

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

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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 KEY-BOARD/READER TO BE TESTED,
(EG: READER CODE OF 03, SR0-5=03,
3. SET SR 6 THROUGH 11 TO THE DEVICE CODE OF THE PRINTER/PUNCH TO BE TESTED,
(EG: PRINTER CODE OF 04, SR6-11=04,
4. PRESS DEPOSIT,

C. SET LOCATION 0022 AS FOLLOWS:

1. LOAD ADDRESS 0022,
2. PLACE THE FOLLOWING IN THE SRI
0110 FOR 110 BAUD, OR
0150 FOR 150 BAUD, OR
0300 FOR 300 BAUD, OR
0600 FOR 600 BAUD, OR
1200 FOR 1200 BAUD, 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
ENTERES 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
ENTERES 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
ENTERES 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 ENTERES 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 ENTERES 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
ENTERES SCOPE LOOP THAT ISSUES SPI WITH PRINTER
FLAG SET AND TTY INTERRUPT DISABLED, MANUAL
RESTART,

(6,1 CONT'D)

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

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

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

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

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

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

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

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

(6,1 CONT'D)

LOC 2607 PRG0, ROUTINE 4, ERROR HALT A, PRINTER FLAG SET PRIOR TO 9 BIT TIMES, (EG, 110 BAUD: 9×9.09 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 229), 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 9.55×9.09 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)

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| LOC 2754 | PRG0, ROUTINE 7, ERROR HALT B, RTF INSTRUCTION FAILED TO SET LINK WITH ADDR=1, NO SCOPE LOOP, MANUAL RESTART; |
| LOC 2757 | PRG0, ROUTINE 7, ERROR HALT C, RTF INSTRUCTION FAILED TO TURN THE INTERRUPT ON, NO SCOPE LOOP, MANUAL RESTART; |
| LOC 3025 | PRG1, ROUTINE 1, ERROR HALT A, RECEIVER FLAG NOT SETTING UPON COMPLETION OF ISSUING A TLS OR KSF FAILED TO SKIP ON RECEIVER FLAG SET, PRESSING CONTINUE ENTERS SCOPE LOOP THAT CLEARS THE RECEIVER FLAG AND ISSUES A TLS AND WAITS TWICE THE TIME FOR THE FLAG TO SET AND THEN ISSUES A KSF, MANUAL RESTART; |
| LOC 3053 | PRG1, ROUTINE 2, ERROR HALT A, SAME AS PRG1, ROUTINE 1, ERROR HALT A, |
| LOC 3062 | PRG1, ROUTINE 2, ERROR HALT B, KSF INSTRUCTION FAILED TO SKIP ON RECEIVER FLAG, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KSF CONTINUOUSLY, MANUAL RESTART; |
| LOC 3113 | PRG1, ROUTINE 3, ERROR HALT A, SAME AS PRG1, ROUTINE 1, ERROR HALT A, |
| LOC 3122 | PRG1, ROUTINE 3, ERROR HALT B, KSF INSTRUCTION SKIPPED ON RECEIVER FLAG NOT SET, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES KSF WITH NO RECEIVER FLAG SET CONTINUOUSLY, MANUAL RESTART; |
| LOC 3160 | PRG1, ROUTINE 4, ERROR HALT A, THE READER FLAG FAILED TO CAUSE AN INTERRUPT, PRESSING CONTINUE ENTERS SCOPE LOOP THAT TURNS THE INTERRUPT ON CONTINUOUSLY, MANUAL RESTART; |
| LOC 3230 | PRG1, ROUTINE 5, ERROR HALT A, SRQ INSTRUCTION FAILED TO SKIP ON READER FLAG SET AND TELETYPE INTERRUPT ENABLE FLIP-FLOP ENABLED, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SRQ CONTINUOUSLY WITH TTY ENABLED AND READER FLAG SET, MANUAL RESTART; |
| LOC 3235 | PRG1, ROUTINE 5, ERROR HALT B, SPI INSTRUCTION FAILED TO SKIP ON READER FLAG SET AND TELETYPE INTERRUPT ENABLE FLIP-FLOP ENABLED, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES SPI CONTINUOUSLY WITH TTY ENABLED AND READER FLAG SET, MANUAL RESTART; |
| LOC 3242 | PRG1, ROUTINE 5, ERROR HALT C, CAF INSTRUCTION FAILED TO CLEAR THE READER FLAG, PRESSING CONTINUE ENTERS SCOPE LOOP THAT ISSUES CAF CONTINUOUSLY WITH THE RECEIVER FLAG SET, MANUAL RESTART; |

(6,1 CONT'D)

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|----------|---|
| 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

- NOTE1 ON THE 40 PIN SIDE CONNECTOR: PIN E MUST BE CONNECTED TO PIN M, PIN F MUST BE CONNECTED TO PIN J.
- RTN01 CHECKS THAT KCC WILL CLEAR THE AC, TEST IS DONE 100 TIMES,
- RTN11 TLS IS USED TO SEND DATA AND KSF CHECKS TO SEE IF THE RECEIVER FLAG SET UPON COMPLETION OF RECEIVING THE DATA, TEST IS DONE 100 TIMES,
- RTN21 TEST OF KSF TO SKIP ON RECEIVER FLAG CONSISTENTLY, TEST IS DONE 4000 TIMES,
- RTN31 TEST OF KSF TO NOT SKIP ON NO RECEIVER FLAG, TEST IS DONE 500 TIMES,
- RTN41 CHECKS THAT NO OTHER DEVICE CAN CAUSE AN INTERRUPT AND THAT THE READER FLAG WILL INTERRUPT, TEST IS DONE 1000 TIMES,
- RTN51 CHECKS THE ABILITY OF:
 SRQ TO SKIP ON A READER INTERRUPT
 SPI TO SKIP ON A READER INTERRUPT
 CAF TO CLEAR KBRD/READER FLAG,
 SRQ TO NOT SKIP ON NO READER FLAG
 SPI TO NOT SKIP ON NO READER FLAG
 TEST IS DONE 100 TIMES,
- RTN61 CHECKS THAT THE READER FLAG SETS NO LATER THAN THE REQUIRED TIME FOR IT TO SET,
 110 BAUD = 100 MSEC,
 150 BAUD = 66,7 MSEC,
 300 BAUD = 33,3 MSEC,
 600 BAUD = 16,7 MSEC,
 1200 BAUD = 8,33 MSEC,
 2400 BAUD = 4,16 MSEC,
 TEST IS DONE 100 TIMES,
- RTN71 CHECKS DATA HANDLING CAPABILITIES BY SENDING A NUMBER FOLLOWED BY ITS COMPLEMENT, TEST IS DONE 512 TIMES,
- RT101 CHECKS DATA HANDLING CAPABILITIES BY SENDING RANDOM NUMBERS, TEST IS DONE 512 TIMES,
- RTN111 CHECKS THAT KRS CAN "INCLUSIVE OR" READER BUFFER WITH AC, TEST IS DONE 500 TIMES,
- RTN121 CHECKS THAT KRB WILL "JAM TRANSFER" RECEIVER BUFFER TO AC, AND THAT KRB WILL CLEAR READER FLAG, TEST IS DONE 500 TIMES,

PRG2 - BASIC INPUT LOGIC TESTS (CURRENT)

