237 JMP TYPEA /NO, REPEAT
1645 5627 JMP I TYPLN /YES, EXIT,

```



```

1646 0000  FETCH, 0
1647 0000  TCTR, 0

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 2395  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 1326  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          /SUB TO INITIALIZE SGET SUB,
1710 7200  CLA
1711 3314  DCA SPT0          /ZERO SPT0
1712 3316  DCA SPIND      /ZERO SPIND
1713 5707  JMP I SINPT      /EXIT
1714 0000  SPT0, OPEN
1715 0000  SPT1, OPEN
1716 0000  SPIND, OPEN
1717 0000  SGET, OPEN          /"SPECIAL" BINARY COUNT
1720 7320  CLA STL          /PATTERN SUBROUTINE,
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
    
```

```

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 7415
1763 1233
1764 6060
1765 0707
1766 7700
1767 1031
1770 1343
1771 1400
1772 1324
1773 1407
1774 1216
1775 1316
1776 1212
1777 1200
2000

PAGE

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

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

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

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

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

```

2012 0000 S100I, OPEN
2013 4577 SETLOC /SET COUNT OF
2014 0062 CTRA /=-100 DECIMAL
2015 7634 -144 /IN CTRA,
2016 5612 JMP I S100I /EXIT, AC=0,
    
```

/ROUTINE TO DETERMINE DEVICE CAUSING UNEXPECTED INTERRUPT;

```

2017 0000 INTFND, OPEN
2020 7200 CLA
2021 0031 INTKSF, KSF /KEYBOARD/READER?
2022 7410 SKP /NO,
2023 4276 JMS HLTD /GO BOLT AND DISPLAY IOT
2024 0041 INTTSF, TSF /TTY PRINTER/PUNCH?
2025 7410 SKP /NO,
2026 4276 JMS HLTD /GO BOLT AND DISPLAY IOT
2027 0011 RSF /H,S, READER?
2030 7410 SKP /NO,
2031 4276 JMS HLTD /HALT AND DISPLAY IOT
2032 0021 PSF /H,S, PUNCH?
2033 7410 SKP /NO,
2034 4276 JMS HLTD /HALT AND DISPLAY IOT
2035 6401 6401 /PT00/LT00 UNIT 1 IN?
2036 7410 SKP /NO,
2037 4276 JMS HLTD /HALT AND DISPLAY IOT
2040 6411 6411 /PT00/LT00 UNIT 1 OUT?
2041 7410 SKP /NO,
2042 4276 JMS HLTD /HALT AND DISPLAY IOT
2043 6421 6421 /PT00/LT00 UNIT 2 IN?
2044 7410 SKP /NO,
2045 4276 JMS HLTD /HALT AND DISPLAY IOT
2046 6431 6431 /PT00/LT00 UNIT 2 OUT?
2047 7410 SKP /NO,
2050 4276 JMS HLTD /HALT AND DISPLAY IOT
2051 6441 6441 /PT00/LT00 UNIT 3 IN?
2052 7410 SKP /NO,
2053 4276 JMS HLTD /HALT AND DISPLAY IOT
2054 6451 6451 /PT00/LT00 UNIT 3 OUT?
2055 7410 SKP /NO,
2056 4276 JMS HLTD /HALT AND DISPLAY IOT
2057 6461 6461 /PT00/LT00 UNIT 4 IN?
2060 7410 SKP /NO,
2061 4276 JMS HLTD /HALT AND DISPLAY IOT
2062 6471 6471 /PT00/LT00 UNIT 4 OUT?
2063 7410 SKP /NO,
2064 4276 JMS HLTD /HALT AND DISPLAY IOT
2065 6111 6111 /PT00/LT00 UNIT 5 OR DC02 IN?
2066 7410 SKP /NO,
2067 4276 JMS HLTD /HALT AND DISPLAY IOT
2070 6121 6121 /PT00/LT00 UNIT 5 OR DC02 OUT?
    
```

```

2071 5275 JMP ,+4 /NO,
2072 4276 JMS HLTD /HALT AND DISPLAY IOT
2073 7777 7777 /DON'T KNOW WHAT DEVICE
2074 7777 7777 /CAUSED THE INTERRUPT,
2075 4276 JMS HLTD /HALT AND DISPLAY ALL I/S,
2076 0000 HLTD, OPEN
2077 1276 TAD HLTD
2100 1311 TAD M3
2101 3276 DCA HLTD
2102 1676 TAD I HLTD /GET IOT THAT CAUSED SKIP
2103 7402 HLT /AND HALT, IOT IN AC,
2104 7001 IAC
2105 3306 DCA ,+1
2106 0000 OPEN
2107 7200 CLA
2110 5617 JMP I INTFND /EXIT
2111 7775 M3, -3

2112 0000 PUNCH, OPEN
2113 2071 ISE PFLAG /SET PFLAG,
2114 0046 OUT0, TFS /PUNCH/PRINT,
2115 7200 CLA
2116 1071 TAD PFLAG /GET C(PFLAG),
2117 7650 SNA CLA /FLAG RESET?
2120 5323 JMP OUT2 /YES
2121 0041 OUT1, TSF /NO, FLAG UP?
2122 5316 JMP ,+4 /NO,
2123 0042 OUT2, TCF /YES, CLEAR PRINTER FLAG,
2124 3071 DCA PFLAG /CLEAR PFLAG,
2125 5712 JMP I PUNCH /EXIT, AC=0,
    
```

/ROUTINE TO CONTROL THE CHARACTERS TO BE TYPED ON ALL TTYS,

```

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

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

```

2134 0000 TLC37I, OPEN /GET FIRST LETTER TO BE TYPED
2135 1734 TAD I TLC37I
2136 3342 DCA ,+4 /SAVE IT,
2137 4555 CKSR37 /IS IT A "37"?
2140 5425 JMP I CHAIN /NO, CHAIN
2141 4473 JMS I UTPLNS /YES, GO TYPE LETTER & NEXT 2
2142 0000 OPEN /FIRST LETTER TO BE TYPED,
2143 5425 JMP I CHAIN /CHAIN
    
```

/CONTROL ROUTINE TO FILL A BUFFER WITH CHARACTERS,

```

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

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

```

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

/SUBROUTINE TO MARK TAB POSITIONS,

```

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

```

2175 1627
2176 1600
2177 1031
2200 PAGE
    
```

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

```

2200 4577 PRG0, SETLOC /SET KSTART TO INITIAL
2201 0023 KSTART /ROUTINE ADDRESS;
2202 2205 P0TS0
2203 5604 JMP I ,+1 /GO START TEST
2204 0236 SRSET
    
```

/TEST 0 CHECKS THE ABILITY OF

/SPF TO SET THE PRINTER FLAG,
/TSF TO SKIP ON PRINTER FLAG SET,
/CAF TO CLEAR PRINTER FLAG, AC, AND LINK,
/TCF TO CLEAR PRINTER FLAG,
/TSF TO NOT SKIP ON PRINTER FLAG EQUAL TO ZERO,

```

2205 0000 P0TS0, 0
2206 2270 P0TS1
2207 4432 JMS I S200 /SET DELAY TO DELAY TWICE
                /10 BIT TIMES FOR AN NON 110
                /BAUD DEVICE AND TWICE 11 BIT
                /TIMES FOR AN 110 BAUD DEVICE;
                /SEE BIT TIME TABLE AT BEGINNING
                /OF PROGRAM,

2210 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES;
2211 4560 P0TS0A, USPF /SET PRINTER FLAG
2212 4566 UTSF /FLAG SET?
2213 5237 JMP P0E0A /NO, SPF OR TSF FAILED
2214 7360 P0TS0B, CLA CMA CLL CML /AC AND LINK = 1
2215 6007 CAF /YES, NOW CLEAR IT,
2216 4576 DELAY /GO DELAY
2217 4566 UTSF /FLAG SET?
2220 7410 SKP /NO, CONTINUE TEST
2221 5244 JMP P0E0B /YES, CAF OR TSF FAILED
2222 7420 P0TS0C, SNL /LINK SET?
2223 7440 SZA /NO, AC SET?
2224 5253 JMP P0E0C /YES, CAF FAILED TO CLEAR AC AND/OR LINK
2225 4560 P0TS0D, USPF /SET PRINTER FLAG
2226 4566 UTSF /PRINTER FLAG SET?
2227 5237 JMP P0E0A /NO, SPF OR TSF FAILED
2230 4565 P0TS0E, UTSF /YES, CLEAR PRINTER FLAG
2231 4566 UTSF /PRINTER FLAG SET?
2232 7610 SKP CLA /NO, OK,
2233 5262 JMP P0E0E /YES, TCF FAILED TO CLEAR PRINTER FLAG;
2234 2062 ISZ CTRA /DONE TEST 100 TIMES?
2235 5211 JMP P0TS0A /NO, REPEAT TEST
2236 5425 JMP I CHAIN /YES, CHAIN NOW
    
```

/ERROR HLTS FOR P0TS0,

```

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

2244 7402 P0E0B, HLT /CAF FAILED TO CLEAR PRINTER FLAG
                /OR TSF SKIPPED,
                /SCOPE LOOP, PRESS CONTINUE TO ENTER,
2245 4560 USPF /SET PRINTER FLAG
2246 6007 CAF /CLEAR FLAGS
    
```

```

2247 4576          DELAY          /DELAY
2250 4566          UTSP           /FLAG SET?
2251 5245          JMP             P0E0B+1 /NO, REPEAT;
2252 5245          JMP             P0E0B+1 /YES, REPEAT;

2253 7402          P0E0C, HLT          /CAF FAILED TO CLEAR AC AND/OR LINK
/SCOPE LOOP, PRESS CONTINUE TO ENTER;
2254 7360          CLA CMA CLL CML /LINK AND AC SET
2255 6007          CAF             /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          P0E0E, HLT          /TCF FAILED TO CLEAR PRINTER FLAG
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2263 4560          USPF           /SET PRINTER FLAG
2264 4565          UTCF           /CLEAR PRINTER FLAG
2265 4566          UTSP           /FLAG SET?
2266 5263          JMP             P0E0E+1 /NO, REPEAT;
2267 5263          JMP             P0E0E+1 /YES, REPEAT;

```

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

```

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

```

```

2321 6001          ION            /ENABLE INTERRUPT (SCOPE LOOP)
2322 7000          NOP            /INTERRUPT
2323 5321          JMP             ,=2
2324 2062          P0TS1C, ISZ CTRA /DONE 4000 TIMES?
2325 5313          JMP             P0TS1B /NO, REPEAT TEST;
2326 5425          JMP I CHAIN     /YES, CHAIN

```

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

```

2327 0002          P0TS2, 2
2330 2504          P0TS3
2331 4431          JMS I 54000     /SET UP TO DO TEST 4000 TIMES,
2332 4577          P0TS2A, SETLOC  /SET INTERRUPT RETURN
2333 0002          2              /TO P0E2A
2334 2415          P0E2A
2335 6007          CAF             /CLEAR EVERYTHING AND ENABLE INT ENABLE F',F,
2336 4561          UKIE           /DISABLE INTERRUPT ENABLE FF
2337 4560          USPF           /SET PRINTER FLAG;
2340 6001          ION            /TURN INTERRUPT ON;
2341 7000          NOP            /
2342 4557          P0TS2B, USPI    /SKIP IF TTY INTERRUPT REQUEST
2343 7610          SKP            /
2344 5776          JMP             CLA P0E2B /USPI SKIPPED
2345 6003          P0TS2C, SRQ    /SKIP IF INTERRUPT REQUEST
2346 7610          SKP            /
2347 5775          JMP             CLA P0E2C /SRQ SKIPPED
2350 4577          P0TS2D, SETLOC  /SET INTERRUPT RETURN
2351 0002          2              /TO P0TS2E;
2352 2400          P0TS2E
2353 4560          USPF           /SET PRINTER FLAG
2354 7201          CLA IAC        /AC11 = 1,
2355 4561          UKIE           /ENABLE TTY INTERRUPT ENABLE F',F,
2356 6001          ION            /TURN INTERRUPT ON;
2357 7000          NOP            /INTERRUPT AT END OF THIS INSTRUCTION
2360 5774          JMP             P0E2D /KIE FAILED TO ENABLE TTY INTERRUPT F',F,

2374 2443
2375 2435
2376 2427
2377 2017
2400 2400          PAGE

2400 4557          P0TS2E, USPI    /TTY INTERRUPT REQUEST?
2401 5296          JMP             P0E2E /NO, SPI FAILED TO SKIP,
2402 6003          P0TS2F, SRQ    /IS THERE AN INTERRUPT REQUEST?
2403 5265          JMP             P0E2F /NO, SRQ FAILED TO SKIP,

```

```

2404 7300 P0TS2G, CLA CLL /AC + LINK = 0
2405 4561 UKIE /DISABLE TTY INTERRUPT ENABLE F,F;
2406 6007 CAF /CLEAR EVERYTHING AND ENABLE TTY INTERRUPT F,F;
2407 4560 USPF /SET PRINTER FLAG;
2410 4557 USPI /SKIP IF INTERRUPT REQUEST
2411 5274 JMP P0E2G /CAF FAILED TO ENABLE TTY INTERRUPT ENABLE F,F;
2412 2062 ISZ CTRA /DONE 4000 TIMES?
2413 5777' JMP P0TS2A /NO, REPEAT TEST
2414 5425 JMP I CHAIN /CHAIN
    
```