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

- 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: YZ0      "
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 W7W
      LEFT ARROW;
```

(8,5 CONT'D)

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

THE ASR35 WORST CASE PATTERN USED IS /C?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 @[\
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-DWKLD-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 = 100 MSEC
/0150 BAUD      10 BITS * 6.67 MSEC = 66.7 MSEC
/0300 BAUD      10 BITS * 3.33 MSEC = 33.33 MSEC
/0600 BAUD      10 BITS * 1.67 MSEC = 16.67 MSEC
/1200 BAUD      10 BITS * .833 MSEC = 8.33 MSEC
/2400 BAUD      10 BITS * .416 MSEC = 4.167 MSEC
/*****
/
6001 ION=6001      /TURN INTERRUPT ON;
6002 IOF=6002      /TURN INTERRUPT OFF.
6003 SRO=6003      /SKIP IF INTERRUPT REQUEST.
6004 GTF=6004      /GET INTERRUPT FLAGS
6005 RTF=6005      /RESTORE INTERRUPT FLAGS AND TURN INTERRUPT ON
6007 CAF=6007      /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT
6030 KCR=6030      /CLEAR KBRD FLAG BUT DO NOT SET RDR RUN
6031 KSF=6031      /SKIP IF KEYBOARD/READER FLAG = 1.
6032 KCC=6032      /CLEAR AC AND KBRD/READER FLAG, SET READER RUN.
6034 KRS=6034      /READ KEYBOARD/READER BUFFER STATIC
6035 KIE=6035      /ENABLE TTY INTERRUPT WHEN AC11 EQUALS 1
6036 KRB=6036      /CLEAR AC, READ KEYBOARD BUFFER, CLEAR
                        /KEYBOARD FLAGS.
6040 SPF=6040      /SET PRINTER FLAG.
6041 TSF=6041      /SKIP IF TELEPRINTER/PUNCH FLAG = 1.
6042 TCF=6042      /CLEAR TELEPRINTER/PUNCH FLAG.
6044 TPC=6044      /LOAD TELEPRINTER/PUNCH BUFFER
                        /SELECT AND PRINT.
6045 SPI=6045      /SKIP IF TTY INTERRUPT
6046 TLS=6046      /LOAD TELEPRINTER/PUNCH BUFFER,
                        /SELECT AND PRINT AND CLEAR
                        /TELEPRINTER/PUNCH FLAG.

7002 BSW=7002      /SWAP BYTES IN AC.
7200 CLA=7200
7402 HLT=7402

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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 [MOVE
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 USPI=JMS I [XSPI
4556 STALL=JMS I [STAL
4555 CKSR37=JMS I [CK37
4554 CKSR33=JMS I [CK33
4553 CKSR35=JMS I [CK35
4577 BLOCKA=END
6601 BLOCK1=BLOCKA+2
6711 BLOCKB=BLOCKA+112
6722 BLKBB=BLOCKA+123
6713 BLOCK2=BLOCKA+114
6724 BLK2=BLOCKA+125
7023 BLOCKC=BLOCKA+224
7034 BLKCC=BLOCKA+235
7577 DBLK=BLOCKA+1000
7631 M147=147      /-103 DECIMAL;
0304 RRRP=0304

0000 *0
0000 0000
0001 5001      JMP 1
0002 0002      2
0003 0003      3
0005 0005      *5
5402 5402      JMP 1 2
0006 0006      0
0016 0000      *16      OPEN      /AUTO INDEX,
0020 0000      *20
0020 0000      TTYTYP, OPEN
0021 0304      TTYIOT, RRRP      /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
 0024 0000 DELAYM, OPEN
 0025 0263 CHAIN, CHAINN
 0026 1365 KBFLAG, KFLAG
 0027 0474 DLONT1, DLONT
 0030 2012 S100, S1001
 0031 2000 S4000, S40001
 0032 2005 S200, S2001
 0033 2126 TLCALL, TLCALL
 0034 2134 TLC37, TLC371
 0035 2144 FBF, FBF1
 0036 0000 PRGNUM, OPEN
 0037 2200 PRGTAB, PRG0
 0040 3000 PRG1
 0041 3503 PRG2
 0042 4307 PRG3
 0043 4434 PRG4
 0044 5274 PRG5
 0045 5340 PRG6
 0046 5465 PRG7
 0047 5651 PRG10
 0050 5722 PRG11
 0051 5764 PRG12
 0052 0000 TEMP, OPEN
 0053 0000 TEMP1, OPEN
 0054 0000 CURTST, OPEN
 0055 0000 RTNNO, OPEN
 0056 0000 NXTST, OPEN
 0057 0000 NSCTR, OPEN
 0060 0000 MILCTR, OPEN
 0061 0000 MIL1, OPEN

/USER PROGRAM START,
 /CHAIN RTN ENTRY,

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

/7372 FOR 110 BAUD,
 /7522 FOR 150 BAUD,
 /7652 FOR 300 BAUD,
 /7726 FOR 600 BAUD,
 /7754 FOR 1200 BAUD,
 /7767 FOR 2400 BAUD,

/COUNTER A;
 /COUNTER B;

/ENTRY TO SYNC TAPE RTN,

0062 0000 CTRA, OPEN
 0063 0000 CTRB, OPEN
 0064 0000 STLD, OPEN
 0065 0530 SYNC, SYNK

0066 0436 INPATY, IBIN
 0067 0444 GETPT, GTBIN
 0070 0513 CHECK, CMCK
 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
 0110 0212 LF, 212
 0111 0277 DLYMSK, 277
 0112 0000 WTS6A, OPEN

/ENTRY TO INITIATE PATTERN
 /ENTRY TO GET PATTERN CHAR;

/CARRIAGE RETURN
 /LINE FEED

/CONTROL ROUTINE

*200
 0200 7610 START, SKP CLA
 0201 7402 HLT
 0202 7621 CAM
 0203 4777 JMS SETRND
 0204 4776 JMS STBAUD
 0205 7604 BORET, LAS
 0206 0152 AND [17
 0207 1151 TAD [12
 0210 7540 SMA SZA
 0211 5201 JMP START+1
 0212 7604 LAS
 0213 0152 AND [17
 0214 3036 DCA PRGNUM
 0215 1036 TAD PRGNUM
 0216 1150 TAD [PRGTAB
 0217 3052 DCA TEMP
 0220 1452 TAD I TEMP
 0221 3235 DCA PRGADR
 0222 4775 JMS DVCSEL
 0223 7604 SLDC02, LAS
 0224 0147 AND [7760
 0225 6117 MTON
 0226 7201 CLA IAC
 0227 6115 MINT
 0230 4475 JMS I UMOVE
 0231 0005 5
 0232 0001 1
 0233 7776 -2
 0234 5635 JMP I '+1
 0235 0000 PRGADR, OPEN

/INCORRECT PROGRAM NUMBER
 /CLEAR AC AND MQ;
 /SET UP RANDOM NUMBERS
 /SET UP LOC MIL1 FOR SELECTED BAUD RATE,
 /READ SR
 /PROGRAM MASK = 17
 /PROGRAM LIMIT = +12
 /VALID PROGRAM NUMBER?
 /NO,
 /YES, READ SR,
 /SAVE PROGRAM NUMBER,
 /DEVELOP PROGRAM START
 /ADDRESS AND STORE AT
 /PRGADR,

/PERFORM IOT SELECTION
 /SELECT DC02 UNIT

/ENABLE DC02 INTERRUPT
 /INITIALIZE
 /INTERRUPT,
 /AREA,


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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
0300 7402 PRGEND, HLT /END OF PROGRAM HALT
0301 5263 JMP CHAINN

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

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

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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 M1L1 /GET CONSTANT
0344 3060 DCA M1LCTR /STORE IN M1LCTR
0345 2060 ISZ M1LCTR /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 PAGE
0400 PAGE
0401 7300 RGNA, OPEN /RANDOM NUMBER SUB A,
0401 7300 CLA CLL

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0402 1215      TAD RP1A
0403 7886      RTL
0404 1216      TAD RP2A
0405 3215      DCA RP1A
0406 1215      TAD RP1A
0407 7886      RTL
0410 1216      TAD RP2A
0411 7886      RTL
0412 3216      DCA RP2A
0413 1215      TAD RP1A
0414 5600      JMP I RGNA      /EXIT RGNA SUB,
0415 1233      RP1A, 1233
0416 7622      RP2A, 7622

0417 0000      RGNB, OPEN      /RANDOM NUMBER SUB B,
0420 7300      CLA CLL
0421 1234      TAD RP1B
0422 7886      RTL
0423 1235      TAD RP2B
0424 3234      DCA RP1B
0425 1234      TAD RP1B
0426 7886      RTL
0427 1235      TAD RP2B
0430 7886      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
0448 1243      TAD PT1      /GET PT1
0449 7881      IAC      /INCREMENT ACCUMULATOR
0450 0145      AND [377]      /LIMIT TO 8 BITS
0451 3242      DCA PT0      /STORE AT PT0
0452 1243      TAD PT1      /GET PT1
0453 5644      JMP I GTBIN      /EXIT

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

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0462 5257      JMP CHRCNT+1
0463 7841      CIA      /2'S COMPLEMENT IT
0464 3273      DCA SCNT
0465 1656      TAD I CHRCNT
0466 3852      DCA TEMP
0467 1273      TAD SCNT
0470 3452      DCA I TEMP      /STORE AT SPECIFIED ADDRESS
0471 2256      ISZ CHRCNT      /SET UP EXIT
0472 5656      JMP I CHRCNT      /EXIT
0473 0000      SCNT, OPEN

/SUBROUTINE TO GENERATE RANDOM DELAY COUNT (NOT MORE THAN 377(8));
0474 0000      DLCT, 0
0475 4200      JMS RGNA      /GO GENERATE RANDOM NUMBER
0476 0111      AND OLYMSK      /MASK OUT UNDESIRE BITS
0477 7450      SNA      /ZERO?
0500 5275      JMP DLCT+1      /YES, GET ANOTHER NUMBER
0501 7841      CIA      /2'S COMPLEMENT IT
0502 3824      DCA DELAYM
0503 5674      JMP I DLCT      /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 7841      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

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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 STLD
0554 7700      SNA CLA      /STALL?
0555 5751      JMP I STAL    /NO, EXIT
0556 4274      JMS DLCT      /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
0600      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 0146      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       /77?
0665 7650      SNA CLA        /YES, EXIT CODE.
0666 5626      JMP I TYPSTG
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 /KCC
0726 5724 JMP I XKCC /EXIT
0727 7402 HLT /KCC SKIPPED,

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

0734 0000 XKR8, OPEN /SUB TO ISSUE KRB,
0735 6036 KRB /KRB
0736 5734 JMP I XKR8 /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 /TCF
0747 5745 JMP I XTCF /EXIT
0750 7402 HLT /TCF SKIPPED,

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

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

0761 0000 XKIE, OPEN /SUB TO ISSUE KIE,
0762 6035 KIE /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

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PAGE

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1000 1000 PAGE
1001 0000 STBF, OPEN /SUB TO SET UP BUFFER AREA,
1002 4574 MOVE /CRLF TO BLOCKA,
1003 0107 CR
1004 6577 BLOCKA
1005 7776 -2
1006 4555 CKSR37 /KSR37?
1007 5220 JMP ST33B /NO,
1008 4574 MOVE /CRLF TO BLKBB
1009 0107 CR
1010 6722 BLKBB
1011 7776 -2
1012 4574 MOVE /CRLF TO BLKCC,
1013 0107 CR
1014 7034 BLKCC
1015 7776 -2
1016 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 /37?
1043 5255 JMP FBF3 /NO,
1044 4574 MOVE /YES,
1045 6601 BLOCK1

```

```

1046 6604      BLOCK1*3
1047 7662      =116
1050 4574      MOVE
1051 6601      BLOCK1
1052 6724      BLK2
1053 7657      =121
1054 5631      JMP I FBF3      /EXIT FBF3,
1055 4574      FBF33, MOVE
1056 6601      BLOCK1
1057 6604      BLOCK1*3
1060 7673      =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 XSP37 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 0000      PAGE
1201 4577      /PUNCH 70 (CODE 376) CHARACTERS SUBROUTINE
1202 1211      PLTLR, 0
1203 7672      SETLOC          /SET P70CTR TO -70
1204 1377      P70CTR
1205 4474      TAD (376)      /GET 376 CODE
1206 2211      JMS I UPUNCH    /GO PUNCH IT
1207 5204      ISZ P70CTR      /ALL CHARACTERS PUNCHED?
1208 5600      JMP ,=3          /NO, REPEAT,
1209 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 RBSY /SET READER BUSY INDICATOR
1225 4577 SETLOC /SET READER INTERRUPT
1226 1267 VCTR /SERVICE RETURN ADDRESS,
1227 1233 RSSERV
1230 6001 ION /ENABLE INTERRUPT
1231 5616 JMP I RSYNC /EXIT
1232 0000 RSCTR, 0

1233 6036 RSSERV, KRB /READ
1234 1144 TAD [-377 /ADD MINUS RUBOUT
1235 7640 SZA CLA /IS IT A RUBOUT?
1236 5245 JMP ,+7 /NO,
1237 3076 DCA RBSY /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 OLYMSK /REMOVE EXCESS BITS
1330 7450 SNA /ZERO?
1331 5326 JMP ,+3 /YES, GET ANOTHER NUMBER
1332 7041 C1A /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 RBSY /FETCH RBSY,
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 RBSY /SET RBSY INDICATOR