/ERROR HLTS FOR P0TS2.

```

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

2427 7602 P0E2R, HLT CLA /SPI SKIPPED WITH FLAG SET
/AND INTERRUPT ENABLE DISABLED;
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2430 4561 UKIE /DISABLE INTERRUPT ENABLE
2431 4560 USPF /SET PRINTER FLAG
2432 4557 USPI /SKIP IF TTY INT REQUEST,
2433 5230 JMP P0E2B+1 /REPEAT,
2434 5230 JMP P0E2B+1 /REPEAT,

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

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

```

2455 5247 JMP P0E2D+4 /REPEAT

2456 7402 P0E2E, HLT /SPI FAILED TO SKIP,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2457 7201 CLA IAC /AC11 = 1
2460 4561 UKIE /ENABLE TTY
2461 4560 USPF /SET PRINTER FLAG
2462 4557 USPI /SKIP IF INTERRUPT REQUEST
2463 5257 JMP P0E2E+1 /REPEAT,
2464 5257 JMP P0E2E+1 /REPEAT,

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

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

/TEST 3 CHECKS THE ABILITY OF
/TPC TO SET THE PRINTER FLAG,
/TLS TO CLEAR PRINTER FLAG,
/TLS TO SET PRINTER FLAG,

```

2504 0003 P0TS3, 3
2505 2544 P0TS4
2506 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES,
2507 4432 JMS I S200 /SET DELAY TO DELAY TWICE
/10 BIT TIMES FOR AN NON 110
/BAUD DEVICE AND TWICE 11 BIT
/TIMES FOR AN 11" BAUD DEVICE,
/SEE BIT TIME TABLE AT BEGINNING
/OF PROGRAM,
2510 4565 P0TS3A, UTCF /CLEAR PRINTER FLAG
2511 4564 UTPC /PRINT
2512 4576 DELAY /DELAY TWICE MAX TIME
2513 4566 UTSF /FLAG SET, IT SHOULD BE,
2514 5327 JMP P0E3A /FLAG NOT SET,
2515 4563 P0TS3B, UTLS /CLEAR + SET PRINTER FLAG;
2516 4566 UTSF /FLAG SET?
2517 7610 SKP CLA /NO, OK
    
```

```

2520 5334      JMP      P0E3B      /YES
2521 4576      P0TS3C, DELAY      /DELAY TWICE BAUD RATE;
2522 4566      UTSF      /FLAG SET?
2523 5340      JMP      P0E3C      /NO
2524 2062      ISZ     CTRA      /YES, DONE 100 TIMES
2525 5310      JMP     P0TS3A      /NO, DO TEST AGAIN
2526 5425      JMP I   CHAIN      /EXIT,

2527 7602      P0E3A, HLT   CLA      /TPC FAILED TO SET PRINTER FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2530 4565      UTSF      /CLEAR PRINTER FLAG
2531 4564      UTPC      /SET FLAG BY BEGINNING OF 10TH BIT
2532 4576      DELAY      /WAIT
2533 5330      JMP     ,=3      /REPEAT,

2534 7602      P0E3R, HLT   CLA      /TPS FAILED TO CLEAR PRINTER FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2535 4560      USPF      /SET PRINTER FLAG
2536 4563      UTLS      /CLEAR PRINTER FLAG AT TP3,
2537 5335      JMP     ,=2

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

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

2574 2600

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2575 2614
2576 2607
2577 2332
2600      PAGE
2600 4577      P0TS4C, SETLOC
2601 0024      DELAY
2602 7761      -17
2603 4576      DELAY
2604 2062      ISZ     CTRA      /DELAY SO WE'RE PAST THE END,
2605 5777      JMP     P0TS4A      /DONE 100 TIMES?
2606 5425      JMP I   CHAIN      /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,
2610 4563      UTLS      /START PRINTER
2611 4566      UTSF      /FLAG SET
2612 5211      JMP     ,=1      /NO, CHECK AGAIN
2613 5210      JMP     ,=3      /REPEAT

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

/TEST TO CHECK THAT THE PUNCH/PRINTER FLAG SETS AT THE PROPER TIME;
2616 0005      P0TS5, 5
2617 2660      P0T6
2620 4430      JMS I S100
2621 4563      UTLS
2622 4566      UTSF
2623 5222      JMP     ,=1      /FLAG SET?
2624 4577      P0TS5A, SETLOC      /SET DELAY TO
2625 0024      DELAY      /=98 DECIMAL,
2626 7636      /
2627 1022      TAD     BAUDRT      /GET BAUD RATE,
2630 7104      RAL     CLA      /MOVE INTO POSITION TO DETERMINE IF 2400,
2631 7710      SPA     CLA      /IS IT 2400?
2632 2024      ISZ     DELAY      /YES, INCREMENT DELAY SO AS TO DELAY LESS;
2633 4563      UTLS      /PRINT
2634 4576      DELAY      /DELAY
2635 4566      UTSF      /FLAG SET?
2636 7610      SKP     CLA      /NO, OK,
2637 5254      JMP     P0E5A      /YES, ERROR,
2640 4577      P0TS5B, SETLOC      /SET DELAY TO
2641 0024      DELAY      /=4 DECIMAL,
2642 7774      /
2643 4576      DELAY      /DELAY
2644 4566      UTSF      /FLAG NOW SET?
2645 5256      JMP     P0E5B      /NO, ERROR,

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2646 4576      DELAY
2647 4576      DELAY
2650 4576      DELAY
2651 2062      ISZ CTRA      /TEST DONE?
2652 5221      JMP P0T54+3    /NO, REPEAT,
2653 5425      JMP I CHAIN     /YES, CHAIN,

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

2656 7402      P0E5B, HLT      /FLAG NOT SETTING SOON ENOUGH;
/SCOPE LOOP,  PRESS CONTINUE TO ENTER,
2657 5255      JMP P0E5A+1

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

2660 0006      P0T6,   6
2661 2736      P0T7
2662 4431      JMS I $4000    /SET UP TO DO TEST 4000 TIMES;
2663 6007      P0T6A, CAF      /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      P0E6A, HLT      /GTF FAILED,
2671 7360      P0T6B, 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      P0E6B, HLT      /GTF CLEARED LINK,
2676 7104      P0T6C, CLL RAL    /{AC SHOULD EQUAL ZERO, LINK SHOULD EQUAL 1},
2677 7430      SZA
2678 7440      SZA
2701 7402      P0E6C, HLT      /GTF DID NOT GET LINK,
2702 6007      P0T6D, CAF      /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT,
2703 4560      USPF      /SET PRINTER FLAG,
2704 6004      GTF      /GET INTERRUPT FLAGS;
2705 0335      AND K5200    /MASK,
2706 7006      RTL      /PUT INTERRUPT BUS = (AC SHOULD EQUAL 1000)
2707 7004      RAL      /-FLAG INTO LINK, (AC SHOULD EQUAL ZERO),
2710 7430      SZA
2711 7440      SZA      /IS AC ZERO?
2712 7402      P0E6D, HLT      /GTF FAILED TO GET INTERRUPT BUS,
2713 4577      P0T6E, SETLOC    /SET INTERRUPT RETURN LOCATION
2714 0002      2
2715 2725      P0T6F
2716 6007      CAF      /CLEAR ALL FLAGS,
2717 6001      ION      /TURN INTERRUPT ON
2720 6004      GTF      /GET INTERRUPT FLAGS;
2721 0335      AND K5200

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2722 4560      USPF      /SET PRINTER FLAG,
2723 7000      NOP      /{INTERRUPT},
2724 7402      P0E6E, HLT      /GTF CLEARED ION,
2725 7102      P0T6F, CLL BSW    /PUT ION = (AC SHOULD EQUAL 0002);
2726 7012      RTR      /FLAG INTO LINK, (AC SHOULD EQUAL 0000),
2727 7430      SZA
2730 7440      SZA      /AC ZERO?
2731 7402      P0E6F, HLT      /GTF FAILED TO GET ION;
2732 2062      ISZ CTRA      /TEST DONE?
2733 5263      JMP P0T6A      /NO, REPEAT,
2734 5425      JMP I CHAIN
2735 5200      K5200, 5200

```

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

```

2736 0007      P0T7,   7
2737 7777      7777
2740 4431      JMS I $4000    /SET UP TO DO TEST 4000 TIMES,
2741 4577      SETLOC    /SET INTERRUPT RETURN
2742 0002      2
2743 2760      P0T7C+3
2744 7320      P0T7A, CLA CLL CML /AC EQUALS ZERO, LINK EQUALS 1,
2745 6005      RTF      /RESTORE FLAGS,
2746 7420      SNL      /LINK SET?
2747 7440      SZA      /AC ZERO?
2750 7402      P0E7A, HLT      /RTF FAILED TO RESTORE LINK,
2751 7330      P0T7B, CLA CLL CML RAR /AC EQUALS 4000
2752 6005      RTF      /RESTORE FLAGS, (LINK),
2753 7420      SNL      /LINK RESTORED?
2754 7402      P0E7B, HLT      /RTF FAILED TO RESTORE LINK,
2755 4560      P0T7C, USPF      /SET PRINTER FLAG,
2756 7000      NOP      /{INTERRUPT},
2757 7402      P0E7C, HLT      /RTF DID NOT SET ION;
2760 2062      ISZ CTRA      /TEST DONE?
2761 5344      JMP P0T7A      /NO, REPEAT,
2762 5425      JMP I CHAIN

```

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3000 PAGE

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

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3000 4577      PRG1, SETLOC
3001 0023      KSTART
3002 3005      P1TS0

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3003 5604      JMP I  ,+1
3004 0236      SRSET

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

3005 0000      P1TS0, 0
3006 3010      P1TS1
3007 4777      JMS      P1TS0A

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

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

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

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

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

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

3034 0002      P1TS2, 2
3035 3066      P1TS3
3036 4432      JMS I S200      /SET DELAYM TO DELAY TWICE
/10 BIT TIMES FOR AN NON 110
/BAUD DEVICE AND TWICE 11 BIT

```

```

/10 BIT TIMES FOR AN 110 BAUD DEVICE,
/SEE BIT TIME TABLE AT BEGINNING
/OF PROGRAM,

3037 4431      JMS I S4000    /SET UP TO DO TEST 4000 TIMES,
3040 4571      P1TS2A, UKCC   /CLEAR AC AND KBRD FLAG,
3041 4563      UTLS          /SEND,
3042 4576      DELAY        /DELAY TWICE 10 OR 11 BIT TIMES,
3043 4565      UTCF         /CLEAR TELEPRINTER FLAG,
3044 4572      UKSF         /KEYBOARD FLAG SET?
3045 5253      JMP          P1E2A /NO,
3046 4572      P1TS2B, UKSF   /YES, KEYBOARD FLAG SET?
3047 5262      JMP          P1E2B /NO,
3050 2062      ISZ CTRA      /YES, DONE 4000 TIMES?
3051 5246      JMP P1TS2B    /NO, REPEAT
3052 5425      JMP I CHAIN   /CHAIN

3053 7602      P1E2A, HLT CLA /FLAG NOT SET OR KSF FAILED TO SKIP,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,

3054 4571      UKCC
3055 4563      UTLS
3056 4572      UKSF
3057 4576      DELAY
3060 5254      JMP          ,=4
3061 5260      JMP          ,=-1

3062 7602      P1E2B, HLT CLA /KSF FAILED TO SKIP,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,

3063 4572      UKSF
3064 5263      JMP          ,=1
3065 5263      JMP          ,=2

/ISSUE TLS AND THEN KCC, WAIT TWICE MAXIMUM BIT RATE FOR
/FLAG TO SET, RESET FLAG (TLS AND THEN KCC) AND SKIP ON FLAG
/500 TIMES TO VERIFY NO SKIP OCCURS WITH FLAG = 0,

3066 0003      P1TS3, 3
3067 3126      P1TS4
3070 4577      SETLOC      /SET COUNT OF
3071 2062      CTRA        /=-500 (DEC)
3072 7014      =764        /IN CTRA,
3073 4432      JMS I S200    /SET DELAYM TO DELAY TWICE
/10 BIT TIMES FOR AN NON 110
/BAUD DEVICE AND TWICE 11 BIT
/TIMES FOR AN 110 BAUD DEVICE,
/SEE BIT TIME TABLE AT BEGINNING
/OF PROGRAM,

3074 4571      P1TS3A, UKCC   /CLEAR AC AND KBRD FLAG,
3075 4563      UTLS          /SEND,
3076 4576      DELAY        /DELAY TWICE 10 OR 11 BIT TIMES
3077 4572      UKSF         /FLAG SET,

```



```

3170 5313      JMP PIE3A      /NO,
3171 4571      UKCC      /CLEAR AND AND KPRD FLAG,
3172 4563      UTLS      /YES, SEND DATA,
3173 4572      UKSF      /FLAG SET
3174 5306      JMP ,+2      /NO, OK
3175 5322      JMP PIE3B      /YES,
3176 4566      UTSF      /PRINTER FLAG SET?
3177 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,
3114 4563      UTLS      /SEND
3115 4571      UKCC      /CLEAR AC AND KPRD FLAG
3116 4576      DELAY
3117 4572      UKSF
3120 5314      JMP ,=4
3121 5320      JMP ,=1