```

```

1354 4577 SETLOC /SET DATA ADDR
1355 1416 RADDR
1356 6577 BLOCKA
1357 4574 MOVE /SET DATA BLOCK LENGTH
1360 0101 BLKCNT
1361 1417 RBCTR
1362 7777 -1
1363 3775/ DCA ERRCTR /CLEAR ERROR COUNTER
1364 5751 JMP I RSTUP /EXIT,

```

/ROUTINE TO SET KEYBOARD FLAG,

```

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

```

```

1375 5721
1376 0417
1377 0376
1400 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

```

1420 7200 RDRSRV, CLA
1421 4776/ JMS RGNA /GET A RANDOM NUMBER
1422 0111 AND DLYMSK /REMOVE EXCESS BITS
1423 7450 SNA /ZERO?
1424 5221 JMP ,=3 /YES, GET ANOTHER NUMBER
1425 7041 CIA /NO, 2'S COMPLEMENT IT,
1426 3102 DCA DELAYS /STORE RANDOM NUMBER IN DELAYS,
1427 4274 JMS DLMSR /STALL,
1430 1616 RDSRV, TAD I RADDR /GET EXPECTED CHARACTER
1431 3235 DCA SB /STORE AT SB

```

```

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

1440 3103 ERROR, DCA 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)
1448 5256 JMP RUDONE /NO,
1449 1103 TAD ERRCTR /YES, GET BAD CHARACTER
1450 7402 HLT /ERROR HALT, BAD CHAR IN AC
1451 7200 CLA
1452 1235 TAD SB
1453 7402 HLT
1454 2217 RUDONE, ISZ RBCTR /GOOD CHAR IN AC
1455 5472 JMP I UOUT /ALL DONE?
1456 7200 CLA /NO, TO MAINLINE
1457 1775/ TAD ERRCTR /YES,
1458 7650 SNA CLA /GET C(ERRCTR)
1459 5266 JMP ,+3 /ANY ERRORS?
1460 1775/ TAD ERRCTR /NO,
1461 7402 HLT /YES,
1462 7300 CLA CLL /NUMBER OF ERRORS IN AC,
1463 3076 DCA RBUSY /CLEAR RBUSY INDICATOR
1464 1100 TAD LINK
1465 7004 RAL /RESTORE LINK
1466 1077 TAD AC /TO MAINLINE
1467 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
1480 5701 JMP I ,+1
1481 1502 ,+1
1482 1061 TAD M1L1 /GET AND STORE
1483 3312 DCA RCTRB /IMS CONSTANT
1484 2312 ISZ RCTRB /DELAYED 1 MS?
1485 5304 JMP ,=1 /NO,
1486 2311 ISZ RCTRA /YES, DONE DELAYING?
1487 5300 JMP ,=7 /NO,
1488 5674 JMP I DLMSR /YES, EXIT
1491 0000 RCTRA, 0
1492 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 1 10 /GET A RATE FROM TABLE,
1522 7650 SNA CLA /DO THEY MATCH?
1523 9330 JMP ,+5 /YES, GO SET DELAY ROUTINE,
1524 2346 ISZ NTST /NO, KEEP A COUNT,
1525 9320 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 1 MIL1 /
1535 3061 DCA MIL1 /
1536 5713 JMP 1 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 1 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 1 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 0000 PAGE
/COMBINED TEST NORMAL TEST SEQUENCE
1601 7200 CNTST, 0
1602 3076 DCA RBUSY /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 RDBLK /READ DATA BLOCK (STALLS)
1610 4772 JMS PBLK /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 1 CHAIN /CHAIN

/TYPE LINE OF 3 CHARACTERS (NO DELAY)
1615 0000 TYPLN3, 0
1616 7200 CLA /CLEAR STLID
1617 3064 DCA STLID /CLEAR STLID
1620 1615 TAD 1 TYPLN3 /SET AND STORE
1621 3224 DCA ,+3 /ADDRESS OF DATA
1622 2215 ISZ TYPLN3
1623 4767 JMS FBFS /GO FILL BUFFER WITH 3 CHARACTERS
1624 0000 0
1625 4227 JMS TYPLN /GO TYPE LINE
1626 5615 JMP 1 TYPLN3 /EXIT

```

/TYPE LINE OF ASCII PRINTABLE CHARACTERS

```

1627 0000 TYPLN, 0
1630 4555 CKSR37 /KSR37?
1631 1140 TAD C11 /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 1 FETCH /YES, SET CHARACTER
1641 4474 JMS 1 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 1 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 2345 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 7026 RTL
1675 7004 RAL
1676 0365 AND (707
1677 1326 TAD ASCT
1678 0365 AND (707
1679 1344 TAD (6060
1682 3705 DCA I SASC
1683 5671 JMP I CNV
1684 0000 WASC, 0
1685 0000 SASC, 0
1686 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
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/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 CTBA EQUAL TO -144 (=100 DECIMAL);

```

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

```

/ROUTINE TO DETERMINE DEVICE CAUSING UNEXPECTED INTERRUPT;

```

2017 0000 INTFND, OPEN
2020 7200 CLA
2021 6031 INTKSF, KSF /KEYBOARD/READER?
2022 7410 SKP /NO,
2023 4276 JMS HLTD /GO BOLT AND DISPLAY IOT
2024 6041 INTTSF, TSF /TTY PRINTER/PUNCH?
2025 7410 SKP /NO,
2026 4276 JMS HLTD /GO BOLT AND DISPLAY IOT
2027 6011 RSF /H,S, READER?
2030 7410 SKP /NO,
2031 4276 JMS HLTD /HALT AND DISPLAY IOT
2032 6021 PSF /H,S, PUNCH?
2033 7410 SKP /NO,
2034 4276 JMS HLTD /HALT AND DISPLAY IOT
2035 6401 6401 /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?

```

/PDP-8/E TELETYPE CONTROL TEST; MAINDEC-08-DHKLD-A=L

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```

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
2103 7402 HLT /GET IOT THAT CAUSED SKIP
2104 7001 IAC /AND HALT, IOT IN AC,
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 6046 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 6041 OUT1, TSF /NO, FLAG UP?
2122 5316 JMP ,+4 /NO,
2123 6042 OUT2, TCF /YES, CLEAR PRINTER FLAG,
2124 3071 DCA PFLAG /CLEAR PFLAG,
2125 5712 JMP I PUNCH /EXIT, AC=0,

```

/ROUTINE TO CONTROL THE CHARACTERS TO BE TYPED ON ALL 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 UTPLN3 /GO TYPE SAVED LETTER & NEXT 2,
2132 0000 OPEN /FIRST LETTER TO BE TYPED,
2133 5425 JMP I CHAIN /CHAIN

```

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

```

2134 0000 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 UTPLN3 /YES, GO TYPE LETTER & NEXT 2
2142 0000 OPEN /FIRST LETTER TO BE TYPED,
2143 5425 JMP I CHAIN /CHAIN

```

/CONTROL ROUTINE TO FILL A BUFFER WITH CHARACTERS,

```

2144 0000 FBFI, OPEN /GET DATA
2145 7300 CLA CLL
2146 1744 TAD I FBFI
2147 3351 DCA I,+2 /SAVE IT
2150 4777 JMS FBFI /GO FILL A BUFFER=
2151 0000 OPEN /WITH THIS +NEXT 2 CHAR
2152 4776 JMS CNYST /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 STLD /ZERO STALL INDICATOR,
2155 4775 JMS TYPLN /TYPE LINE WITHOUT STALLS
2156 7240 CLA CMA /7777
2157 3064 DCA STLD /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 TBMK
2166 4573 TYPE
2167 6306 TBMK1
2170 2062 ISZ CTRA
2171 5366 JMP I,+3
2172 5762 JMP I MTABP /EXIT,

```

```

2175 1627
2176 1600
2177 1031
2200 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 DELAYN 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
2228 4565 P0TS0E, UTSF /YES, CLEAR PRINTER FLAG
2229 4566 UTSF /PRINTER FLAG SET?
2230 7610 SKP CLA /NO, OK,
2231 5262 JMP P0E0E /YES, TCF FAILED TO CLEAR PRINTER FLAG;
2232 2062 ISZ CTRA /DONE TEST 100 TIMES?
2233 5211 JMP P0TS0A /NO, REPEAT TEST
2234 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    /SET INTERRUPT RETURN
2271 2327      P0TS2      /TO P0E1A,
2272 4577      SETLOC
2273 0002      2
2274 2304      P0E1A
2275 6007      P0TS1A, CAF  /ATTEMPT TO CLEAR ALL FLAGS
2276 4560      USPF       /SET PRINTER FLAG
2277 4565      UTCF       /CLEAR PRINTER FLAG
2280 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 1 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 1 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    /SET UP TO DO TEST 4000 TIMES,
2330 2504      P0TS3      /SET INTERRUPT RETURN
2331 4431      JMS 1 54000 /TO P0E2A
2332 4577      P0TS2A, SETLOC
2333 0002      2
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      PAGE

2400 4557      P0TS2E, USPI /TTY INTERRUPT REQUEST?
2401 5256      JMP        P0E2E /NO, SPI FAILED TO SKIP;
2402 6003      P0TS2F, SRQ /IS THERE AN INTERRUPT REQUEST?
2403 5265      JMP        P0E2F /NO, SRQ FAILED TO SKIP;

```

```

2404 7300 POTS2G, 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 POTS2A /NO, REPEAT TEST
2414 5425 JMP I CHAIN /CHAIN

```

/ERROR HLTS FOR POTS2.

```

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

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

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

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