3122 7602      PIE3B, HLT CLA      /KSF SKIPPED ON NO FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3123 4563      UTLS
3124 4426      JMS I KBFLAG
3125 5323      JMP PIE3B+1

```

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

```

3126 0004      PITS4, 4
3127 3200      PITS5
3130 4577      SETLOC      /SET INTERRUPT RETURN
3131 0002      2      /TO PIE4A
3132 3143      PIE4A      /
3133 4563      PITS4A, UTLS      /SEND
3134 4426      JMS I KBFLAG
3135 4565      UTCF      /CLEAR PRINTER FLAG,
3136 4571      UKCC      /CLEAR READER FLAG
3137 6001      ION      /TURN INTERRUPT ON,
3140 7000      NOP      /
3141 6002      IOF      /TURN INTERRUPT OFF,
3142 5345      JMP ,+3      /SKIP OVER,
3143 4776      PIE4A, JMS INTFND    /UNEXPECTED INTERRUPT,
3144 5333      JMP PITS4A      /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      PITS4C
3153 4563      PITS4B, UTLS      /SEND
3154 4426      JMS I KBFLAG
3155 4565      UTCF      /CLEAR PRINTER FLAG,
3156 6001      ION      /INTERRUPT ON,

```

```

3157 7000      NOP      /SHOULD INTERRUPT
3160 7402      HLT      /READER FLAG FAILED TO INTERRUPT OR
/INTERRUPT SYSTEM MALFUNCTION,
/SET INTERRUPT RETURN
3161 4577      SETLOC
3162 0002      2
3163 3166      PITS4C=1
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3164 6001      ION
3165 7000      NOP
3166 5364      JMP ,=2

3167 2062      PITS4C, ISZ CTRA      /DONE 1000 TIMES YET?
3170 5353      JMP PITS4B      /NO, REPEAT
3171 6007      CAF      /EXIT
3172 5425      JMP I CHAIN    /EXIT,

3176 2017
3177 3513      PAGE
3200

```

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

```

3200 0005      PITS5, 5
3201 3271      PITS6
3202 4430      JMS I S100      /SET UP TO DO TEST 100 TIMES,
3203 6007      CAF      /CLEAR AND ENABLE INTERRUPT ENABLE FF
3204 4563      PITS5A, UTLS      /SEND
3205 4426      JMS I KBFLAG
3206 4565      UTCF      /CLEAR PRINTER FLAG,
3207 6003      SRQ      /INTERRUPT REQUEST?
3210 5230      JMP PIE5A      /NO,
3211 4557      PITS5B, USPI      /YES, TTY INTERRUPT REQUEST?
3212 5235      JMP PIE5B      /NO,
3213 6007      PITS5C, CAF      /YES, CLEAR FLAG,
3214 4572      UKSF      /FLAG SET?
3215 7610      SKP CLA      /NO, OK
3216 5242      JMP PIE5C      /FLAG SET FOR SOME REASON,
3217 6003      PITS5D, SRQ      /INTERRUPT REQUEST?
3220 7610      SKP CLA      /NO, OK
3221 5257      JMP PIE5D      /
3222 4557      PITS5E, USPI      /TTY INTERRUPT REQUEST PRESENT?
3223 7610      SKP CLA      /NO, OK
3224 5264      JMP PIE5E      /
3225 2062      ISZ CTRA      /TEST DONE 100 TIMES?
3226 5204      JMP PITS5A      /NO, REPEAT,
3227 5425      JMP I CHAIN    /CHAIN,

3230 7602      PIE5A, HLT CLA      /SRQ FAILED TO SKIP ON KPRD, FLAG,

```

```

/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3231 4250 JMS PIE5
3232 6003 SRQ
3233 5231 JMP ,=2
3234 5233 JMP ,=1

3235 7602 PIE5R, HLT CLA /SPI FAILED TO SKIP ON KRRD FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3236 4250 JMS PIE5
3237 4557 USPI
3240 5236 JMP ,=2
3241 5240 JMP ,=1

3242 7602 PIE5C, HLT CLA /CAF FAILED TO CLEAR KRRD FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3243 4250 JMS PIE5
3244 6007 CAF
3245 4566 UTSF
3246 5243 JMP PIE5C+1
3247 5243 JMP PIE5C+1

3250 0000 PIE5, OPEN /ROUTINE TO SET KBRD FLAG,
3251 7201 CLA IAC
3252 4561 UKIE
3253 4563 UTLS
3254 4426 JMS I KBRFLAG
3255 4565 UTCF
3256 5650 JMP I PIE5 /EXIT

3257 7602 PIE5D, HLT CLA /SRQ SKIPPED WITH NO FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3260 6007 CAF
3261 6003 SRQ
3262 5260 JMP PIE5D+1
3263 5260 JMP PIE5D+1

3264 7602 PIE5E, HLT CLA /SPI SKIPPED WITH NO FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3265 6007 CAF
3266 4557 USPI
3267 5265 JMP PIE5E+1
3270 5265 JMP PIE5E+1

```

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

```

3271 0006 P1TS6, 6
3272 3314 P1TS7
3273 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES,
3274 4577 SETLOC /SET DELAYM
3275 0024 DELAYM /TO -103 DECIMAL

```

```

3276 7631 P1TS6A, M147 /
3277 4563 UTLS /SEND
3300 4571 UKCC /RECEIVE
3301 4576 DELAY /DELAY 10-11 BIT TIMES
3302 4565 UTCF /CLEAR TELEPRINTER FLAG
3303 4572 UKSF /KBRD FLAG SET?
3304 5310 JMP PIE6A /FLAG NOT SET
3305 2062 ISZ CTRA /DONE 100 TIMES YET?
3306 5277 JMP P1TS6A
3307 5425 JMP I CHAIN /CHAIN,

3310 7602 PIE6A, HLT CLA /FLAG NOT SETTING IN REQUIRED TIME,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3311 4563 UTLS
3312 4426 JMS I KBRFLAG
3313 5311 JMP PIE6A+1

```

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

```

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

```

/TEST OF KEYBOARD AND PUNCH BUFFERS USING RANDOM DATA,

```

3325 0010 P1T10, 10
3326 3400 P1T11
3327 4577 SETLOC /SET COUNT OF
3330 0062 CTRA /512 (DEC)
3331 7000 -1000 /IN CTRA,
3332 4775 JMS SETRND /INITIALIZE RANDOM NUMBER GENERATOR,
3333 4777 P1T10A, JMS RGNB /GET A RANDOM NUMBER,
3334 0145 AND [377 /MASK,
3335 4337 JMS TRDATA /TRANSFER DATA AND CHECK,
3336 5333 JMP P1T10A /REPEAT

```

/SUBROUTINE USED BY P1TS7 AND P1T10

```

3337 0000 TRDATA, OPEN
3340 3346 DCA HOLD1
3341 1346 TAD HOLD1
3342 7421 MQL /STORE GOOD DATA IN MQ,
3343 7721 ACL /RELOAD AC WITH THE GOOD
3344 4353 JMS SNDREC /TRANSMIT AND RECEIVE

```

```

3345 4470      JMS I CHECK      /DID I RECEIVE WHAT I SENT?
3346 0000      HOLD1, OPEN        /WHAT I SENT,
3347 5366      JMP P1E710      /RECEIVED NOT SAME AS SENT,
3350 2062      ISZ CTRA      /DONE?
3351 5737      JMP I TRDATA     /NO,
3352 5425      JMP I CHAIN      /YES, CHAIN,

/ROUTINE TO SEND AND RECEIVE DATA,

3353 0000      SNDREC, OPEN
3394 4565      UTCF
3355 4564      UTPC
3396 4571      UKCC
3357 4572      UKSF
3360 5357      JMP ,=1
3361 7200      CLA          /JUST IN CASE
3362 4570      UKRS
3363 4566      UTSF
3364 5363      JMP ,=1
3365 5753      JMP I SNDREC   /EXIT WITH RECEIVED DATA IN AC,

/COMMON HLT FOR P1T57 AND P1T10,

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

/SCOPE LOOP, PRESS CONTINUE TO ENTER,

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

3374 0417
3375 1740
3376 1717
3377 1707
3400          PAGE
    
```

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

```

3400 0011      P1T11, 11
3401 3435      P1T12
3402 4577      SETLOC      /SET COUNT OF
3403 0062      CTRA      /=500 (DEC)
3404 7014      =764      /IN CTRA,
3405 6007      P1T11A, CAF   /CLEAR THE WORLD,
3406 4777      JMS RGNB     /GET A RANDOM NUMBER
3407 7421      MQL          /STORE IT IN MQ
    
```

```

3410 7701      ACL          /RELOAD AC
3411 4563      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 P1E11A   /NO,
3421 2062      ISZ CTRA     /DONE 500 TIMES YET?
3422 5205      JMP P1T11A  /NO, REPEAT
3423 5425      JMP I CHAIN  /YES CHAIN,

3424 7402      P1E11A, HLT   /KRS FAILED TO "OR" KBRD WITH AC
/SCOPE LOOP, PRESS CONTINUE TO ENTER,

3425 6007      CAF
3426 7701      ACL          /MQ TO AC
3427 4563      UTLS
3430 4566      UTSF
3431 5230      JMP ,=1
3432 7240      CLA CMA
3433 4570      UKRS
3434 5225      JMP P1E11A+1

/TEST OF KRB

3435 0012      P1T12, 12
3436 7777      7777
3437 4430      JMS I S100
3440 4577      SETLOC      /SET DELAY
3441 0024      DELAY      /TO -103 DEC,
3442 7631      M147
3443 6007      P1T12A, CAF   /CLEAR THE WORLD,
3444 1134      TAD [252     /AC =252
3445 4563      UTLS       /SEND
3446 4566      UTSF       /DONE SENDING YET?
3447 5246      JMP ,=1     /NO
3450 7240      CLA CMA     /7777
3451 4567      UKRB       /CLEAR AC, FLAG AND READ BUFFER,
3452 7041      CMA IAC     /CHANGE TO A NEGATIVE NUMBER
3453 1134      TAD [252     /ADD SENT DATA TO AC
3454 7440      SZA        /WERE THEY EQUAL?
3455 5264      JMP P1E12A   /NO
3456 4572      P1T12B, UKSF /FLAG CLEAR?
3457 7610      SKP CLA     /YES
3460 5274      JMP P1E12B   /NO,
3461 2062      ISZ CTRA     /DONE TEST YET?
3462 5243      JMP P1T12A  /NO, REPEAT
3463 5425      JMP I CHAIN  /YES, CHAIN,

3464 7402      P1E12A, HLT   /KRB FAILED TO JAM READER BUFFER TO AC,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,

3465 6007      CAF
3466 1134      TAD [252
3467 4563      UTLS
    
```

```

3470 4566      UTSF
3471 5270      JMP ,+1
3472 4567      UKRB
3473 5265      JMP P1E12A+1

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

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

```

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

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

```

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

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

```

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

```

                                /SEE BIT TIME TABLE AT BEGINNING
                                /OF PROGRAM,
3533 4430      P2TS1A, JMS I S100      /SET UP TO DO TEST 100 TIMES,
3534 4571      P2TS1B, UKCC          /CLEAR AC AND FLAG
3535 4576      DELAY          /GO DELAY
3536 4572      UKSF          /SKIP ON FLAG = 1
3537 5343      JMP P2E1      /ERROR, GO TO E1
3540 2062      ISZ CTRA      /ALL DONE?
3541 5334      JMP P2TS1B    /NO, REPEAT
3542 5425      JMP I CHAIN   /CHAIN
3543 7402      P2E1, HLT     /TST1 ERROR HALT, FLAG IS NOT
                                /SET, OR KSF FAILED
3544 5333      JMP P2TS1A    /RESTARTING TEST,
    
```

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

```

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

```

3550 4431      P2TS2A, JMS I S4000      /SET UP TO DO TEST 4000 TIMES,
3551 4571      UKCC          /CLEAR AC AND FLAG
3552 4576      DELAY          /GO DELAY
3553 4572      UKSF          /SKIP ON FLAG = 1
3554 5362      JMP P2E2A     /DID NOT SKIP, GO TO E2A
3555 4572      UKSF          /SKIP ON FLAG = 1
3556 5364      JMP P2E2B     /DID NOT SKIP, GO TO E2B
3557 2062      ISZ CTRA      /ALL DONE?
3560 5355      JMP ,+3       /NO, REPEAT
3561 5425      JMP I CHAIN   /CHAIN
3562 7402      P2E2A, HLT    /TST2 ERROR HALT, FLAG
                                /NOT SET OR KSF FAILURE,
3563 5351      JMP P2TS2A
3564 7402      P2E2B, HLT    /TST2 ERR HALT 0,
                                /KSF FAILURE
3565 4572      UKSF          /SKIP ON FLAG = 1
3566 5365      JMP ,+1       /REPEAT
3567 5365      JMP ,+2       /REPEAT
    
```