```

```

2455 5247 JMP P0E2D+4 /REPEAT

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

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

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

/TEST 3 CHECKS THE ABILITY OF
/TPC TO SET THE PRINTER FLAG,
/TPC TO CLEAR PRINTER FLAG,
/TPC TO SET PRINTER FLAG,
2504 0003 POTS3, 3
2505 2544 POTS4
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,
/OF PROGRAM,
2510 4565 POTS3A, 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 POTS3B, UTL /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 1 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      P0E3B, HLT CLA      /TLS FAILED TO CLEAR PRINTER FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
2535 4560      USPF      /SET PRINTER FLAG
2536 4563      UTLS      /CLEAR PRINTER FLAG AT TP3;
2537 5335      JMP ,=2

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

/ PUNCH, PRINTER TIMING TEST.
2544 0004      P0TS4, 4
2545 2616      P0TS5
2546 4430      JMS I S100      /SET UP TO DO TEST 100 TIMES,
2547 4577      P0TS4A, SETLOC      /SET DELAYM
2550 0024      DELAYM      /TO -81 (DEC)
2551 7657      -121
2552 1022      TAD BAUDRT      /GET BAUD RATE;
2553 1136      TAD [-110      /ADD A -110 TO IT;
2554 7650      SNA CLA      /IS IT 110 BAUD WE'RE WORKING WITH?
2555 5360      JMP ,+3      /YES, LEAVE DELAYM ALONE;
2556 1135      TAD [-130      /NO, CHANGE DELAYM TO -88 (DEC);
2557 3024      DCA DELAYM      /DELAYM NOW SET TO -88 DECIMAL;
2558 4563      UTLS      /PRINT
2559 4576      DELAY      /DELAY A LITTLE LESS THAN 9 BIT TIMES
2560 4566      UTSF      /FLAG SET
2561 7410      SKP      /NO, OK
2562 5776      JMP      P0E4A      /YES,
2563 4577      P0TS4B, SETLOC      /SET DELAYM
2564 0024      DELAYM      /TO -7 (DEC)
2565 7771      -7
2566 4576      DELAY      /DELAY SO WE'RE PAST THE 9.5 BIT TIME POINT
2567 4566      UTSF      /FLAG SET?
2568 5775      JMP      P0E4B      /NO
2569 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      DELAYM
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 1 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 2600      P0T6
2618 4430      JMS I S100
2619 4563      UTLS
2620 4566      UTSF
2621 5222      JMP ,=1      /FLAG SET?
2622 4577      P0TS5A, SETLOC      /SET DELAYM TO
2623 0024      DELAYM      /-98 DECIMAL,
2624 7636      -142
2625 1022      TAD BAUDRT      /GET BAUD RATE,
2626 7104      RAL CLL      /MOVE INTO POSITION TO DETERMINE IF 2400,
2627 7710      SPA CLA      /IS IT 2400?
2628 2024      ISZ      DELAYM      /YES, INCREMENT DELAYM SO AS TO DELAY LESS;
2629 4563      UTLS      /PRINT
2630 4576      DELAY      /DELAY
2631 4566      UTSF      /FLAG SET?
2632 7610      SKP CLA      /NO, OK,
2633 5254      JMP P0E5A      /YES, ERROR,
2634 4577      P0TS5B, SETLOC      /SET DELAYM TO
2635 0024      DELAYM      /-4 DECIMAL,
2636 7774      -4
2637 4576      DELAY      /DELAY
2638 4566      UTSF      /FLAG NOW SET?
2639 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 P0T5A+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      P0E5R, 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 54000     /SET UP TO DO TEST 4000 TIMES,
2663 6007      CAF           /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT,
2664 7040      CMA           /GET INTERRUPT FLAGS
2665 6004      GTF           /MASK,
2666 0335      AND K5200
2667 7440      SZA
2670 7402      P0E6A, HLT     /GTF FAILED,
2671 7360      CLA CMA CLL CML /SET LINK AND AC,
2672 6004      GTF           /GET INTERRUPT FLAGS, (AC SHOULD EQUAL 4000),
2673 0335      AND K5200     /MASK,
2674 7420      SNL
2675 7402      P0E6B, HLT     /GTF CLEARED LINK,
2676 7104      P0T6C, CLL RAL /AC SHOULD EQUAL ZERO, LINK SHOULD EQUAL 1,
2677 7430      SZL
2678 7440      SZA
2679 7402      P0E6C, HLT     /GTF DID NOT GET LINK,
2680 6007      CAF           /CLEAR ALL FLAGS, AC, LINK, AND ENABLE TTY INTERRUPT,
2681 4560      USPF          /SET PRINTER FLAG,
2682 6004      GTF           /GET INTERRUPT FLAGS,
2683 0335      AND K5200     /MASK,
2684 7006      RTL          /PUT INTERRUPT BUS = (AC SHOULD EQUAL 1000)
2685 7004      RAL          /FLAG INTO LINK, (AC SHOULD EQUAL ZERO),
2686 7430      SZL          /IS LINK 1?
2687 7440      SZA          /IS AC ZERO?
2688 7402      P0E6D, HLT     /GTF FAILED TO GET INTERRUPT BUS,
2689 4577      P0T6E, SETLOC  /SET INTERRUPT RETURN LOCATION
2690 0002      2            /TO P0T6F,
2691 2725      P0T6F
2692 6007      CAF           /CLEAR ALL FLAGS,
2693 6001      ION           /TURN INTERRUPT ON
2694 6004      GTF           /GET INTERRUPT FLAGS,
2695 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      SZL          /LINK 1?
2728 7440      SZA          /AC ZERO?
2729 7402      P0E6F, HLT     /GTF FAILED TO GET ION,
2730 2062      ISZ CTRA      /TEST DONE?
2731 5263      JMP P0T6A     /NO, REPEAT,
2732 5425      JMP I CHAIN
2733 5200      K5200, 5200

```

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

```

2736 0007      P0T7, 7
2737 7777      7777
2740 4431      JMS I 54000     /SET UP TO DO TEST 4000 TIMES,
2741 4577      SETLOC        /SET INTERRUPT RETURN
2742 0002      2            /TO P0T7C+3,
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?
2748 7402      P0E7A, HLT     /RTF FAILED TO RESTORE LINK,
2749 7330      P0T7B, CLA CLL CML RAR /AC EQUALS 4000
2750 6005      RTF           /RESTORE FLAGS, (LINK),
2751 7420      SNL          /LINK RESTORED?
2752 7402      P0E7B, HLT     /RTF FAILED TO RESTORE LINK,
2753 4560      USPF          /SET PRINTER FLAG,
2754 7000      NOP           /((INTERRUPT),
2755 7402      P0E7C, HLT     /RTF DID NOT SET ION,
2756 2062      ISZ CTRA      /TEST DONE?
2757 5344      JMP P0T7A     /NO, REPEAT,
2758 5425      JMP I CHAIN

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2777 2547
3000 PAGE

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

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3000 4577      PRG1, SETLOC
3001 0023      KSTART
3002 3005      P1TS0

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3003 5604      JMP I 1+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 P2TS0A

/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 0302      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

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/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,

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3170 5313      JMP P1E3A      /NO,
3171 4571      UKCC          /CLEAR AND AND KRD FLAG,
3172 4563      UTLS          /YES, SEND DATA,
3173 4572      UKSF          /FLAG SET
3174 5306      JMP ,+2        /NO, OK
3175 5322      JMP P1E3B      /YES,
3176 4566      UTFS          /PRINTER FLAG SET?
3177 5306      JMP ,+1        /NO, WAIT TO CONTINUE TEST,
3178 2062      ISZ CTRA      /DONE 500 TIMES?
3179 5301      JMP ,+10       /NO REPEAT TEST
3180 5425      JMP I CHAIN    /CHAIN,

3181 7602      P1E3A, HLT CLA      /FLAG NOT SET OR KSF FAILED,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3182 4563      UTLS          /SEND
3183 4571      UKCC          /CLEAR AC AND KRD FLAG
3184 4576      DELAY
3185 4572      UKSF
3186 5314      JMP ,+4
3187 5320      JMP ,+1

3188 7602      P1E3B, HLT CLA      /KSF SKIPPED ON NO FLAG,
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3189 4563      UTLS
3190 4426      JMS I KBFLAG
3191 5323      JMP P1E3B+1

```

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

```

3192 0004      P1TS4, 4
3193 3200      P1TS5
3194 4577      SETLOC        /SET INTERRUPT RETURN
3195 0002      2            /TO P1E4A
3196 3143      P1E4A
3197 4563      P1TS4A, UTLS    /SEND
3198 4426      JMS I KBFLAG
3199 4565      UTCF          /CLEAR PRINTER FLAG,
3200 4571      UKCC          /CLEAR READER FLAG
3201 6001      ION           /TURN INTERRUPT ON,
3202 7000      NOP          /
3203 6002      IOF          /TURN INTERRUPT OFF,
3204 5345      JMP ,+3        /SKIP OVER,
3205 4776      P1E4A, JMS INTFND /UNEXPECTED INTERRUPT,
3206 5333      JMP P1TS4A     /TRY AGAIN,
3207 4577      SETLOC        /SET COUNT OF
3208 7062      CTRA          /-1000 (DEC)
3209 6030      -1750         /IN CTRA,
3210 4577      SETLOC        /SET INTERRUPT RETURN
3211 0002      2
3212 3167      P1TS4C
3213 4563      P1TS4B, UTLS    /SEND
3214 4426      JMS I KBFLAG
3215 4565      UTCF          /CLEAR PRINTER FLAG,
3216 6001      ION           /INTERRUPT ON,

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3197 7000      NOP          /SHOULD INTERRUPT
3198 7402      HLT           /READER FLAG FAILED TO INTERRUPT OR
/INTERRUPT SYSTEM MALFUNCTION,
/SET INTERRUPT RETURN
3199 4577      SETLOC
3200 0002      2
3201 3166      P1TS4C=1
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3202 6001      ION
3203 7000      NOP
3204 5364      JMP ,+2

3205 2062      P1TS4C, ISZ CTRA /DONE 1000 TIMES YET?
3206 5353      JMP P1TS4B      /NO, REPEAT
3207 6007      CAF            /EXIT
3208 5425      JMP I CHAIN    /EXIT,

3209 2017      3176
3210 3513      3177
3211 3200      PAGE