3577 0417
 3600 PAGE

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

```

/SKIP ON FLAG 500 TIMES TO VERIFY THAT NO
/SKIP OCCURS WITH FLAG = 0,
3600 0003 P2TS3, 3
3601 3630 P2TS4
3602 4432 JMS I S200 /SET DELAYM TO DELAY TWICE
/10 BIT TIMES FOR AN NON 110
/BAUD DEVICE AND TWICE 11 BIT
/TIMES FOR AN 110 BAUD DEVICE;
/SEE BIT TIME TABLE AT BEGINNING
/OF PROGRAM,

3603 4577 SETLOC /SET COUNT OF
3604 0062 CTRA /:=500 (DEC) IN
3605 7014 -764 /CTRA
3606 4571 P2TS3A, UKCC /CLEAR FLAG
3607 4576 DELAY /GO DELAY
3610 4572 UKSF /READY?
3611 5221 JMP P2E3A /NO, ERROR
3612 4571 UKCC /YES, RESET FLAG
3613 4572 UKSF /READY?
3614 5216 JMP ,+2 /NO, OK
3615 5223 JMP P2E3B /YES, ERROR
3616 2062 ISZ CTRA /ALL DONE TESTING?
3617 5213 JMP ,+4 /NO, REPEAT
3620 5425 JMP I CHAIN /YES, CHAIN
3621 7402 P2E3A, HLT /TST3 ERR HALT A, FLAG
/NOT SET OR KSF FAILURE
/TRY AGAIN
3622 5206 JMP P2TS3A
3623 7402 P2E3B, HLT /TST3 ERR HALT B, FLAG
/FAILED TO RESET, OR KSF
/SKIPPED ERRONEOUSLY,

/TURN OFF READER BEFORE ENTERING
/SCOPE LOOP,
3624 4571 UKCC /CLEAR FLAG AND AC
3625 4572 UKSF /SKIP ON FLAG = 1
3626 5224 JMP ,+2 /REPEAT
3627 5224 JMP ,+3 /REPEAT

```

```

/THIS ROUTINE CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT,
/AND THEN CHECKS THAT THE READER FLAG IS CAPABLE OF INTERRUPTING,
3630 0004 P2TS4, 4
3631 3671 P2TS5
3632 4577 SETLOC /SET INTERRUPT RETURN
3633 0002 2 /TO P2E4A,
3634 3644 P2E4A
3635 4565 P2TS4A, UYCF /CLEAR PUNCH/PRINTER FLAG
3636 4426 JMS I KBFLAG
3637 4571 UKCC /CLEAR READER FLAG
3640 6001 ION /ENABLE INTERRUPT
3641 7000 NOP
3642 6002 /TURN OFF INTERRUPT
3643 5246 JMP ,+3
3644 4777 P2E4A, JMS INTFND /UNEXPECTED INTERRUPT

```

```

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 /WAIT FOR READER FLAG
3654 5253 JMP ,+1 /TO SET
3655 6001 P2TS4B, ION /ENABLE INTERRUPT
3656 7000 NOP
3657 7402 P2E4B, HLT /READER FLAG FAILED TO INTERRUPT,
/OR INTERRUPT SYSTEM MALFUNCTION
/SET INTERRUPT RETURN
3660 4577 SETLOC /TO P2TS4C-1,
3661 0002 2
3662 3665 P2TS4C=1
/SCOPE LOOP
3663 6001 ION
3664 7000 NOP
3665 5263 JMP ,+2
/
3666 2062 P2TS4C, ISZ CTRA /DONE?
3667 5255 JMP P2TS4B /NO, REPEAT
3670 5425 JMP I CHAIN

```

```

/READER TIMING TEST, CHECKS THAT READER FLAG IS #1 NO
/LATER THAN 103 MILLISECONDS AFTER KCC INSTRUCTION IS ISSUED,
/
3671 0005 P2TS5, 5
3672 3711 P2TS6
3673 4577 SETLOC /SET DELAYM
3674 0024 DELAY /TO -103
3675 7631 M147
3676 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES;
3677 4571 P2TS5A, UKCC /START READER, CLEAR PC FLAG
3700 4576 DELAY /GO DELAY 103 MILLISECS
3701 4572 UKSF
3702 5306 JMP P2E5
3703 2062 ISZ CTRA
3704 5277 JMP P2TS5A
3705 5425 JMP I CHAIN
3706 7402 P2E5, HLT /TST5 ERR HALT, FLAG NOT=1
/103 MSECS AFTER KCC INSTRUCTION,

3707 4426 JMS I KBFLAG
3710 5305 JMP ,+3 /YES, REPEAT,

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/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

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3714 0062      CTRA      /-256(DEC)
3715 7400      -430      /IN CTRA
3716 4426      P2TS6A, JMS I KBFLAG
3717 4570      UKRS      /READ CHARACTER,
3720 3112      DCA WTS6A /SAVE AT WTS6A,
3721 4577      SETLOC   /SET COUNT OF
3722 0063      CTRB     /CTRB
3723 6030      -1750    /-1000 (DEC) IN
3724 7200      P2TS6B, CLA
3725 4570      UKRS     /READ CHARACTER,
3726 7421      MQL      /STORE IN HQ,
3727 7701      ACL      /GET IT BACK INTO THE AC,
3730 7041      CIA      /2'S COMPLEMENT IT
3731 1112      TAD WTS6A /ADD EXPECTED CHAR,
3732 7640      SZA CLA  /RESULT 0?
3733 5346      JMP P2E6A /NO, ERROR, GO TO E6A,
3734 7240      P2TS6C, CLA CMA
3735 4570      UKRS     /READ CHARACTER
3736 7040      CMA
3737 7440      SZA      /AC STILL 7777
3740 5356      JMP P2E6C /NO, ERROR GO TO P2E6C,
3741 2063      ISZ CTRB /READ CHAR 1000 TIMES?
3742 5324      JMP P2TS6B /NO, GO READ IT AGAIN,
3743 2062      ISZ CTRA /YES, READ 256 DIFF, CHARS?
3744 5316      JMP P2TS6A /NO,
3745 5425      JMP I CHAIN /YES, CHAIN

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

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

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

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

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

3762 0007      P2TS7, 7
3763 4030      P2T10
    
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3764 4430      JMS I 9100 /SET UP TO DO TEST 100 TIMES,
3765 4432      JMS I 9200 /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,

3766 5776'      JMP P2TS7A

3776 4000
3777 2017
          4000      PAGE

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

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

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

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

4030 0010      P2T10, 10
4031 4153      P2T11
4032 4431      JMS I 54000 /SET UP TO DO TEST 4000 TIMES,
    
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4033 4426 JMS I KBFLAG
4034 4577 P2T10A, SETLOC /SET INTERRUPT RETURN LOCATION
4035 0002 2 /TO P2E10A,
4036 4073 P2E10A
4037 4572 UKSF
4040 5233 JMP P2T10A+1
4041 7200 CLA /AC=0
4042 4561 UKIE /DISABLE TTY INTERRUPT
4043 6001 ION /TURN INTERRUPT ON
4044 7000 NOP
4045 4002 P2T10B, IOF /TURN INTERRUPT OFF.
4046 6003 SRQ /SKIP IF INTERRUPT REQUEST;
4047 7410 SKP
4050 5307 JMP P2E10B /ERROR, SRQ FAILED, GO TO P2E10B,
4051 4557 P2T10C, USPI /SKIP IF TTY INTERRUPT;
4052 7410 SKP
4053 5315 JMP P2E10C /ERROR, SPI FAILED, GO TO P2E10C,
4054 4577 P2T10D, SETLOC /SET INTERRUPT RETURN LOCATION
4055 0002 2 /TO P2T10E
4056 4064 P2T10E
4057 7201 CLA IAC /AC11=1
4060 4561 UKIE /ENABLE TTY INTERRUPT,
4061 6001 ION /TURN INTERRUPT ON;
4062 7000 NOP / (SHOULD INTERRUPT);
4063 5323 JMP P2E10D /ERROR, GO TO P2E10D;
4064 6003 P2T10E, SRQ /SKIP IF INTERRUPT REQUEST;
4065 5335 JMP P2E10E /ERROR, GO TO P2E10E;
4066 4557 P2T10F, USPI /SKIP IF TTY INTERRUPT;
4067 5344 JMP P2E10F /ERROR, GO TO P2E10F;
4070 2062 ISZ CTRA /DONE?
4071 5234 JMP P2T10A /NO, REPEAT,
4072 5425 JMP I CHAIN

4273 7402 P2E10A, HLT /KIE FAILED TO DISABLE TTY;
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
4274 4572 UKSF /IS READER FLAG SET?
4275 4777 JMS INTFND /NO, UNEXPECTED INTERRUPT;
4276 4577 SETLOC /SET INTERRUPT RETURN LOCATION
4277 0002 2 /TO P2E10A+1,
4300 4074 P2E10A+1
4301 4426 JMS I KBFLAG / (SCOPE LOOP).
4302 7200 CLA
4303 4561 UKIE /DISABLE TTY INTERRUPT;
4304 6001 ION /INTERRUPT ON;
4305 7000 NOP
4306 5274 JMP P2E10A+1 /REPEAT,

4407 7602 P2E10B, HLT CLA /SRQ SKIPPED WITH TTY DISABLED;
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
4410 4426 JMS I KBFLAG
4411 4561 UKIE
4412 6003 SRQ /SKIP IF INTERRUPT, (AC11=0); REQUEST, (SHOULD NOT SKIP)
4413 5310 JMP P2E10B+1 /REPEAT

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4114 5310 JMP P2E10B+1 /REPEAT

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

4123 7402 P2E10D, HLT /KIE FAILED TO ENABLE TTY INTERRUPT WITH AC11=1.
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
4124 4577 SETLOC /SET INTERRUPT RETURN LOCATION
4125 0002 2 /TO P2E10D+4,
4126 4127 P2E10D+4
4127 7201 CLA IAC / (SCOPE LOOP);
4130 4561 UKIE /ENABLE TTY INTERRUPT;
4131 4426 JMS I KBFLAG
4132 6001 ION /TURN INTERRUPT ON;
4133 7000 NOP
4134 5327 JMP P2E10D+4 /REPEAT,

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

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

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

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

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/SEE BIT TIME TABLE AT BEGINNING
/OF PROGRAM,

4157 4561 P2T11A, UKIE /DISABLE TTY (AC 11=0);
4160 4426 JMS I KBFLAG
4161 7360 CLA CMA CLL CML /AC AND LINK SET;
4162 6007 CAF /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY;
4163 7420 SNL
4164 7440 SZA
4165 5776 JMP P2E11A /ERROR, GO TO P2E11A;
4166 4576 P2T11B, DELAY /GO DELAY 200 MILLI SEC.
4167 4572 UKSF /DID FLAG COME UP?
4170 7610 SKP CLA
4171 5775 JMP P2E11B /YES, ERROR, GO TO P2E11B.
4172 5774 JMP P2T11C /CROSS PAGE

4174 4200
4175 4215
4176 4206
4177 2017
4200 4200 PAGE

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

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

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

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

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

/TEST OF KRB INSTRUCTION,

4233 0012 P2T12, 12
4234 7777 7777
4235 4577 SETLOC /SET COUNT OF
4236 0062 CTRA /-256 DECIMAL
4237 7400 -400 /IN CTRA
4240 4577 SETLOC /SET DELAYM
4241 0024 DELAYM /TO -103
4242 7631 M147 /DECIMAL,
4243 4426 JMS I KBFLAG
4244 4570 UKRS /GET THE CHARACTER;
4245 3112 DCA WTS6A /SAVE IT
4246 4426 JMS I KBFLAG /ADVANCE TAPE AND BRING NEW CHARACTER INTO BUFFER,
4247 1145 P2T12A, TAD C377
4250 4567 UKRB /READ BUFFER, CLEAR FLAG, ADVANCE TAPE
4251 4572 UKSF /FLAG CLEAR?
4252 7410 SKP /YES, OK,
4253 5276 JMP P2E12A /NO, ERROR;
4254 3104 DCA UTEMP
4255 4576 P2T12B, DELAY /DELAY 10 OR 11 BIT TIMES
4256 4572 UKSF /FLAG NOW SET?
4257 5303 JMP P2E12B /NO, ERROR;
4260 1112 P2T12C, TAD WTS6A /GET GOOD,
4261 7421 MQL /MQ CONTAINS GOOD DATA
4262 7701 ACL /RELOAD AC WITH GOOD FROM MQ,
4263 7001 IAC /ADD ONE TO IT,
4264 3112 DCA WTS6A /SAVE IT
4265 1112 TAD WTS6A /GET IT BACK,
4266 0145 AND C377 /KEEP DESIRED DATA;
4267 7041 CMA IAC /NEGATE IT,
4270 1104 TAD UTEMP /ADD LAST READ CHARACTER TO IT,
4271 7640 SZA CLA /ARE THEY EQUAL,
4272 5305 JMP P2E12C /NO, ERROR
4273 2062 ISZ CTRA /DONE?
4274 5247 JMP P2T12A /NO, REPEAT,
4275 5425 JMP I CHAIN /YES, CHAIN,

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

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

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

/PROGRAM 3, ASR33/35 TELETYPE READER TEST. CHECKS ABILITY OF READER
/TO CORRECTLY READ AT FULL SPEED AND WITH RANDOM STALLS.
4307 4577 PRG3, SETLOC /SET KSTART TO INITIAL
4310 0023 KSTART /ROUTINE ADDRESS,
4311 4314 P3TS0
4312 5713 JMP I ,+1 /GO START TEST
4313 7236 SRSET

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

4340 7200 CLA
4341 1332 TAD SB0 /GET CORRECT CHARACTER
4342 7402 HLT /AC CONTAINS THE EXPECTED CHARACTER
4343 5334 JMP P3T0B
    
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/READ 2000 CHARACTERS WITH RANDOM DELAY BETWEEN CHARACTERS;
/MATCH EACH CHARACTER READ AGAINST COUNT PATTERN
/
4344 0001 P3TS1, 1
4345 4400 P3TS2
4346 4465 JMS I SYNC /TO SYNC TAPE
4347 4577 SETLOC /SET COUNT OF
4350 0062 CTRA /=-2000 (DEC) IN
    
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4351 4060 -3720 /CTRA
4352 4571 UKCC /START READER
4353 4466 JMS I INPATT /INITIALIZE PATTERN
4354 4467 P3TS1A, JMS I GETPT /GET PATTERN CHARACTER
4355 3364 DCA SB1 /STORE AT SB1
4356 4427 JMS I DLCNT1 /GENERATE RANDOM DELAY
4357 4576 DELAY /DELAY
4360 4572 UKSF /READY?
4361 5360 JMP , =1 /NO, TEST AGAIN
4362 4567 UKRB /YES, READ CHARACTER
4363 4470 JMS I CHECK /GO CHECK FOR CORRECT MATCH

4364 0000 SB1, 0 /CORRECT CHAR HERE
4365 5371 JMP P3E1 /ERROR, GO TO P3E1
4366 2062 P3T1B, ISZ CTRA /OK, ALL DONE?
4367 5354 JMP P3TS1A /NO,
4370 5425 JMP I CHAIN /YES, CHAIN
4371 7402 P3E1, HLT /TST1 ERR HALT, AC CONTAINS
          /CHARACTER THAT DID NOT MATCH
          /AGAINST PATTERN, DEPRESS
          /KEYCONTINUE

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

4375 5366 JMP P3T1B

4377 4157 PAGE
4400
    
```

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/READ WITH RANDOM STALL BETWEEN RANDOM CHARACTER GROUPS
/100 GROUPS READ,
/
4400 0002 P3TS2, 2
4401 7777 7777
4402 4465 JMS I SYNC /GO SYNC TAPE
4403 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES,
4404 4571 UKCC /START READER
4405 4466 JMS I INPATT /INITIALIZE PATTERN
4406 4427 P3TS2A, JMS I DLCNT1 /SET RANDOM DELAY
4407 4777 JMS CHRCNT /SET RANDOM CHARACTER
4410 0063 CTRB /COUNT IN CTRB
4411 4467 P3TS2B, JMS I GETPT /GET PATTERN CHARACTER
4412 3220 DCA SB2 /AND STORE AT SB2
4413 4576 DELAY /GO DELAY NO OF
4414 4572 UKSF /READY?
4415 5214 JMP , -1 /NO, TEST AGAIN
4416 4567 UKRB /READ CHARACTER
4417 4470 JMS I CHECK /CHECK FOR CORRECT MATCH
4420 0000 SB2, 0 /AGAINST SB2 CONTENTS
4421 5227 JMP P3E2 /ERROR, GO TO P3E2
4422 2063 ISZ CTRB /OK, ALL CHARS FOR GROUP DONE?
4423 5211 JMP P3TS2B /NO
    
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4424 2062 P3T2C, ISZ CTPA /YES, ALL GROUPS DONE?
4425 5276 JMP P3TS2A /NO
4426 5425 JMP I CHAIN /YES, CHAIN

4427 7402 P3E2, HLT /YST2 ERROR WALT, AC CONTAINS CHAR THAT
/DID NOT MATCH AGAINST PATTERN, DEPRESS KEY
/CONTINUE

4430 7200 CLA
4431 1220 TAD S02 /GET CORRECT CHARACTER
4432 7402 HLT /AC CONTAINS THE EXPECTED CHARACTER
4433 5224 JMP P3T2C

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/PROGRAM 4,

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4434 4776 PRG4, JMS STBF /SET UP BUFFER AREA
4435 4577 SETLOC /SET KSTART TO INITIAL
4436 0023 KSTART /ROUTINE ADDRESS
4437 4442 P4TS0
4440 5641 JMP I ,+1 /GO START PROGRAM
4441 0236 SRSET

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

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/RIGHT MARGIN TEST

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4475 0001 P4TS1, 1
4476 4925 P4TS2
4477 7200 CLA
4500 1131 TAD [=16
4501 7421 MQL
4502 1130 TAD [RM33B
4503 3323 DCA RMB
4504 4555 CKSR37 /KSR37?
4505 5312 JMP ,+5 /NO,
4506 1127 TAD [=17 /YES,
4507 7421 MQL
4510 1126 TAD [RM37A
4511 3323 DCA RMB
4512 4573 TYPE /PRINT TEST TITLE
4513 6337 RMTST
4514 7701 ACL
4515 3104 DCA UTEMP
4516 4573 RMTSTA, TYPE /PRINT ---- I
4517 1563 RM33A
4520 2104 ISZ UTEMP /DONE TIMES?
4521 5316 JMP RMTSTA /NO, SO DO IT AGAIN
4522 4573 TYPE /YES, PRINT =I=
4523 0000 RMB, OPEN
4524 5425 JMP I CHAIN /CHAIN

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/SPACE TEST

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4525 0002 P4TS2, 2
4526 4600 P4TS3
4527 4573 TYPE /PRINT TEST TITLE
4530 6354 SPTST
4531 4555 CKSR37 /KSR37?
4532 1125 TAD [5 /NO
4533 1124 TAD [=51 /YES
4534 3104 DCA UTEMP /=36 TO UTEMP
4535 4573 SPTSTA, TYPE /PRINT \, SPACE
4536 6324 SPTSTC
4537 2104 ISZ UTEMP /DONE 36 TIMES?
4540 5335 JMP SPTSTA /NO, SO DO IT AGAIN,
4541 4555 CKSR37 /KSR37?
4542 1123 TAD [4 /NO
4543 1122 TAD [=50 /YES
4544 3104 DCA UTEMP /=36 TO UTEMP
4545 1374 TAD (=1 /GET =1
4546 3105 SPTSTB, DCA UTEMP1 /AC TO UTEMP1
4547 1105 TAD UTEMP1 /UTEMP1
4550 3106 DCA UTEMP2 /TO UTEMP2
4551 1107 TAD CR /GET "CR" CODE
4552 4474 JMS I UPUNCH /PRINT IT
4553 4474 JMS I UPUNCH /DUMMY CYCLE
4554 1142 TAD [240 /GET "SPACE" CODE
4555 4474 JMS I UPUNCH /PRINT IT
4556 2106 ISZ UTEMP2 /DONE SPACING?
4557 5354 JMP ,=3 /NO,
4560 1132 TAD [257 /GET "/" CODE

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4561 4474 JMS I UPUNCH /PRINT IT
4562 7104 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 1135 TAD UTEMP1 /ADD C(UTEMP1)
4567 5346 JMP SPTSTB /GO TO SPTSTB

4574 7777
4575 7656
4576 1000
4577 2456
4600
    
```

PAGE

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/TYPE LINE OF CHARACTERS ABC
4600 0003 P4TS3, 3
4601 5122 P4TS47
4602 7240 CLA CMA /SET STALL
4603 3084 DCA STLD /INDICATOR
4604 4573 TYPE /PRINT TEST TITLE
4605 6366 LFTST
4606 4555 CKSR37 /KSR37?
4607 1140 TAD C11 /NO,
4610 1377 TAD (-121 /YES,

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

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

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

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

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

/TYPE LINE OF CHARACTERS MNO
4645 0010 P4TS10, 10
4646 4651 P4TS11
4647 4433 JMS I TLCALL
4650 6123 M

/TYPE LINE OF CHARACTERS PQR
4651 0011 P4TS11, 11
4652 4655 P4TS12
4653 4433 JMS I TLCALL
4654 6126 P

/TYPE LINE OF CHARACTERS STU
4655 0012 P4TS12, 12
4656 4661 P4TS13
4657 4433 JMS I TLCALL
4660 6131 S

/TYPE LINE OF CHARACTERS VWX
4661 0013 P4TS13, 13
4662 4665 P4TS14
4663 4433 JMS I TLCALL
4664 6134 V

/TYPE LINE OF CHARACTERS YZ0
4665 0014 P4TS14, 14
4666 4671 P4TS15
4667 4433 JMS I TLCALL
4670 6137 Y

/TYPE LINE OF CHARACTERS 123
4671 0015 P4TS15, 15
4672 4675 P4TS16
4673 4433 JMS I TLCALL
4674 6142 ONE

/TYPE LINE OF CHARACTERS 456
4675 0016 P4TS16, 16
4676 4701 P4TS17
4677 4433 JMS I TLCALL
4700 6145 FOUR

/TYPE LINE OF CHARACTERS 789
4701 0017 P4TS17, 17
4702 4705 P4TS20
4703 4433 JMS I TLCALL
4704 6150 SEVEN

/TYPE LINE OF CHARACTERS ;"#
4705 0020 P4TS20, 20
4706 4711 P4TS21
4707 4433 JMS I TLCALL
4710 6153 C241
    
```

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/TYPE LINE OF CHARACTERS %X&
4711 0021 P4TS21, 21
4712 4715 P4TS22
4713 4433 JMS I TLCALL
4714 6156 C244

/TYPE LINE OF CHARACTERS '()
4715 0022 P4TS22, 22
4716 4721 P4TS23
4717 4433 JMS I TLCALL
4720 6161 C247

/TYPE LINE OF CHARACTERS **,
4721 0023 P4TS23, 23
4722 4725 P4TS24
4723 4433 JMS I TLCALL
4724 6164 C252

/TYPE LINE OF CHARACTERS =,()
4725 0024 P4TS24, 24
4726 4731 P4TS25
4727 4433 JMS I TLCALL
4730 6167 C255

/TYPE LINE OF CHARACTERS !|<
4731 0025 P4TS25, 25
4732 4735 P4TS26
4733 4433 JMS I TLCALL
4734 6172 C272

/TYPE LINE OF CHARACTERS =>?
4735 0026 P4TS26, 26
4736 4741 P4TS27
4737 4433 JMS I TLCALL
4740 6175 C275

/TYPE LINE OF CHARACTERS @ [\
4741 0027 P4TS27, 27
4742 4745 P4TS30
4743 4433 JMS I TLCALL
4744 6200 C300

/TYPE LINE OF CHARACTERS J* AND LEFT ARROW
4745 0030 P4TS30, 30
4746 4751 P4TS31
4747 4433 JMS I TLCALL
4750 6203 C335

/TYPE LINE OF SMALL A, B, AND C
4751 0031 P4TS31, 31
4752 4755 P4TS32
4753 4434 JMS I TLC37
4754 6206 SA

/TYPE LINE OF SMALL D, E, AND F
4755 0032 P4TS32, 32
4756 4761 P4TS33
4757 4434 JMS I TLC37
4760 6211 SD

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

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4762 5000 P4TS34
4763 4434 JMS I TLC37
4764 6214 SG

4777 7657 PAGE
5000 5000

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

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

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

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

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

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

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

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5045 4777/ JMS TYPLN
5046 5425 JMP I CHAIN

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

/TYPE 12 LINES OF ASR33 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS,
5054 0044 P4TS44, 44
5055 5072 P4TS45
5056 4573 TYPE /PRINT TITLE
5057 6412 WCPTST
5060 4554 CKSR33 /33?
5061 5425 JMP I CHAIN /NO
5062 4774/ JMS FW336 /PATTERN TO BUFFER
5063 4577 SETLOC /-6 TO CTRA
5064 0062 CTRA
5065 7772 -6
5066 4775/ P4T44A, JMS WOSWS
5067 2062 ISZ CTRA
5070 5266 JMP P4T44A /NO, REPEAT
5071 5425 JMP I CHAIN /YES, CHAIN

/TYPE 12 LINES OF ASR35 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS,
5072 0045 P4TS45, 45
5073 5106 P4TS46
5074 4553 CKSR35 /35?
5075 5425 JMP I CHAIN /NO,
5076 4773/ JMS FW356 /PATTERN TO BUFFER
5077 4577 SETLOC /-6 TO CTRA
5100 0062 CTRA
5101 7772 -6
5102 4775/ P4T45A, JMS WOSWS
5103 2062 ISZ CTRA /ALL LINES TYPED?
5104 5302 JMP P4T45A /NO, REPEAT
5105 5425 JMP I CHAIN /YES, CHAIN

/TYPE 12 LINES OF KSR37 WORST CASE PATTERN, ALTERNATE LINES WITH STALLS,
5106 0046 P4TS46, 46
5107 7777 7777
5110 4555 CKSR37 /37?
5111 5425 JMP I CHAIN /NO, BYPASS TEST;
5112 4772/ JMS FW376 /YES, PATTERN TO BUFFER
5113 4577 SETLOC /-6 TO CTRA
5114 0062 CTRA
5115 7772 -6
5116 4775/ P4T46A, JMS WOSWS
5117 2062 ISZ CTRA /ALL LINES TYPED?
5120 5316 JMP P4T46A /NO, REPEAT
5121 5425 JMP I CHAIN /YES, CHAIN