```

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

```

3212 0005      P1TS5, 5
3213 3271      P1TS6
3214 4430      JMS I S100     /SET UP TO DO TEST 100 TIMES,
3215 6007      CAF          /CLEAR AND ENABLE INTERRUPT ENABLE FF
3216 4563      P1TS5A, UTLS    /SEND
3217 4426      JMS I KBFLAG
3218 4565      UTCF          /CLEAR PRINTER FLAG,
3219 6003      SRQ          /INTERRUPT REQUEST?
3220 5230      JMP P1E5A      /NO,
3221 4557      P1TS5B, USPI    /YES, TTY INTERRUPT REQUEST?
3222 5235      JMP P1E5B      /NO,
3223 6007      P1TS5C, CAF     /YES, CLEAR FLAG,
3224 4572      UKSF          /FLAG SET?
3225 7610      SKP CLA        /NO, OK
3226 5242      JMP P1E5C      /FLAG SET FOR SOME REASON,
3227 6003      P1TS5D, SRQ     /INTERRUPT REQUEST?
3228 7610      SKP CLA        /NO, OK
3229 5257      JMP P1E5D      /
3230 4557      P1TS5E, USPI    /TTY INTERRUPT REQUEST PRESENT?
3231 7610      SKP CLA        /NO, OK
3232 5264      JMP P1E5E      /
3233 2062      ISZ CTRA      /TEST DONE 100 TIMES?
3234 5204      JMP P1TS5A     /NO, REPEAT,
3235 5425      JMP I CHAIN    /CHAIN,

3236 7602      P1E5A, HLT CLA /SRQ FAILED TO SKIP ON KRD, 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 KBRD 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 KBRD FLAG;
/SCOPE LOOP, PRESS CONTINUE TO ENTER,
3243 4250 JMS PIE5
3244 6007 CAF
3245 4566 UTSP
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 KBFLAG
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 PITS6, 6
3272 3314 PITS7
3273 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES,
3274 4577 SETLOC /SET DELAYM
3275 0024 DELAYM /TO -123 DECIMAL

```

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3276 7631 M147 /
3277 4563 PITS6A, UTLS /SEND
3278 4571 UKCC /RECEIVE
3281 4576 DELAY /DELAY 10-11 BIT TIMES
3282 4565 UTCF /CLEAR TELEPRINTER FLAG
3283 4572 UKSF /KBRD FLAG SET?
3284 5310 JMP PIE6A /FLAG NOT SET
3285 2062 ISZ CTRA /DONE 100 TIMES YET?
3286 5277 JMP PITS6A
3287 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 KBFLAG
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 PITS7, 7
3315 3325 PITS7, 7
3316 4577 SETLOC /SET COUNT OF
3317 0062 CTRA /#512 (DEC)
3320 7000 -1000 /IN CTRA,
3321 4777 JMS SINPT /INITIALIZE SPECIAL BIN COUNT,
3322 4776 PITS7A, JMS SGET /GET A NUMBER
3323 4337 JMS TRDATA /TRANSFER DATA AND CHECK;
3324 5322 JMP PITS7A /REPEAT

/TEST OF KEYBOARD AND PUNCH BUFFERS USING RANDOM DATA,

3325 0010 PITS7, 10
3326 3400 PITS7, 10
3327 4577 SETLOC /SET COUNT OF
3330 0062 CTRA /#512 (DEC)
3331 7000 -1000 /IN CTRA,
3332 4775 JMS SETRND /INITIALIZE RANDOM NUMBER GENERATOR,
3333 4774 PITS7A, JMS RGNB /GET A RANDOM NUMBER;
3334 0145 AND [377 /MASK,
3335 4337 JMS TRDATA /TRANSFER DATA AND CHECK;
3336 5333 JMP PITS7A /REPEAT

/SUBROUTINE USED BY PITS7 AND PITS10

3337 0000 TRDATA, OPEN
3340 3346 DCA HOLD1
3341 1346 TAD HOLD1
3342 7421 MQL /STORE GOOD DATA IN MQ;
3343 7701 ACL /MELOAD AC WITH THE GOOD
3344 4353 JMS SNOREC /TRANSMIT AND RECEIVE

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3345 4470      JMS I CHECK      /DID I RECEIVE WHAT I SENT?
3346 0000      OPEN              /WHAT I SENT,
3347 5366      H0LD1, JMP P1E710  /RECEIVED NOT SAME AS SENT,
3350 2062      ISZ CTRA          /DONE?
3351 5737      JMP I YRDATA      /NO,
3352 5425      JMP I CHAIN       /YES, CHAIN,

/ROUTINE TO SEND AND RECEIVE DATA,

3353 0000      SNDRCC, OPEN
3354 4565      UTCF
3355 4564      UTPC
3356 4571      UKCC
3357 4572      UKSF
3360 5357      JMP ,=1
3361 7200      CLA              /JUST IN CASE
3362 4570      UKRS
3363 4566      UTSF
3364 5363      JMP ,=1
3365 5753      JMP I SNDRCC      /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 SNDRCC
3371 5367      JMP P1E710+1      /STAY IN LOOP,

3374 0417
3375 1740
3376 1717
3377 1707
3400 3400      PAGE

```

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

```

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

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

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

3465 6007      CAF
3466 1134      TAD [252
3467 4563      UTLS

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```

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      UTL5
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,

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```

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 B,
/KSF FAILURE
3565 4572      UKSF          /SKIP ON FLAG = 1
3566 5365      JMP ,=1          /REPEAT
3567 5365      JMP ,=2          /REPEAT

```

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3577 0417      PAGE
3600

```

/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
P2TS3A, UKCC /CLEAR FLAG
3606 4571 DELAY /GO DELAY
3607 4576 UKSF /READY?
3610 4572 JMP P2E3A /NO, ERROR
3611 5221 UKCC /YES, RESET FLAG
3612 4571 UKSF /READY?
3613 4572 JMP ,+2 /NO, OK
3614 5216 JMP P2E3B /YES, ERROR
3615 5223 ISZ CTRA /ALL DONE TESTING?
3616 2062 JMP ,+4 /NO, REPEAT
3617 5213 JMP I CHAIN /YES, CHAIN
3620 5425 P2E3A, HLT /TSTJ ERR HALT A, FLAG
/NOT SET OR KSF FAILURE
3621 7402 P2E3B, HLT /TRY AGAIN
/TSTJ 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
P2TS4A, UTCF /CLEAR PUNCH/PRINTER FLAG
3635 4565 JMS I KBFLAG
3636 4426 UKCC /CLEAR READER FLAG
3637 4571 ION /ENABLE INTERRUPT
3640 6001 NOP
3641 7000 /TURN OFF INTERRUPT
3642 6002 IOF
3643 5246 JMP ,+3
3644 4777 P2E4A, JMS INTFND /UNEXPECTED INTERRUPT

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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
3660 4577 SETLOC /SET INTERRUPT RETURN
3661 0002 2 /TO P2TS4C+1,
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

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/READER TIMING TEST, CHECKS THAT READER FLAG IS #1 NO
/LATER THAN 103 MILLISECONDS AFTER KCC INSTRUCTION IS ISSUED,
3671 0005 P2TS5, 5
3672 3711 P2TS6
3673 4577 SETLOC /SET DELAYM
3674 0024 DELAYM /TO -103
3675 7631 M147
3676 4430 JMS I S100 /SET UP TO DO TEST 100 TIMES;
3677 4571 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 /TSTJ ERR HALT, FLAG NOT #1
/103 MSEC 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      -400          /IN CTRA
3716 4426      P2TS6A, JMS I KBFLAG
3717 4570      UKRS          /READ CHARACTER,
3720 3112      DCA WTS6A    /SAVE AT WTS6A,
3721 4577      SETLOC       /SET COUNT OF
3722 0063      CTRB         /CTRB
3723 6030      -1750        /-1000 (DEC) IN
3724 7200      P2TS6B, CLA
3725 4570      UKRS          /READ CHARACTER,
3726 7421      MQL          /STORE IN MQL,
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   /NO 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 S100   /SET UP TO DO TEST 100 TIMES,
3765 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,

3766 5776/      JMP P2TS7A

3776 4000
3777 2017
4000 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 S4000  /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 6002 P2T10B, 10F /TURN INTERRUPT OFF,
4046 6003 SRQ /SKIP IF INTERRUPT REQUEST,
4047 7410 SKP
4050 5307 JMP P2E10B /ERROR, SRQ FAILED, GO TO P2F10B,
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 P2F10D,
4064 6003 P2T10E, SRQ /SKIP IF INTERRUPT REQUEST,
4065 5335 JMP P2E10E /ERROR, GO TO P2F10E,
4066 4557 P2T10F, USPI /SKIP IF TTY INTERRUPT,
4067 5344 JMP P2E10F /ERROR, GO TO P2F10F,
4070 2062 ISZ CTR /DONE,
4071 5234 JMP P2T10A /NO, REPEAT,
4072 5425 JMP I CHAIN

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

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

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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 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 /MO CONTAINS GOOD DATA
4262 7701 ACL /RELOAD AC WITH GOOD FROM MO,
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 2023      KSTART      /ROUTINE ADDRESS;
4311 4314      P3TS0
4312 5713      JMP I 1,+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 2062      CTRA      /-4095(DEC) IN
4321 2001      -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 2000      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 2001      P3TS1, 1
4345 4400      P3TS2
4346 4465      JMS I SYNC      /TO SYNC TAPE
4347 4577      SETLOC      /SET COUNT OF
4350 2062      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 DLONT1      /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 2000      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      /TST11 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 DLONT1      /SET RANDOM DELAY
4407 4777      JMS CHRCNT      /SET RANDOM CHARACTER
4410 2063      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 2000      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, IS2 CTPA /YES, ALL GROUPS DONE?
4425 5226 JMP P3TS2A /NO
4426 5425 JMP I CHAIN /YES, CHAIN

4427 7402 P3E2, HL7 /TST2 ERROR WALT, AC CONTAINS CHAR THAT
/DID NOT MATCH AGAINST PATTERN, DEPRESS KEY
/CONTINUE

4430 7200 CLA
4431 1220 TAD SB2 /GET CORRECT CHARACTER
4432 7402 HL7 /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 SETLOG /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 C11 /NO,
4446 1375 TAD C=122 /YES
4447 7421 MQL /STORE IN MQ,
4450 4573 TYPE /PRINT TEST TITLE
4451 6327 CRTST
4452 1133 TAD C334 /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 C240 /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 C257 /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 4525 P4TS2
4477 7200 CLA
4500 1131 TAD C=16
4501 7421 MQL
4502 1130 TAD CRN33B
4503 3323 DCA RMB
4504 4555 CKSR37 /KSR37?
4505 5312 JMP ,=5 /NO,
4506 1127 TAD C=17 /YES,
4507 7421 MQL
4510 1126 TAD CRN37A
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

```

/SPACE TEST