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/KSR37, KSR35, OR ASR35 TAB TEST
5122 0047 P4TS47, 47
5123 5231 P4TS50
5124 4555 CKSR37 /KSR37?
5125 5346 JMP TBTB /NO,
5126 4573 TYPE /YES, TYPE TITLE
5127 6267 TBTST
5130 1121 TAD [-11 /-9 TO CTRA
5131 4771/ JMS MTABP /GO TO SUB TO MARK TAB POSITIONS,
5132 1370 TAD [+12 /SET TAB COUNT
5133 3340 DCA TBCNT /TO -10
5134 1367 TBTB, TAD [-7 /YES, -7 TO CTRA
5135 3062 DCA CTRA
5136 3361 DCA SPCNT /0 TO SPACE COUNT
5137 4766/ JMS TABP /GO TAB AND PRINT SLASH 9 TIMES,
5140 0000 TBCNT, OPEN /TAB COUNT,
5141 2062 ISZ CTRA /DONE?
5142 7410 SKP /NO,
5143 5425 JMP I CHAIN /YES, CHAIN
5144 2361 ISZ SPCNT /INCREMENT SPACE COUNT
5145 5337 JMP TBTB+3 /REPEAT
5146 4553 TBTB, CKSR35 /KSR, ASR35?
5147 5425 JMP I CHAIN /NO, BYPASS TEST
5150 4573 TYPE /YES, TYPE TITLE
5151 6267 TBTST
5152 1367 TAD [-7 /-7 TO CTRA
5153 4771/ JMS MTABP /GO TO SUB TO MARK TAB POSITIONS,
5154 4573 TYPE /YES,
5155 6301 TBMRK+1
5156 1121 TAD [-11 /SET TAB COUNT
5157 3340 DCA TBCNT /TO -9
5160 5334 JMP TBTB
5161 0000 SPCNT, OPEN
5162 0000 SPCTR, OPEN

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

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

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5207 1777/ SPAC, TAD SPCNT /GET SPACE COUNT
5210 7450 SNA /0?
5211 5220 JMP TABPA /YES, DON'T SPACE
5212 7041 CIA /NO, NEGATE COUNT
5213 3776/ DCA SPCTR
5214 1142 TAD [240 /SPACE
5215 4474 JMS I UPUNCH
5216 2776/ ISZ SPCTR /DONE SPACING?
5217 5214 JMP ,=3 /NO, SPACE AGAIN
5220 1140 TABPA, TAD [11 /GET TAB CODE
5221 4474 JMS I UPUNCH /OUTPUT TO TELEPRINTER
5222 4474 JMS I UPUNCH /DUMMY CYCLE,
5223 4474 JMS I UPUNCH /DUMMY CYCLE
5224 1132 TAD [257 /GET "/" CODE
5225 4474 JMS I UPUNCH /AND TYPE IT
5226 2200 ISZ TABCTR /DONE?
5227 5207 JMP SPAC /NO, REPEAT
5230 5601 JMP I TABP /YES, EXIT
    
```

```

/KSR37 BACKSPACE TEST,
P4TS50, 50
5231 0050 P4TS4
5232 4623 CKSR37 /KSR37?
5233 4555 JMP I CHAIN /NO
5234 5425 TYPE /YES, TYPE TITLE
5235 4573 BKSPTR
5236 6253 TAD [=51 /:=41 TO CTRA
5237 1124 DCA CTRA
5240 3062 TYPE /TYPE ALTERNATE U/S,
5241 4573 BKSU
5242 6574 ISZ CTRA /DONE?
5243 2062 JMP ,=3 /NO,
5244 5241 TAD [=47 /:=39 TO CTRA
5245 1375 DCA CTRA
5246 3062 JMS BKSPC /BACKSPACE TWICE
5247 4263 =2
5250 7776 TAD C252 /TYPE "*"
5251 1774/ JMS I UPUNCH
5252 4474 JMS BKSPC /BACKSPACE THRICE
5253 4263 =3
5254 7775 TAD C252 /TYPE "*"
5255 1774/ JMS I UPUNCH
5256 4474 ISZ CTRA /DONE 39 TIMES?
5257 2062 JMP ,=5 /NO,
5260 5253 JMP I CHAIN /YES, CHAIN
5261 5425 BKSCTR, OPEN
5262 0000

5263 0000 BKSPC, OPEN
5264 1663 TAD I BKSPC /GET BACKSPACE COUNT
5265 3262 DCA BKSCTR /AND STORE AT BKSCTR
5266 2263 ISZ BKSPC /SET UP EXIT
5267 1373 TAD [210 /GET BACKSPACE CODE
5270 4474 JMS I UPUNCH /OUTPUT TO TELEPRINTER
    
```

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5271 2262 ISZ BKSCTR /DONE BACKSPACING?
5272 5267 JMP ,=3 /NO, REPEAT
5273 5663 JMP I BKSPC /YES, EXIT

/PROGRAM 5, PUNCH TEST
PRG5, SETLOC /SET INTERRUPT SERVICE ADDRESS
2 /TO INTSVC
INTSVC
SETLOC /SET DATA BLOCK
BLKCNT /LENGTH TO
=1000 /:=512
UKCC
TAD (BLOCKA /SET UP ADDRESS TO
DCA UTEMP /STORE DATA,
TAD [=1000 /:=512 TO CTRA
DCA CTRA
JMS SINPT /INITIALIZE SPECIAL COUNT PATTERN
JMS SGET /GET CHARACTER
DCA I UTEMP /STORE IT
ISZ UTEMP /INCREMENT POINTER,
ISZ CTRA /DONE 512 CHARACTERS?
JMP ,=4 /NO, REPEAT
UKSF
JMP ,=1
PRG5A, CLA /YES, CLEAR READY BUSY
DCA RBUSY
JMS PLTLR /PUNCH LEADER
JMS PSYNC /PUNCH SYNC CHARACTER
JMS PBLK /PUNCH DATA BLOCK FULL SPEED,
JMS PLTLR /PUNCH TRAILER
JMS RSYNC /SYNC READER
JMS RDBLK /READ DATA BLOCK
JMS RRDY /WAIT FOR READER NOT BUSY
JMS PLTLR /PUNCH LEADER
JMS PSYNC /PUNCH SYNC CHARACTER
JMS PBLKR /PUNCH DATA BLOCK (WITH STALLS),
JMS PLTLR /PUNCH TRAILER
JMS RSYNC /SYNC READER
JMS RDBLK /READ DATA BLOCK
JMS RRDY /WAIT FOR READER NOT BUSY
JMP PRG5A /REPEAT,
    
```

```

/PROGRAM 6, KEYBOARD TEST
PRG6, SETLOC /SET KSTART TO INITIAL
KSTART /ROUTINE ADDRESS
P6T0
TYPE /PRINT
KMSG1
JMP I ,+1
SRSET

5340 4577
5341 0023
5342 5400
5343 4573
5344 6432
5345 5746
5346 0236

5360 1324
5361 1343
    
```

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.

P6T0, 0
 5401 5421 P6T1
 5402 4431 JMS I 54000
 5403 4571 UKCC /CLEAR AC AND FLAG
 5404 4573 TYPE
 5405 6443 KMSG2
 5406 4572 UKSF /READY?
 5407 5206 JMP ,=1 /WAIT
 5410 4572 UKSF /READY, SKIP ON FLAG
 5411 5215 JMP P6E0 /NO SKIP, ERROR
 5412 2062 ISZ CTRA /ALL DONE?
 5413 5210 JMP ,=3 /NO, REPEAT
 5414 5425 JMP I CHAIN /YES, CHAIN
 5415 7602 P6E0, HLT CLA /KSF FAILURE
 5416 4572 UKSF /SCOPE LOOP
 5417 5216 JMP ,=1 /SKIPS ON FLAG
 5420 5216 JMP ,=2 /CONTINUOUSLY

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

P6T1, 1
 5421 0001 P6T2
 5422 5440 UKCC /CLEAR AC AND FLAG
 5423 4571 TYPE
 5424 4573 KMSG3
 5425 6454 P6T1A, UKSF /READY?
 5426 4572 JMP ,=1 /WAIT
 5427 5226 UKRB /READ CHARACTER
 5430 4567 UTLS /PRINT IT
 5431 4563 UTSF /PRINTER READY?
 5432 4566 JMP ,=1 /NO, WAIT
 5433 5232 TAD C=-377
 5434 1144 SZA /IS IT RUBOUT?
 5435 7440

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 7777
 5441 7777 UKCC /CLEAR AC AND FLAG
 5442 4571 TYPE /PRINT TITLE AND
 5443 4573 KMSG4 /INSTRUCTION
 5444 6521 TYPE
 5445 4573 KMSG3A
 5446 6462 P6T2A, UKSF /FLAG I?
 5447 4572 JMP ,=1 /NO, WAIT
 5450 5247 UKRB /YES, READ KEYBOARD
 5451 4567 DCA WTS6A /STORE CHARACTER
 5452 3112 JMS ASCCN /CONVERT CHARACTER
 5453 4777 WTS6A /TO PRINTABLE OCTAL,
 5454 0112 OCTEQV
 5455 4541 TYPE /PRINT CHARACTER
 5456 4573 KMSG5
 5457 6537 TAD WTS6A
 5460 1112 TAD C=-377
 5461 1144 SZA CLA /WAS IT A RUBOUT?
 5462 7640 JMP P6T2A /NO,
 5463 5247 JMP I CHAIN /YES, CHAIN
 5464 5425

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

PRG7, SETLOC /SET INTERRUPT SERVICE
 5465 4577 2 /ADDRESS TO INTSVC
 5466 0002 INTSVC
 5467 1254 SETLOC /SET DATA BLOCK LENGTH
 5470 4577 BLKCNT /TO -150
 5471 0101 -226
 5472 7552 JMS I KBFLAG
 5473 4426 JMS STBF /SET UP BUFFER AREA
 5474 4776 SETLOC /SET KSTART TO INITIAL
 5475 4577 KSTART /ROUTINE ADDRESS
 5476 0023 P7T0
 5477 5502 JMP I ,+1 /START PROGRAM
 5500 5701 SRSET
 5501 0236

P7T0, 0
 5502 0000 P7T1
 5503 5506 JMS I FBF /DATA: ABC
 5504 4435 A
 5505 6107 P7T1, 1
 5506 0001 P7T2
 5507 5512 JMS I FBF /DATA: DEF
 5510 4435 D
 5511 6112

5512	0002	P7T2,	2	
5513	5516		P7T3	
5514	4435		JMS I FBF	/DATAI GHI
5515	5115		G	
5516	0003	P7T3,	3	
5517	5522		P7T4	
5520	4435		JMS I FBF	/DATAI JKL
5521	6120		J	
5522	0004	P7T4,	4	
5523	5526		P7T5	
5524	4435		JMS I FBF	/DATAI MNO
5525	6123		H	
5526	0005	P7T5,	5	
5527	5532		P7T6	
5530	4435		JMS I FBF	/DATAI POR
5531	6126		P	
5532	0006	P7T6,	6	
5533	5536		P7T7	
5534	4435		JMS I FBF	/DATAI STU
5535	6131		S	
5536	0007	P7T7,	7	
5537	5542		P7T10	
5540	4435		JMS I FBF	/DATAI VWX
5541	6134		V	
5542	0010	P7T10,	10	
5543	5546		P7T11	
5544	4435		JMS I FBF	/DATAI YZ0
5545	6137		Y	
5546	0011	P7T11,	11	
5547	5552		P7T12	
5550	4435		JMS I FBF	/DATAI 123
5551	6142		ONE	
5552	0012	P7T12,	12	
5553	5556		P7T13	
5554	4435		JMS I FBF	/DATAI 456
5555	6145		FOUR	
5556	0013	P7T13,	13	
5557	5562		P7T14	
5560	4435		JMS I FBF	/DATAI 789
5561	6150		SEVEN	
5562	0014	P7T14,	14	
5563	5566		P7T15	
5564	4435		JMS I FBF	/DATAI !"#
5565	6153		C241	
5566	0015	P7T15,	15	
5567	5572		P7T16	
5570	4435		JMS I FBF	/DATAI \$%&
5571	6156		C244	
5572	0016	P7T16,	16	
5573	5600		P7T17	
5574	4435		JMS I FBF	/DATAI '()
5575	6161		C247	
5576	1000			
5577	1650			

	5600		PAGE	
5600	0017	P7T17,	17	
5601	5604		P7T20	
5602	4435		JMS I FBF	/DATAI *+;
5603	6164		C252	
5604	0020	P7T20,	20	
5605	5610		P7T21	
5606	4435		JMS I FBF	/DATAI -./
5607	6167		C255	
5610	0021	P7T21,	21	
5611	5614		P7T22	
5612	4435		JMS I FBF	/DATAI ! <
5613	6172		C272	
5614	0022	P7T22,	22	
5615	5620		P7T23	
5616	4435		JMS I FBF	/DATAI =>?
5617	6175		C275	
5620	0023	P7T23,	23	
5621	5624		P7T24	
5622	4435		JMS I FBF	/DATAI @C\
5623	6200		C300	
5624	0024	P7T24,	24	
5625	5630		P7T25	
5626	4435		JMS I FBF	/DATAI]^ AND LEFT ARROW
5627	6203		C335	
5630	0025	P7T25,	25	
5631	5634		P7T26	
5632	4777/		JMS FBALL	/DATAI ALL PRINTABLE ASCII
5633	4776/		JMS CNTST	
5634	0026	P7T26,	26	
5635	5640		P7T27	
5636	4775/		JMS FW336	/DATAI ASR33 PRINTER WORST CASE
5637	4776/		JMS CNTST	/PATTERN
5640	0027	P7T27,	27	
5641	5644		P7T30	
5642	4774/		JMS FW356	/DATAI ASR35 PRINTER WORST CASE
5643	4776/		JMS CNTST	/PATTERN
5644	0030	P7T30,	30	
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	PRG10,	JMS I SYNC	/SYNC TAPE
5652	3321		DCA ERRCTR	/CLEAR ERROR COUNTER
5653	4466		JMS I INPATT	/INITIALIZE PATTERN,
5654	4571		UKCC	/START READER
5655	7604	SRT0A,	LAS	/READ SR


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5656 0120      AND [400
5657 7650      SNA CLA      /STALL? (SR3#0)
5660 7040      CMA        /YES
5661 3064      DCA STLID   /NO

5662 4467      SRT00, JMS I GETPT /GET PATTERN CHAR,
5663 3273      DCA SBSP   /STORE AT SBSP,
5664 4556      STALL      /STALL
5665 4572      UKSF      /READY?
5666 5265      JMP ,=1     /TEST AGAIN,
5667 4567      UKRB      /READ, CLEAR AC AND FLAG,
5670 3103      DCA ERRCR
5671 1103      TAD ERRCR
5672 4470      JMS I CHECK /GO CHECK CHARACTER WORD,
5673 0000      SBSP, 0      /
5674 7410      SKP      /ERROR, NO MATCH, GO INC, ERRCNT
5675 5313      JMP HLTST  /OK,
5676 2321      ERRCNT, ISZ ERRCTR /INCREMENT ERROR COUNTER
5677 5302      JMP ,+3
5678 7240      CLA CMA   /DFLOW, RESET TO 7777,
5679 3321      DCA ERRCTR
5672 7604      LAS        /READ SR,
5673 0143      AND [100
5674 7650      SNA CLA   /HALT ON ERROR? (SR5)
5675 5313      JMP HLTST  /NO,
5676 1103      TAD ERRCR  /YES, GET BAD CHAR,
5677 7402      HLT
5678 7200      CLA
5679 1273      TAD SBSP   /GET GOOD CHARACTER
5672 7402      HLT
5673 7604      HLTST, LAS /READ SR
5674 7700      SMA CLA   /HALT? (SR0)
5675 5255      JMP SRT0A  /NO,
5676 1321      TAD ERRCTR /GET ERROR COUNT
5677 7402      HLT      /HALT, ERROR COUNT IN AC
5678 5255      JMP SRT0A
5672 0000      ERRCTR, 0 /ERROR COUNTER

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

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5722 4772/ PRG11, JMS STBF
5723 4573      TYPE
5724 6546      P11MG1
5725 1371      PRG11A, TAD (BLOCK1-1
5726 3016      DCA I 16
5727 4573      TYPE
5728 6562      P11MG2
5729 4353      JMS GKBCR
5730 3416      DCA I 16
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

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5740 1144      TAD [-377
5741 7640      SZA CLA      /STALL?
5742 7240      CLA CMA   /YES,
5743 3064      DCA STLID /NO,
5744 4773/ JMS FBF3   /SET UP LINE,
5745 6601      BLOCK1
5746 4770/ JMS TYPLN  /TYPE LINE OF CHARACTERS
5747 7604      LAS        /READ SR,
5748 7700      SMA CLA   /CHANGE DATA? (SP0#1)
5749 5346      JMP ,=3     /NO,
5750 5325      JMP PRG11A /YES,
5751 0000      GKBCR, OPEN /SUB TO GET KEYBOARD CHARACTER,
5752 4572      UKSF      /WAIT FOR FLAG,
5753 5354      JMP ,=1
5754 4567      UKRB      /READ CHARACTER,
5755 7421      MQL      /STORE CHARACTER,
5756 7701      ACL      /GET IT BACK,
5757 4474      JMS I UPUNCH /ECHO IT,
5758 7701      ACL      /GET CHARACTER AGAIN,
5759 5753      JMP I GKBCR /EXIT

```

/PROGRAM 12, PUNCHES BINARY COUNT PATTERN,