```

4525 0002 P4TS2, 2
4526 4600 P4TS3
4527 4573 TYPE /PRINT TEST TITLE
4530 6354 SPTS7
4531 4555 CKSR37 /KSR37?
4532 1125 TAD C5 /NO
4533 1124 TAD C=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 C4 /NO
4543 1122 TAD C=50 /YES
4544 3104 DCA UTEMP /=36 TO UTEMP
4545 1374 TAD C=1 /GET =1
4546 3105 SPTS7B, 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 C240 /GET "SPACE" CODE
4555 4474 JMS I UPUNCH /PRINT IT
4556 2106 ISZ UTEMP2 /DONE SPACING?
4557 5354 JMP ,=3 /NO,
4560 1132 TAD C257 /GET "/" CODE

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4561 4474 JMS I UPUNCH /PRINT IT
4562 2174 ISZ UTEMP /DONE 36 TIMES?
4563 7410 SKP /NO,
4564 5425 JMP I CHAIN /YES, CHAIN
4565 7344 CLA CLL CHA RAL /-2 TO AC
4566 1105 TAD UTEMP1 /ADD C(UTEMP1)
4567 5346 JMP SPTSTB /GO TO SPTSTB

4574 7777
4575 7656
4576 1000
4577 7456
4600

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PAGE

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/TYPE LINE OF CHARACTERS ABC
4600 0003 P4TS3, 3
4601 5122 P4TS47
4602 7240 CLA CHA /SET STALL
4603 3064 DCA STLD /INDICATOR
4604 4573 TYPE /PRINT TEST TITLE
4605 6366 LFTST
4606 4555 CKSR37 /KSR37?
4607 1140 TAD C11 /NO,
4610 1377 TAD C121 /YES,

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

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

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

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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 %&
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 ]* 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 0034 P4TS34, 34
5001 5004 P4TS35
5002 4434 JMS I TLC37
5003 6217 SJ
/TYPE LINE OF SMALL J, K, AND L
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 STLI0

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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,
P4TS43, 43
5047 0043 P4TS44
5050 5054 JMS FBALL /FILL BUFFER WITH ALL CHARS,
5051 4776/ JMS WOSWS
5052 4775/ JMP I CHAIN /CHAIN
5053 5425

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

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

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

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```

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

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

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

```

```

5207 1777/ SPAC, TAD SPCT /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;

```

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

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

```

5274 4577 PRG5, SETLOC /SET INTERRUPT SERVICE ADDRESS
5275 0002 2 /TO INTSVC
5276 1254 INTSVC
5277 4577 SETLOC /SET DATA BLOCK
5300 0101 BLKCNT /LENGTH TO
5301 7000 =1000 /=-512
5302 4571 UKCC
5303 1372 TAD (BLOCKA /SET UP ADDRESS TO
5304 3104 DCA UTEMP /STORE DATA,
5305 1371 TAD [-1000 /=-512 TO CTRA
5306 3062 DCA CTRA
5307 4770/ JMS SINPT /INITIALIZE SPECIAL COUNT PATTERN
5310 4767/ JMS SGET /GET CHARACTER
5311 3504 DCA I UTEMP /STORE IT
5312 2104 ISZ UTEMP /INCREMENT POINTER,
5313 2062 ISZ CTRA /DONE 512 CHARACTERS?
5314 5310 JMP ,=4 /NO, REPEAT
5315 4572 UKSF
5316 5315 JMP ,=1
5317 7200 PRG5A, CLA /YES, CLEAR READY BUSY
5320 3076 DCA RBUSY
5321 4766/ JMS PLTLR /PUNCH LEADER
5322 4765/ JMS PSYNC /PUNCH SYNC CHARACTER
5323 4764/ JMS PBLK /PUNCH DATA BLOCK FULL SPEED,
5324 4766/ JMS PLTLR /PUNCH TRAILER
5325 4763/ JMS RSYNC /SYNC READER
5326 4762/ JMS RDBLK /READ DATA BLOCK
5327 4761/ JMS RRDY /WAIT FOR READER NOT BUSY
5330 4766/ JMS PLTLR /PUNCH LEADER
5331 4765/ JMS PSYNC /PUNCH SYNC CHARACTER
5332 4760/ JMS PBLKR /PUNCH DATA BLOCK (WITH STALLS),
5333 4766/ JMS PLTLR /PUNCH TRAILER
5334 4763/ JMS RSYNC /SYNC READER
5335 4762/ JMS RDBLK /READ DATA BLOCK
5336 4761/ JMS RRDY /WAIT FOR READER NOT BUSY
5337 5317 JMP PRG5A /REPEAT,

```

/PROGRAM 6, KEYBOARD TEST

```

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

5360 1324
5361 1343

```

5362 1400
5363 1216
5364 1316
5365 1212
5366 1200
5367 1717
5370 1707
5371 7000
5372 6577
5373 0210
5374 6164
5375 7731
5376 5162
5377 5161
5400

PAGE

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

5400 0000 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 CYRA /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,

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

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

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

5440 0002 P6T2, 2
5441 7777 7777
5442 4571 UKCC /CLEAR AC AND FLAG
5443 4573 TYPE /PRINT TITLE AND
5444 6521 KMSG4 /INSTRUCTION
5445 4573 TYPE
5446 6462 KMSG3A
5447 4572 P6T2A, UKSF /FLAG 1?
5450 5247 JMP ,=1 /NO, WAIT
5451 4567 UKRB /YES, READ KEYBOARD
5452 3112 DCA WTS6A /STORE CHARACTER
5453 4777 JMS ASCCN /CONVERT CHARACTER
5454 0112 WTS6A /TO PRINTABLE OCTAL
5455 6541 OCTEQV
5456 4573 TYPE /PRINT CHARACTER
5457 6537 KMSG5
5460 1112 TAD WTS6A
5461 1144 TAD [-377
5462 7640 SZA CLA /WAS IT A RUBOUT?
5463 5247 JMP P6T2A /NO,
5464 5425 JMP I CHAIN /YES, CHAIN

/PROGRAM 7, COMBINED READER, PRINTER, PUNCH TEST,
PRG7,

5465 4577 SETLOC /SET INTERRUPT SERVICE
5466 0002 2 /ADDRESS TO INTSVC
5467 1254 INTSVC
5470 4577 SETLOC /SET DATA BLOCK LENGTH
5471 0101 BLKCNT /TO -150
5472 7552 -226
5473 4426 JMS I KBFLAG
5474 4776 JMS STBF /SET UP BUFFER AREA
5475 4577 SETLOC /SET KSTART TO INITIAL
5476 0023 KSTART /ROUTINE ADDRESS
5477 5502 P7T0
5500 5701 JMP I ,+1 /START PROGRAM
5501 0236 SRSE7

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

| | | | | |
|------|------|--------|-----------|-------------|
| 5512 | 0002 | P7T2, | 2 | |
| 5513 | 5516 | | P7T3 | |
| 5514 | 4435 | | JMS I FBF | /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 | | M | |
| 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 |


```

5656 7120      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 ERCTR /INCREMENT ERROR COUNTER
5677 5302      JMP ,+3
5678 7240      CLA CMA       /DFLOW, RESET TO 7777.
5679 3321      DCA ERCTR
5679 7604      LAS          /READ SR,
5679 0143      AND [100
5679 7650      SNA CLA      /HALT ON ERROR? (SR5)
5679 5313      JMP HLTST     /NO,
5679 1103      TAD ERRCR    /YES, GET BAD CHAR,
5679 7402      HLT
5679 7200      CLA
5679 1273      TAD SBSP     /GET GOOD CHARACTER
5679 7402      HLT
5679 7604      LAS          /READ SR
5679 7700      SMA CLA      /HALT? (SR0)
5679 5255      JMP SRT0A     /NO,
5679 1321      TAD ERCTR    /GET ERROR COUNT
5679 7402      HLT          /HALT, ERROR COUNT IN AC
5679 5255      JMP SRT0A
5679 0000      ERCTR, 0     /ERROR COUNTER

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

```

```

5722 4772/     PRG11, JMS STBF
5723 4573      TYPE
5724 6546      P11MG1
5725 1371      PRG11A, TAD (BLOCK1-1
5726 3016      DCA 16
5727 4573      TYPE
5728 6546      P11MG2
5731 4353      JMS GKBCR
5732 3416      DCA I 16
5733 4353      JMS GKBCR
5734 3416      DCA I 16
5735 4353      JMS GKBCR
5736 3416      DCA I 16
5737 4353      JMS GKBCR

```

```

5740 1144      TAD [-377
5741 7640      SZA CLA      /STALL?
5742 7240      CLA CMA       /YES,
5743 3064      DCA STLID    /NO,
5744 4773/     JMS FBF3     /SET UP LINE,
5745 6601      BLOCK1
5746 4770/     JMS TYPLN    /TYPE LINE OF CHARACTERS
5747 7604      LAS          /READ SR,
5750 7700      SMA CLA      /CHANGE DATA? (SP0=1)
5751 5346      JMP ,=3       /NO,
5752 5325      JMP PRG11A    /YES,
5753 0000      GKBCR, OPEN  /SUB TO GET KEYBOARD CHARACTER,
5754 4572      UKSF         /WAIT FOR FLAG,
5755 5354      JMP ,=1
5756 4567      UKRB         /READ CHARACTER,
5757 7421      MQL          /STORE CHARACTER,
5760 7701      ACL          /GET IT BACK,
5761 4474      JMS I UPUNCH /ECHO IT,
5762 7701      ACL          /GET CHARACTER AGAIN,
5763 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,

```