```

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

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

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PAGE

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6000 0000      DVCSSEL, OPEN /DEVICE CODE SELECT ROUTINE,
6001 1117      TAD [INTAB /GET START ADDR OF INPUT IOT TABLE,
6002 3052      DCA TEMP   /AND SAVE AT TEMP,
6003 1021      TAD TTYIOT /OBTAIN NEW INPUT IOT AND
6004 7012      RTR      /STORE AT UTEMP,
6005 7010      RAR
6006 0116      AND [0770
6007 3104      DCA UTEMP
6008 4222      JMS DVCOM
6009 1115      TAD [OUTTAB /PERFORM INPUT IOT SELECTION,
6010 3052      DCA TEMP   /GET START ADDR OF OUTPUT IOT TABLE,
6011 1021      TAD TTYIOT /AND OBTAIN NEW OUTPUT IOT AND
6012 7006      RTL      /OBTAIN NEW OUTPUT IOT AND
6013 7004      RAL      /STORE AT UTEMP,
6014 0116      AND [0770
6015 3104      DCA UTEMP

```

6020	4222	JMS DVCOM	/PERFORM OUTPUT IOT SELECTION;
6021	5600	JMP I DVCSEL	/EXIT DVCSEL;
6022	0000	DYCOM, OPEN	/COMMON SUB TO SELECT IOT/S,
6023	1452	TAD I TEMP	
6024	7450	SNA	/0?
6025	5622	JMP I DVCOM	/YES, EXIT
6026	3105	DCA UTEMP1	
6027	1505	TAD I UTEMP1	
6030	0114	AND C7007	/REMOVE OLD DEVICE CODE;
6031	1104	TAD UTEMP	/INSERT NEW DEVICE CODE;
6032	3505	DCA I UTEMP1	/PUT BACK NEW IOT CODE;
6033	2052	ISE TEMP	/SET UP FOR NEXT IOT CODE;
6034	5223	JMP DVCOM+1	

6035	0720	INTAB, XKSF+1	
6036	0725	XKCC+1	
6037	0731	XKRS+1	
6040	0735	XKRB+1	
6041	0756	XKCR+1	
6042	0762	XKIE+1	
6043	2021	INTKSF	
6044	1233	RSSERV	
6045	1264	INKSF	
6046	1433	IN0	
6047	0000	0	
6050	0741	OUTTAB, XTSF+1	
6051	0746	XTCF+1	
6052	1172	XTPC+1	
6053	0752	XTLS+1	
6054	1166	XSPF+1	
6055	0766	XSPI+1	
6056	1261	INTCF	
6057	1257	INTSF	
6060	2024	INTTSF	
6061	2114	OUT0	
6062	2121	OUT1	
6063	2123	OUT2	
6064	0000	0	
6065	0247	A33WP6, 0247	/"
6066	0337	0337	/LEFT ARROW
6067	0327	0327	/" </td
6070	0257	0257	/" </td
6071	0327	0327	/" </td
6072	0337	0337	/LEFT ARROW
6073	0247	A35WP6, 0247	/" </td
6074	0333	0333	/" </td
6075	0277	0277	/?"
6076	0303	0303	/" </td
6077	0277	0277	/?"
6100	0333	0333	/" </td
6101	0316	A37WP6, 0316	/BIG N

6102	0361	0361	/SMALL Q
6103	0301	0301	/BIG A
6104	0376	0376	/SWUNG DASH
6105	0301	0301	/BIG A
6106	0361	0361	/SMALL Q
6107	0301	A, 301	
6110	0302	302	
6111	0303	303	
6112	0304	D, 304	
6113	0305	305	
6114	0306	306	
6115	0307	G, 307	
6116	0310	310	
6117	0311	311	
6120	0312	J, 312	
6121	0313	313	
6122	0314	314	
6123	0315	H, 315	
6124	0316	316	
6125	0317	317	
6126	0320	P, 320	
6127	0321	321	
6130	0322	322	
6131	0323	S, 323	
6132	0324	324	
6133	0325	325	
6134	0326	V, 326	
6135	0327	327	
6136	0330	330	
6137	0331	Y, 331	
6140	0332	332	
6141	0260	260	
6142	0261	ONE, 261	
6143	0262	262	
6144	0263	263	
6145	0264	FOUR, 264	
6146	0265	265	
6147	0266	266	
6150	0267	SEVEN, 267	
6151	0270	270	
6152	0271	271	
6153	0241	C241, 241	
6154	0242	242	
6155	0243	243	
6156	0244	C244, 244	
6157	0245	245	
6160	0246	246	
6161	0247	C247, 247	
6162	0250	250	
6163	0251	251	
6164	0252	C252, 252	
6165	0253	253	
6166	0254	254	

6167	0255	C255,	255	
6170	0256		256	
6171	0257		257	
6172	0272	C272,	272	
6173	0273		273	
6174	0274		274	
6175	0275	C275,	275	
6176	0276		276	
6177	0277		277	
6200	0300	C300,	300	
6201	0333		333	
6202	0334		334	
6203	0335	C335,	335	
6204	0336		336	
6205	0337		337	
6206	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	SH,	355	
6223	0356		356	
6224	0357		357	
6225	0360	SP,	360	
6226	0361		361	
6227	0362		362	
6230	0363	SS,	363	
6231	0364		364	
6232	0365		365	
6233	0366	SV,	366	
6234	0367		367	
6235	0370		370	
6236	0371	SY,	371	
6237	0372		372	
6240	0340		340	
6241	0373	C373,	373	
6242	0374		374	
6243	0375		375	
6244	0376		376	
6245	0377	C377,	377	
6246	0000		000	
6247	0377		377	
6250	4543	CARLF,	TEXT	'X##?'
6251	0077			
6252	0000			
6253	4543	BKSPT,	TEXT	'X##BACKSPACE TESTX##?'
6254	4302			

6255	0103			
6256	1323			
6257	2001			
6260	0305			
6261	4024			
6262	0523			
6263	2445			
6264	4343			
6265	0077			
6266	0000			
6267	4543	TBTST,	TEXT	'X##TAB TESTX##?'
6270	4324			
6271	0102			
6272	4024			
6273	0523			
6274	2445			
6275	4343			
6276	0077			
6277	0000			
6300	4040	TBMRK,	TEXT	' /?'
6301	4040			
6302	4040			
6303	4040			
6304	5700			
6305	7700			
6306	4040	TBMRK1,	TEXT	' /?'
6307	4040			
6310	4040			
6311	4057			
6312	0077			
6313	0000			
6314	5511	RM33B,	TEXT	'=-[?'
6315	5500			
6316	7700			
6317	5555	RM37i,	TEXT	'---[?'
6320	5555			
6321	1155			
6322	1100			
6323	7700			
6324	3440	SPTSTC,	TEXT	'\ @?'
6325	0077			
6326	0000			
6327	4543	CRTST,	TEXT	'X##CR TESTX##?'
6330	4303			
6331	2240			
6332	2405			
6333	2324			
6334	4543			
6335	4300			
6336	7700			
6337	4543	RMTST,	TEXT	'X##RIGHT MARGIN TESTX##?'
6340	4322			
6341	1107			
6342	1024			
6343	4015			

6344 0122
6345 0711
6346 1640
6347 2405
6350 2324
6351 4543
6352 4300
6353 7700
6354 4543 SPTST, TEXT 'X##SPACE TESTX##?'
6355 4323
6356 2001
6357 0305
6360 4024
6361 0523
6362 2445
6363 4343
6364 0077
6365 0000
6366 4543 LFTST, TEXT 'X##LF TESTX##?'
6367 4314
6370 0640
6371 2405
6372 2324
6373 4543
6374 4300
6375 7700
6376 4543 CRTST, TEXT 'X##CHARACTER TESTS##?'
6377 4303
6400 1001
6401 2201
6402 0324
6403 0522
6404 4024
6405 0523
6406 2423
6407 4543
6410 4300
6411 7700
6412 4543 WCPTST, TEXT 'X##WORST CASE PATTERN TESTX##?'
6413 4327
6414 1722
6415 2324
6416 4003
6417 0123
6420 0540
6421 2001
6422 2424
6423 0522
6424 1640
6425 2405
6426 2324
6427 4543
6430 4300
6431 7700
6432 4543 KMSG1, TEXT 'X##KYBD TESTX##?'

6433 4313
6434 3102
6435 0440
6436 2405
6437 2324
6440 4543
6441 0077
6442 0000
6443 4543 KMSG2, TEXT 'X##PRESS A KEYX##?'
6444 2022
6445 0523
6446 2340
6447 0140
6450 1305
6451 3145
6452 4300
6453 7700
6454 4543 KMSG3, TEXT 'X##ECHO TEST'
6455 0503
6456 1017
6457 4024
6460 0523
6461 2400
6462 4543 KMSG3A, TEXT 'X##CHARACTER KEYED WILL BE TYPED.'
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 TEXT 'X##RUBOUT ENDS ROUTINE,X##?'
6504 2225
6505 0217
6506 2524
6507 4005
6510 1604
6511 2340
6512 2217
6513 0524
6514 1116
6515 0556
6516 4543
6517 4300
6520 7700
6521 4543 KMSG4, TEXT 'X##OCTAL EQUIVALENT TEST?'

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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   KMSG5, TEXT   '#!'
6540 0000
6541 4040   OCTEQV, TEXT   '#0?'
6542 4040
6543 4543
6544 0077
6545 0000
6546 4543   P11MG1, TEXT   '#PRINTER EXERCISER#0?'
6547 2022
6550 1116
6551 2405
6552 2240
6553 0530
6554 0522
6555 0311
6556 2305
6557 2245
6560 4300
6561 7700
6562 4543   P11MG2, TEXT   '#TYPE IN DATA 10?'
6563 2431
6564 2005
6565 4011
6566 1640
6567 0401
6570 2401
6571 4072
6572 0077
6573 0000
6574 2540   BKSU, TEXT    '#U 0?'
6575 0077
6576 0000
6577 0000   END, 0        /BEG OF 1000 WORD BUFFER

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0114 7007
0115 6050
0116 0770
0117 6035
0120 0400
0121 7767
0122 7730

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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	CLA	7200	HLTD	2076	MTON	6117
A33WP6	6065	CNTST	1600	HLTST	5713	MTRS	6127
A35WP6	6073	GNV	1671	40LD1	3346	NTST	1546
A37WP6	6101	CR	0107	IBIN	0436	NTSTA	1595
AC	0077	CRAF	0562	IN0	1433	NXTST	2056
ACL	7701	CRCTR	0561	INCKTN	0261	OCTEOV	6541
ASCCN	1650	CRLF	4575	INKSF	1284	ONE	6142
ASCT	1706	CRST	6327	INPAT	0066	OPEN	2000
BAUCDN	1537	CRSTA	4456	INTAB	6035	OUT	1271
BAUDRT	0022	CRSTB	4461	INTCF	1261	OUT0	2114
BAUTAB	0504	CTRA	0062	INTFND	2017	OUT1	2121
BDREY	0205	CTRB	0063	INTKSF	2021	OUT2	2123
BKSCTR	9262	CTSK	0550	INTSF	1257	OUTTAB	6050
BKSPC	5263	CURTST	0054	INTSVC	1254	P	6126
BKSPT	6253	D	6112	INTTSF	2024	P0E0A	2237
BKSU	6574	DBLK	7577	IOF	6002	P0E0B	2244
BLK2	6724	DELAY	4576	ION	6001	P0E0C	2253
BLKBR	6722	DELAYM	0024	J	6120	P0E0E	2262
BLKCC	7034	DELAYS	0102	K5200	2735	P0E1A	2374
BLKGNT	0101	DLCNT	0474	KBFLAG	0026	P0E1R	2315
BLOCK1	6611	DLCNT1	0027	KCC	6032	P0E2A	2415
BLOCK2	6713	DLMSR	1474	KCR	6030	P0E2B	2427
BLOCKA	6577	DLYMS	7337	KFLAG	1365	P0E2C	2435
BLOCKB	6711	DLYMSK	0111	KIE	6075	P0E2D	2443
BLOCKC	7023	DVCOM	6022	KMSG1	6432	P0E2E	2456
BSW	7002	DVSEL	6000	KMSG2	6443	P0E2F	2465
C241	6153	END	6577	KMSG3	6454	P0E2G	2474
C244	6156	ERRCNT	5676	KMSG3A	6462	P0E3A	2527
C247	6161	ERRCR	0103	KMSG4	6521	P0E3B	2534
C252	6164	ERRCTR	5721	KMSG5	6537	P0E3C	2540
C255	6167	ERROR	1440	KRB	6036	P0E4A	2627
C272	6172	FADDR	0623	KRS	6034	P0E4B	2614
C275	6175	FBA33	1102	KSF	6031	P0E5A	2654
C300	6200	FBALL	1066	KSTART	0023	P0F5B	2656
C335	6203	FBF	0035	LAS	7694	P0E6A	2670
C373	6241	FBF3	1031	LF	0110	P0E6B	2675
C377	6245	FBF33	1055	LFTST	6366	P0E6C	2701
CAF	6007	FBFI	2144	LFTSTA	4612	P0E6D	2712
CAM	7621	FETCH	1646	LINK	0170	P0E6E	2724
CARLF	6250	FLAG	0716	M	6123	P0E6F	2731
CHAIN	0025	FORWD	0302	M147	7631	P0E7A	2750
CHAINN	0263	FOUR	6145	M3	2111	P0E7B	2754
CHKC	0513	FW336	1117	MCTR	0625	P0E7C	2757
CHECK	0070	FW356	1135	MIL1	0061	P076	2660
CHRCNT	0456	FW376	1153	MILCTR	0060	P076A	2663
CHRTST	6376	G	6115	MINT	6115	P076B	2671
CK33	0352	GETPT	0067	MOVE	4574	P076C	2676
CK35	0360	GETRDY	0237	MOVEA	0613	P076D	2702
CK37	0366	GKRCR	5733	MOVEE	0600	P076E	2713
CKSR33	4554	GTBIN	0444	MQL	7421	P076F	2725
CKSR35	4553	GTF	6004	MSCTR	0057	P077	2736
CKSR37	4555	HLT	7402	MTABP	2162	P077A	2744

P077B	2751	P1711	3400	P2E7B	4021	P4T45A	5102
P077C	2755	P1711A	3405	P2T10	4030	P4T46A	5116
P0780	2205	P1712	3435	P2T10A	4034	P4TS0	4442
P0780A	2211	P1712A	3443	P2T10B	4045	P4TS1	4475
P0780B	2214	P1712B	3456	P2T10C	4051	P4TS10	4645
P0780C	2222	P17S0	3005	P2T10D	4054	P4TS11	4651
P0780D	2225	P17S1	3010	P2T10E	4064	P4TS12	4655
P0780E	2230	P17S1A	3014	P2T10F	4066	P4TS13	4661
P07S1	2270	P17S2	3034	P2T11	4153	P4TS14	4665
P07S1A	2275	P17S2A	3040	P2T11A	4157	P4TS15	4671
P07S1B	2313	P17S2B	3046	P2T11B	4166	P4TS16	4675
P07S1C	2324	P17S3	3066	P2T11C	4200	P4TS17	4701
P07S2	2327	P17S3A	3074	P2T12	4233	P4TS2	4525
P07S2A	2332	P17S4	3126	P2T12A	4247	P4TS20	4705
P07S2B	2342	P17S4A	3133	P2T12B	4255	P4TS21	4711
P07S2C	2345	P17S4B	3153	P2T12C	4240	P4TS22	4715
P07S2D	2350	P17S4C	3167	P2T12D	3510	P4TS23	4721
P07S2E	2400	P17S5	3200	P2TS0A	3513	P4TS24	4725
P07S2F	2402	P17S5A	3204	P2TS1	3530	P4TS25	4731
P07S2G	2404	P17S5B	3211	P2TS1A	3533	P4TS26	4735
P07S3	2504	P17S5C	3213	P2TS1B	3534	P4TS27	4741
P07S3A	2510	P17S5D	3217	P2TS2	3545	P4TS3	4600
P07S3B	2515	P17S5E	3222	P2TS2A	3551	P4TS30	4745
P07S3C	2521	P17S6	3271	P2TS3	3600	P4TS31	4751
P07S4	2544	P17S6A	3277	P2TS3A	3606	P4TS32	4755
P07S4A	2547	P17S7	3314	P2TS4	3630	P4TS33	4761
P07S4B	2565	P17S7A	3322	P2TS4A	3635	P4TS34	5000
P07S4C	2600	P2E0	3524	P2TS4B	3655	P4TS35	5004
P07S5	2616	P2E1	3543	P2TS4C	3666	P4TS36	5010
P07S5A	2624	P2E10A	4073	P2TS5	3671	P4TS37	5014
P07S5B	2640	P2E10B	4107	P2TS5A	3677	P4TS4	4623
P11MG1	6546	P2E10C	4115	P2TS6	3711	P4TS40	5020
P11MG2	6562	P2E10D	4123	P2TS6A	3716	P4TS41	5024
P1E11A	3424	P2E10E	4135	P2TS6B	3724	P4TS42	5030
P1E12A	3464	P2E10F	4144	P2TS6C	3734	P4TS43	5047
P1E12B	3474	P2E11A	4206	P2TS7	3742	P4TS44	5054
P1E1A	3025	P2E11B	4215	P2TS7A	4000	P4TS45	5072
P1F2A	3053	P2E11C	4224	P2TS7B	4006	P4TS46	5106
P1E2B	3062	P2E12A	4276	P3E0	4337	P4TS47	5122
P1E3A	3113	P2E12B	4303	P3E1	4371	P4TS5	4631
P1E3B	3122	P2E12C	4305	P3E2	4427	P4TS50	5231
P1E4A	3143	P2E2A	3562	P3T0B	4334	P4TS6	4635
P1E5	3250	P2E2B	3564	P3T1B	4366	P4TS7	4641
P1E5A	3250	P2E3A	3621	P3T2C	4424	P6E0	5415
P1E5B	3235	P2E3B	3623	P3TS0	4314	P6T0	5400
P1E5C	3242	P2E4A	3644	P3TS0A	4324	P6T1	5421
P1E5D	3257	P2E4B	3657	P3TS1	4344	P6T1A	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
P1710	3325	P2E6C	3756	P3TS2B	4411	P770	5502
P1710A	3333	P2E7A	4015	P4T44A	5066	P771	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	2126
P7T14	5562	RCTRA	1511	SM	6222	TLCALL	0033
P7T15	5566	RCTRB	1512	SNOREC	3353	TLS	6046
P7T16	5572	RDBLK	1400	SP	6225	TPC	6044
P7T17	5600	RDBLKR	1407	SPAC	0207	TRDATA	3337
P7T18	5512	RDRSPV	1420	SPCNT	5161	TSC1	0634
P7T20	5604	RDSRV	1430	SPCTR	5142	TSC2	0643
P7T21	5610	RGNA	0400	SPF	6040	TSF	6041
P7T22	5614	RGNB	0417	SPI	6045	TTYIOT	0021
P7T23	5620	RM33A	1563	SPIND	1716	TTYTYP	0020
P7T24	5624	RM33B	6314	SPT0	1714	TYPAT	0654
P7T25	5630	RM37A	6317	SPT1	1715	TYPE	4573
P7T26	5634	RMB	4523	SPTST	6354	TYPEA	1637
P7T27	5640	RMTST	6337	SPTSTA	4545	TYPLN	1627
P7T3	5516	RMTSTA	4546	SPTSTB	4546	TYPLN3	1615
P7T30	5644	RP1A	0415	SPTSTC	6324	TYPSP	0660
P7T4	5522	RP1B	0434	SRQ	6003	TYPSTG	0026
P7T5	5526	RP2A	0416	SRSET	0236	UKCC	4571
P7T6	5532	RP2B	0435	SRT0A	5655	UKCR	4562
P7T7	5536	RRDY	1343	SRT0B	5662	UKIE	4561
PADDR	1342	RRPP	0304	SS	6230	UKRB	4567
PBLK	1316	RSCTR	1232	ST33B	1030	UKRS	4570
PBLKR	1324	RSSERV	1233	STAL	0551	UKSF	4572
PCTR	1341	RSTUP	1351	STALL	4556	UMOVE	0075
PDCR	1310	RSYNC	1216	START	0200	UOUT	0072
PFLAG	0071	RTF	6005	STBAUD	1513	UPUNCH	0074
PLTLR	1200	RTNNO	0055	STBF	1000	USPF	4560
PRG0	2200	RUDONE	1456	STCTR	0326	USPI	4557
PRG1	3000	S	6131	STLID	0064	UTCF	4565
PRG10	5651	S100	0030	SV	6233	UTEMP	0104
PRG11	5722	S100I	2012	SY	6236	UTEMP1	0105
PRG11A	5725	S200	0032	SYNC	0065	UTEMP2	0106
PRG12	5764	S200I	2005	SYNK	0530	UTLS	4563
PRG2	3503	S4000	0031	SYNKA	0534	UTPC	4564
PRG3	4307	S4000I	2000	TABCTR	5200	UTPLN3	0073
PRG4	4434	SA	6206	TABP	5201	UTSF	4566
PRG5	5274	SASC	1705	TABPA	5220	V	6134
PRG5A	5317	SB	1435	TADDR	0624	VCTR	1267
PRG6	5340	SB0	4332	TBCNT	5140	WASC	1704
PRG7	5465	SB1	4364	TBMRK	6300	WCHK	0527
PRGADR	0235	SB2	4420	TBMRK1	6306	WCPTST	6412
PRGEND	0300	SBSP	5673	TBTA	5134	WQSHS	2153
PRGNUM	0036	SCNT	0473	TBTB	5146	WTS6A	7112
PRGTAB	0037	SD	6211	TBTST	6267	XKCC	0724
PRINT	0671	SETLOC	4577	TCF	6042	XKCR	0755
PSYUP	1277	SETRND	1740	TCTR	1647	XKIE	0761
PSYNC	1212	SEVEN	6150	TEMP	0052	XKR8	0734
PT0	0442	SG	6214	TEMP1	0053	XKRS	0730
PT1	0443	SGET	1717	TEHQ	0714	XKSF	0717

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