```

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

```

PAGE

```

6000 0000      DVCSEL, OPEN /DEVICE CODE SELECT ROUTINE,
6001 1117      TAD [INTAB /GET START ADDR OF INPUT IOT TABLE,
6002 3052      DCA TEMP     /AND SAVE AT TEMP,
6003 1021      TAD TTYIOT   /OBTAIN NEW INPUT IOT AND
6004 7012      RTR          /STORE AT UTEMP,
6005 7010      RAR
6006 0116      AND [0770
6007 3104      DCA UTEMP
6010 4222      JMS DVCOM    /PERFORM INPUT IOT SELECTION,
6011 1115      TAD [OUTTAB /GET START ADDR OF OUTPUT IOT TABLE,
6012 3052      DCA TEMP     /AND OBTAIN NEW OUTPUT IOT AND
6013 1021      TAD TTYIOT   /OBTAIN NEW OUTPUT IOT AND
6014 7006      RTL          /STORE AT UTEMP,
6015 7004      RAL
6016 0116      AND [0770
6017 3104      DCA UTEMP

```

| | | | |
|------|------|--------------|--------------------------------|
| 6020 | 4222 | JMS DVCOM | /PERFORM OUTPUT 10T SELECTION; |
| 6021 | 5600 | JMP 1 DVCSEL | /EXIT DVCSEL; |
| 6022 | 0000 | DVCOM, OPEN | /COMMON SUB TO SELECT 10T/S, |
| 6023 | 1452 | TAD 1 TEMP | |
| 6024 | 7450 | SNA | /0? |
| 6025 | 5622 | JMP 1 DVCOM | /YES, EXIT |
| 6026 | 3105 | DCA UTEMP1 | |
| 6027 | 1505 | TAD 1 UTEMP1 | |
| 6030 | 0114 | AND 07007 | /REMOVE OLD DEVICE CODE; |
| 6031 | 1104 | TAD UTEMP | /INSERT NEW DEVICE CODE; |
| 6032 | 3505 | DCA 1 UTEMP1 | /PUT BACK NEW 10T CODE; |
| 6033 | 2052 | ISE TEMP | /SET UP FOR NEXT 10T 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 | /" </td |
| 6076 | 0303 | 0303 | /" </td |
| 6077 | 0277 | 0277 | /" </td |
| 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 | M, 315 | |
| 6124 | 0316 | 316 | |
| 6125 | 0317 | 317 | |
| 6126 | 0320 | P, 320 | |
| 6127 | 0321 | 321 | |
| 6130 | 0322 | 322 | |
| 6131 | 0323 | S, 323 | |
| 6132 | 0324 | 324 | |
| 6133 | 0325 | 325 | |
| 6134 | 0326 | V, 326 | |
| 6135 | 0327 | 327 | |
| 6136 | 0330 | 330 | |
| 6137 | 0331 | Y, 331 | |
| 6140 | 0332 | 332 | |
| 6141 | 0260 | 260 | |
| 6142 | 0261 | ONE, 261 | |
| 6143 | 0262 | 262 | |
| 6144 | 0263 | 263 | |
| 6145 | 0264 | FOUR, 264 | |
| 6146 | 0265 | 265 | |
| 6147 | 0266 | 266 | |
| 6150 | 0267 | SEVEN, 267 | |
| 6151 | 0270 | 270 | |
| 6152 | 0271 | 271 | |
| 6153 | 0241 | C241, 241 | |
| 6154 | 0242 | 242 | |
| 6155 | 0243 | 243 | |
| 6156 | 0244 | C244, 244 | |
| 6157 | 0245 | 245 | |
| 6160 | 0246 | 246 | |
| 6161 | 0247 | C247, 247 | |
| 6162 | 0250 | 250 | |
| 6163 | 0251 | 251 | |
| 6164 | 0252 | C252, 252 | |
| 6165 | 0253 | 253 | |
| 6166 | 0254 | 254 | |

| | | | |
|------|------|-------------|-------------------------|
| 6167 | 0255 | C255, | 255 |
| 6170 | 0256 | | 256 |
| 6171 | 0257 | | 257 |
| 6172 | 0272 | C272, | 272 |
| 6173 | 0273 | | 273 |
| 6174 | 0274 | | 274 |
| 6175 | 0275 | C275, | 275 |
| 6176 | 0276 | | 276 |
| 6177 | 0277 | | 277 |
| 6200 | 0300 | C300, | 300 |
| 6201 | 0333 | | 333 |
| 6202 | 0334 | | 334 |
| 6203 | 0335 | C335, | 335 |
| 6204 | 0336 | | 336 |
| 6205 | 0337 | | 337 |
| 6206 | 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 | BKSP, 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 | RM37A, TEXT | '----[?' |
| 6320 | 5555 | | |
| 6321 | 1155 | | |
| 6322 | 1100 | | |
| 6323 | 7700 | | |
| 6324 | 3440 | SPTS+G, 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 | CHRTST, TEXT | 'X##CHARACTER TESTX##?' |
| 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##KYBO 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 /%#i
6540 0000
6541 4040 OCTEQV, TEXT / %00?i
6542 4040
6543 4543
6544 0077
6545 0000
6546 4543 P11MG1, TEXT /%#PRINTER EXERCISERX#0?i
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?i
6563 2431
6564 2005
6565 4011
6566 1640
6567 0401
6570 2401
6571 4072
6572 0077
6573 0000
6574 2540 BKSU, TEXT /U 0?i
6575 0077
6576 0000
6577 0000 END, 0 /BEG OF 1000 WORD BUFFER
S
0114 7007
0115 6050
0116 0770
0117 6035
0120 0400
0121 7767
0122 7730

```

```

0123 0004
0124 7727
0125 0005
0126 6317
0127 7761
0130 6314
0131 7762
0132 0257
0133 0334
0134 0252
0135 7650
0136 7670
0137 7653
0140 0011
0141 7772
0142 0240
0143 0100
0144 7401
0145 0377
0146 0077
0147 7760
0150 0037
0151 7766
0152 0017
0153 0360
0154 0352
0155 0366
0156 0551
0157 0765
0160 1165
0161 0761
0162 0755
0163 0751
0164 1171
0165 0745
0166 0740
0167 0734
0170 0730
0171 0724
0172 0717
0173 0626
0174 0600
0175 0562
0176 0337
0177 0326

```

[illegible]

| | | | | | | | | | |
|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1000 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 |
| 1100 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11110000 |
| 1200 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 |
| 1300 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11001111 |
| 1400 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 |
| 1500 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 |
| 1600 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 |
| 1700 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 11111111 | 10000001 | 11111111 | 11111111 |

[illegible][illegible][illegible][illegible][illegible]

6600
6700

7000

7100

—

7200
7300

7366

7400

7500

— — — — —

7600
7700

7788

| | | | | | | | |
|--------|------|--------|------|--------|------|--------|------|
| A | 6107 | CLA | 7200 | HLTD | 2076 | MTON | 6117 |
| A33WP6 | 6065 | CNTST | 1600 | HLTTST | 5713 | MTRS | 6127 |
| A35WP6 | 6073 | GNV | 1671 | HOLD1 | 3346 | NTST | 1546 |
| A37WP6 | 6101 | CR | 0107 | IBIN | 0436 | NTSTA | 1555 |
| AC | 0077 | CRALF | 0562 | IN0 | 1433 | NXTST | 0056 |
| ACL | 7701 | CRCTR | 0561 | INCHTN | 0261 | OCTEDV | 6541 |
| ASCCN | 1650 | CRLF | 4575 | INKSF | 1244 | ONE | 6142 |
| ASCT | 1706 | CRST | 6327 | INPATY | 0846 | OPEN | 0000 |
| BAUCON | 1537 | CRTSTA | 4456 | INTAB | 4035 | OUT | 1271 |
| BAUDRT | 0022 | CRTSTB | 4461 | INTCF | 1261 | OUT0 | 2114 |
| BAUTAB | 0504 | CTRA | 0062 | INTFND | 2017 | OUT1 | 2121 |
| BOREY | 0205 | CTRB | 0063 | INTKSF | 2021 | OUT2 | 2123 |
| BKSGTR | 5262 | 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 |
| BLKBP | 6722 | DELAHM | 0024 | J | 6120 | P0E0E | 2262 |
| BLKCC | 7034 | DELAHS | 0102 | K5200 | 2715 | P0E1A | 2374 |
| BLKCNT | 0101 | DLCNT | 0474 | KBFLAG | 0026 | P0E1R | 2315 |
| BLCKK1 | 6601 | DLCNT1 | 0027 | KCC | 6012 | P0E2A | 2415 |
| BLCKK2 | 6713 | DLMSR | 1474 | KCR | 6030 | P0E2B | 2427 |
| BLCKKA | 6577 | DLYMS | 0337 | KFLAG | 1365 | P0E2C | 2435 |
| BLCKKB | 6711 | DLYMSK | 0111 | KIE | 6015 | P0E2D | 2443 |
| BLCKKC | 7023 | DVCOM | 6022 | KMSG1 | 6432 | P0E2E | 2456 |
| BSW | 7002 | DVCSL | 6003 | 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 | 2607 |
| C272 | 6172 | FAADR | 0623 | KRS | 6034 | P0E4B | 2614 |
| C275 | 6175 | FBA33 | 1102 | KSF | 6231 | P0E5A | 2654 |
| C300 | 6200 | FBALL | 1066 | KSTART | 0023 | P0F5B | 2656 |
| C335 | 6203 | FBF | 0035 | LAS | 7604 | P0F6A | 2670 |
| C373 | 6241 | FBF3 | 1031 | LF | 0110 | P0F6B | 2675 |
| C377 | 6245 | FBF33 | 1055 | LFTST | 6366 | P0F6C | 2701 |
| CAF | 6007 | FBFI | 2144 | LFTSTA | 4612 | P0F6D | 2712 |
| CAM | 7621 | FETCH | 1646 | LINK | 0170 | P0F6E | 2724 |
| CARLF | 6250 | FLAG | 0716 | M | 6123 | P0F6F | 2731 |
| CHAIN | 0025 | FORWD | 0302 | M147 | 7631 | P0F7A | 2750 |
| CHAINN | 0263 | FOUR | 6145 | M3 | 2111 | P0F7B | 2754 |
| CHCK | 0513 | FW336 | 1117 | MCTR | 0625 | P0F7C | 2757 |
| CHECK | 0070 | FW356 | 1135 | MIL1 | 0061 | P0T6 | 2660 |
| CHRCNT | 0456 | FW376 | 1153 | MILCTR | 0060 | P0T6A | 2663 |
| CHRTST | 6376 | G | 6115 | MINT | 6115 | P0T6B | 2671 |
| CK33 | 0352 | GETPT | 0067 | MOVE | 4574 | P0T6C | 2676 |
| CK35 | 0360 | GETRDY | 0237 | MOVEA | 0613 | P2T6D | 2702 |
| CK37 | 0366 | GKBCR | 5733 | MOVEE | 0600 | P0T6E | 2713 |
| CKSR33 | 4554 | GTBIN | 0444 | MQL | 7421 | P0T6F | 2725 |
| CKSR35 | 4553 | GTF | 6004 | MSCTR | 0057 | P0T7 | 2736 |
| CKSR37 | 4555 | HLT | 7402 | MTABP | 2162 | P0T7A | 2744 |

| | | | | | | | |
|--------|------|--------|------|--------|------|--------|------|
| P0T7B | 2751 | P1T11 | 3400 | P2T7B | 4021 | P4T45A | 5102 |
| P0T7C | 2755 | P1T11A | 3405 | P2T7D | 4030 | P4T46A | 5116 |
| P0T80 | 2205 | P1T12 | 3435 | P2T7E | 4034 | P4T50 | 4442 |
| P0T8A | 2211 | P1T12A | 3443 | P2T7F | 4045 | P4T51 | 4475 |
| P0T8B | 2214 | P1T12B | 3456 | P2T7G | 4051 | P4T52 | 4645 |
| P0T8C | 2222 | P1T13 | 3005 | P2T7H | 4054 | P4T511 | 4651 |
| P0T8D | 2225 | P1T14 | 3010 | P2T7I | 4064 | P4T512 | 4655 |
| P0T8E | 2230 | P1T15 | 3014 | P2T7J | 4066 | P4T513 | 4661 |
| P0T8F | 2270 | P1T16 | 3034 | P2T7K | 4153 | P4T514 | 4665 |
| P0T8G | 2275 | P1T17 | 3040 | P2T7L | 4157 | P4T515 | 4671 |
| P0T8H | 2313 | P1T18 | 3046 | P2T7M | 4166 | P4T516 | 4675 |
| P0T8I | 2324 | P1T19 | 3066 | P2T7N | 4200 | P4T517 | 4701 |
| P0T8J | 2327 | P1T20 | 3074 | P2T7O | 4233 | P4T52 | 4525 |
| P0T8K | 2332 | P1T21 | 3126 | P2T7P | 4247 | P4T52B | 4705 |
| P0T8L | 2342 | P1T22 | 3133 | P2T7Q | 4255 | P4T521 | 4711 |
| P0T8M | 2345 | P1T23 | 3153 | P2T7R | 4260 | P4T522 | 4715 |
| P0T8N | 2350 | P1T24 | 3167 | P2T7S | 4310 | P4T523 | 4721 |
| P0T8O | 2400 | P1T25 | 3200 | P2T7T | 4313 | P4T524 | 4725 |
| P0T8P | 2402 | P1T26 | 3204 | P2T7U | 4330 | P4T525 | 4731 |
| P0T8Q | 2404 | P1T27 | 3211 | P2T7V | 4333 | P4T526 | 4735 |
| P0T8R | 2504 | P1T28 | 3213 | P2T7W | 4334 | P4T527 | 4741 |
| P0T8S | 2510 | P1T29 | 3217 | P2T7X | 4345 | P4T53 | 4600 |
| P0T8T | 2515 | P1T30 | 3222 | P2T7Y | 4351 | P4T53B | 4745 |
| P0T8U | 2521 | P1T31 | 3271 | P2T7Z | 4360 | P4T531 | 4751 |
| P0T8V | 2544 | P1T32 | 3277 | P2T7A | 4366 | P4T532 | 4755 |
| P0T8W | 2547 | P1T33 | 3314 | P2T7B | 4363 | P4T533 | 4761 |
| P0T8X | 2565 | P1T34 | 3322 | P2T7C | 4365 | P4T534 | 5000 |
| P0T8Y | 2600 | P2E0 | 3524 | P2T7D | 4365 | P4T535 | 5004 |
| P0T9 | 2616 | P2E1 | 3543 | P2T7E | 4366 | P4T536 | 5010 |
| P0T9A | 2624 | P2E1A | 4073 | P2T7F | 4371 | P4T537 | 5014 |
| P0T9B | 2640 | P2E1B | 4107 | P2T7G | 4377 | P4T54 | 4623 |
| P11M01 | 6546 | P2E1C | 4115 | P2T7H | 4371 | P4T54B | 5020 |
| P11M02 | 6562 | P2E1D | 4123 | P2T7I | 4376 | P4T541 | 5024 |
| P1E11A | 3424 | P2E1E | 4135 | P2T7J | 4374 | P4T542 | 5030 |
| P1E12A | 3464 | P2E1F | 4144 | P2T7K | 4374 | P4T543 | 5047 |
| P1E12B | 3474 | P2E1G | 4205 | P2T7L | 4376 | P4T544 | 5054 |
| P1E1A | 3025 | P2E1H | 4215 | P2T7M | 4380 | P4T545 | 5072 |
| P1E2A | 3053 | P2E1I | 4224 | P2T7N | 4386 | P4T546 | 5106 |
| P1E2B | 3062 | P2E1J | 4276 | P3E0 | 4337 | P4T547 | 5122 |
| P1E3A | 3113 | P2E1K | 4303 | P3E1 | 4371 | P4T55 | 4631 |
| P1E3B | 3122 | P2E1L | 4305 | P3E2 | 4427 | P4T55B | 5231 |
| P1E4A | 3143 | P2E2A | 3562 | P3T0B | 4334 | P4T56 | 4635 |
| P1E5 | 3250 | P2E2B | 3564 | P3T1R | 4366 | P4T57 | 4641 |
| P1E5A | 3250 | P2E3A | 3621 | P3T2C | 4474 | P6E0 | 5415 |
| P1E5B | 3255 | P2E3B | 3623 | P3T30 | 4314 | P6T0 | 5400 |
| P1E5C | 3242 | P2E4A | 3644 | P3T30A | 4324 | P6T1 | 5421 |
| P1E5D | 3257 | P2E4B | 3657 | P3T31 | 4344 | P6T1A | 5426 |
| P1E5E | 3264 | P2E5 | 3706 | P3T31A | 4354 | P6T2 | 5440 |
| P1E6A | 3310 | P2E6A | 3746 | P3T32 | 4400 | P6T2A | 5447 |
| P1E710 | 3366 | P2E6B | 3752 | P3T32A | 4406 | P70CTR | 1211 |
| P1T10 | 3325 | P2E6C | 3756 | P3T32B | 4411 | P7T0 | 5502 |
| P1T10A | 3333 | P2E7A | 4015 | P4T44A | 5066 | P7T1 | 5506 |

| | | | | | | | |
|--------|------|--------|------|--------|------|--------|------|
| P7T10 | 5542 | PUNCH | 2112 | SHALT | 0317 | TEHR | 0715 |
| P7T11 | 5546 | RADDR | 1416 | SINPT | 1737 | TLCS7 | 0034 |
| P7T12 | 5552 | RBCTR | 1417 | SJ | 6217 | TLCS71 | 2134 |
| P7T13 | 5556 | RBUSY | 0076 | SLDC02 | 0223 | TLCALI | 2126 |
| P7T14 | 5562 | RCTRA | 1511 | SM | 6222 | TLCALL | 0033 |
| P7T15 | 5566 | RCTRB | 1512 | SNDREC | 3353 | TL5 | 6046 |
| P7T16 | 5572 | RDBLK | 1400 | SP | 6225 | TPC | 6044 |
| P7T17 | 5600 | RDBLKR | 1407 | SPAC | 6237 | TRDATA | 3337 |
| P7T2 | 5512 | RDRSPV | 1420 | SPCNT | 5161 | TSC1 | 0634 |
| P7T20 | 5604 | RDSRV | 1430 | SPCTR | 5162 | TSC2 | 0643 |
| P7T21 | 5610 | RGNA | 0400 | SPF | 6040 | TSF | 6041 |
| P7T22 | 5614 | RGNB | 0417 | SPI | 6045 | TTY10T | 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 | 4575 | TYPLN | 1627 |
| P7T3 | 5516 | RMTSTA | 4516 | SPTSTB | 4546 | TYPLN3 | 1615 |
| P7T30 | 5644 | RP1A | 0415 | SPTSTC | 6324 | TYPSP | 0660 |
| P7T4 | 5522 | RP1B | 0434 | SRQ | 6003 | TYPSTG | 0626 |
| P7T5 | 5526 | RP2A | 0416 | SRESET | 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 | 1020 | UKRS | 4570 |
| PBLKR | 1324 | RSSERV | 1233 | STAL | 0551 | UKSP | 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 |
| PLTR | 1200 | RTNNO | 0055 | STBF | 1000 | USPF | 4560 |
| PRG0 | 2200 | RUDONE | 1456 | STCTR | 0326 | USPI | 4557 |
| PRG1 | 3000 | S | 6131 | STLID | 0044 | UTC | 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 | S2201 | 2005 | SYNK | 0530 | UTLS | 4563 |
| PRG2 | 3503 | S4000 | 0031 | SYNKA | 0534 | UTPC | 4564 |
| PRG3 | 4307 | S4000I | 2000 | TABCTR | 0200 | UTPLN3 | 0073 |
| PRG4 | 4434 | SA | 6206 | TABP | 0201 | UTSF | 4566 |
| PRG5 | 5274 | SASC | 1705 | TABPA | 0220 | V | 6134 |
| PRG5A | 5317 | SB | 1435 | TADDR | 0624 | VCTR | 1267 |
| PRG6 | 5340 | SB0 | 4332 | TBCNT | 5140 | WASC | 1704 |
| PRG7 | 5465 | SB1 | 4364 | TBMKK | 6300 | WCHK | 0527 |
| PRGADR | 0235 | SB2 | 4420 | TBMKK1 | 6306 | WCPTST | 6412 |
| PRGEND | 0300 | SBSP | 5673 | TBTA | 5134 | WOSWS | 2153 |
| PRGNUM | 0036 | SCNT | 0473 | TBTB | 5146 | WTS6A | 0112 |
| PRGTAB | 0037 | SD | 6211 | TBTST | 6267 | XXCC | 0724 |
| PRINT | 0671 | SETLOC | 4577 | TCF | 6042 | XXCR | 0755 |
| PSTUP | 1277 | SETRND | 1740 | TCTR | 1647 | XXIE | 0761 |
| PSYNC | 1212 | SEVEN | 6150 | TEMP | 0052 | XXRB | 0734 |
| PT0 | 0442 | SG | 6214 | TEMP1 | 0053 | XXRS | 0730 |
| PT1 | 0443 | SGET | 1717 | TEMQ | 0714 | XXSF | 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